

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Application ID: 75707202020085230
Application Status: In Progress - DHCD
Program Name: Virginia Telecommunications Initiative 2021
Organization Name: LENOWISCO Planning District Commission
Organization Address: 372 Technology Trail Lane
Duffield, VA 24244
Profile Manager Name: Duane Miller
Profile Manager Phone: (276) 431-2206
Profile Manager Email: dmiller@lenowisco.org

Project Name: VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project
Project Contact Name: Duane Miller
Project Contact Phone: (276) 431-2206
Project Contact Email: dmiller@lenowisco.org
Project Location: 372 Technology Trail Lane
Duffield, VA 24244-5330
Project Service Area: Lee County

Total Requested Amount: \$1,230,563.00

Required Annual Audit Status: Accepted

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Budget Information:

Cost/Activity Category	DHCD Request	Other Funding	Total
Telecommunications	\$1,230,563.00	\$820,375.00	\$2,050,938.00
Construction	\$1,230,563.00	\$820,375.00	\$2,050,938.00
Total:	\$1,230,563.00	\$820,375.00	\$2,050,938.00

Budget Narrative:

This project has a total project cost of \$2,050,938.00. LENOWISCO is proposing a 60/40 match combination, in which \$1,230,563.00 (60%) is requested from the DHCD with a cash match of \$820,375.00 (40%) from Scott County Telephone Cooperative (SCTC) in cooperation with Powell Valley Electric Cooperative (PVEC). This project will construct 73 miles of fiber optic cable to serve 679 potential customers beginning at the Tennessee State Line in western Lee county, moving NE along US 58 and US 58 ALT into Dryden, St. Charles and on to Keokee, all in Lee County, Virginia. SCTC initially identified 3,200(+) unserved locations throughout Lee County which will require an approximate investment of \$12 million. This proposed \$2,050,938.00 project will build on the initial FY2020 VATI project, and has been designed to be phased based on funding availability. These locations will be served using SCTC's existing backbone and will cut down on costs for future phased projects if funded. Project costs include outside plant construction, make-ready for Old Dominion Power, central office electronics, customer premise electronics, PON splitters and engineering. SCTC has an agreement already in-place with PVEC to build this project which includes in the contract that there will be no make-ready charges or pole rental fees for this project. This will be a huge savings for this project. All cost estimates are based on the pricing based on SCTC's prior projects. SCTC seeks pricing on each project from different vendors to keep costs as low as possible. The only exception is on electronics. SCTC uses Calix electronics to keep this network operable with SCTC's existing network. Since SCTC purchases electronics from one vendor, volume discounts and discounted upgrades are requested. SCTC has constructed 15 Fiber-to-the-Home projects for a total cost of \$44 million to date. SCTC has the experience to complete this project in a timely manner.

Questions and Responses:

1. Project Description and Need

Describe why and how the project area(s) was selected. Describe the proposed geographic area including specific boundaries of the project area (e.g. street names, local and regional boundaries, etc.). Attach a copy of the map of your project area(s). Label map: Attachment 1 – Project Area Map.

Answer:

The project areas are located in Lee County, Virginia. Lee County, VA is the westernmost county in the U S Commonwealth of Virginia and borders Kentucky and Tennessee. The geographic area where this project is located is extremely rural, rugged and mountainous with rocky areas of steep ridges and narrow valleys. This US 58 Corridor Broadband Expansion Project will continue the deployment of reliable, high-speed broadband to rural distressed Lee County, VA.

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Scott County Telephone Cooperative (SCTC) has targeted, using the 911 mapping tool, approximately 679 potential unserved customer locations beginning at the Tennessee State Line in western Lee County, moving NE along US 58 and US 58 ALT into Dryden, St. Charles and on to Keokee, all in Lee County. These locations are located within pockets along the route and would be served using SCTC's existing backbone. SCTC proposes to build 73 miles of Fiber to serve 679 unserved potential customers within the project area. This will be a \$2,050,938.00 project with a 60/40 funding combination. \$1,230,563.00 (60%) requested from the DHCD and \$820,375.00 (40%) from SCTC.

SCTC had initially identified 3,200(+) unserved locations throughout Lee County which will require an approximate investment of \$12 million. These customers have requested service at PVEC office which has been documented. This proposed \$2,050,938.00 project will expand the initial FY2020 VATI project, and has been designed to be phased based on funding availability for future projects. All locations will be served using SCTC's existing backbone. Because this project is building off SCTC's existing backbone fiber and the fiber constructed from the prior VATI project awarded to LENOWISCO substantial costs savings will be realized. If awarded this project will reduce the costs for future projects because each time we build out into low density high costs areas it extends SCTC's network closer to other unserved areas.

Seven (7) areas were chosen for this project due to having no broadband service along the project route except for five customers out of 679. The areas are: Cayler (96 locations), Bethany Road (30 locations), Kesterson Mill (68 locations), Sand Cave Road (97 locations), Curtis Russell Road (187 locations), Cooney Hollow (55 locations), and Big Hill Road (146 locations). There is no 10/1 mbps or 25/3 mbps broadband services available as defined by the DHCD criteria in this project according to the surveys conducted by SCTC.

Lee County, Virginia is designated a distressed county, one of four in Virginia, according to the Appalachian Regional Commission (ARC). Attachment 3 includes maps indicating distressed areas in Virginia. USDA has designated Lee County as a "persistent poverty county" and is the only county in the State of Virginia with that designation. That definition means Lee County has had a poverty rate that exceeds 20% for more than three consecutive 10-year periods. In 2017, Lee County lead the Commonwealth with a 28.2% poverty rate. (http://www.arc.gov/images/appregion/economic_statusFY2019/CountyEconomicStatusandDistressAreasFY2019Virginia.pdf)

The median household income for Lee County of \$32,590.00 is 53% below the median household income for the State of Virginia of \$68,766.00 and it is 43% below the median household income for the United States of \$57,652.00. As you can see, the project is in an area that is well below the National Average of median household income and the median household income is even much lower when compared to the State of Virginia. This demonstrates an economy in dire need of an economic boost. (<https://www.census.gov/quickfacts/fact/table/US,leecountyvirginia,VA/PST045218>)

The educational needs in Lee County, Virginia are no different from any other rural community which faces the financial challenges of providing an effective education to its rural students. The people of Lee County 25 and older that are high school graduates is 74.6% of the population and for the State of Virginia, it is 89.0% of the population. Also, the people 25 and older who have a Bachelor's Degree make up only 11.1% of the population in Lee County and make up 37.6% of the population for the State of Virginia. These percentages clearly demonstrate that having the ability to pursue a college degree on-line would help the students in these distressed areas to have a better quality of life by helping them obtain the education to attain better jobs. The Lee County School System

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

does not have facilities/schools in the project area, but the Lee County School System does have Interactive classrooms at their high schools. They also have computer labs at all the schools in their system. They offer on-line classes for college credit. They have homework and school related activities (school closings due to weather and ballgames, etc.) posted on their website. The students within the project area are at a distinct disadvantage because they are not able to take advantage of these services because of the lack of Broadband services. The proposed broadband project will allow the students in the project area to have a more fulfilling educational experience by just being able to take advantage of existing offerings they are unable to access at the present time. Also, these students in the proposed project area will have access to use the many resources available to complete research projects or take on-line classes that they do not have access to at the present time.

There are no Health Care Facilities located in the project area. If funded, once this proposed broadband project is completed, there is a greater possibility that one of the regional providers might consider locating a facility within the project area. Or, at least, healthcare employees would be able to work from home when needed if there are broadband services available to them.

There are no public safety entities in the project area. The public safety entities that serve the project area is the Lee County Sheriffs Office and a Volunteer Fire & Rescue Squad which are located in Jonesville, Virginia.

There are no schools within the project area, but there are school-age/college students that reside within the areas of the project. It is vital to have broadband available to these students, especially during this COVID-19 pandemic. All students should have access to broadband so they can access their assignments/work from home when needed.

2. List existing providers in the proposed project area and the speeds offered. Please do not include satellite. Describe your outreach efforts to identify existing providers and how this information was compiled with source(s).

Answer:

Scott County Telephone Cooperative's (SCTC's) Marketing/Member Relations Director/STE Manager, Greg Hood has gone door to door in the project areas and discussed the lack of service with almost all of the residences in the proposed project areas that have been targeted and they almost all the residence have signed a petition or completed a letter of expressing interest in acquiring Broadband service.

There is no broadband service in six (6) of the seven (7) areas of this project. Sunset Digital does have five (5) customers on the Sand Cave Road area of the project. Sunset Digital does not have additional vacant fibers along Sand Cave Road thus, the remaining customers on that route are unserved because service is unavailable to them. SCTC surveyed the area and potential customers located on Sand Cave road and they are unserved due to the lack of fiber and they have stated they cannot get service.

Fixed Providers: All seven (7) Areas in the project: (Maps provided for each area in Attachment 3)

Light Blue color indicates a claim of service from this provider in those areas.

Sunset Digital 1000Mbps down 1000Mbps up

Dark Blue color indicates a claim of service from these providers in those areas. Sunset Digital-1000Mbps down and 1000Mbps up, Comcast/Xfinity-150Mbps down and 10Mbps up, Verizon Communications- 3-10Mbps down and 1Mbps up.

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

After inspecting the seven (7) service areas in the proposed project for fiber or coaxial cable to provide possible service from Sunset Digital or Comcast /Xfinity, SCTC found no such outside plant in six (6) of the seven (7) proposed service areas. Therefore, no such service could exist in six (6) of the seven (7) service areas which include Caylor, Bethany, Kesterson Road, Curt Russell Road, Cooney Hollow Road, and Big Hill Road.

Sand Cave Road has Sunset Digital's fiber plant, but the residences of that community said there was no fiber available to provide them service so no more customers can be connected. SCTC found five (5) customers connected to Sunset Digital there. The remaining home owners say they cannot get service due to lack of facilities. SCTC's Manager Greg Hood has letters and surveys to document this fact which will be attached in the grant documents.

Comcast/Xfinity is showing service in parts of Cooney Hollow and Big Hill Road. Comcast/Xfinity offers 150Mbps down and 10Mbps up service, but SCTC could not find any service in these areas when surveyed by SCTC employees.

Verizon Communications shows from 1.5Mbps down to 10Mbps down and 1Mbps up service in parts of Curt Russell Road, Big Hill Road, and Cooney Hollow Road, but it does not meet the definition of Broadband because it is less than 25Mbps down and 3Mbps up. SCTC's Marketing/Member Relations Director, Greg Hood and his staff surveyed the area quite extensively and only found five (5) customers with Verizon Communications service. The customers who have Verizon Communication service say they have less than 5Mbps download and less than 1Mbps upload.

After extensive due diligence, SCTC also surveyed as many as possible of the 679 potential customers within the seven (7) proposed Service Areas for this project. Many of these potential customers signed a survey indicating they could not get 10/1Mbps service despite the Covid-19 pandemic. SCTC's conclusion is that this area is eligible for DHCD's criteria for VATI grant funding.

(See letters of support and Maps in Attachment 3 - Documentation Unserved Area VATI Criteria)

3. Describe if any areas near the project have received funding from federal grant programs, including but not limited to Connect America Funds II (CAF II), ACAM, ReConnect, and Community Connect. If there have been federal funds awarded near the project, provide a map verifying the proposed project area does not conflict with these areas. Describe if there are Rural Digital Opportunity Fund (RDOF) eligible census blocks located in the proposed project area. Label Map: Attachment 2 – Documentation on Federal Funding Area.

Answer:

SCTC has provided a map that indicates each of the proposed project areas. The seven (7) proposed areas in the project are outside of any CAF II areas and any possible RDOF areas to be awarded at a later date.

Attachment 2 - Documentation on Federal Funding Area (Map)

4. Overlap: To be eligible for VATI, applicants must demonstrate that the proposed project area(s) is unserved. An unserved area is defined as an area with speeds of 25/3 mbps or less and with less than 10% service overlap within the project area. Describe any anticipated service overlap with current providers within the project area. Provide a

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

detailed explanation as to how you determined the percentage overlap. Label Attachment: Attachment 3 – Documentation Unserved Area VATI Criteria.

Answer:

There is no broadband service available within six (6) of the seven (7) areas of the proposed project.

Scott County Telephone Cooperative's (SCTC's) Marketing/Member Relations Director/STE Manager, Greg Hood has discussed the lack of service with most of the residences in the seven (7) proposed project areas that have been targeted and they all have shown their interest for Broadband by completing a survey.

Sunset Digital and Comcast/Xfinity indicates Broadband Service available within some of the project areas, but there is no Broadband service that meets the VATI criteria except for five (5) Sunset Digital customers in the Sand Cave area.

Fixed Providers: All seven (7) Areas of the Project: (Maps provided for each area in Attachment 3)

Light Blue color indicates a claim of service from this provider in those areas.

Sunset Digital 1000Mbps down and 1000Mbps up

Dark Blue color indicates a claim of service from these providers in those areas. Sunset Digital-1000Mbps down and 1000Mbps up, Comcast/Xfinity-150Mbps down and 10Mbps up, Verizon Communications- 3-10Mbps down and 1Mbps up.

After inspecting the seven (7) service areas in the proposed project for fiber or coaxial cable to provide possible service from Sunset Digital or Comcast /Xfinity, SCTC found no such outside plant in six (6) of the seven (7) proposed service areas. Therefore, no such service could exist in six (6) of the seven (7) service areas which include Caylor, Bethany, Kesterson Road, Curt Russell Road, Cooney Hollow Road, and Big Hill Road.

Sand Cave Road has Sunset Digital's fiber plant, but the residences of that community said there was no fiber available to provide them service so no more customers can be connected. SCTC found five (5) customers connected to Sunset Digital there. The remaining home owners say they cannot get service due to lack of facilities. SCTC's Manager Greg Hood has letters and surveys to document this fact which will be attached in the grant documents.

Comcast/Xfinity is showing service in parts of Cooney Hollow and Big Hill Road. Comcast/Xfinity offers 150Mbps down and 10Mbps up service, but SCTC could not find any service in these areas when surveyed by SCTC employees.

Verizon Communications shows from 1.5Mbps down to 10Mbps down and 1Mbps up service in parts of Curt Russell Road, Big Hill Road, and Cooney Hollow Road, but it does not meet the definition of Broadband because it is less than 25Mbps down and 3Mbps up. SCTC's Marketing/Member Relations Director, Greg Hood and his staff surveyed the area quite extensively and only found five (5) customers with Verizon Communications service. The customers who have Verizon Communication service say they have less than 5Mbps download and less than 1Mbps upload.

After extensive due diligence, SCTC also surveyed as many as possible of the 679 potential customers/residences

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

in the seven (7) proposed Service Areas. Many of these potential customers signed a survey indicating they could not get 10/1Mbps service despite the Covid-19 pandemic. The overlap of the five (5) customers who have Sunset Digital's service on Sand Cave Road is less than 1% overlap. SCTC's conclusion is that this area is eligible for DHCD's criteria for VATI grant funding.

See Attachment 3 - Documentation of Unserved Area VATI Criteria (Maps and Letters of Support)

5. Total Passings: Provide the number of total serviceable units in the project area. Applicants are encouraged to prioritize areas lacking 10 Megabits per second download and 1 Megabits per second upload speeds, as they will receive priority in application scoring. For projects with more than one service area, each service area must have delineated passing information. Label Attachment: Attachment 4 – Passings Form
 - a. Of the total number of passings, provide the number of residential, business, non-residential, and community anchors in the proposed project area. Describe the methodology used for these projections.
 - b. Provide the number of serviceable units in the project area that have 10/1 mbps or less. Describe the methodology used for these projections.

Answer:

Total Passing - 679 There is no 10/1Mbps or 25/3Mbps broadband service within six (6) of the seven (7) areas of the proposed project.

Residential - 671 Residential locations in the project.

Business - Non-Home based - Three (3) Businesses are located in the project - Hammonds Processing, White Rock Machinery and Brothers Trucking Shop.

Non-Residential - Five (5) churches are in the project - Ramey Chapel, Gods House of Worship, Willis Chapel, Trinity Tabernacle, and Mountain View Baptist.

Community Anchors - 0

Total Serviceable Units - 679

These projections are based on 911 Maps for Lee County to project the potential customers in the Old Dominion Power service area by SCTC's Engineering Firm, Metts Engineering and PVEC's mapping tool was used to determine the number of potential customers in PVEC's service area. SCTC employees conducted multiple site visits "on foot" while conducting potential customer surveys.

6. For wireless projects only: Please explain the ownership of the proposed wireless infrastructure. Please describe if the private co-applicant will own or lease the radio mast, tower, or other vertical structure onto which the wireless infrastructure will be installed.

Answer:

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

N/A

7. Speeds: Describe the internet service offerings, including download and upload speeds, to be provided after completion of the proposed project. Detail whether that speed is based on dedicated or shared bandwidth, and detail the technology that will be used. This description can be illustrated by a map or schematic diagram, as appropriate. List the private co-applicant's tiered price structure for all speed offerings in the proposed project area, including the lowest tiered speed offering at or above 25/3 mbps.

Answer:

Internet service offerings for residential, non-discounted monthly broadband Internet:

25Mbps up and 12Mbps down @ \$59.95, 50Mbps up and 25Mbps down @ \$79.95, and 100Mbps up and 50Mbps down @ \$89.95. 200Mbps up and 100Mbps down @ \$99.95, 500Mbps up and 200Mbps down @ \$109.95, 1000Mbps up and 500Mbps down (1 Gig) @ \$130.95. Higher bandwidth speeds from 1Gbps up to 10Gbps of dedicated bandwidth per location will be available if requested.

Residences with school-age students in Lee County will be offered a discount of \$10.00/month.

Business customers, schools, libraries, and higher education are always given competitive and preferred rates to encourage economic development, job creation and educational opportunities for the youth in SCTC's current footprint.

Note - At the customer's request, additional bundled services will be available that would include telephone and security services.

In the proposed project, SCTC will be utilizing Calix's Passive Optical Network (PON) solution in preparation of 10Gbps becoming a standard service offering. PON technology allows the service provider to centralize access equipment and reduce turn-up time. With a PON solution SCTC is able to offer higher service speeds while reducing the total number of network components needed, thus simplifying network design and lowering administrative overhead. SCTC will have the ability to offer up to 10Gbps of dedicated bandwidth per location. A description of the detailed technology to be used is included in Attachment 14.

Attachment 14 – Detailed Technology of the Project

8. Network Design: Provide a description of the network system design used to deliver broadband service from the network's primary internet point(s) of presence to end users, including the network components that already exist and the ones that would be added by the proposed project. Provide a detailed explanation of how this information was determined with sources. If using a technology with shared bandwidth, describe how the equipment will handle capacity during peak intervals. For wireless projects, provide a propagation map for the proposed project area with a clearly defined legend for scale of map. Label Map: Attachment 5 – Propagation Map Wireless Project.

Answer:

The Scott County Telephone Cooperative's (SCTC's) network is configured as an actively switched Ethernet

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

network. Active Ethernet is a relatively simpler protocol that uses less complexity and signaling overhead that can provide higher transmission speeds and greater throughput capacities. It allows a greater direct control of actual packet routing and traffic management that provides more granularity for grooming data flow and for analysis/trouble-shooting when needed. The resultant customer and inter-carrier connections provide better interoperability and less signaling complexity. SCTC currently uses a combination of Ciena and Calix hardware to light their network. Our current standard deployment gear can provide each end user with up to 1Gbps of bandwidth. But, with alternate interface cards, speeds up to 10Gbps can be provided to the end user without deploying special hardware.

In the proposed project, SCTC will be utilizing Calix's Passive Optical Network (PON) solution in preparation of 10Gbps becoming a standard service offering. PON technology allows the service provider to centralize access equipment and reduce turn-up time. With a PON solution SCTC is able to offer higher service speeds while reducing the total number of network components needed, thus simplifying network design and lowering administrative overhead.

The SCTC regional network consists of redundantly ringed fiber pathways across the region, each with multiple fiber strands in each cable sheath. These individual fiber strands are lit using Dense Wave Division Multiplexing (DWDM) technology that enables multiple transmission pathways within each fiber strand. Currently SCTC only uses eight wavelengths to enable up to 80Gbps of throughput capacity strand, but is currently in the process of expanding this to forty wavelengths. With this expansion, SCTC will be capable of transporting up to forty 100Gpbs connections.

SCTC uses redundant Juniper routers in its core to process all internet traffic. The routers currently have four 10Gbps based gateway connections to the Internet backbone. These are contracted from four different providers (Level3, CenturyLink, Hurricane Electric, and Windstream). Windstream provides direct content provider peering and web caching to reduce latency delays of accessed data. These four 10Gbps connections terminate at diverse nodes in our redundantly ringed network. Each gateway is homed back to diverse Internet backbone nodes such as Chicago, Ashburn, Atlanta, Louisville and Raleigh/Durham. The dynamic routing of Internet destined traffic across these four pathways is managed using Border Gate Routing Protocol (BGP). This is the same protocol that automatically controls traffic on the Internet backbone itself.

See Attachment 14 - Detailed Technology of the project.

9. Project Readiness

Describe the current state of project development, including but not limited to: planning, preliminary engineering, identifying easements/permits, status of MOU or MOA, and final design. Prepare a detailed project timeline or construction schedule, identifying specific tasks, staff, contractor(s) responsible, collection of data, etc., and estimated start and completion dates. Applicants must include Memorandums of Understanding (MOUs) or Memorandums of Agreement (MOAs) between applicants (drafts are allowable). Label Attachments: Attachment 6 – Timeline/Project Management Plan; Attachment 7 – MOU/MOA between Applicant/Co-Applicant.

Answer:

Planning and preliminary Engineering for this project is complete. SCTC's partnership with Powell Valley Electric

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Cooperative (PVEC) will result in no make-ready and no pole rental fees for this project when located within PVEC's footprint. PVEC will build this project and purchase outside plant materials. SCTC will purchase materials to install the electronics in the network as well as at the customer premise and provide that installation. SCTC will obtain estimates from contractors and vendors to price check them. Construction will primarily be aerial, as the lines will be installed on pre-existing poles. Minimal to no ground disturbance is expected and significantly decreases potential environmental impacts.

LENOWISCO will administer the grant funds, help obtain the easements and permits, if needed, from Old Dominion Power and SCTC will manage the construction of the Project. SCTC has an existing relationship with Old Dominion Power to attach to their poles. (See Attachment 6 for the Timeline and the Project Management Timeline) (See Attachment 7 for Pole attachment agreements between SCTC and Old Dominion Power Company).

Scott County Telephone Cooperative (SCTC) has a revenue sharing agreement with LENOWISCO. In 2012, SCTC purchased the LENOWISCO Network, LLC thru its subsidiary company, Appalachian Broadband, LLC. SCTC is currently doing a revenue share of 2% of the gross revenue from that network with LENOWISCO. Those funds are used for seed money to expand Broadband service or economic development projects in the LENOWISCO Planning District footprint. (See Attachment 7 - MOU between LENOWISCO and SCTC)

Scott County Telephone Cooperative (SCTC) has entered into a partnership with Powell Valley Electric Cooperative (PVEC) to provide Broadband service to all PVEC customers. PVEC will build the outside plant and SCTC will supply the electronics. A revenue share agreement is in place to pay Powell Valley Electric Cooperative for their investment. When they are paid in full, SCTC will own the network. Powell Valley Electric Cooperative will then begin charging pole rental and SCTC will pay Powell Valley Electric a maintenance fee to maintain the network and sell services over the network. Together, we will serve the region. (Attachment 7 includes a copy of the MOU and Agreement between SCTC and PVEC)

Attachment 6 - Timeline/Project Management Plan

Attachment 7 - MOU's and Agreements

10. Matching funds: Complete the funding sources table indicating the cash match and in-kind resources from the applicant, co-applicant, and any other partners investing in the proposed project (VATI funding cannot exceed 80 percent of total project cost). In-kind resources include, but are not limited to: grant management, acquisition of rights of way or easements, waiving permit fees, force account labor, etc. Please note the a minimum 20% match is required to be eligible for VATI, the private sector provider must provide 10% of the required match. If the private co-applicant's cash match is below 10% of total project cost, applicants must provide financial details demonstrating appropriate private investment. Label Attachments: Attachment 8 - Funding Sources Table; Attachment 9 – Documentation of Match Funding.

Answer:

Scott County Telephone Cooperative (SCTC) will be responsible for the total cash on-hand match of \$820,375.00 for this project.

Attachment 8 - Funding Sources Table

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Attachment 9 - Documentation of Match Funding

11. Leverage: Describe any leverage being provided by the applicant, co-applicant, and partner(s) in support of the proposed project.

Answer:

The LENOWISCO PDC has a revenue sharing agreement with Scott County Telephone Cooperative (SCTC). In 2012, SCTC purchased the LENOWISCO Network, LLC thru its subsidiary company, Appalachian Broadband, LLC. SCTC is currently doing a revenue share of 2% of the gross revenue from that network with LENOWISCO. Those funds are used for "seed money" to expand Broadband service or economic development projects in the LENOWISCO Planning District footprint. (Attachment 7 includes a copy of the MOU between LENOWISCO and SCTC)

Due to this grant being phased from LENOWISCO's first VATI FY2020 grant "Regional Broadband Expansion Phase 1", SCTC will be able to use some of the same cabinets to house the electronics for this VATI Grant and save a considerable amount of money. This proposed project is contiguous to some of our existing network which allows SCTC to build redundancy in the network which improves service reliability that will be exceptional for all customers.

Due to SCTC's partnership with PVEC, no make-ready or pole attachment fees will be charged, which is a huge savings. Additionally, since PVEC is constructing and attaching the project on their existing electrical pole lines, no right of way issues will arise since PVEC already has the right-of-way acquired. This partnership is allowing fiber deployment to be expedited faster than we have ever been able to construct and light this type of network before. (Attachment 7 includes a copy of SCTC and PVEC's MOU and Agreement)

12. Marketing: Describe the broadband adoption plan.

a. Explain how you plan to promote customer take rate, including marketing activities, outreach plan, and other actions to reach the identified serviceable units within the project area. Provide the anticipated take rate and describe the basis for the estimate.

b. Describe any digital literacy efforts to ensure residents and businesses in the proposed project area sufficiently utilize broadband. Please list any partnering organizations for digital literacy, such as the local library or cooperative extension office.

Answer:

Scott County Telephone Cooperative's (SCTC's) Marketing/Member Relations Director and STE Operations Manager, Greg Hood, will be responsible for providing data management to identify all customers within each phase of the areas of the project. Flyers will be posted and letters mailed announcing that service is available to all potential customers within each project area. Door-to-door sales, outbound calling, social media and website information will be done as well.

Scott County Telephone Cooperative (SCTC) projects a 60% penetration rate for broadband services within all areas of the proposed project within one (1) year of the projects completion date. This estimate is based on

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

historical data from fifteen (15) broadband projects that SCTC has completed.

If the grant is awarded, Digital Literacy training will be supplied at the time of installation.

13. Project Management: Identify key individuals who will be responsible for the management of the project and provide a brief description of their role and responsibilities for the project. Present this information in table format. Provide a brief description of the applicant and co-applicant's history and experience with managing grants and constructing broadband communication facilities. Please attach any letters of support from stakeholders. If applicant is not a locality(s) in which the project will occur, please provide a letter of support from that locality. Attachment 10 – Letters of Support.

Answer:

NAME	TITLE	YEARS OF EXPERIENCE	RESPONSIBILITIES
William J. Franklin	Chief Executive Officer (SCTC)	27 Years	Co-oversight of all aspects of the project
Roger Fraysier	Assistant Chief Operating Officer (SCTC)	20 Years	Accounting functions of the project.
Roger Fraysier	Operations Manager (SCTC)	20 Years	Operational functions of the project.
Greg Hood	Operations Manager (STE)	22 Years	Providing all marketing plans/materials and data management to identify all broadband customers in proposed project area.
Matt Hill	Chief Operating Officer/Chief Engineer (SCTC)	28 Years	Engineering management, network management & design functions of the project.
Gwen Richardson	Project Manager/Office Manager/Exec. VP & Operations Manager MountaiNet (SCTC)	34 Years	Timelines, reporting and customer service on the projects.

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Duane A. Miller	Executive Director (LENOWISCO)	24 Years	Co-Oversight of all aspects of the project
Rebecca Crockett	Director of Project Development (LENOWISCO)	13 Years	Project management/ grant administration of the project.
Marcella Powers	Project Management Specialist (LENOWISCO)	18 Years	Project management aspects of the project.
Deana Stoddard	Project Management Specialist (LENOWISCO)	2 Years	Project management aspects of the project.

The LENOWISCO Planning District Commission and Scott County Telephone Cooperative (SCTC) have worked together for many years to better our communities, counties and region. LENOWISCO will help Scott County Telephone Cooperative assistance in obtaining permits, right of ways, easements, and any help resolve any other issues that may arise with this project. LENOWISCO will manage the grant funds and document the monies insure they are dispersed properly.

Scott County Telephone Cooperative's management team has completed fifteen (15) fiber to the premise projects totaling approximately \$44 million. SCTC will design, construct, manage and maintain this project. SCTC will be responsible for the match on this project.

Powell Valley Electric Cooperative has completed several Fiber-to-Home projects for other providers totaling roughly \$30 million or more. So, a partnership with each other to extend Broadband to unserved areas in our region gain the efficiencies of scope and volume which allows all to combine our resources to serve a much larger area without hiring additional staff. This partnership is ideal for all constituents, whether it's a residential customer or business owner. This partnership will allow SCTC to offer more Bandwidth at a lower price to improve the quality of life and to promote economic development in our region. That is, by example, the driving force behind Cooperatives.

Scott County Telephone Cooperative has an agreement with Powell Valley Electric Cooperative that any projects we do together, they will construct the outside plant and Scott County Telephone will light it. So, Powell Valley Electric Cooperative will provide the match for the outside plant construction. This match will be repaid from the revenue sharing agreement Scott County Telephone Cooperative has with Powell Valley Electric Cooperative. When repaid from both parties revenue sharing agreement, Scott County Telephone Cooperative will own the network. This partnership is a win/win for our communities, our region and our state.

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

14. Project Budget and Cost Appropriateness

Budget: Applicants must provide a detailed budget that outlines how the grant funds will be utilized, including an itemization of equipment, construction costs, and a justification of proposed expenses. If designating more than one service area in a single application, each service area must have delineated budget information. For wireless projects, please include delineated budget information by each tower. Expenses should be substantiated by clear cost estimates. Include copies of vendor quotes or documented cost estimates supporting the proposed budget. **Label Attachments:** Attachment 11 – Derivation of Costs; Attachment 12 - Documentation of Supporting Cost Estimates.

Answer:

This proposed \$2,050,938.00 project will build on the initial FY2020 VATI project, and has been designed to be phased based on funding availability. These locations will be served using SCTC's existing backbone and will cut down on costs for future phased projects if funded.

Project costs include outside plant construction, make-ready for Old Dominion Power, central office electronics, customer premise electronics, PON splitters and engineering.

SCTC has an agreement already in-place with PVEC to build this project, which includes in the contract, that there will be no make-ready charges or pole rental fees for any project within their footprint. This will be a huge savings for this project. All cost estimates are based on prior projects. SCTC seeks pricing on each project from different vendors to keep costs as low as possible. A draft contract is attached for PVEC's labor cost for this project. The only exception is on electronics. SCTC uses Calix electronics to keep this network operable with SCTC's existing network. Since SCTC purchases electronics from one vendor, volume discounts and discounted upgrades are requested.

SCTC has constructed 15 Fiber-to-the-Home projects for a total cost of \$44 million to date. SCTC has the experience to complete this project in a timely manner.

Attachment 11 - Derivation of Costs

Attachment 12 - Documentation of Supporting Cost Estimates

15. The cost benefit index is comprised of three factors: (i) state share for the total project cost, (ii) state cost per unit passed, and (iii) the internet speed. From these statistics, individual cost benefit scores are calculated and averaged together to create a point scale for a composite score. Provide the following:

- a. Total VATI funding request
- b. Number of serviceable units
- c. Highest residential speed available in proposed project area

Answer:

Total VATI funding request-\$1,230,563.00

Total Number of serviceable units - 679

Highest residential speed available in proposed project area- 10Gbps

16. Commonwealth Priorities

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Additional points will be awarded to proposed projects that reflect Commonwealth priorities. If applicable, describe the following:

- a. How the proposed project fits into a larger plan to achieve universal broadband coverage for the locality. Explain the remaining areas of need in the locality and a brief description of the plan to achieve universal broadband coverage.
- b. Businesses, community anchors, or other passings in the proposed project area that will have a significant impact on the locality or region because of access to broadband.
- c. Unique partnerships involved in the proposed project. Examples include electric utilities, universities, and federal/state agencies.
- d. Digital equity efforts to ensure low to moderate income households in the proposed project area will have affordable access to speeds at or above 25/3 mbps.

Answer:

- a. This project fits into a larger project to achieve universal broadband coverage for Lee County, VA for PVEC has pledged to build fiber to every location and SCTC has agreed to light and manage it. Under the current contract, PVEC and SCTC will do a revenue share which pays back PVEC for any investment they make. Until that investment is paid back, PVEC are waiving pole rentals and make ready charges. Upon repayment of their investment, PVEC will begin charging pole rental fees and the revenue share will stop. SCTC's, PVEC's and LENOWISCO's goal is to have fiber to every location in the LENOWISCO Planning District. We will pursue all funding opportunities to accomplish this goal. Each are all committed, so the remaining areas of need will be completed in phases to achieve the goal of ultimately having universal broadband coverage in the LENOWISCO Planning District footprint.
- b. There are no community anchors within this project area, but there are three (3) small businesses and 679 potential customers within the proposed project areas. These potential customers matter as well, even though they may live in a rural-rugged distressed area with a high poverty level. Broadband services will have a significant impact on them as well as others who are unserved in Lee County, VA. With access to broadband, remotely serving school children of all ages will be possible as well as teleworking. Both these needs have increased tremendously during the COVID-19 pandemic.
- c. LENOWISCO and Scott County Telephone Cooperative (SCTC) have worked together for many years. They have a unique partnership and share a common interest to better their communities, counties and region. SCTC's partnerships with Powell Valley Electric Cooperative (PVEC) is ideal for all constituents because they share the same goals of offering a service (broadband) to everyone at an affordable price. All parties involved strive to improve the quality of life and promote economic development within their communities, counties and the entire Region.
- d. Digital equity efforts will be adopted to ensure low to moderate income households in the proposed project area will have affordable access to speeds at or above 25/3Mbps if this project is awarded. SCTC's 25/12Mbps service offering is only \$59.95. Additionally, SCTC is offering customers with school age children a \$10.00 price

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

reduction to promote connectivity and enhance their educational opportunities.

(Attachment 15 - SWVA Broadband Plan)

17. Additional Information

17. Provide any other information that the applicant desires to include. Applicants are limited to four additional attachments.

Label Additional Attachments as:

- a. Attachment 13 – Two most recent Form 477 submitted to the FCC or equivalent
- b. Attachment 14 – XXXXXXXX
- c. Attachment 15 – XXXXXXXX
- d. Attachment 16 – XXXXXXXX
- e. Attachment 17 – XXXXXXXX

Answer:

Attachment 1 Project Area Map	A1-Project Area Maps
Attachment 2 Documentation on Federal Funding	A2-Maps on Federal Funding
Attachment 3 Documentation Unserved Area VATI Criteria	A3-Maps of each service area/Surveys
Attachment 4 Passings Form	A4-Passings Form
Attachment 5 Propagation Map if Wireless	A5-N/A
Attachment 6 Timeline/Project Management Plan	A6-Timeline/Project Management Plan
Attachment 7 MOU/MOA between Applicant/Co-Applicant	A7-MOU LENOWISCO & SCTC, MOU & Agreement SCTC & PVEC, Pole Attachment Agreement SCTC & ODP
Attachment 8 Funding Sources Table	A8-Funding Sources Table
Attachment 9 Documentation of Match Funding	A9-Match Funding Letter from SCTC/Pro-forma & Assumptions/Board Resolution

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Attachment 10 Letters of Support	A10-Letters of Support
Attachment 11 Derivation of Costs	A11-Derivation of Costs
Attachment 12 Documentation of Supporting Costs Estimates	A12-Cost Estimate Documentation
Attachment 13 Two Most Recent Form 477's	A13-2 Most recent Form 477's
Attachment 14 Detailed Technology	A14-Calix Specifications
Attachment 15 SW VA Broadband Plan	A15-SW VA Broadband Plan

Attachments:

Two most recent Form 477 submitted to FCC

Attachment13TwoMostRecentForm477s7272020102502.pdf

Optional

Attachment15SWVABroadbandPlan7222020123813.pdf

Optional

Attachment14DetailedTechnologyoftheProject7272020112226.pdf

Map(s) of project area, including proposed infrastructure

Attachment1ProjectAreaMaps731202042821.pdf

Documentation of Federal Funding (CAF/ACAM/USDA, etc...) in and/or near proposed project area.

Attachment2DocumentationofFederalFunding731202044803.pdf

Documentation that proposed project area is unserved based on VATI criteria

Attachment3DocumentationUnservedAreaVATICriteria811202084802.pdf

Passings Form (Please use template provided)

Attachment4PassingsForm810202022257.pdf

Application to DHCD Submitted through CAMS

LENOWISCO Planning District Commission

VATI FY2021 LENOWISCO PDC US 58 Corridor Broadband Expansion Project

Propagation Map if Wireless Project

Attachment5PropagationMapifWirelessProject842020113110.pdf

Timeline/Project Management Plan

Attachment6TimelineProjectManagementPlan729202030700.pdf

MOU/MOA between applicant/co-applicant (can be in draft form)

Attachment7MOUsbetweenLENOWISCOandSCTC731202045610.pdf

Funding Sources Table

Attachment8VATIFundingSourcesTable7292020120104.pdf

Documentation for match funding

Attachment9DocumentationofMatchFunding811202090101.pdf

Letters of Support

Attachment10VATI2021LettersofSupportPackage816202031544.pdf

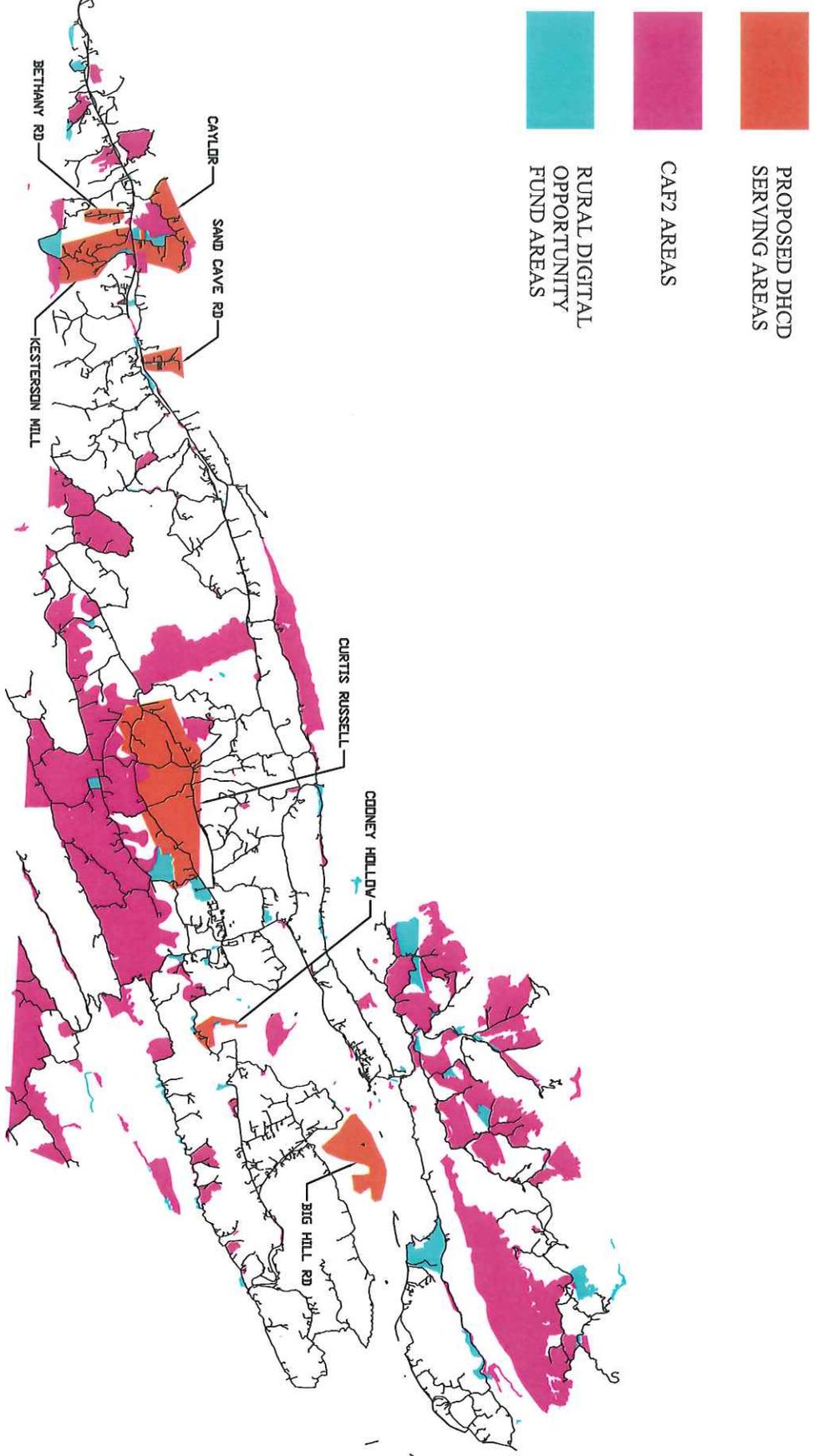
Derivation of Cost (Project Budget)

Attachment11DerivationofCosts8122020112908.pdf

Documentation supporting project costs (e.g. vendor quotes)

Attachment12DocumentationofSupportingCostEstimates813202061406.pdf

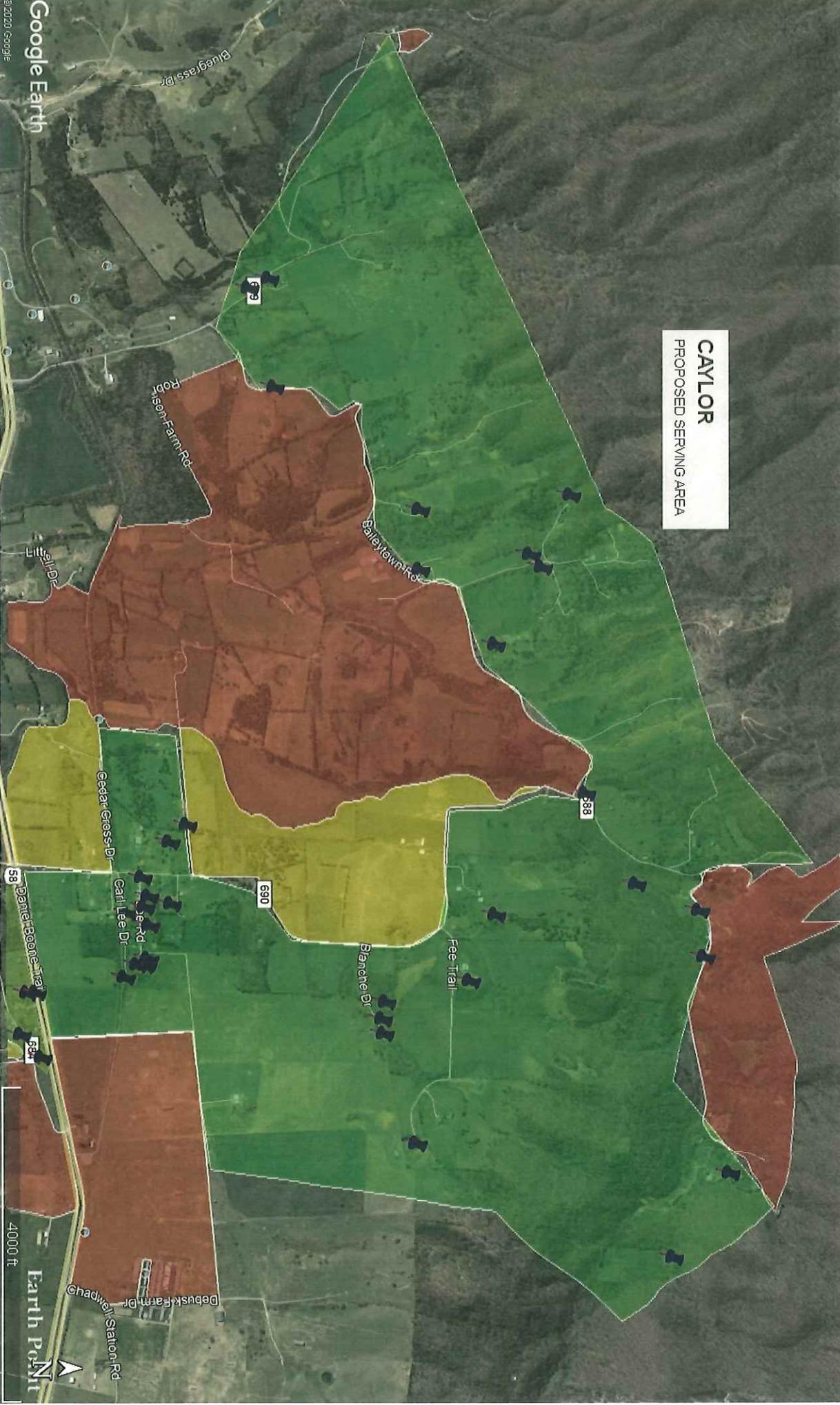
Notes:
The LENOWISCO PDC, SCTC and PVEC are poised to make a difference in the lives of the citizens of Lee County. Our determination to serve all the locations in Lee County, Wise County and Scott County is evidence of that commitment. We are building faster and connecting more customers than anyone ever before us. This project will speed this process by providing funding which will allow us to serve the 679 potential customers and move us closer to serving the harder to serve areas that are even more rural.



- PROPOSED DHCD SERVING AREAS
- CAF2 AREAS
- RURAL DIGITAL OPPORTUNITY FUND AREAS

SHEET 1 OF 1	SCTC DHCD PROPOSED SERVING AREAS	W. METTS ENGINEERING CO., INC. © 121 BRIDGE ST. BRANCHVILLE SC, 29432 (803) 274-4242	PROJECT: <u>LEE COUNTY</u> DRAWN BY: <u>HCH</u> CHECKED BY: <u>MAM</u> DATE: <u>07/28/20</u>
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CAYLOR
PROPOSED SERVING AREA





BETHANY RD
PROPOSED SERVING AREA





KESTERSON MILL
PROPOSED SERVING AREA

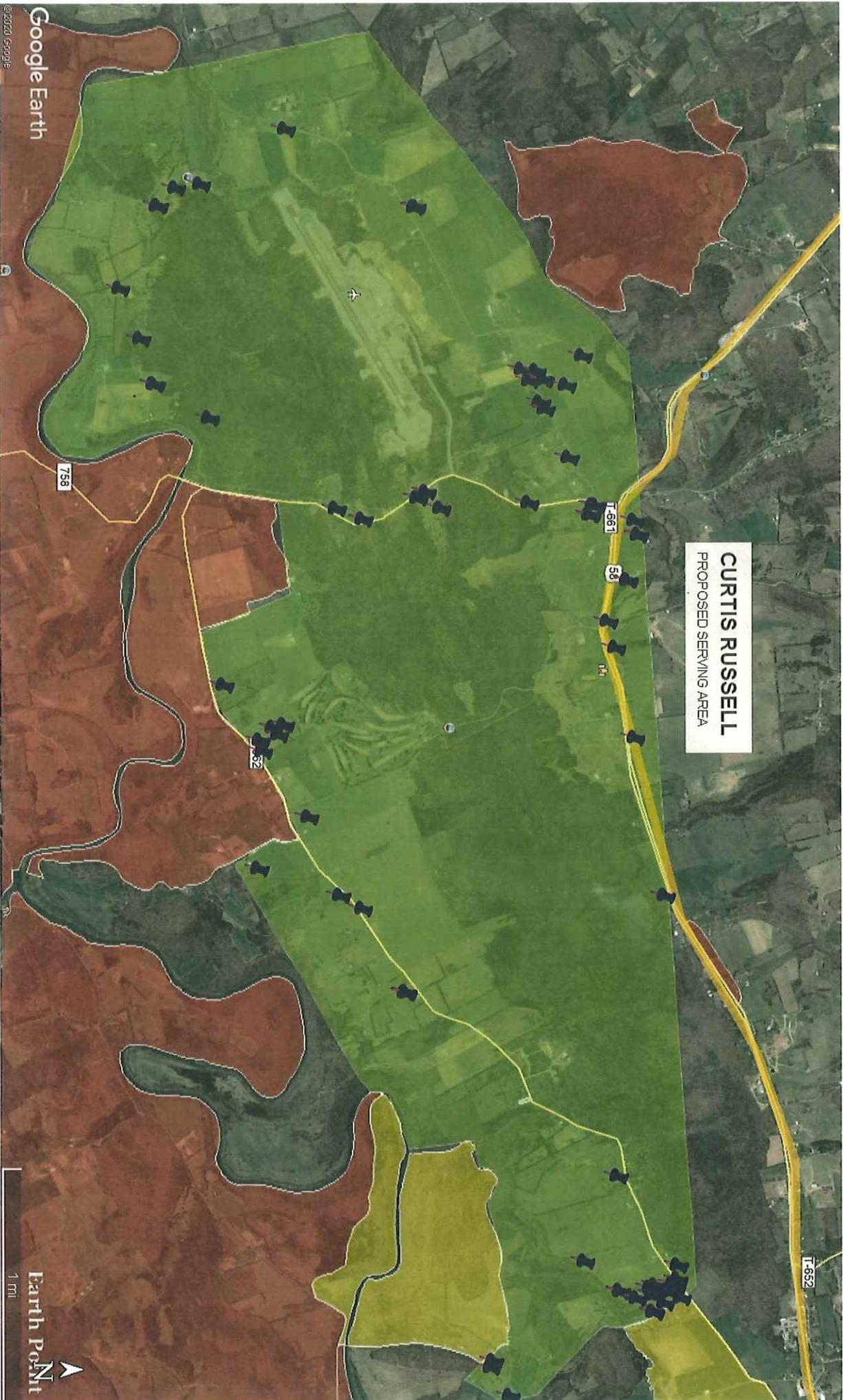
5000 ft

SAND CAVE RD
PROPOSED SERVING AREA

Google Earth!



Earth Point
2000 ft



CURTIS RUSSELL
PROPOSED SERVING AREA

Google Earth
©2020 Google

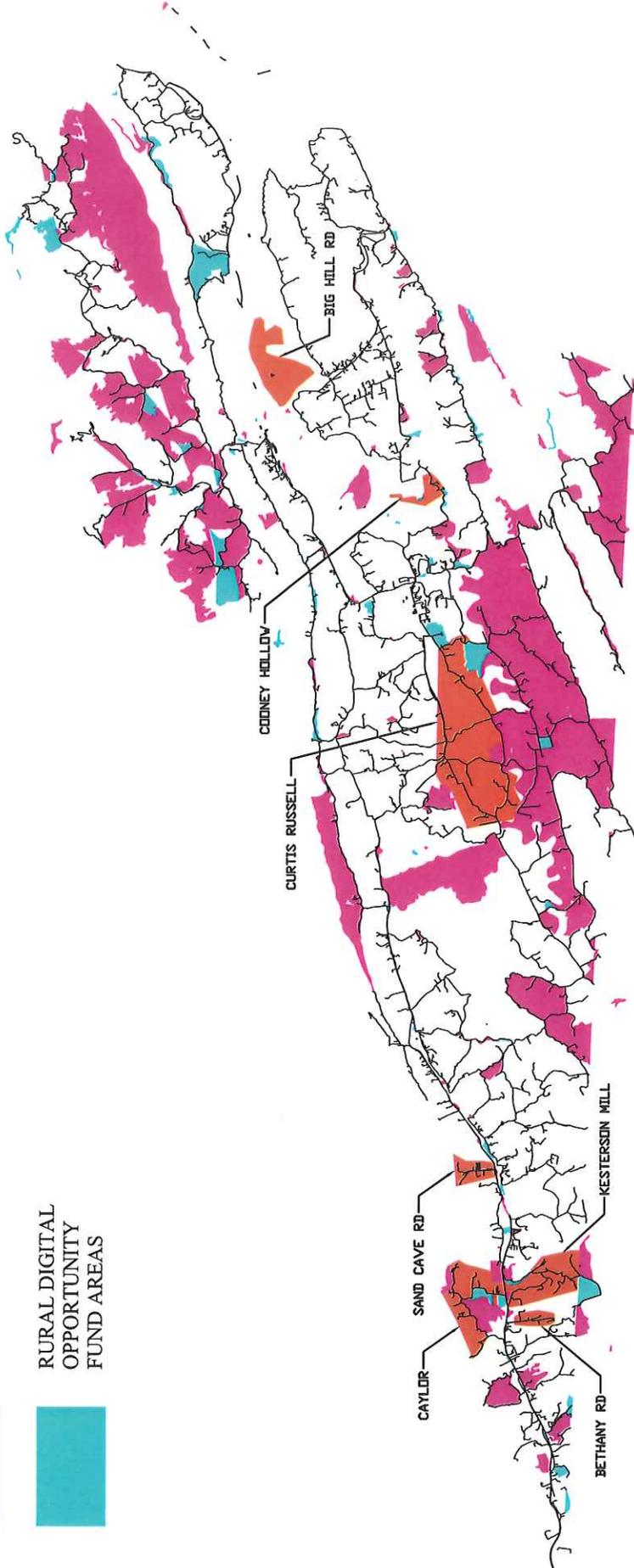
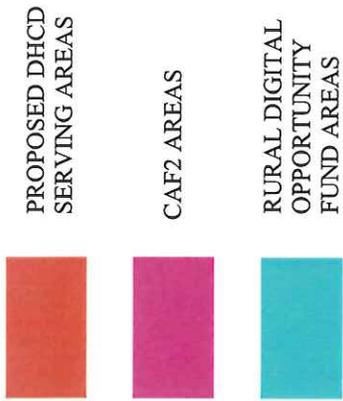
Earth Point
1 mi



BIG HILL RD
PROPOSED SERVING AREA

Attachment 2

Documentation indicating there is no Federal Funding within the proposed service areas.



PROJECT: LEE COUNTY
DRAWN BY: HGH
CHECKED BY: MAM
DATE: 07/28/20

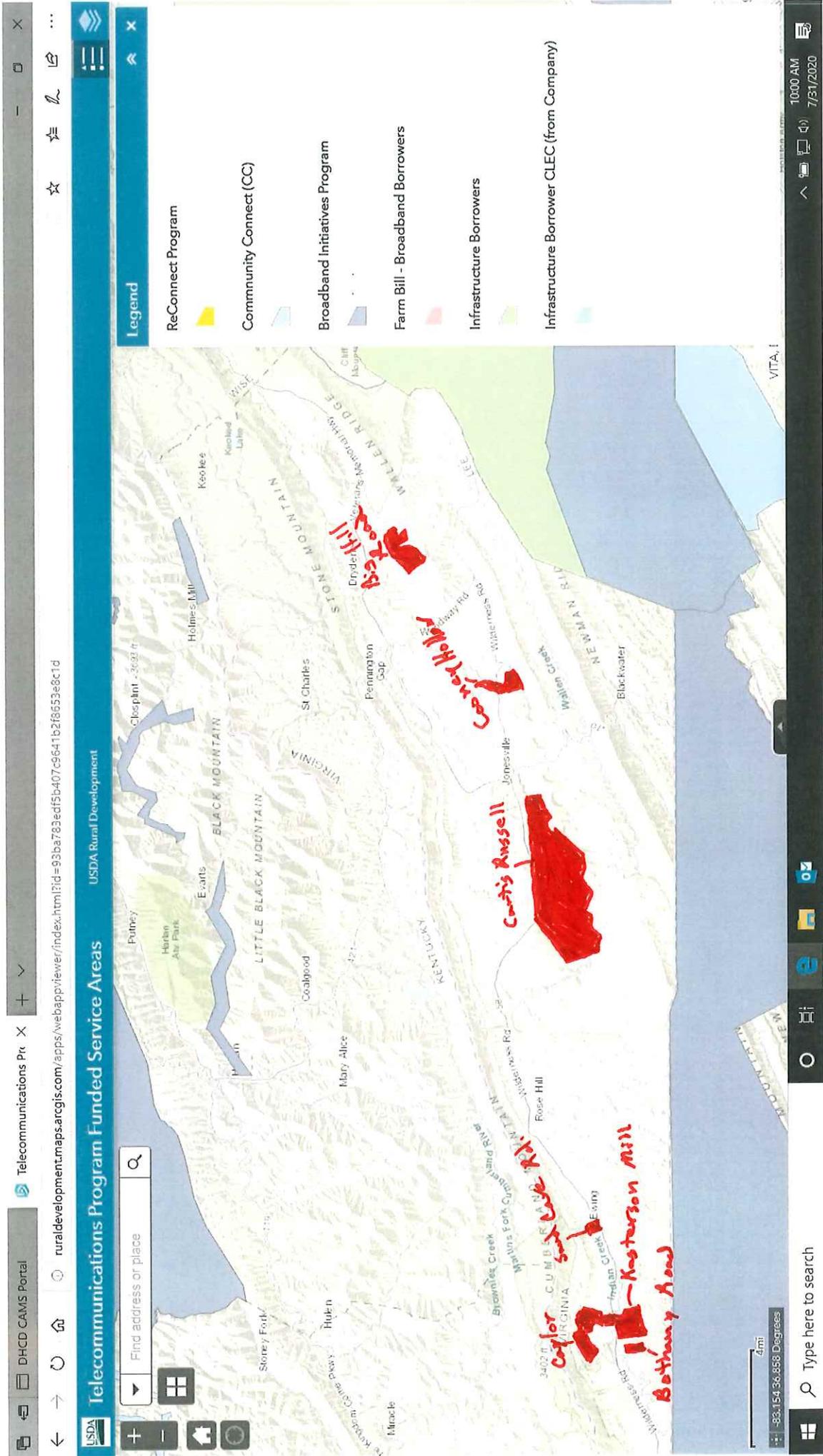
W. METTS
ENGINEERING CO., INC. ©
121 BRIDGE ST.
BRANCHVILLE SC, 29432
(803) 274-4242

SCTC
DHCD PROPOSED SERVING AREAS

SHEET 1 OF 1

Attachment 2

Documentation indicating there is no Federal Funding within the proposed service areas.



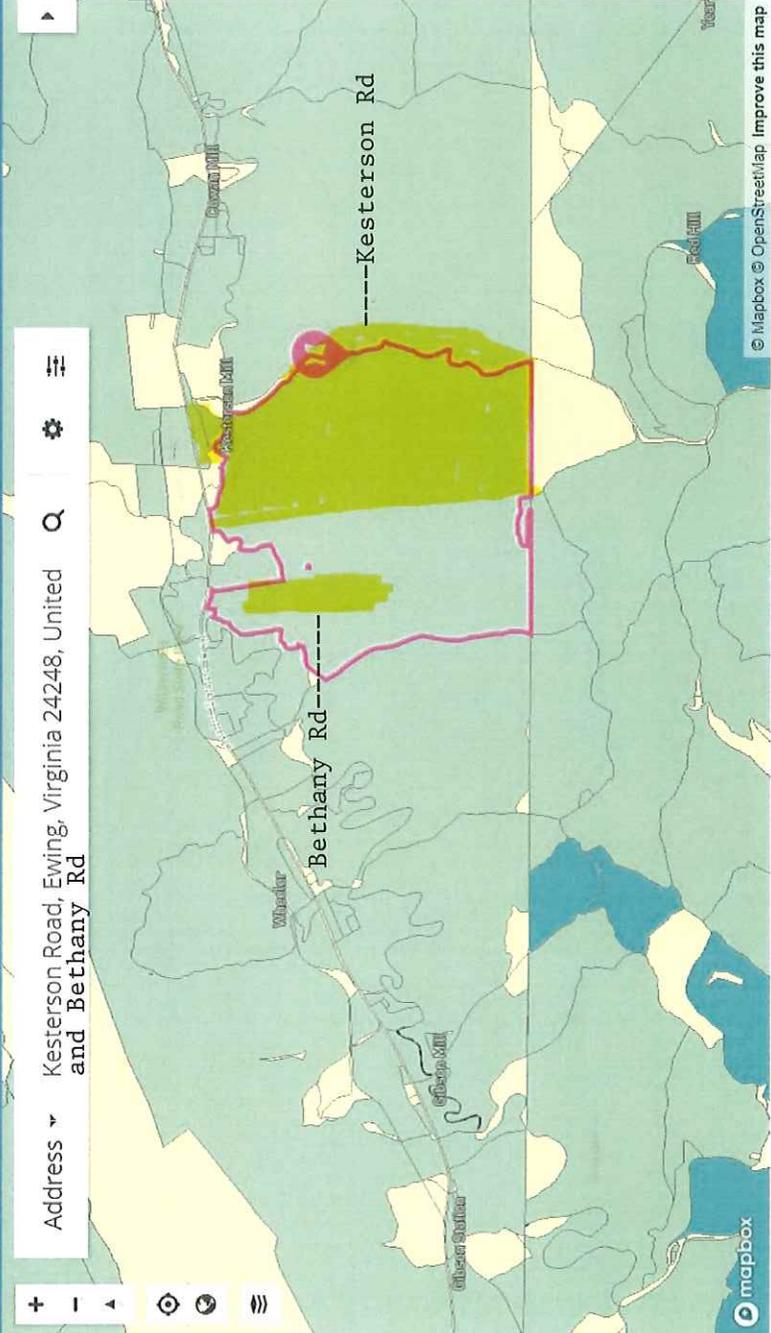
Attachment 3

Location Summary | Fix X + v
https://broadbandmap.fcc.gov/#/location-summary?version=jun2019&place_name=Kesterson%20Road,%20Ewing,%20Virginia%2024248,%20United%20States&lat=36.614657&lon=-83.4E

Fixed Broadband Deployment

Home Location Summary Area Summary Area Comparison Provider Detail Data Download About

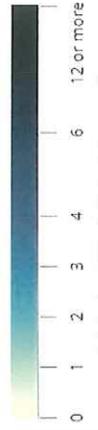
Address Kesterson Road, Ewing, Virginia 24248, United States and Bethany Rd



© Mapbox © OpenStreetMap Improve this map

All Providers Reporting Service
Census block ID: 511059506002030

Number of Fixed Residential Broadband Providers



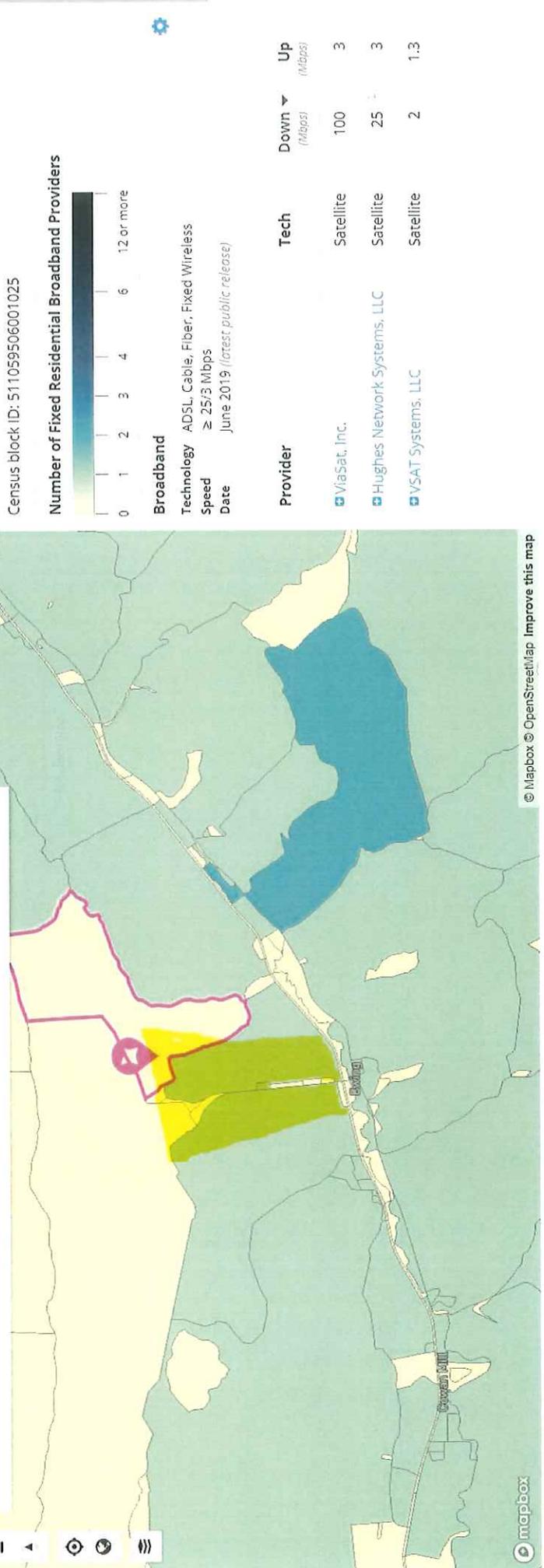
Broadband
Technology ADSL, Cable, Fiber, Fixed Wireless
Speed ≥ 25/3 Mbps
Date June 2019 (latest public release)

Provider	Tech	Down (Mbps)	Up (Mbps)
Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	1000
ViaSat, Inc.	Satellite	100	3
Hughes Network Systems, LLC	Satellite	25	3
VSAT Systems, LLC	Satellite	2	1.3

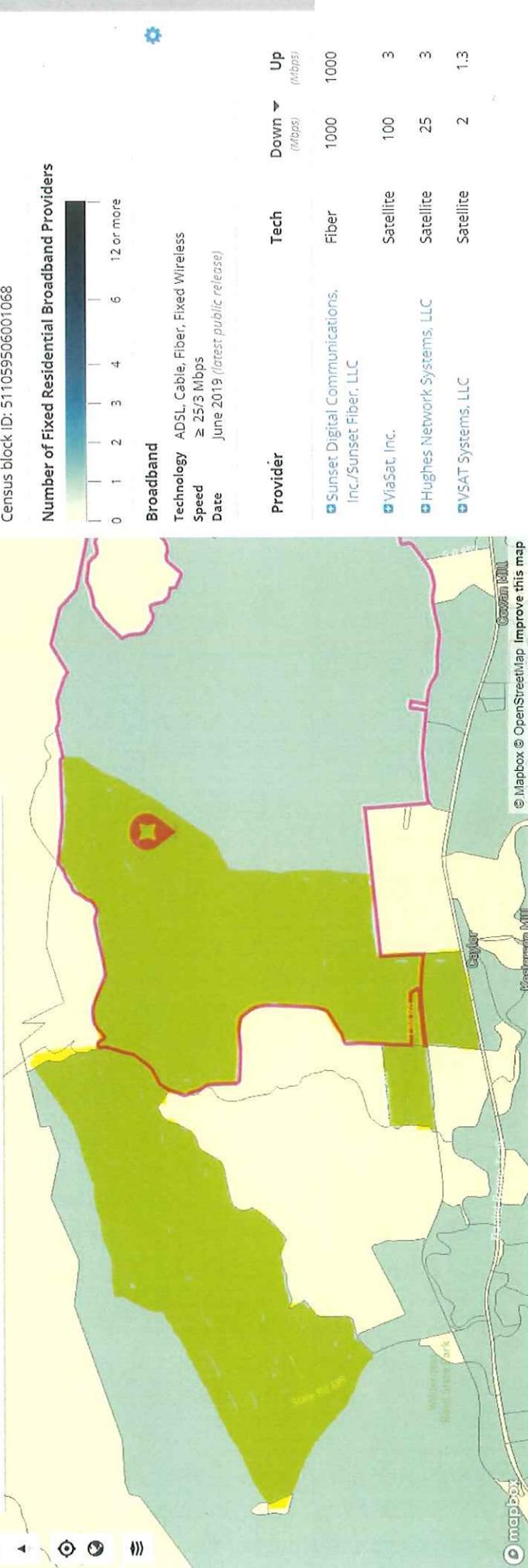
Type here to search

4:32 PM 8/3/2020

Address Sand Cave Rd, Ewing, Virginia 24248, United States



Coordinates ∇ 36.648912, -83.485185 **Caylor**



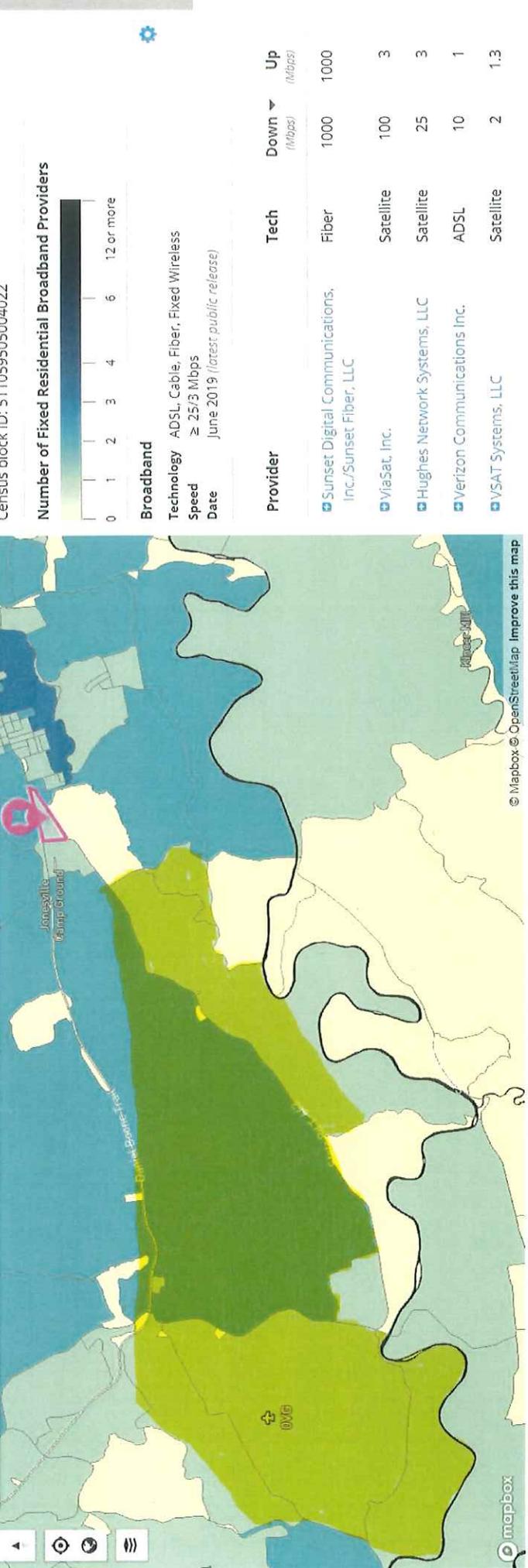
Provider	Tech	Down (Mbps)	Up (Mbps)
Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	1000
ViaSat, Inc.	Satellite	100	3
Hughes Network Systems, LLC	Satellite	25	3
VSAT Systems, LLC	Satellite	2	1.3

Coordinates ▾ 36.692974, -83.061359 Cooney Hollow



Provider	Tech	Down (Mbps)	Up (Mbps)
<input checked="" type="checkbox"/> Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	1000
<input checked="" type="checkbox"/> ViaSat, Inc.	Satellite	100	3
<input checked="" type="checkbox"/> Hughes Network Systems, LLC	Satellite	25	3
<input checked="" type="checkbox"/> VSAT Systems, LLC	Satellite	2	1.3

Address ▾ Curt Russell Rd, Jonesville, Virginia 24263, Unit Q



All Providers Reporting Service

Census block ID: 511059505004022

Number of Fixed Residential Broadband Providers



Broadband

Technology ADSL, Cable, Fiber, Fixed Wireless
 Speed ≥ 25/3 Mbps
 Date June 2019 (latest public release)

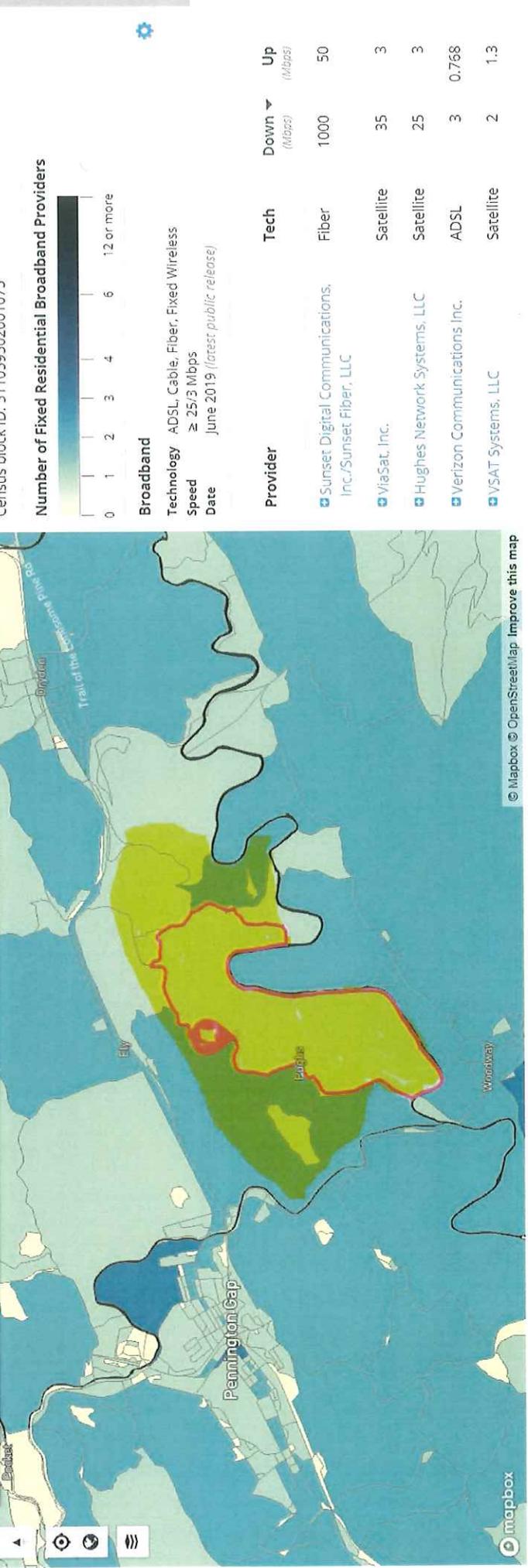
Provider	Tech	Down (Mbps)	Up (Mbps)
Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	1000
ViaSat, Inc.	Satellite	100	3
Hughes Network Systems, LLC	Satellite	25	3
Verizon Communications Inc.	ADSL	10	1
V/SAT Systems, LLC	Satellite	2	1.3

© Mapbox © OpenStreetMap Improve this map

Fixed Broadband Deployment

[Home](#)
[Location Summary](#)
[Area Summary](#)
[Area Comparison](#)
[Provider Detail](#)
[Data Download](#)
[About](#)

Address **Big Hill Road, Pennington Gap, Virginia 24277**



© Mapbox © OpenStreetMap Improve this map

All Providers Reporting Service
 Census block ID: 511059502001075

Number of Fixed Residential Broadband Providers
 0 1 2 3 4 6 12 or more

Broadband
 Technology ADSL, Cable, Fiber, Fixed Wireless
 Speed $\geq 25/3$ Mbps
 Date June 2019 (latest public release)

Provider	Tech	Down (Mbps)	Up (Mbps)
<input checked="" type="checkbox"/> Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	50
<input checked="" type="checkbox"/> ViaSat, Inc.	Satellite	35	3
<input checked="" type="checkbox"/> Hughes Network Systems, LLC	Satellite	25	3
<input checked="" type="checkbox"/> Verizon Communications Inc.	ADSL	3	0.768
<input checked="" type="checkbox"/> VSAT Systems, LLC	Satellite	2	1.3

Portion of - Big Hill

Fixed Broadband Deployment

Home Location Summary Area Summary Area Comparison Provider Detail Data Download About

Coordinates 36.759831, -82.99562

All Providers Reporting Service
Census block ID: 511059502001080

Number of Fixed Residential Broadband Providers

Broadband
Technology ADSL, Cable, Fiber, Fixed Wireless, Satellite, Other
Speed ≥ 25/3 Mbps
Date June 2019 (latest public release)

Provider	Tech	Down (Mbps)	Up (Mbps)
Sunset Digital Communications, Inc./Sunset Fiber, LLC	Fiber	1000	50
Comcast Corporation	Cable	150	10
ViaSat, Inc.	Satellite	35	3
Hughes Network Systems, LLC	Satellite	25	3
Verizon Communications Inc.	ADSL	5	0.768
VSAT Systems, LLC	Satellite	2	1.3

Type here to search

9:55 AM 8/4/2020

My Name is Cathy Smith

I have been on the waiting list

for SunSet for over 8 yrs. Everytime

We call about service they tell me

they don't have any fibers. I even

Called about the bussiness internet and

they told me the same thing. So we

got Viqsat. It is so slow.

Cant watch TV or kids cant look any-

thing up on line. If kids cant go to

school I will need good internet.

I also do Foster Care. Thank you.

My Number is 423-489-1314

To Whom it may concern
my name is Janny Williams
I have lived at 798 Sand Creek
Road for 38 years I am 59 years
old and have been on a waiting
list with Sunnet digital for at least
4 or 5 years then it went to
Point Broadband I have three
children taking college courses
or trying to and one of my
daughters is a teacher @ Thomas
Walker I have 10 grandchildren
8 of them would be taking
classes from my home if they
don't go back to school this
year so we desperately need
this Internet I ~~don't~~ have
one that has special needs.
So My Neighbor moved away
Katrina Tssacs, she gave me
a key to her house because she
got the Point Broadband before
me after just moving in
then decided to sell, so I have
paid her bill for 2 years.
and used a range extender
to pull it to my house because
it is on the pole in my back
yard but then won't hook me up

NOTES

I have had to go to her house in the middle of the night to try to reboot it. I afraid I would get shot going into a neighbors house. Just for Internet. We have many people up my Road that have the same stories. So Adam and I went around getting names. Sprint Broad band kept us hoping for to long. I also have tried Hughes net and it didn't work then Viasat and they took \$180 out of my account and promised me if it didn't work I could disconnect. So after 4 days I tried to disconnect they won't unless I give them \$350 more they didn't tell me to begin with. So this is our last hope!

Thank You

Jammy Williams

798 Sand Cave Rd

Ewing Va.

P.S. my daughter needs this also to teach from home for home visits with students!

To Whom It May Concern,

I, Michelle R. Smith, a Lee County VA resident and school teacher am writing this letter concerning local availability of reliable internet.

Greg Hood visited my mother today. He gave her papers to sign and get signatures of people in her area, Sand Cave Road, who wanted fiber internet.

Some residents of the Sand Cave Road area have what used to be called Sunset Digital. Now, it's referred to as Point Broadband. However, very few were able to get it, and have been on waiting lists for approximately ten years!

My mother lives at 798 Sand Cave Rd. Ewing, VA 24248.

Her phone number is 276-861-4349.

She has been on a waiting list for years. Her next door neighbor has Point Broadband. It is hooked to the power pole in my mother's yard.

Her neighbor moved out of her house & let my mother use her internet (by way of a range extender). My mother has paid her bill for about two years, until recently because her neighbor rented out her house & the renters took over the internet.

As you can imagine, it's been a very frustrating ordeal.

The reason why this matter of getting affordable, reliable internet is so important is due to the current COVID-19 pandemic. I need reliable internet at my mother's for online classes, remote learning and job necessity.

Please help us get the needed resources in this ever connected world.

Sincerely,
Michelle Smith 270-861-4346
Jammy Williams

Melissa Allen
P O Box 503
Ewing VA 24248
(845) 585-2260

To Whom it May Concern:

I am a teacher in Lee County, Virginia. My physical address is 155 Briarcliff Drive. I have been trying to get fiber optic internet service since February 4, 2016. Sunset Digital told me they were at capacity in our area, due to underestimating demand. I asked how they could underestimate demand in an area that all local politicians frequent because of the large number of people in a small location. They said that they had not anticipated the LMU Veterinary Schools.

Since it has changed to Point Broadband, nothing has changed. I have also been told about capacity. They cannot, or will not, give me an anticipated date of service.

I have made them aware of the fact that I am a teacher and need this service for online classes and lesson planning. Because of the pandemic, the need for this service is even greater. My son, a Senior this year will have four online classes.

I was informed that they received a grant to provide additional service to our community. Nonetheless, several have not been able to acquire this service.

2092

Any assistance you can give us
would be greatly appreciated.

Sincerely,

Melissa Allen

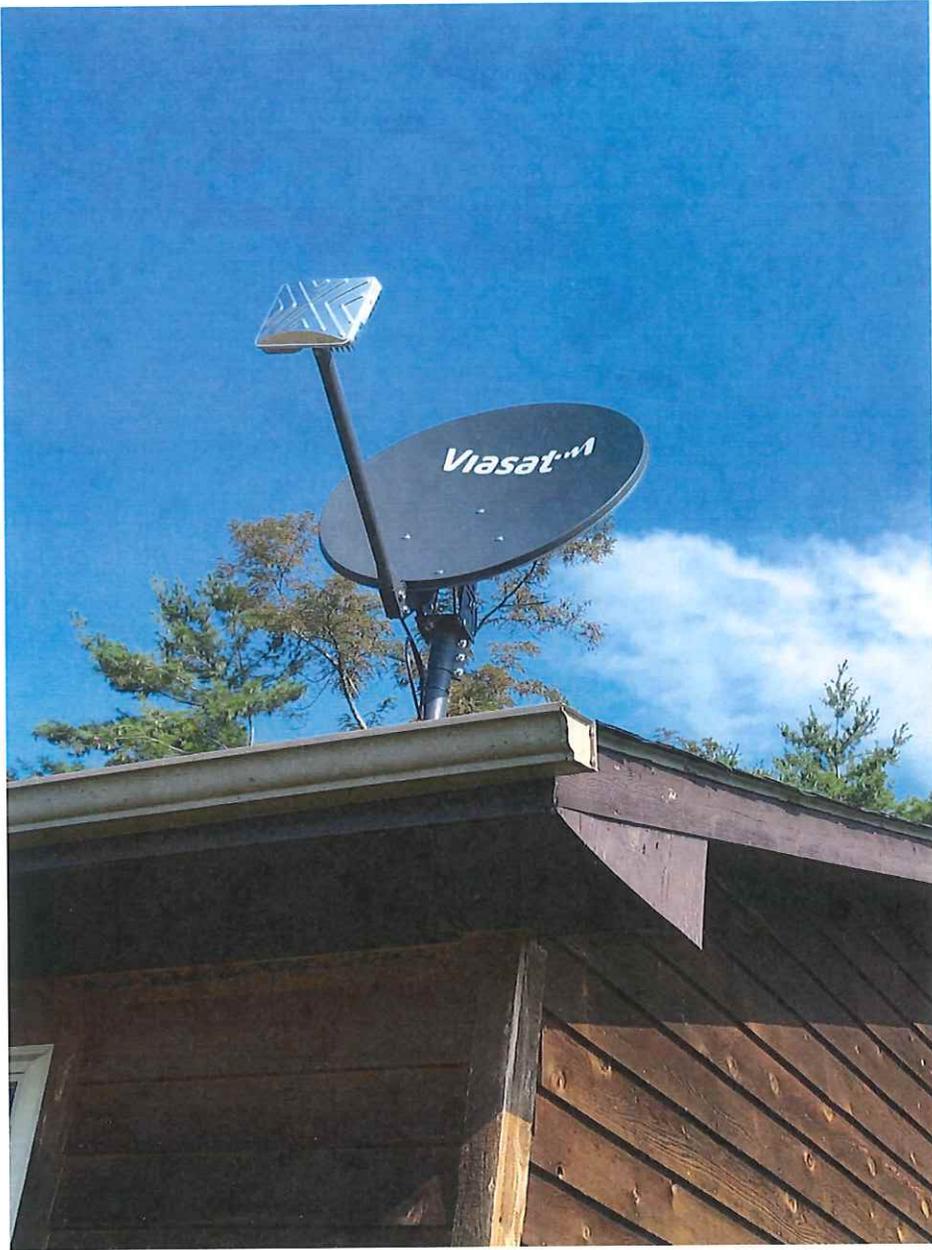
**Customers In
Sand Cave Community
That Currently Have
Satellite
Internet**



587 Sand Cave Rd



759 Sand Cave Rd



798 Sand Cave Rd



167 Boone Tabernacle Rd



205 Boone Tabernacle Rd



117 Thistle Dr



149 Dewberry Dr



236 Thistle Drive



123 Arvee Drive



210 Red Clover Dr

G. Hood

From: Vanessa Mayes <vanessamayes21@gmail.com>
Sent: Sunday, June 28, 2020 3:52 PM
To: ghood@sctc.org
Subject: Bethany Rd-Ewing, VA project
Attachments: Bethany Rd Internet Project.docx

Greg,
It was very nice to meet you this past Friday and discuss broadband limitations with you in my area, near Elydale School. My daughter and I spent Friday evening going door to door in the area you and I surveyed earlier in the day. I am attaching a list of everyone I talked to. These people are ready to sign up and were excited about a prospect for high-speed internet services. Most who have satellite services told me they were paying high monthly rates for not very dependable services.

In addition to myself being a small business owner, there is another small business on this list and she has tried for years to get internet services through Sunset/Point but with no success. I even called Point again on Friday afternoon and I was told I am not in their service area, even though their cabinet is only a few hundred feet away from my home. Most of us on the list I am providing have businesses or children in school or college that are in desperate need of high speed internet services. Also, a few of the addresses provided are rental properties and the owners tell me that renting is challenging due to the lack of internet services available. All of these are issues you and I discussed on Friday.

I greatly appreciate you taking the time to come to Bethany Rd and survey the area. Once engineering can take a closer look at the area and reviews the almost 20 residences that are ready to sign up in this short 1.25 mile distance, I am hopeful that SCTC will be able to provide us with the high speed internet service we so desperately need. Thank you again and I look forward to hearing from you.

Sincerely,
Vanessa Mayes

Vanessa Mayes
418 Bethany Rd
Ewing, VA 24248
(865)585-1549

Stella Sutphin
348 Bethany Rd
Ewing, VA 24248
(276)445-4532

Carolyn Littrell
263 Bethany Rd
Ewing, VA 24248
(276)445-4652

Jody Hensley
352 Bethany Rd
Ewing, VA 24248
(276)445-5443

Margaret Marcum
508 Bethany Rd
Ewing, VA 24248
(276)445-5728

Robert Clonce
623 Bethany Rd
Ewing, VA 24248
(423)851-1213

Jeff Scott
178 Spice Cir
Ewing, VA 24248
(606)269-4689

Nancy Scott
137 Spice Cir
Ewing, VA 24248
(606)269-7272

Linda Simpson
259 Dellway Dr
Ewing, VA 24248
(276)861-3707

Harold Simpson
397 Dellway Dr
Ewing, VA 24248
(276)861-3707

Marsha Hensley
240 Trojan Dr
Ewing, VA 24248
(276)861-3422

Amanda Rodriguez
500 Trojan Dr
Ewing, VA 24248
(606)670-5782

Logan Brooks
556 Trojan Dr
Ewing, VA 24248
(865)585-3421

Amanda Rodriguez
839 Trojan Dr
Ewing, VA 24248
(606)670-5782

Mike Kidwell
903 Trojan Dr
Ewing, VA 24248
(865)585-3838

Larry Kidwell
961 Trojan Dr
Ewing, VA 24248
(276)445-5546

Adam Hensley
1060 Trojan Dr
Ewing, VA 24248
(865)585-6750

Francine Hensley
1061 Trojan Dr
Ewing, VA 24248
(276)445-3999

Lonesome Trail Enterprises
227 Verlin Hensley Dr
Ewing, VA 24248
(276)445-5443

Kesterson Rd. AND Surrounding Area

Broadband support

	<u>NAME</u>	<u>ADDRESS</u>	<u>SIGNATURE</u>
1.	Jay Wilson	244 Marson Quillen	Joyce Wilson
2.	Shirley Miller	547 Marson Quillen Rd	Shirley Miller
3.	Carl & Norma Wilson Capps	250 Marson Quillen Rd	Norma W. Capps
4.	Liana Howerton	124 Mink Hollow Rd	Liana Howerton
5.	Derek Saylor	124A Mink Hollow Rd	Derek Saylor
6.	David Hensley	1485 Kesterson Rd	David Hensley
7.	Joseph Hensley	1323 Kesterson Rd	Joseph Hensley
8.	George Hummer	398 Mink Hollow Rd	George Hummer
9.	James Anderson	654 Mink Hollow Rd	James Anderson
10.	Lawrence E. Hensley	1116 Kesterson Rd	Lawrence E. Hensley
11.	Sally Bulmer	194 Bulmer Mtn Trail	Sally Bulmer
12.	Wilma Bussell	1600 Kesterson Rd	Wilma Bussell
13.	Wade C. Wilson	1711 Kesterson Rd	Wade C. Wilson
14.	Joseph Wilson	1802 Kesterson Road	Joseph Wilson
15.	Rebecca Roe	118 Marson Quillen	Rebecca Roe
16.	Jacob Ayers	1263 Big Springs Rd	Jacob Ayers

July 7 2020

oad

NAME

ADDRESS

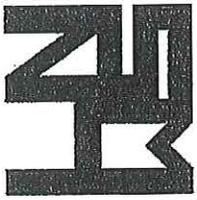
SIGNATURE

- | | | | | |
|-----------------------|-----------------------|-------------------------------------|--------------------------|-------------------|
| 17. Linda Guillen | 1967 Kesterson Road | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Linda Guillen |
| 18. Rosette Goinx | 1348 Kesterson Rd. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Rosette Goinx |
| 19. Willard N. Moore | 759 Moore Hollow | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Willard N. Moore |
| 20. Margaret Lambdin | 755 Moore Hollow Dr. | <input type="checkbox"/> | <input type="checkbox"/> | Margaret Lambdin |
| 21. Becky Sutterfield | 786 Big Spring Union | <input type="checkbox"/> | <input type="checkbox"/> | Becky Sutterfield |
| 22. Bridget Cinnamon | 2003 Big Spring Union | <input type="checkbox"/> | <input type="checkbox"/> | Bridget Cinnamon |
| 23. Joyce Montgomery | 755 Big Spring Union | <input type="checkbox"/> | <input type="checkbox"/> | Joyce Montgomery |
| 24. Norman W. Moore | 773 Big Spring Union | <input type="checkbox"/> | <input type="checkbox"/> | Norman W. Moore |
| 25. Jimmy Bryant | 2764 Kesterson Rd | <input type="checkbox"/> | <input type="checkbox"/> | Jimmy Bryant |
| 26. Brad Pillion | Road 3 Box 91P | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Brad Pillion |
| 27. Wendell Daniels | R.R. 3 Box 91-e | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Wendell Daniels |
| 28. James Billingsley | Big Spring Union Rd | <input type="checkbox"/> | <input type="checkbox"/> | James Billingsley |
| 29. Nancy Estep | 2657 Kesterson Rd | <input type="checkbox"/> | <input type="checkbox"/> | Nancy Estep |
| 30. Eric Estep | 184 Elder Grove Dr. | <input type="checkbox"/> | <input type="checkbox"/> | Eric Estep |
| 31. Daw DE Parton | 533 Elder Grove Dr | <input checked="" type="checkbox"/> | | Daw DE Parton |
| 32. Justin Noah | 414 Elder Grove Dr | <input checked="" type="checkbox"/> | | Justin Noah |



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<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Austin Dean/Rylee Cope	166 Peaceful Breeze Lane Jonesville VA 24263	276-832-2751	<i>Austin Dean</i>
Jody Willis	163 Peaceful Breeze Lane Jonesville VA 24263	276-393-6254	<i>Jody Willis</i>
Peggy Willis	1923 Cooney Hollow Road Jonesville VA 24263	276-393-2590	<i>Peggy Willis</i>
Connie Burchett	574 Reed Patch Rd. VA	276-215-1758	<i>Connie S. Burchett</i>
Kerly Enston	Reed Patch Road	276-215-9837	<i>Kerly Enston</i>
Barry	1523 Cooney Hollow Rd Jonesville VA		<i>Barry</i>
Louanna Mullins	313 Mullins Dr Jonesville VA	276-275-3444	<i>Louanna Mullins</i>
Roger Scott	860 Cooney Hollow Rd	276-832-2461	<i>Roger Scott</i>
Carter Stanten	838 Cooney Hollow RD	276-220-3468	<i>Carter Stanten</i>
Barry Parker	738 Cooney Hollow Rd		<i>Barry Parker</i>
Bonnie Skidmore	494 Cooney Hollow Rd. Jonesville Va	276-346-1795	<i>Bonnie Skidmore</i>
Joyce Mullins	324 Cooney Hollow Rd		<i>Joyce Mullins</i>
Boyd Humbert	188 Cooney Hollow Rd		<i>Boyd Humbert</i>
Justin Warner	680 Cooney Hollow Rd		<i>Justin Warner</i>



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<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Ray S. Jackson	1449 Ray Check Rd Jonesville Va 24263	276-346-2830	<i>Ray S. Jackson</i>
Steven Elkins	780 Reed Patch Rd Jonesville, Va 24263	(423) 361-2584	<i>Steven Elkins</i>
Don Elkins	728 Reed Patch Rd Jonesville, Va 24263	276-346-3445	<i>Don Elkins</i>
Nicole Davis	1143 Cooney Hollow Rd. Jonesville, VA 24263	276-346-2830	<i>Nicole Davis</i>
Billy Strickland	401 Cooney Hollow Rd. Jonesville, VA 24263	276-346-2830	<i>Billy Strickland</i>
Honda Ruth Kent	463 Cooney Hollow Rd Jonesville VA 24263	276-346-2170	<i>Honda Ruth Kent</i>
Jenny Bugan	716 Cooney Hollow Rd Jonesville VA 24263	276-219-2881	<i>Jenny Bugan</i>
Vale Park 276 870-0310	1001 Reed Patch Rd. Jonesville Va. 24263	276-346-2830	<i>Vale Park</i>
Juanita Reed 423 754 5060	1005 Reed Patch Rd. Jonesville Va 24263	276-346-2830	<i>Juanita Reed</i>



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Name	Address	Telephone #	Signature
Emily Keel	38 Lee rd Ewing Va 24248	(706) 829-5047	Emily Keel
Betty Joanne	345 Lee rd Ewing Va		Betty Joanne
Kaye Parker	264 Lee rd Ewing Va.	865-585-6861	Kaye Parker
Angela Sawyer	257 Lee Rd., Ewing, VA.		Angela Sawyer
Angela Sawyer	278 Lee Rd., Ewing, VA.		Angela Sawyer
Deanna Jansway	231 Lee Rd Ewing Va	865-278-4620	Deanna Jansway
Heather Gains	171 Lee Rd Ewing Va	865-585 5147	Heather Gains
John Jansway	216 Jansway Dr Ewing VA	276-870-0042	John Jansway
Marilyn Jansway	191 Lee Rd Ewing VA.	24248 - 276 870-3574	Marilyn Jansway
Sam Jansway	150 Jansway Ewing VA	24248 606 690-1632	Sam Jansway
Devon Fontaine	553 Caylor Road Ewing VA	24248 220 4555	Devon Fontaine
Mountain View Baptist	591 Caylor Road Ewing VA	24248	Mountain View Baptist
Rachell Cox	676 Free Trail Ewing VA.	24248	606-670-8982
Ashley Fee	Free Trail Ewing VA.	24248	865-885-8649



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Name	Address	Telephone #	Signature
Linda Lee	549 Fee Trail Ewing VA 24248	865-585-8729	<i>Linda Lee</i>
Connor Rowland	1493 Caylor RD Ewing	24248 703-861 4252	<i>Connor Rowland</i>
Andy Sizemore	341 Dry Branch Rd, Ewing VA	24248 600-670-5865	<i>Andy Sizemore</i>
Kyle Sizemore	532 Caylor Rd, Ewing VA	24248 600-670-3094	<i>Kyle Sizemore</i>
Lynn Thomas	178 Apple Orchard Dr	415-4900 Lynn Thomas	<i>Lynn Thomas</i>
Danny Thomas	184 Hubert Thomas Dr		<i>Danny Thomas</i>
Georgia Turner	178 Hubert Thomas Dr		<i>Georgia Turner</i>
L.W. Thomas	923 Dry Branch Rd	Ewing VA 27645	<i>L.W. Thomas</i>
Harold Bailey	575 Old Bailey Drive	Ewing	<i>Harold Bailey</i>
Charles Chewell	207 Bailey Drive	Ewing Va.	<i>Charles Chewell</i>
Mike Bailey	1883 Old Bailey Drive	Ewing	<i>Mike Bailey</i>
Lois Hill	327 Old Bailey Drive	Ewing Va.	<i>Lois Hill</i>
Lynn Maxwell	295 Old Bailey Drive	Ewing Va	<i>Lynn Maxwell</i>
Brenda Brooks	306 Old Bailey Drive	Ewing Va.	<i>Brenda Brooks</i>



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Name

Address

Telephone #

Signature

Tammy Williams

798 Sand Cove Rd.

800-499-0700

Claren Prodemore

249 Briar Cliff Dr.

800-670-1787

Kim Cockett

391 Sand Cavelld.

865-585-7318

Thomas Prodemore

1st Back Field Rd.

865-585-7318

Edward Ayers

262 Red Clover Loop

406 670 41664

Jack Black

262 Red clover Loop

865-585-7318

Brandon Lowe

(Sand Cove Rd) Boone Trail Rd

423-557-2443

Trinity Tabernacle

Sand Cavelld

865-585-4017

Andy Warf

117 Thistle Dr.

276-445-5372

Kaia Dorman-Cheek

1109 Thistle Dr

276-445-5372

Joe Cheek

1109 Thistle Dr

1-423-300-1817

Joe Bryant

320 Thistle Dr

865-585-5718

Sharon Taylor

336 Thistle Dr.

865-279-4259

Paul Taylor

336 Thistle Dr.

865-585-3693



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Name	Address	Telephone #	Signature
Melissa Allen	(155 Briarcliff Dr.) PO Box 503	865-585-2260	Melissa Allen
Sheila Long	PO Box 415 Ewing VA 24248	865-585-1220	Sheila Long
Todd Albrecht	PO Box 14 Ewing VA 24248	606-670-8215	Todd Albrecht
Ronnie Smith	P.O. Box 211 Ewing, Va. 24248	276-445-8446	Ronnie Smith
Diana Smith	233 Briarcliff Ewing Va. 24248	423-851-1135	Diana Smith
Anna Dean	500 Sand Cave Rd 24248	606 8960859	Anna Dean
Paula Dean	511 Sand Cave Rd Ewing VA 24248	606-670-1135	Paula Dean
Terry Dean	511 Sand Cave Rd Ewing VA 24248	606-670-0804	Terry Dean
Dorey Atkfeld	475 Sand Cave Rd Ewing VA 24248	865-585-1696	Dorey Atkfeld
Keith E Eldridge	287 SHALLOW CREEK DR. EWING VA 24248	276-690-4802	Keith E Eldridge
Ronny Back	P.O. Box 106 Ewing VA 24248	606-670-1411	Ronny Back
Melinda Roberts	391 Sand Cave Rd. Ewing, Va. 24248	276-207-6554	Melinda Roberts
Aaron Rutherford	407 Sandcave Rd Ewing, Va 24248	1(276)861-4224	Aaron Rutherford
John Cheek	311 Sandcave Rd Ewing VA 24248	865-5767-3169	John Cheek



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<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
John Turner	232 Red Clover Loop	865 865 0604	[Signature]
John Turner	197 Red Clover Loop	865-276-219-4832	[Signature]
Kaethe Turner	210 Red Clover Loop	606-896-0703	[Signature]
Neil Hall	222 Red Clover Loop	276-445-4703	[Signature]
Neil Hall	" "	" "	[Signature]
Bob Rains	183 Red Clover Loop	865 278 6614	[Signature]
Ray Green	123 Arnee Dr Ewing Va	606-269-0938	[Signature]
Carrie Howard	145 Sand Cove Rd. Ewing Va	606-499-1022	[Signature]
Vivian Ayers	259 Sandcove Rd Ewing VA	865-585-7278	[Signature]
William D. [unclear]	61 SAWN AVE ROAD Ewing VA	828-736-8179	[Signature]
Kim Marsee	170 White Rock Rd	865 885-0224	[Signature]
Sharon Taylor	336 Thistle Dr Ewing	865-279-4259	[Signature]
Lauren Bryant	334 Thistle Dr Ewing	276-275-9414	[Signature]
Sassy Chadwell	147 Arnee Dr Ewing	276-596-7104	[Signature]



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Name	Address	Telephone #	Signature
Jamun Byrnt	300 Histle Dr. Ewing, Va	276-275-9414	Jamun Byrnt
Chonda S Delph	119 Sagebrush Dr Va	606-670-8823 cell	
Michael Wiggins	141 Sagebrush Dr VA	606 670 3364	
Courtney Stapleton	174 Sagebrush Dr. VA	606 670 0018	Courtney Stapleton
Charla S Shelton	187 Sagebrush Dr Ewing, VA	606-302-1872	Charla Shelton
Chaslm Scott	289 Sagebrush Ewing Va	865 585-7960	Chaslm Scott
Travis Scott	289 Sagebrush Ewing Va	865-585-3172	Travis Scott
Clyde Scott	205 Ewing Va	865-279-0300	Clyde Scott
Elijah Scott	289 Sagebrush Ewing	606-670-3959	Elijah Scott
Creby Scott	289 Sagebrush Ewing	276-861-4887	Creby Scott
Madison McCumy	289 Sagebrush Ewing	606-670-3959	Madison McCumy
Rick Welsh	133 Brian Cliff Dr. Ewing	276-275-3466	Rick Welsh
Kelly Welsh	133 Brian Cliff Dr Ewing	276-275-4756	Kelly Welsh
Ashley Cumley	133 Brian Cliff Drive Ewing	276-1039-1010 H3	Ashley Cumley



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Name	Address	Telephone #	Signature
Alysa Chadwell	273 Stacklam Rd Ewing 24248	321-505-0402	<i>[Signature]</i>
Eric Anderson	P.O. Box 505 Ewing Va. 24248	276-471-2363	<i>[Signature]</i>
Ariel Chadwell	273 Stockyard Rd	6066701109	<i>[Signature]</i>
Jimmy King	249 SIOCKYARD DR Ewing	276-445-5237	<i>[Signature]</i>
Larry Smith	713 Sandcove Rd. Ewing	276-445-4076	<i>[Signature]</i>
Betty Smith	713 Sandcove Rd Ewing	276-690-4334	<i>[Signature]</i>
Virginia Beggs	759 Sandcove Rd. Ewing	276 445 0568	<i>[Signature]</i>
John Grizzle	759 Sandcove Ewing	276-445-0568	<i>[Signature]</i>
Cathy Smith	167 Boone Tabernacle Rd Ewing VA	423-489-1314	<i>[Signature]</i>
Robert Smith	167 Boone Tabernacle Rd Ewing VA	805-279-5998	<i>[Signature]</i>
Clydette Woodard	171 Boone Tabernacle Rd Ewing VA	606-670-8300	<i>[Signature]</i>
Adam Smith	205 Boone Tabernacle Rd Ewing VA	606-670-8619	<i>[Signature]</i>
Robert Smith	205 Boone Tabernacle Rd Ewing VA	606-670-2580	<i>[Signature]</i>
Brandy Smith	205 Boone Tabernacle Rd Ewing VA	606-670-5009	<i>[Signature]</i>



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Name

Address

Telephone #

Signature

Whitney Moore 174 Boone Tabernacle Rd Ewing VA 24248 606-670-3235 *[Signature]*
 M. Cardwell 45 Boone Tabernacle Rd Ewing VA 24248 805-279-1574
 Nancy Bridemore 141 Backfields Ln Ewing VA 24248 805-585-1569 *[Signature]*
 Robert Indenoso 289 Briar Cliff Drive Ewing Va 24248 8165-712-3063 *[Signature]*
 Jessie Grizzle 714 Sand Cave Rd Ewing VA 24248 606-449-0528
 Phyllis Owens 319 Sand Cave Rd. Ewing Va 24248 *[Signature]*
 Dan + Chel Capps 698 Sand Cave Rd. Ewing Va 24248 *[Signature]* 445-4475



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Name	Address	Telephone #	Signature
Henry Shell	1081 Curt Bussell Rd	276-275-104	
Stephanie Sumpter Emory minton Rooi Roben STEELE	137 Country Side Dr.	276-585-8842	
Anley Longworth	122 Eula Court RD	276-832-1141	
Todd Hines	434 Cecher Farm Lane	276 870-1968	
Nancy Hines	1316 Curt Bussell Road	276 690 5274	
Matt Duncan	130 Angus Drive	276 365 5228	
Missy Hines	1312 Curt Bussell Road	276 870 1969	
Jason Shuler	328 Country Side Dr		
Billie Sue Heyler	342 Country Side Dr.	276-346-2257	
Robert Johnston	297 Country Side Dr.	276-393-5222	
Edna E. Jees	292 Country side Dr.	276-728-6796	
Uderic D. Stapian	270 Country Side Dr.	276-870-2421	



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Name	Address	Telephone #	Signature
Kristen Booth	223 Countryside Dr Jonesville, VA 24263	483-200-5841	Kristen Booth
Nelissa Sage	262 Country Dr. Jonesville VA 24263	276-832-1490	Nelissa Sage
GARY RUSSELL	142 RUSSELL SAUNDERS JONESVILLE VA 24263	423-375-1482	Gary Russell
Tammy Ingle	115 Eula Court Rd Jonesville VA 24263	832-8713	Tammy Ingle
Melioda Jones	140 Countryside Drive Jonesville VA 24263	276-298-5771	Melioda Jones
Jamice Riggs	184 Country Side Dr Jonesville VA 276-393-2639		Jamie Riggs
Rick Napier	314 Hurricane Bridge Rd. Jonesville, Va. 24263		Rick Napier
Rigga Nash	269 Hurricane Bridge Rd Jonesville VA 24263		Rigga Nash
Gwen Cain	1013 Curt Russell Rd. Jonesville 24263		Gwen Cain
Doug Clark	1057 Curt Russell Rd Jonesville 24263		Doug Clark
CHRIS LEVIS	139 Hurricane Bridge Rd Jonesville 24263		Chris Lewis
Nirdee Gordon	1213 Curt Russell Rd. Jonesville, VA 24263		Nirdee Gordon
Cathy Moretz	1185 Curt Russell Rd Jonesville VA 24263		Cathy Moretz
Dino Jenkins	130 Hurricane Bridge Rd Jonesville VA 24263		Dino Jenkins



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Name	Address	Telephone #	Signature
God's House of Worship	1792 Big Hill Rd. Penn Gap, VA	(276-393-9947)	Billy Posey
Jim & Kim Britton	147 Fox Drive Penn Gap, VA	(276-219-0819)	Kim Britton
Billie Evans Posey Sr.	1792 Trl. Big Hill Rd. Penn Gap	(276-393-9947)	Billy Posey
Elfiada Britton	173 James Britton Dr Penn Gap, VA	(276-546-4138)	Elfiada Britton
Phyllis Spears	115 Fox Dr. Penn Gap VA	(276-546-5233)	Phyllis Spears
Corey & Marian Bledsoe	813 Bighill Rd.	(276)639-1910	Marian Bledsoe
Nathan Winder	127 Sister Field Drive Penn Gap, VA	(276-210-5262)	Nathan Winder
Lois Ridings	245 Sisterfield Drive Penn Gap VA	(276-876-4884)	Lois Ridings
Err: Warren Terry Evans	226 Remy Rd Penn Gap VA	242577	[Signature]
Patricia McDonough	300 Zen Pennington Rd Penn Gap, VA	(276-345-3215)	[Signature]
Karen Maggard	1054 Big Hill Rd. Penn Gap, VA	(276-546-1177)	Karen Maggard
Jeff Hammonds	410 Milford Hammonds Dr. Penn Gap, VA	(276-337-6942)	[Signature]
Anthony Barnette	171 Stonecold Dr. Penn Gap, VA	(276-365-4716)	Anthony Barnette
Jeff Mullins	4121 Big Hill Rd Trl. Penn Gap VA	(276-391-1451)	Jeff Mullins



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Name	Address	Telephone #	Signature
Brent & Brandi Bundy	271 Posey Dr. Pennington Gap, VA 24277	(276-220-3260)	Brandi Bundy
Dixie Bundy	208 Robert Hornsby Dr. Pennington Gap, VA 24277	(276-393-4842)	Wanda Bundy
Stephanie Wilder	1297 Big Hill Rd. Pennington Gap, VA 24277	(276-870-5724)	Stephanie Wilder
Ashley Laney	147 Posey Dr. Pennington Gap, VA 24277	(276-395-1475)	Ashley Laney
Wanda & Bill Posey	Posey Dr. Pennington Gap, VA 24277	(276-393-9947)	Wanda Posey
Brad Chasteen	305 Robert Hornsby Dr. Pennington Gap, VA 24277	(276-275-6413)	Brad Chasteen
Wisa Hyde	464 Robert Hornsby Dr. Pennington Gap, VA 24277	(276-248-1507)	Wisa Hyde
Marcia Hornsby	324 Robert Hornsby Dr. Pennington Gap, VA 24277	(276-546-1627)	Marcia Hornsby
Pam Fannon	219 Alpine Dr. Pennington Gap, VA 24277	(276-546-5277)	Pam Fannon
Jeff Ewing	105 Alpine Dr. Pennington Gap, VA 24277	(276-870-0134)	Jeff Ewing
Bernita Ewing	106 Alpine Dr. Pennington Gap, VA 24277	(276-220-7129)	Bernita Ewing
Chris Bundy	208 Robert Hornsby Dr. Pennington Gap, VA 24277	(276-275-6998)	Chris Bundy
Ashley & Jimmy Mullins	2029 Big Hill Rd. Pennington Gap, VA 24277	(276-393-2121)	Jimmy Mullins
Katherine Foster	1297 Big Hill Rd. Pennington Gap, VA 24277	(276-546-4607)	Katherine Foster



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<u>Name</u>	<u>Address</u>	<u>Telephone #</u>	<u>Signature</u>
Helen + Robert Jones	4235 Big Hill Rd. Penn Gap, VA		Vacant home for sale
Sanders	4241 Big Hill Rd. Penn Gap, VA	24277	
Travis Marum	4000 Big Hill Rd.	(276-210-8409)	
Michael Parsons	168 East Dr.	(276-219-7011)	
Willis Chapel	124 Willis Chapel Rd. Penn Gap, VA	24277	
Stephane Fee	245 Willis Chapel Rd.	(276-393-5557)	Stephane Fee
Brian Fee	248 Willis Chapel Rd.	(276-393-4171)	Brian Fee
Annie Hall	588 "	(276-546-1159)	
Colton McConnell	591 "	(276-393-8406)	Colton McConnell
Anna Faye Wilton	491 "	(276-546-2499)	Anna Faye Wilton
Adam Hall	470 x "	(276-275-4047)	Adam Hall
Kristy Dennis	3408 Big Hill Rd.	(276-346-6349)	Kristy Dennis
Kay Hobbs Helton	727 Big Hill Rd. Penn Gap, VA	(276-546-1130)	Kay Helton
Cinda Duvor	779 Big Hill Rd. Penn Gap, VA	(276-546-3237)	Cinda Duvor



LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Lee County, Virginia who do not have any broadband or adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

Name	Address	Telephone #	Signature
Chris Collins	352 Moon In Back trl Pennington Gap VA 24277	(276-275-9882)	
Arthur Sanders	2702 Big Hill Rd Pennington Gap VA 24277		
Amanda Graham	1453 Big Hill Rd Pennington Gap VA 24277	(276-346-1964)	
Patricia Evans	253 Huckleberry Drive Pennington Gap VA 24277	(276-554-2908)	
Melissa Johnson	144 Ramey Rd., Pennington Gap, VA 24277	(276-365-2034)	
Cheryl Wood	140 Ramey Rd., Pennington Gap, VA 24277	(276-365-4316)	
Carol Spears	430 Spears Dr. Penn Gap, VA 24277		
Charlie Spears	431 Spears Dr. Penn Gap, VA 24277	(276-546-3946)	
Amanda Carter	3145 Big Hill Rd Pennington Gap VA	(276-337-1993)	
Patricia Sexton		(276-219-1360)	
Terry Spears	223 Owl Dr. Pennington Gap, VA 24277		
Vass Brewer			
Mark Carter			
Cody Haynes			



LENOWISCO Planning District Commission in cooperation with Scott County Telephone Cooperative is applying for a Virginia Telecommunications Initiative Grant for areas in Lee County, Virginia who do not have any broadband or adequate 10/1 broadband service. This grant will supply the needed funds to construct a fiber optic-network with broadband speeds of up to 1 Gig of service to your home. If you support this endeavor and feel the need to improve the quality of life and promote economic development in your area, please provide your information below including your signature. Your signature represents your interest only and is not a contract.

Name	Address	Telephone #	Signature
Lizzy Turner	221 Doe Run Trl	Pennington Gap VA 24263	<i>[Signature]</i>
Silvia Turner	224 Doe Run Trl	VA	<i>[Signature]</i>
Misty Whitfield	204 Ninas Dr	VA	<i>[Signature]</i>
Candice Howard	224 Doe Run Trl	VA	<i>[Signature]</i>
William J. [unclear]	1155 Bighill Rd	Pennington Gap VA	<i>[Signature]</i>
Jacqueline Lawson	115A Bighill Rd	Pennington Gap VA	<i>[Signature]</i>
Steven Martin	295 Martins Elevel Dr	Pen Gap VA 24277	
Karen Maggard	1054 Big Hill Rd	Pen Gap, VA 24277	<i>[Signature]</i>
Hubert Gibson (landlord)	778 Big Hill Rd	Pennington Gap, VA 24277	
Jeff Mullins / Mullins Construction	4100 Big Hill Rd	Pen Gap VA 24277	<i>[Signature]</i>
Terry Spears	223 Owl Drive	Pennington Gap, VA 24277	<i>[Signature]</i>
Elsie Burton	404 Big Hill Rd	Pennington Gap, VA 24277	
Patsy Hawkins	476 Big Hill Rd	Pennington Gap, VA 24277	
Arnold Britton	108 Bob Cox Dr	Pennington Gap, VA 24277	<i>[Signature]</i>

2021 Virginia Telecommunication Initiative (VATI) Passing Form

Type of Passings 679	Total Number in Project Area	Number with Speeds at 10/1 or below in Project Area
Residential	671	666
Businesses (non-home based)	3	3
Businesses (home-based)	0	0
Community Anchors	0	0
Non-residential	5	5
Total Number of Passings	679	674

*Note: The Total Number of Passings **MUST** be equal to the Residential, Business (non-home based), Non-residential and Community Anchors sum.*

Definitions

Passing – any structure that can receive service.

Business – An organization or entity that provides goods or services in order to generate profit. Businesses based in residential homes can count if they are a registered business (BPOL, LLC, etc.).

Community Anchor - schools, libraries, medical and health care providers, public safety entities, community colleges and other institutions of higher education, and other community support organizations and agencies that provide outreach, access, equipment, and support services to facilitate greater use of broadband service by vulnerable populations, including low-income, unemployed, and the aged.

Non-Residential Passing – places of worship, federal, state, or local facilities or other potential customers that are neither a residence, business or a community anchor as defined above.

Attachment 5

Propagation Map if Wireless Project

N/A

Attachment 6 - Timeline/Project Management Plan

LENOWISCO VATI FY2021 "US 58 Corridor Broadband Expansion Project"

Task	Responsible Person	Responsible Entity	Proposed Timeline											
			Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Apply for Permits	Matthew Hill/Metts Eng.	SCTC												
Solicit Quotes for Materials/Electronics	Matthew Hill/Metts Eng.	SCTC												
Select Vendors for Materials/Electronics	Matthew Hill/Metts Eng.	SCTC												
Prepare Quarterly Report	Jimmy Adkins/Melissa Jessee	LENOWISCO/SCTC												
Construction	Mathew Hill/Bo Gooden	SCTC/ Powell Valley Electric												
Fiber Splicing/Testing	Mathew Hill	SCTC												
Electronics Installation	Mathew Hill	SCTC												
Prepare Quarterly Report	Jimmy Adkins/Melissa Jessee	SCTC												
Installations/Marketing	Greg Hood	SCTC												
Prepare Closeout Report	Jimmy Adkins/Melissa Jessee	SCTC												
Project Complete	Mathew Hill	SCTC												

Starting Date is when contract is signed with DHCD



Memorandum of Understanding Between Scott County Telephone Cooperative and the LENOWISCO Planning District Commission

1. Whereas the LENOWISCO Planning District Commission (LENOWISCO) is authorized by Chapter 42 of title 15.2 of the Code of Virginia, 1950 as amended, to assist local government units in planning their development; and
2. Whereas, the Scott County Telephone Cooperative's (SCTC) mission includes providing regional telecommunication services, active community service and promoting economic development; and
3. Whereas, the Virginia Department of Housing and Community Development's (DHCD) Virginia Telecommunications Initiative (VATI) is established to provide financial assistance to supplement construction costs to extend service to areas that are presently unserved; and
4. Whereas, the VATI program requires a unit of government to serve as applicant, along with a private sector provider as a co-applicant; and
5. Whereas, LENOWISCO and SCTC both actively support the same goals regarding regional broadband expansion.
6. Now Therefore Be It Resolved, that the LENOWISCO Planning District Commission and Scott County Telephone Cooperative's partnership consist of, but not limited to, the following components:
 - SCTC will coordinate planning/technical staff and applicable consultants in gathering the information necessary to submit the identified projects and subsequent implementation if awarded.
 - LENOWISCO will provide grant administrative services and technical assistance with utilities, localities, public entities, etc. where applicable.
7. Be it further resolved, that, unless duly noted, the SCTC and/or applicable consultants are responsible for creation and compilation of any and all necessary data or information required for submission and implementation of any partnered project.

Accepted by Scott County Telephone Cooperative

William J. Franklin
WILLIAM J. FRANKLIN, Chief Executive Officer

8-29-19
Date

Accepted by the LENOWISCO Planning District Commission

Duane A. Miller
DUANE A. MILLER, Executive Director

8/30/19
Date

Attachment 7

MOU and Agreement
between
Scott County Telephone Cooperative
and
Powell Valley Electric Cooperative

Memorandum of Understanding (MOU)

Whereas Powell Valley Electric Cooperative (PVEC) and Scott County Telephone Cooperative (SCTC) wish to cooperate to design, construct, and operate additions to the existing SCTC fiber optic network for purposes of providing Automated Meter Infrastructure (AMI) capability to every PVEC member.

Whereas PVEC is recognized as having extensive and longstanding experience in line construction and maintenance.

Whereas SCTC is recognized as a leader in rural fiber optic broadband deployment.

PVEC hereby coordinates with SCTC for the expansion of fiber lines to the homes and businesses of PVEC members to meet the goal of providing AMI to every PVEC member as appropriate and providing communications for PVEC's other electrical needs.

PVEC RESPONSIBILITIES: PVEC will be responsible for:

- Construction of backbone fiber, drop fiber, installation of member premise electronics, and splicing.
- PVEC will work with SCTC to verify materials are compatible to SCTC's existing network.
- Maintenance on all fiber in the PVEC footprint and this maintenance charge will be at PVEC cost and billed to SCTC monthly.

FINANCIAL RESPONSIBILITIES: PVEC will finance any or all of PVEC's costs (including both capital and construction) associated with its responsibilities listed above in PVEC RESPONSIBILITIES. These costs will be accrued through the PVEC work order system and a running total of its Project Costs will be maintained by PVEC. All PVEC work order costs, which are not offset by grant funding, will be reimbursed by SCTC at a monthly rate of \$40.00 per member connected and serviced on the broadband network. These member revenues will be tabulated monthly and the amounts paid to PVEC. All applicable payments will be deducted from the running Project total owed to PVEC by SCTC.

AUDIT RIGHTS: SCTC will have the right to audit project-related portions of PVEC's work order system at any time to determine total accumulated costs. PVEC will have the right to audit SCTC's collections of project-related revenue and all other SCTC expenditures pursuant to this initiative.

SCTC RESPONSIBILITIES: SCTC will be responsible for

- Providing light to the fiber,

- Provisioning services, monitoring equipment, engineering, material specifications,
- Identifying target areas in conjunction with PVEC,
- Quality control, training on installation of electronics, and training for splicing.

NETWORK OWNERSHIP: PVEC, at its sole discretion, may declare an area materially complete and, SCTC will then start paying Joint Use pole attachment rent to PVEC for poles in that area. The designated areas will be determined by PVEC. When 100% of the fiber network is paid in full, ownership of the fiber network will be transferred "AS IS" from PVEC to SCTC.

SCTC will provide, free of charge, network connectivity and communications to all installed PVEC Demarc equipment indefinitely, including downline devices, substations, radios, etc.

DEFINITIVE AGREEMENT: This Memorandum of Understanding sets forth the understanding of the parties regarding the transactions described herein. The parties shall exercise definitive agreements, including but not limited to, an operating agreement for Project by January 1, 2019, unless otherwise agreed by the parties.

If the foregoing is acceptable to you, please sign and date this Memorandum of Understanding in the space provided below.

SCOTT COUNTY TELEPHONE COOPERATIVE

BY: Bill Franklin
Bill Franklin, General Manager/CEO

Date 1-14-19

POWELL VALLEY ELECTRIC COOPERATIVE

BY: Randell Meyers
Randell Meyers, General Manager/CEO

Date 1/14/2019

**Fiber Lease Agreement
between
Scott County Telephone Cooperative
and
Powell Valley Electric Cooperative, Inc.**

This Agreement, made and entered into this the first day of January, 2019 between Scott County Telephone Cooperative of Gate City, Virginia (hereinafter called "SCTC"), and Powell Valley Electric Cooperative, Inc., with headquarters at New Tazewell, Tennessee (hereinafter called "PVEC") and collectively called "Parties."

WITNESSETH:

WHEREAS, the PVEC's service area includes all or parts of Claiborne, Hancock, Union, Grainger and Hawkins Counties in Tennessee, and parts of Lee, Scott and Wise Counties in Virginia (hereinafter called "Service Area") and, in an effort to modernize its electric grid, PVEC proposes to deploy fiber throughout its service area to meet the current and future needs of its electrical system; and

WHEREAS, in addition to improving communications with its offices, substations, down line devices, radios, and other equipment, PVEC plans to replace its existing antiquated metering system with real time metering (called AMI) by deploying fiber throughout its Service Area; and

WHEREAS, SCTC recognizes that Sunset Digital Communications, LLC currently provides PVEC with communications to its offices, substations, down line devices, radios, etc. under a long term agreement and

understands the need to coordinate its fiber deployment accordingly; and

WHEREAS, to ensure the success and timelines of PVEC's grid moderation project, PVEC plans to construct fiber and associated equipment to each home and business within its service area (hereinafter called "Buildout") and lease the excess fiber to SCTC, it being the objective of PVEC to provide the fiber deployment at zero net cost to its members.

NOW THEREFORE, for and in consideration of the premises and the mutual covenants set forth, the parties hereto covenant and agree to the following terms:

- I. Training: SCTC will provide, at SCTC's expense, adequate training for PVEC's personnel in all aspects of fiber installation and related equipment installation. SCTC will also provide, to PVEC at SCTC's expense, training in splicing, fiber allocation, and related training.
- II. Engineering and Design: PVEC will have full control of all design and construction of facilities it builds under this Agreement. SCTC may advise and consult but must, upon PVEC's request, provide all engineering. SCTC must determine, for PVEC and at no cost to PVEC, if materials that PVEC specifies are compatible with SCTC's network.
- III. Construction ("Buildout"):
 - A. Non-grant: PVEC will provide, install and splice dark fiber and provide and install associated hardware, enclosures, etc. (but will not provide or install pop sites or associated electronics) to every home and business without Broadband within PVEC's service area to meet

the PVEC's current and future electrical needs and will initially own the facilities that it constructs. SCTC may also construct (at its expense) and own facilities within PVEC's Service Area. To ensure compatibility, SCTC will purchase and provide all electronics.

B. Grant/Loan: SCTC and PVEC may jointly or individually apply for grants and/or loans to fund Broadband projects within PVEC's Service Area. The parties may negotiate separate unit prices and payment arrangements for such projects.

C. Fiber Lighting: In either case (Non-Grant or Grant/Loan), SCTC will light all fiber and incorporate it into SCTC's Network. SCTC shall offer Broadband Services to each prospective PVEC member.

IV. Maintenance: PVEC, at SCTC's expense, will, to the extent that it is able to do so, perform maintenance on the Buildout and SCTC's Network located within PVEC's service area. Said maintenance costs are not to be considered part of the Buildout Project costs.

V. Buildout Costs, Lease and Reimbursement:

A. Buildout costs incurred by the Cooperative will be accumulated utilizing the Cooperative's standard work order system and will include applicable overheads. In addition, Buildout costs will be increased to reflect PVEC's costs for any 3rd party joint-use pole rents paid for non-PVEC owned poles and for property taxes hereinafter described. All accumulated net buildout costs will be increased monthly by a 1/12 of 5% finance charge. All costs will be

accumulated and totaled on an ongoing basis to reflect PVEC's current Buildout Project costs.

B. SCTC will pay to PVEC a monthly lease fee equal to the following:

(a) For Residential Internet Service; 66.67% of SCTC's share of its revenue, and

(b) For Residential Dial Tone Service; 50.00% of SCTC's share of its net revenue, and

(c) For all services sold to businesses; 50.00% of SCTC's share of its net revenue, and

(d) For all video services, 0.00% of SCTC's share of its revenue.

These payments will be based on each customer connected and serviced from the Network (regardless of which party provided the construction), commencing January 1, 2019, and will continue until the sum of all monthly lease payments made hereunder equals PVEC's current total Buildout Project costs, including its finance charge, plus an accrued sum of 1/12 of 0.57% per month of PVEC's Gross Buildout Project Costs to cover its associated property taxes on the Buildout Project. Work performed by PVEC after this point is reached will be billed to and paid by SCTC on a "per job basis."

C. SCTC will promptly reimburse PVEC for any payments due it under any grant/loan projects. These reimbursements will be in addition to any monthly lease fee payments. Facility ownership will be in accordance with each applicable grant/loan.

- VI. Communication Services Provided: SCTC will provide perpetually, at no cost to PVEC, all of the PVEC's communication requirements throughout its entire service area including but not limited to, its offices, substations, line equipment, radios and meters.
- VII. The term of this agreement is perpetual and infinite. Either Party reserves the right to cancel this Agreement at any time subject to the following:
- A. SCTC must continue making the monthly fiber lease payment, as provided above, until such time as the total fiber lease payments made hereunder equals PVEC's total Buildout Project costs, all 3rd party joint-use pole rents; all finance charges and all accrued property tax amounts, or pay all amounts due herein in full lump sum; and
 - B. SCTC must continue providing to PVEC the communication services set forth in VI above free of charge perpetually. In the event that SCTC or its successors assigns fail to adequately provide these free communications, SCTC (or its successors or assigns) herein grants PVEC an irrevocable right to use (IRU) 4 dark fibers within its entire network in Virginia and Tennessee to continue meeting its communication needs.
- VIII. Customer Service/Payment Collections: Both Parties herein agree to mutually explore such means and methods by which PVEC may collect bill payments for and/or handle service requests for SCTC and negotiate a corresponding price per service/collection fee payable by SCTC to PVEC for such services rendered.

- IX. Transfer of Ownership/Joint Use rents/Taxes:
When the total lease payments made, (as provided in Article V.B above) equals PVEC's total Buildout Projects costs including the accrued property tax amount, accrued finance charges and any 3rd party joint-use pole rents, PVEC will sell its Buildout fiber facilities to SCTC for the sum of \$1.00 and other considerations as listed in Article VI and Article VII.B. Transfer of ownership will be "AS IS." PVEC, at its sole discretion, may also declare an area materially complete. SCTC must then start paying pole rent as provided under its current joint use pole agreement with PVEC for the additional attachments made to PVEC owned poles during the Buildout. Each party is responsible to the applicable taxing authority for the payment of taxes due on the fiber Buildout facilities that it owns. During the Buildout, SCTC is responsible for any joint use pole rents due PVEC for only SCTC owned facilities attached to PVEC owned poles.
- X. 3rd Party: SCTC recognizes that some buildout facilities will be attached to 3rd party poles. For facilities constructed outside of PVEC's service area, PVEC will only serve as a subcontractor and SCTC will be responsible to PVEC for all of its costs. SCTC will own the facilities and be responsible for securing any 3rd party joint-use agreements. For facilities constructed within PVEC's service area, SCTC will be responsible for securing any applicable 3rd party joint-use agreements prior to the transfer of ownership from PVEC to SCTC.
- XI. Audit Rights: SCTC will have the right to audit project related portions of PVEC's work order system at any time to determine total accumulated costs. PVEC will have the right to audit SCTC

collections of project related revenue pursuant to this Agreement.

XII. Power Space: SCTC recognizes that the Buildout facilities may include some fiber facilities being located in PVEC's power space and that such facilities require special qualifications and training for personnel working in such power space.

XIII. Assignment: This Agreement is not assignable by either party unless specifically approved by the other party.

XIV. Hold Harmless:

A. SCTC agrees to indemnify and hold harmless PVEC from and against any and all liability, costs, attorneys' fees incurred, expenses, claims and demands, including payment under any workman's compensation laws or under any plan for employee's disability and death benefits, for damage to property, and/or injury to or death of persons, including but not limited to, injuries to and death of employees of SCTC when such damage to property or injury to or death of persons arises out of, results from, or is caused by the negligence or intentional act of SCTC or its employees.

B. PVEC agrees to indemnify and hold harmless SCTC from and against any and all liability, costs, attorneys' fees incurred, expenses, claims and demands, including payment under any workman's compensation laws or under any plan for employee's disability and death benefits, for damage to property, and/or injury to or death of persons, including but not limited to, injuries to and death of employees of PVEC when such damage to property or injury to or death of

persons arises out of, results from, or is caused by the negligence or intentional act of PVEC or its employees.

- XV. Relationship between the Parties: It is understood and agreed that the relationship between the Parties created by this Agreement is that of independent lessor and independent lessee. The Parties agree to comply with all state and federal laws regarding employment of their own employees (if any) including, but not limited to: (a) unemployment insurance, (b) worker compensation (c) withholding of taxes, (d) social security, (e) pension and retirement plans, and (f) medical insurance, and any and all other such regulations and laws, and to further forever save and hold harmless the other party from any and all liability resulting from their failure to so perform.

(Signatures appear on following page.)

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their respective officers thereunto duly authorized, as of the day and year first written above.

SCOTT COUNTY TELEPHONE
COOPERATIVE

William J. Franklin
William J. Franklin, CEO

ATTEST:

Charles "B" Good

POWELL VALLEY ELECTRIC
COOPERATIVE, INC.

Randell W. Meyers
Randell W. Meyers
General Manager/CEO

ATTEST:

Charles "B" Good

Attachment 7

Pole Attachment Agreement between
SCTC
and
Old Dominion Power Company

ATTACHMENT AGREEMENT

THIS AGREEMENT, made this 2nd day of March,
1987 by and between SCOTT COUNTY TELEPHONE COOPERATIVE,
hereinafter called "Permittee", party of the first part, and the
OLD DOMINION POWER COMPANY, a corporation of the State of
Virginia, hereinafter called "ODP", party of the second part,

W I T N E S S E T H:

WHEREAS, pursuant to the provisions of this Agreement and
attached Schedules A, B, and C, which are hereby made a part of
this Agreement, Permittee desires to cause the installation of
the facilities described in Schedule A on the poles of ODP
likewise described in such Schedule in the area as shown on such
Schedule; and,

WHEREAS, ODP is willing to permit, to the extent it may
law-fully do so, the attachment of the described facilities, to
its poles where, in its judgment, such use will not interfere
with its own use of the facilities and of all other licensees
using ODP's poles,

NOW, THEREFORE, in consideration of the mutual covenants,
terms and conditions herein contained, the parties hereto do
hereby mutually covenant and agree as follows:

1. PERMITTED ATTACHMENTS. ODP agrees to permit Permittee
to attach and maintain the facilities described in the Schedule A
attached to this Agreement to ODP's poles and other facilities
likewise described in the attached Schedule and designated on the
attached print, in the manner set out and pursuant to the

provisions of this Agreement. Permittee agrees to pay ODP any fees established by and pursuant to the attached Schedule B. All attachments made pursuant to this Agreement shall be at such points and in such manner as ODP or its agents may direct.

2. CONSTRUCTION AND MAINTENANCE REQUIREMENTS AND SPECIFICATIONS. All facilities attached pursuant to this Agreement shall be erected and maintained in accordance with the requirements and specifications of the National Electrical Safety Code, current edition, ODP's construction practices, or any amendments or revisions of said Code; in compliance with any rules, orders, or regulations now in effect or that hereinafter may be issued by the State Corporation Commission of Virginia; in compliance with all applicable federal, state or local laws, rules, regulations and/or ordinances and in compliance with all applicable rules, orders, or regulations issued by any federal, state or local authority. In the event any of Permittee's construction does not meet ODP's specifications, Permittee will correct same in fifteen (15) work days after written notification. If Permittee fails to correct same within fifteen (15) days, ODP may make such corrections and bill Permittee for the total costs incurred. Permittee, at all times, warrants legal compliance as set out above and assumes all responsibility for insuring such compliance and for any damages, fines or penalties resulting from any noncompliance. ODP undertakes no duty with respect to such compliance by requiring Permittee to meet any specifications or by requiring or failing to require any

corrections, modifications, additions or deletions to any work or planned work by Permittee.

3. MAINTENANCE OF ATTACHMENTS. At all times, Permittee shall, at its own expense, make and maintain said attachments in safe condition and in thorough repair, and in a manner suitable to ODP and so as not to conflict with the use of said poles by ODP, or by any other parties, firms, corporations, governmental units, etc., using said poles, pursuant to any license or permit by ODP, or interfere with the working use of facilities thereon or which may, from time to time, be placed thereon. ODP in no way insures the continuance of Permittee's facilities at their original location or placement of ODP's poles or other facilities. If ODP determines, at its sole discretion to relocate, replace, enlarge, add to, modify or in any manner alter its poles or other facilities, even for ODP's sole convenience, Permittee shall, at its expense, remove and/or relocate its own facilities in a manner directed by ODP. Permittee shall promptly, at any time, at its own expense, upon written notice from ODP, at ODP's sole discretion, relocate, replace or renew the facilities placed on said poles, and transfer them to substituted poles, or perform any other work in connection with said facilities that may be required by ODP. In case of emergency, ODP may arrange to relocate, replace or renew the facilities placed on said poles, transfer them to substituted poles or perform any other work in connection with said facilities that may be required in the maintenance, replacement, removal or relocation of said poles, the facilities thereon or which may be placed thereon, or for the service needs of ODP, or

its other licensees, and Permittee shall, on demand, reimburse ODP for the expense thereby incurred. ODP undertakes no duty however to inspect or insure the repair of any facilities.

4. MAINTENANCE AND OPERATION OF ODP'S FACILITIES. ODP reserves to itself, its successors and assigns, the right to maintain its poles and to operate its facilities thereon in such manner as will, in its own judgment, best enable it to fulfill its own service requirements, but in accordance with the specifications hereinbefore referred to. ODP shall not be liable to Permittee for any interference with the operation of Permittee's facilities arising in any manner out of the use of ODP's poles hereunder.

5. EASEMENTS. Permittee must secure its own easement rights on private property. ODP's approval of attachments shall not constitute any representation or warranty by ODP to Permittee regarding Permittee's right to occupy or use any public or private right-of-way.

6. INSPECTION OF FACILITIES. ODP reserves the right to inspect at any time the facilities described in the attached Schedule. Permittee shall, on demand, reimburse ODP for the expense of any such inspections at ODP's prevailing wage rate per manhour plus associated expenses and applicable overheads. Such inspections, made or not, shall not operate to relieve Permittee of any responsibility, obligation or liability assumed under this

Agreement. ODP undertakes no duty to inspect such facilities or insure that no damage or loss occurs by reason of such facilities.

7. PRECAUTIONS TO AVOID FACILITY DAMAGE. Permittee shall not damage any facilities of ODP or of others supported on ODP's poles and facilities. Permittee shall not interfere with ODP's operation; and hereby assumes all responsibility for any and all loss for such damage and for interference. Permittee shall make an immediate report to ODP of any damage or interference and hereby agrees to reimburse ODP for the expense incurred in making repairs.

8. INDEMNITIES. Permittee agrees to protect, defend, indemnify and save harmless ODP from any and all damage, loss, claim, demand, suit, liability, penalty or forfeiture of every kind nature, including but not limited to costs and expenses of defending against the same, payment of any settlement or judgment therefore and reasonable attorney's fees, by reason of (a) injuries or deaths to persons, (b) damages to or destructions of properties, (c) pollutions, contaminations of or other adverse effects on the environment or (d) violations of governmental laws, regulations or orders whether suffered directly by ODP itself or indirectly by reason of claims, demands or suits against it by third parties, resulting or alleged to have resulted from acts or omissions of Permittee, its employees, agents, or other representatives or from their presence on the premises of ODP or otherwise from performance of this Agreement,

or from or in connection with the construction, installation, operation, maintenance, presence, replacement, enlargement, use or removal of any facilities of Permittee attached or in the process of being attached or removed from any poles of ODP.

9. ATTACHMENT REMOVAL AND NOTICES. Permittee may voluntarily remove its attachments from any pole or poles of ODP, but shall give ODP prior written notice of any such removal. Any such removal shall be undertaken in a manner consistent with Paragraph 7 of this Agreement. No refund of any rental will be due on account of such voluntary removal.

10. NONCOMPLIANCE. If Permittee fails to comply with any of the provisions of this Agreement or defaults in any of its obligations under this Agreement and fails to correct such default or noncompliance within thirty (30) days after written notice from ODP, ODP may, at its option, forthwith terminate this Agreement by giving written notice to Permittee of said termination. No refund of any rental will be due on account of such termination.

11. BILLING. Bills for inspections, expenses and other charges under this Agreement shall be payable within thirty (30) days after presentation. Nonpayment of bills shall constitute a default of this Agreement.

12. WAIVERS. Failure to enforce or insist upon compliance with any of the terms or conditions of this Agreement shall not constitute a general waiver or relinquishment of any such terms or conditions, but the same shall be and remain at all times in full force and effect.

13. USE OF ODP'S FACILITIES BY OTHERS. Nothing herein contained shall be construed as affecting the rights or privileges previously conferred by ODP, by contract or otherwise, to others, not parties to this Agreement, to use any poles covered by this Agreement; and ODP shall have the right to continue and to extend such rights and privileges. The attachment privileges herein granted shall at all times be subject to such previously conferred privileges.

14. ASSIGNMENT. Permittee shall not assign, transfer or sublet the privileges hereby granted without the prior written consent of ODP. Any attempt to so assign without such written consent shall be void.

15. PROPERTY RIGHTS. No use, however extended, of ODP poles or other facilities under this Agreement shall create or vest in Permittee any ownership or property rights in said poles; rights herein contained shall be and remain a mere permission. Nothing herein contained shall be construed to compel ODP to maintain any of said poles for a period longer than demanded by its own service requirements.

16. TERM. This Agreement shall become effective upon its execution and if not terminated in accordance with the provisions of Paragraph 10 shall continue in effect for a term of not less than one (1) year. Either party may terminate the Agreement at the end of said year or at any time thereafter by giving to the other party at least six (6) months' written notice. Upon termination of the Agreement in accordance with any of its terms, Permittee shall immediately remove all its facilities attached to ODP's poles or other facilities pursuant to this contract. All

costs of such removal will be borne by Permittee. Permittee shall exercise precautions to avoid damage to facilities of ODP in so removing and assumes all responsibility for any and all such damage. If Permittee's facilities attached to ODP's pole and other facilities pursuant to this contract are not promptly removed, ODP shall have the right to remove them at the cost and expense of Permittee and without any liability therefore.

17. NOTICES. Any notice or request required by this Agreement shall be deemed properly given if mailed, postage prepaid, to the General Manager, Old Dominion Power Company, P.O. Drawer 658, Norton, VA 24273, in the case of ODP; and to:

MANAGER, SCOTT COUNTY Telephone Co-op, P.O. Box 487
Gate City, Va 24251

in the case of Permittee. The designation of the person to be notified, and/or his address may be changed by ODP or Permittee at any time, or from time to time, by similar notice.

18. ACCESS. At all times, Permittee shall maintain, operate and/or construct all facilities in such manner to insure that ODP has full and free access to all of its facilities described in the Schedule attached to this Agreement for the

purpose of repairing, rebuilding, replacing, maintaining and operating such facilities.

19. ADJUSTMENTS. Nothing contained herein shall be construed as affecting in any way the right of ODP, and ODP shall at all times have the right, to unilaterally make a change in the rental charge for attachment to poles, other charges as provided for, any rule, regulation, condition or any other change required. Such change or changes to become effective as provided for in this Agreement after written notification or changes in applicable regulations or statutes.

20. SUCCESSORS AND ASSIGNS. Unless to the provisions of Section 15 hereof, this Agreement shall extend to and bind the successors and assigns of the parties hereto.

21. INSURANCE. Unless otherwise specified in the attached Schedule C, Permittee shall maintain in force during the term of this Agreement at its expense public liabilities insurance, with deductible provisions and in a minimum amount satisfactory ODP as provided in Schedule C. Upon request, Permittee shall provide ODP with certificates or other evidence of any insurance coverage required herein. Every contract of insurance providing the coverages required herein shall contain the following or equivalent clause: "No reduction, cancellation, or expiration of the policy shall become effective until ten (10) days from the date written notice thereof is actually received by Permittee and ODP as appropriate."

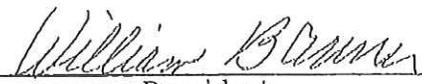
22. ENTIRE AGREEMENT. This Agreement and attached Schedules constitute the entire Agreement between ODP and Permittee and all previous representations relative thereto, either written or oral, are hereby annulled and superseded. No modification shall be binding on ODP and Permittee unless it shall be in writing and signed by both parties. Nothing contained in this Agreement or attached Schedules shall be construed as having any effect in any future agreement or contemplated future agreement between the parties.

23. HEADINGS. Paragraph headings are for the convenience of the parties only and are not to be construed as part of Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed the day and year first above written.

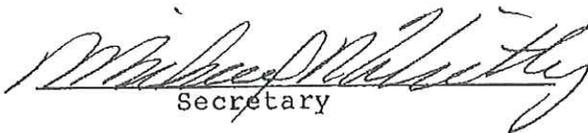
ATTEST:

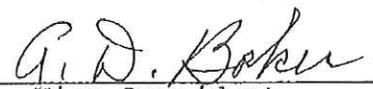

Secretary

By: 
President

ATTEST:

OLD DOMINION POWER COMPANY


Secretary

By:  G.D. Baker ^{W.E.B.}
Vice President

Attachment 8 - VATI FUNDING SOURCES TABLE

LENOWISCO Planning District Commission
 VATI FY2021 US 58 Corridor Broadband Expansion Project
 Lee County, VA

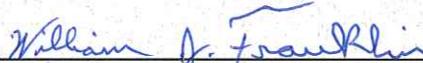
Source	Amount	%	Status
REQUESTED VATI	\$1,230,563.00	60%	Pending
SCOTT COUNTY TELEPHONE COOPERATIVE	\$ 820,375.00	40%	MATCHING FUNDING – CASH ON HAND (SECURED)
	\$		
	\$		
	\$		
	\$		
	\$		
TOTAL	2,050,938.00	100 %	

Attachment 9

Commitment of Matching Funds from Scott County Telephone Cooperative

I hereby certify that \$820,375.00 in funds are available from Scott County Telephone Cooperative (SCTC) for LENOWISCO Planning District Commission's Virginia Telecommunications Initiative (VATI) FY2021 US 58 Corridor Broadband Expansion Project located in Lee County, VA thru the Virginia Department of Housing and Community Development (DHCD).

VATI Requested Amount:	\$	1,230,563.00
SCTC Cash on-Hand:	\$	<u>820,375.00</u>
	\$	2,050,938.00



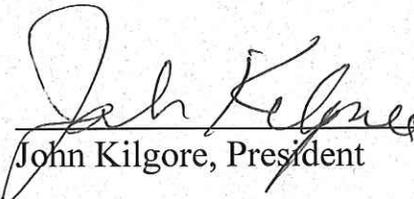
William J. Franklin
Chief Executive Officer
Scott County Telephone Cooperative

7-29-20
Date

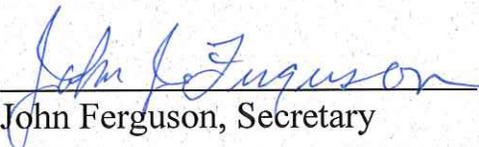
BOARD RESOLUTION

The Board of Directors of the Scott County Telephone Cooperative do hereby resolve to apply for a Virginia Telecommunications Initiative grant in cooperation with the LENOWISCO Planning District thru the Virginia Department of Housing and Community Development and authorize Scott County Telephone Cooperative Chief Executive Officer William J. Franklin to sign on behalf of the corporation and accept responsibility for the accuracy of the application and for the appropriate use of funds, should they be granted.

This resolution was approved upon a motion by Director Jimmy McConnell and duly seconded by Director Brad Bowen on June 8, 2020. The motion carried unopposed.



John Kilgore, President



John Ferguson, Secretary

Pro Forma 5-Year Financial Forecast - All Areas
Balance Sheet - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical					Forecast Period				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cash	\$ 4,507,034	\$ 5,502,776	\$ 5,051,167	\$ 4,433,942	\$ 3,096,325	\$ 5,947,641	\$ 5,519,131	\$ 6,725,406	\$ 7,933,925	\$ 9,902,436
Accounts Receivable	669,311	825,985	857,875	885,375	922,816	1,266,928	1,277,153	1,287,378	1,297,603	1,307,828
Plant Under Construction	561,441	541,016	637,948	1,187,717	1,387,717	1,492,263	1,586,517	1,680,771	1,775,025	1,869,279
Materials & Supplies	160,778	179,950	166,918	168,587	170,273	171,976	173,696	175,432	177,187	178,959
Other current assets	5,898,564	7,049,727	6,713,908	6,675,621	5,577,131	8,878,808	8,556,497	9,868,988	11,183,740	13,258,502
Total Current Assets										
Plant in Service	-	-	-	-	-	-	-	-	-	-
Plant Under Construction	67,204,502	69,013,544	71,771,543	72,521,957	76,312,333	79,511,958	82,521,958	84,521,958	86,271,958	88,521,958
Accumulated Depreciation - Other Assets	2,115,472	1,235,150	858,494	772,645	695,380	625,842	583,288	506,932	456,239	410,615
Other Non-Current Assets	(41,677,732)	(44,822,110)	(47,418,335)	(50,786,666)	(54,789,343)	(59,225,720)	(63,976,878)	(66,965,950)	(74,078,373)	(79,190,797)
Total Non-Current Assets	2,114,553	3,867,356	3,540,229	5,790,229	7,640,229	7,716,631	7,866,631	8,016,631	10,266,965	11,766,965
Total Non-Current Assets										
Total Assets	\$ 29,756,795	\$ 29,293,940	\$ 29,051,931	\$ 28,298,165	\$ 29,858,599	\$ 28,628,711	\$ 26,975,169	\$ 24,079,571	\$ 22,916,789	\$ 21,508,741
Total Liabilities and Equity	\$ 35,655,359	\$ 36,343,667	\$ 35,765,839	\$ 34,973,785	\$ 35,435,730	\$ 37,507,519	\$ 35,531,666	\$ 33,948,559	\$ 34,100,529	\$ 34,767,244
Accounts Payable	\$ 861,100	\$ 867,577	\$ 1,001,875	\$ 1,437,979	\$ 1,287,979	\$ 1,137,979	\$ 987,979	\$ 837,979	\$ 687,979	\$ 537,979
Current Portion - Existing Debt	1,403,000	1,857,000	1,874,085	1,776,634	689,948	689,948	973,840	667,029	617,942	617,942
Other Current Liabilities	479,971	465,152	489,364	424,364	359,364	319,364	304,364	289,364	274,364	259,364
Total Current Liabilities										
Existing Debt	9,654,364	9,089,048	7,889,938	9,173,435	9,968,487	10,298,638	7,819,798	6,152,769	5,534,827	5,534,827
Other Non-Current Liabilities	3,594,901	4,703,179	4,966,758	1,150,356	1,075,356	900,356	425,356	-	-	-
Total Non-Current Liabilities										
Total Liabilities	\$ 13,249,265	\$ 13,792,227	\$ 12,856,656	\$ 10,323,791	\$ 11,043,843	\$ 11,198,994	\$ 8,245,154	\$ 6,152,769	\$ 5,534,827	\$ 5,534,827
Total Equity	\$ 15,993,336	\$ 16,981,956	\$ 16,222,020	\$ 13,962,768	\$ 13,381,134	\$ 13,346,185	\$ 10,511,337	\$ 7,947,141	\$ 7,115,112	\$ 6,950,114
Capital Stock	103,404	102,874	101,932	106,128	109,878	113,628	117,378	121,128	124,878	128,628
Accumulated other comprehensive income	(2,464,982)	(3,513,934)	(4,560,451)	(4,750,000)	(4,950,000)	(4,202,000)	(4,750,000)	(4,960,000)	(5,135,000)	(5,135,000)
Patronage Capital Credits	22,023,601	22,772,771	24,002,338	25,654,889	26,894,718	28,249,706	29,652,951	30,840,290	31,995,639	32,823,503
Total Equity										
Total Liabilities and Equity	\$ 19,662,023	\$ 19,361,711	\$ 19,543,819	\$ 21,011,017	\$ 22,054,596	\$ 24,161,334	\$ 25,020,329	\$ 26,001,418	\$ 26,985,417	\$ 27,817,131
Total Liabilities and Equity	\$ 35,655,359	\$ 36,343,667	\$ 35,765,839	\$ 34,973,785	\$ 35,435,730	\$ 37,507,519	\$ 35,531,666	\$ 33,948,559	\$ 34,100,529	\$ 34,767,244

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - All Areas
Income Statement - VATI

Scott County Telephone Cooperative, Inc. and Subsidiary

	Historical					Forecast Period				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
REVENUES										
Broadband, Voice and Video	\$ 8,805,259	\$ 8,995,259	\$ 8,987,034	\$ 9,057,890	\$ 9,296,918	\$ 9,724,361	\$ 9,922,769	\$ 9,992,934	\$ 10,059,524	\$ 9,552,113
Network Access Service Revenues	2,896,092	3,063,850	3,197,001	2,980,137	2,953,927	2,928,212	2,893,798	2,866,340	2,842,451	2,828,688
Long distance	1,364,471	2,131,082	2,206,214	2,220,568	2,236,038	2,247,927	2,266,186	2,282,668	2,302,875	2,325,810
Other Operating Revenues	2,420,794	2,341,423	3,091,423	3,223,938	3,279,691	3,528,081	3,753,081	3,940,735	4,137,772	4,344,661
Uncollectible Revenues	(106,539)	(113,594)	(101,685)	(104,551)	(105,191)	(110,028)	(112,273)	(113,066)	(113,820)	(108,079)
Total Revenues	15,380,077	16,418,020	17,379,987	17,377,981	17,661,393	18,318,554	18,723,523	18,971,611	19,228,782	18,943,193
EXPENSES										
Plant Specific	2,592,175	2,721,990	3,012,465	3,360,852	3,618,933	3,990,141	4,301,752	4,611,747	4,970,142	5,170,142
Plant Non-specific (excluding depreciation)	4,738,545	5,587,317	5,394,757	5,157,488	4,899,614	4,654,633	4,421,901	4,200,806	3,990,766	3,791,228
Depreciation	3,783,321	3,471,035	3,541,028	3,368,331	4,002,677	4,436,377	4,750,958	4,989,272	5,112,423	5,112,424
Customer Operations and Corporate	3,262,060	3,341,927	3,341,068	3,433,865	3,468,204	3,502,886	3,537,915	3,573,294	3,609,027	3,645,117
Other Operating	-	-	-	-	-	-	-	-	-	-
Total Expenses	14,376,101	15,122,269	15,289,308	15,320,536	15,989,427	16,584,037	17,012,526	17,375,119	17,682,358	17,718,911
Net Operating	1,003,976	1,295,751	2,090,679	2,057,445	1,671,966	1,734,518	1,710,997	1,596,492	1,546,424	1,224,282
Nonoperating Net Income	29,744	55,764	20,435	6,289	6,352	6,415	6,480	6,544	6,610	6,676
Interest Expense - Existing Debt	383,287	349,553	341,325	306,138	329,000	271,886	195,443	292,024	269,066	269,066
AFUDC	53,111	57,709	49,863	64,127	64,768	65,416	66,070	66,731	67,398	68,072
Income Taxes	664,934	291,871	529,852	169,172	174,247	179,475	184,859	190,405	196,117	202,000
Net Income (Loss)	38,610	767,800	1,289,800	1,652,551	1,239,829	1,364,988	1,403,245	1,187,339	1,155,249	827,964

See summary of significant forecast assumptions and accounting policies and accountant's report.

Pro Forma 5-Year Financial Forecast - All Areas
Cash Flows - VATI

	Historical					Forecast Period				
	2016	2017	2018	2019	2020	2021	2022	2023	2024	
Beginning Cash	\$ 5,539,690	\$ 4,507,035	\$ 5,502,776	\$ 5,051,167	\$ 4,433,942	\$ 3,096,325	\$ 5,947,641	\$ 5,519,131	\$ 6,725,406	
CASH FLOWS FROM OPERATING ACTIVITIES										
Net Income (Loss)	38,610	767,800	1,289,800	1,652,551	1,239,829	1,354,988	1,403,245	1,187,339	1,155,249	
Adjustments to Reconcile Net Income (Loss) to Net Cash From Operating Activities:										
Add: Depreciation -	-	-	-	-	-	-	-	-	-	
Add: Depreciation - Other Assets	3,783,321	3,471,035	3,541,028	3,368,331	4,002,677	4,436,377	4,750,958	4,989,272	5,112,423	
Charges in Assets and Liabilities:										
Accounts Receivable	143,209	(156,674)	(31,890)	(27,500)	(37,441)	(344,112)	(10,225)	(10,225)	(10,225)	
Materials & Supplies	(48,352)	20,425	(96,932)	(549,769)	(200,000)	(104,546)	(94,254)	(94,254)	(94,254)	
Other Non-Current Assets	(31,943)	(19,172)	13,032	(1,669)	(1,686)	(1,703)	(1,737)	(1,754)	(1,754)	
Accounts Payable	(1,012,691)	6,477	134,298	436,104	(150,000)	(150,000)	(150,000)	(150,000)	(150,000)	
Other Current Liabilities	6,753	(14,819)	24,212	(162,451)	(1,151,686)	(40,100)	268,992	(321,811)	(64,087)	
Net Cash From Operating Activities	2,878,907	4,075,072	4,873,548	4,715,597	3,701,693	5,150,905	6,166,996	5,596,584	5,947,352	
CASH FLOWS FROM FINANCING ACTIVITIES										
Change in Memberships	-	-	-	4,196	3,750	3,750	3,750	3,750	3,750	
Proceeds from VATI Grant	-	1,400,000	589,515	-	-	1,230,563	-	-	-	
Proceeds from Existing Debt	(1,480,896)	(1,511,316)	(1,771,540)	1,283,497	795,052	330,151	(2,478,840)	(1,667,029)	(617,942)	
Repayments of Existing Debt	-	(18,631)	(60,233)	-	-	-	-	-	-	
Payments of Patronage Capital Credits	1,084,911	1,108,278	263,579	-	-	-	-	-	-	
Payments of Dividends	(1,135,375)	(1,049,482)	(1,047,459)	(4,005,951)	(275,000)	573,000	(1,023,000)	(635,356)	(175,000)	
Other Cash Flows impacts other	-	-	-	-	-	-	-	-	-	
Net Cash From Financing Activities	(1,521,360)	(71,151)	(2,026,138)	(2,718,258)	523,802	2,137,464	(3,498,090)	(2,298,635)	(785,192)	
CASH FLOWS FROM INVESTING ACTIVITIES										
Capital Expenditures VATI Project	(2,435,733)	(1,255,376)	(3,326,146)	(664,565)	(3,713,112)	(2,309,712)	(2,947,416)	(1,943,674)	(1,695,307)	
Capital Expenditures - Other	-	-	-	-	-	(820,375)	-	-	-	
Grant Match - capital portion	45,531	(1,752,803)	27,127	(1,950,000)	(1,850,000)	(76,402)	(150,000)	(150,000)	(2,250,334)	
Other Cash Flows from Investing	-	-	-	-	-	-	-	-	-	
Net Cash From Investing Activities	(2,390,202)	(3,008,179)	(3,299,019)	(2,614,565)	(5,563,112)	(4,437,052)	(3,097,416)	(2,093,674)	(3,949,641)	
Increase (Decrease) in Cash	(1,032,656)	995,742	(451,609)	(617,226)	(1,337,617)	2,851,316	(428,510)	1,206,275	1,206,519	
Ending Cash	\$ 4,507,035	\$ 5,502,776	\$ 5,051,167	\$ 4,433,942	\$ 3,096,325	\$ 5,947,641	\$ 5,519,131	\$ 6,725,406	\$ 7,933,925	

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
GATE CITY, VIRGINIA
VATI Application – Lenowisco PDC US 58 Corridor
SUMMARY OF SIGNIFICANT FORECAST
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 1 - NATURE OF THE FORECASTS

Scott County Telephone Cooperative, Inc. and Subsidiary (the Cooperative) is located in Gate City, Virginia. The financial forecast presents the Cooperative's plans for operations for the next five years.

These financial forecasts present, to the best of management's knowledge and belief, the Cooperative's expected financial position, results of operations, and cash flows for the forecast periods. Accordingly, the forecasts reflect its judgment as of August 5, 2020, the date of these forecasts, of the expected conditions and its expected course of action. The assumptions disclosed herein are those that management believes are significant to the forecasts. There will usually be differences between the forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

The following is a summary of significant accounting policies of Scott County Telephone Cooperative, Inc. and Subsidiary (the Cooperative):

Consolidation - The consolidated financial statements included the accounts of Scott County Telephone Cooperative, Inc. and its wholly owned subsidiary, SCTC Management Group, Inc. Scott Telecom and Electronics, Inc., Scott County Long Distance, Inc., MountaiNet, Inc., and Appalachian Broadband, LLC are wholly owned subsidiaries of SCTC Management Group, Inc. MountaiNet Telephone Cooperative, Inc. and MountaiNet Long Distance, Inc. are wholly owned subsidiaries of MountaiNet, Inc. SW VA Fiber Network, LLC is a wholly owned subsidiary of Appalachian Broadband, LLC. All material intercompany balances and transactions have been eliminated.

The Cooperative's principal line of business is providing local telephone service, long distance, security, telephone service, and cable and internet access services. The revenues reported on these statements of income reflect the relative importance of each type of service. The principal market for these telecommunications services are local residential and business customers residing in the exchange the Cooperative serves in Gate City, Virginia.

Revenue recognition - Compensation for interstate access services is received through tariffed access charges filed by the National Exchange Carrier Association (NECA) with the Federal Communications Commission (FCC) on behalf of the member companies. These access charges are billed by the Cooperative to the interstate interexchange carriers, and pooled with like revenues from all NECA member companies. The portion of the pooled access charge revenue received by the Cooperative is based upon its actual cost of providing interstate access service, plus a return on the investment dedicated to providing that service.

Compensation for Intrastate/IntraLATA access services (for toll traffic not carried by an interexchange carrier) is received under an IntraLATA Toll Originating Responsibility Plan (ITORP). Access charges, as filed with the Virginia State Corporation Commission, are billed to the originating local exchange carrier for terminating toll traffic, and retained by the Cooperative. Toll revenue is billed to the end user at the Cooperative's local tariffed rates, and is retained by the Cooperative. The Cooperative pays the other local exchange carrier for terminating the toll traffic.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
GATE CITY, VIRGINIA
VATI Application – Lenowisco PDC US 58 Corridor
SUMMARY OF SIGNIFICANT FORECAST
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 2 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES: (continued)

Compensation for Intrastate/InterLATA service and Intrastate/IntraLATA service (for toll traffic carried by an interexchange carrier) is received through tariffed access charges as filed with the Virginia State Corporation Commission. These access charges are billed to the interexchange carriers carrying the traffic and retained by the Cooperative.

Compensation for long distance service is received through charges for providing usage of the local exchange network. Toll revenues are recognized when services are rendered.

Compensation for cable television and Internet access is received through monthly charges for providing cable television programming and Internet access to customers that subscribe to these services.

Taxes - The Cooperative collects communications taxes from its members on behalf of the State of Virginia. Revenue is presented net of taxes collected in the statements of income.

Income taxes - The Cooperative accounts for income taxes in accordance with the Income Taxes Topic of the FASB Accounting Standards Codification. This topic requires companies to record deferred tax liabilities or assets for the deferred tax consequences of all temporary differences. Deferred taxes are provided on the liability method whereby deferred tax assets are recognized for deductible temporary differences and operating loss and tax credit carry forwards, and deferred tax liabilities are recognized for taxable temporary differences. Temporary differences are the differences between reported amounts of assets and liabilities and their tax bases. Deferred tax assets are reduced by a valuation allowance, when, in the opinion of management, it is more likely than not that some portion or all of the deferred tax assets will not be realized. Deferred tax assets and liabilities are adjusted for the effects of changes in tax laws and rates on the date of enactment.

Inventories - The Cooperative's inventories are priced at cost. The Cooperative's inventory cost is determined by the average cost method.

Cash equivalents - The Cooperative considers all highly liquid investments with maturity of one year or less when purchased to be cash equivalents.

Accounts receivable - The Cooperative extends credit to its commercial and residential subscribers, the majority of whom reside in southwest Virginia. Accounts receivable are carried at original invoice amount less an estimate made for doubtful receivables based on a review of all outstanding amounts on a monthly basis. Management determines the allowance for doubtful accounts by identifying troubled accounts and by using historical experience applied to an aging of accounts.

Accounts receivable, which do not accrue interest, are written-off when deemed uncollectible. Recoveries of accounts receivable previously written-off are recorded when received.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
 GATE CITY, VIRGINIA
 VATI Application – Lenowisco PDC US 58 Corridor
 SUMMARY OF SIGNIFICANT FORECAST
 ASSUMPTIONS AND ACCOUNTING POLICIES

Depreciation - Depreciation is computed principally by the straight-line method. The estimated annual rates used to compute depreciation for financial reporting purposes are as stated below.

Property, plant, and equipment - Property, plant, and equipment in service and under construction are stated at cost. Listed below are the major classes of property, plant, and equipment.

	ESTIMATED ANNUAL DEPRECIATION RATES
Vehicles and other work equipment	10.00% - 12.86%
Buildings	2.86%
Furniture	6.33%
Leasehold improvements	2.86%
Central office and computer equipment	6.33% - 12.22%
Outside plant - pole, aerial, and buried	4.40% - 4.66%

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD:

Operating revenues and expenses - The following are significant assumptions for revenues and expenses:

General statement and historical reconciliation - The 2016, 2017, 2018, and 2019 revenues and expenses are based on actual, unaudited year-to-date balances. The 2020 revenues and expenses are based on annualized, unaudited balances from the year to date 2020 financials. Each financial statement line item was reviewed for any known and measurable items that could affect the amount. If any further adjustment was made, the assumption will be noted in the line items below. There are no gaps in between the historical period and the forecast period. The forecast period is December 31, 2020 through December 31, 2025.

Access line counts and projection assumptions - Existing access lines for the consolidated entity were gathered by service for 2016, 2017, 2018, and 2019. These categories were forecasted based on the historical trend for those years. The access lines for the new areas served are based on engineering data in the application, the total population, and the number of homes passed each quarter. SCTC projects to obtain a 60% take rate by the end of 2021 and will provide voice, video and broadband services.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
 GATE CITY, VIRGINIA
 VATI Application – Lenowisco PDC US 58 Corridor
 SUMMARY OF SIGNIFICANT FORECAST
 ASSUMPTIONS AND ACCOUNTING POLICIES

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
Voice	6,794	6,697	6,712	6,629	6,599	6,570	6,537	6,407	6,278	6,153
Broadband	5,901	6,295	6,626	6,942	7,323	7,719	8,027	8,348	8,682	9,030
Video	4,021	4,138	4,166	4,384	4,662	4,951	5,150	5,356	5,570	5,793
Security	-	120	222	250	275	300	325	326	327	328
Total Connections	16,716	17,250	17,726	18,204	18,859	19,539	20,039	20,437	20,858	21,303

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

Revenues:

1. Local voice service - Historically, Scott County Telephone Cooperative, Inc. (SCTC) has experienced a 1.5 % decrease in voice lines in its ILEC study area. However, SCTC has seen a 1.7 to 2.5% increase in basic revenue per year based on local rate increases and additions in its non-ILEC areas. The increase from 2017 to 2018 was higher at 2.63%. SCTC forecasts an average 3.81% increase on revenue, which is attributed to the net gains for new areas such as Right Poor Valley. These areas are vastly underserved and SCTC has shown tremendous success in recent years in new areas. Also, SCTC has been proactive in rolling out new services and new bundle pricing. It is forecasted that this rate increase will help offset some of the revenue loss due to access line decrease. Management forecasts a 10% take rate by the end of year one with an average bill of \$70 per month. This trend is expected to continue through 2025. Based on the access line forecast, SCTC forecasted local revenues based on average revenue per unit (ARPU). Local revenue is based on an average ARPU of \$24.92 per month over the entire period 2016 to 2025. This price is inclusive of local service, features, and local bundles. The ARPU is based on an average historical and forecasted price.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
GATE CITY, VIRGINIA
VATI Application – Lenowisco PDC US 58 Corridor
SUMMARY OF SIGNIFICANT FORECAST
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NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

2. Broadband data service - Based on the access line forecast chart above, SCTC forecasted Data revenues based on an average ARPU of \$50.00 per month. The ARPU is based on the average historical price. The increases are from new areas served by the recently closed BIP award, other grants, and increases in the study area. This forecast is based on the engineering, which shows approximately 185 new home passed. SCTC forecasts a 60% take rate by the end of 2022 for data service at an average price of \$50.00 per month. The 7 areas included in this grant and their line increases are included above. Also, the FCC has increased its DSL wholesale tariff rates, local residential rate floor approximately \$2.00 per month per subscriber.
3. Video service - Based on the customer count forecast chart above, SCTC forecasted Video revenues based on an average ARPU of \$56.72 per month. This includes cable and video customers. The ARPU is based on an average historical and forecasted price. SCTC passes on content increases, including local channels as necessary.
4. Middle mile - SCTC has middle mile revenues from billings to other carriers for special and switched access. As the new plant is placed in service, new revenues will be derived from special access services from businesses including wireless companies purchasing access to towers from switched facilities. Based on current tariff rates and contracts this computes to approximately \$32,500 per year on average. SCTC is in the process of completing negotiations with various cell companies for special access that covers ten cells sites for transports and maintenance.
5. Network access - Since 2016, access has remained relatively flat with only minor variations. SCTC maintains annual plant upgrades to its regulated rate base, which, in turn helps in maintaining revenues from federal sources. Following the most recent FCC order, SCTC is well below Universal Service Fund caps and has not experienced any decrease from regulatory rule changes. Since regulated expenses are stable over the forecast period, SCTC expects a relatively flat access revenue change. Overall, this revenue category increases on average about 3.98% per year for 2016 through 2025. Overall MOU is declining but Connect America Funds (CAF) and NECA settlements are relatively flat. This trend of decreasing MOU will continue. Also, by FCC order, the CAF will decrease at 5% per year. NECA settlements make up the difference as SCTC's rate base is projected to increase after the stimulus project and new facilities are constructed throughout the forecast period and recognized in settlements.
6. Universal Service Fund (USF) - SCTC's study area cost per loop will increase each year as new plant and regulated expenses are incurred. Due to the potential impacts of the FCC regulatory changes, SCTC forecasts USF to decrease by an average of 2.42% from 2016 to 2025.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
GATE CITY, VIRGINIA
VATI Application – Lenowisco PDC US 58 Corridor
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ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

7. Toll service/long distance voice (Toll/LD) - Revenue is based on SCTC forecasted Toll/LD customer bill an average of \$17.38 per month. The ARPU is based on an average historical price. SCTC expects an average decline of 0.5% per year. SCTC had approximately 5,000 customers using toll or long distance at December 31, 2016. This is expected to drop to 2,100 by December 31, 2025.
8. Installation revenues - The installation revenue is based on new customers and the rate depends on what type of package is selected. The forecast for new installed customers per year is based on management's forecast. The install revenue is forecasted to grow at a steady amount. Beginning in 2018, SCTC forecasts an average gain of 558 installs per year with an average charge of \$32.86 per install.
9. Uncollectible revenues - This line item has been calculated from the monthly open balance registers. Items over the 60 balance are considered for uncollectibility. As local revenues change, the amount of the uncollectible estimate does as well.
10. Other revenue - Other revenue is made up of security services, billing, collection, service charges, and AFUDC. Due to plant construction level and borrowings, this continues in 2019 and then new projects accelerate in 2020 through 2025 based on an average 12.0% increase each year based on historic trends.

Expenses:

1. Plant Specific - Backhaul/interconnection assumptions - These assumptions are based on the expense per customer per year. As the numbers of customers grow each year, the expense is expected to grow accordingly. Below is a description of each type of expense category relating to backhaul, IP, and video:
 - a. The December 31, 2018 cost for backhaul is \$1,672,557 or \$8.27 per customer per month with 16,848 total customer connections. SCTC will need more capacity as new broadband and video customers are added and previous cost savings have been absorbed. The average cost over the period is projected to be \$8.37 per customer per month. See the project description for the operational needs of the project.
 - b. The current IP/Interconnection cost is \$711,021 at December 31, 2018 or \$5.91 per subscriber per month. There are 10,115 customers who have an Internet connection either for broadband or video. The average price per connection will decrease over time. The average cost over the period is projected to be \$5.70 per subscriber per month.

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GATE CITY, VIRGINIA
VATI Application – Lenowisco PDC US 58 Corridor
SUMMARY OF SIGNIFICANT FORECAST
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 3 - NATURE OF OPERATIONS DURING THE FORECAST PERIOD: (continued)

- c. Video content cost is \$2,754,422 or \$47.49 per video and cable customer per month with 4,883 customers at December 31, 2018. As the number of customers grows the total cost will increase. The average cost per customer per month is expected to be \$50.30 due to pricing increases over time after 2020.

2. Plant Non-Specific - Network maintenance/monitoring - This is based on the payroll expense for the central office, cable, and wire, engineering, and general support departments. It is forecasted to increase by approximately 2.0% through 2025 for two reasons. First, as the fiber plant is deployed and the old copper plant removed, maintenance costs drop. Several temporary employees are expected to drop off the payroll in the forecast period. However, management plans to hire as many employees as possible in some of its non-regulated subsidiaries. Additionally, SCTC plans to hire two to three technicians to keep up with the new network beginning in 2019. Cost of living and raises account for the increase in 2019 through 2025.

3. Utilities expense - SCTC forecasts that power expenses will increase based on the need of the new network electronic equipment, which should increase modestly from 2019 to 2025.

4. Sales/marketing - SCTC forecasts a modest decline throughout the forecast period as new areas of service can be marketed through existing advertisement. Employee attrition is projected in 2019 and 2025 for retirements and consolidations.

5. Customer care - SCTC forecasts a consistent balance to small decline as existing customer service personnel will be able to attend to the new service areas. Employee attrition is projected in 2019 and 2025 for retirements and consolidations.

6. Corporate G&A - Management expects this expense will decrease by 9.67% each year based on normalized trends.

7. Property taxes - As a new plant is completed, property taxes will accrue on the plant in service. The taxes are expected to increase each year as a new plant is constructed. Taxes are approximately .45% of gross plant.

8. Depreciation - Depreciation is calculated based on historically approved depreciation rates times the plant in service balance. The average depreciable life is 20 years since the majority of the plant relates to cable and wire fiber facilities. Plant is forecasted to increase each year as SCTC completes its five year construction plan and maintains upgrades each year.

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GATE CITY, VIRGINIA
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ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS:

The balance sheet items other than the ones discussed above were forecasted using one or a combination of several techniques. Trends were used where feasible and then known and measureable items were taken into account. The following summarizes the significant assumptions impacting the balance sheet line items and cash flow statements:

1. General - The starting point of the forecasted balance sheet is based on the general ledger as of December 31, 2018. Then, any items that are known and measurable were applied to approximate the balance as of the end of each forecasted year. Any adjustments made are described in the assumptions below. SCTC is rate regulated under Part 32 and its Board of Directors.
2. Cash and forecasted cash flow statements - SCTC has historically enjoyed a strong cash balance as management balances leverage with plant investment. The balance at 2018 of \$5.0 million will be used over time for plant upgrades.
3. Current assets - No significant changes are anticipated. This line item includes accounts receivables and inventory.
4. Accounts receivable - SCTC forecasts that connection counts will increase based on historical trends, new services, and new areas. New revenues are from customers for broadband and video. Accounts receivable is approximately 6% of revenues. SCTC has very strong collection policies in place with most of its accounts receivable in the less than 60 days category.
5. Non-current assets - No significant changes are expected. This line item is based on investments in securities and affiliated subsidiaries, in compliance with, the equity method of recording investments.
6. Property, plant, and equipment - SCTC plans on building needed plant upgrades and continuing its five year construction plan process. Historically, SCTC has added, on average, approximately \$500,000 to \$750,000, using part cash flow and part leverage as needed. Most of the plant relates to fiber build outs in SCTC member areas. This is the main use of cash at SCTC. The entire grant portion is accounted for per Part 32 and is netted out against the gross cost of the plant. Therefore, there is no net plant on the balance sheets and no depreciation.
7. Current liabilities - No significant changes are expected for accounts payables, accrued liabilities, or SCTC's current debt structure. This line item is expected to decrease as SCTC pays its accounts payable down each year. SCTC pays invoices as they come in each week after proper review.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
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VATI Application – Lenowisco PDC US 58 Corridor
SUMMARY OF SIGNIFICANT FORECAST
ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS: (continued)

8. Non-current liabilities - No significant changes are expected for SCTC's long-term debt structure or its post retirement benefit plans. Principal payments continue based on the amortization schedule.
9. Equity - No significant changes are expected. Additions to patronage capital come from net margins and no distributions are expected.
10. Capital stock - No significant change is expected nor forecasted.
11. Accumulated other comprehensive income - This amount represents the effects of ASC Topic 715-30 relating to pensions. This relatively new accounting standard requires companies to recognize in equity the impacts of initial transition costs when it adopted its new retirement plan. No significant change is expected.
12. Patronage capital credits - This amount is affected by income or loss. See the comments made for the statements of equity for other assumptions.

Cash Flow Statement:

1. General - The cash flow statement was prepared using the indirect method and is composed of an operating, investing, and financing section. No estimate of cash paid for interest was made. The preparation of the cash flow is based on the changes in the balance sheet and any non-cash items from the income statement, for example, depreciation. The underlying assumptions for the balance sheet and income statement drive the numbers on the cash flow; therefore, no detailed explanation is warranted here. Please review the assumptions for the other financial statements.
2. Operating - Cash flow from operations is impacted by net income, depreciation, current assets, and current liabilities. As net income increases over the forecast period so does the corresponding cash. This is a significant source of cash.

SCOTT COUNTY TELEPHONE COOPERATIVE, INC. AND SUBSIDIARY
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ASSUMPTIONS AND ACCOUNTING POLICIES

NOTE 4 - BALANCE SHEET AND CASH FLOW STATEMENTS: (continued)

3. Investing - Cash flow from investing activities is impacted primarily from the acquisition and construction of plant. SCTC forecasts plant construction based on the engineering in this grant application. This is the major use of cash. The capital investments will begin in 2020 and be completed in 2021. As far as other capital additions outside of the grant process, SCTC is in the process of constructing several new areas with a combination of loans, grants, and cash flow from operations. Most of the investment is for cable and wire facilities to fulfill its obligations under RUS current work plan, state of Virginia grants, and FCC directives for broadband.

4. Financing - Cash flow from financing activities is impacted primarily by the borrowing and repayment of long-term debt. The principle payments are based on the projected amortization schedule of debt for this loan, as well as, existing debt. The proceeds or new borrowings are based on the FRS forms submitted to RUS as plant is constructed. This is a major source of cash.
 - a. Sale of equity - None is forecasted.

 - b. Proceeds from existing debt - None is forecasted.

 - c. Repayment of Broadband Initiative Program (BIP) debt - This loan will be paid back over a 15-year timeframe at an interest rate of 3.5%.

 - d. Repayments of non-BIP debt - The outstanding debt is from RUS and is paid back over a 16 year time period at an average rate of 4.78%.

 - e. Payments of patronage capital credits - No payments of capital credits are forecasted.

 - f. Payments of dividends - No payments of dividends are forecasted.

5. Cash and cash equivalents at the end of the year - Management prefers to have a reasonable amount of cash that is secured in various banks and short-term investments. SCTC considers any investment with a maturity date of one year or less to be cash equivalent.



COMMONWEALTH OF VIRGINIA

HOUSE OF DELEGATES
RICHMOND

TERRY G. KILGORE
POST OFFICE BOX 669
GATE CITY, VIRGINIA 24251

FIRST DISTRICT

COMMITTEE ASSIGNMENTS:
COURTS OF JUSTICE
LABOR AND COMMERCE
RULES

August 3, 2020

Ms. Tamarah Holmes, Ph.D
Director, Office of Broadband
Virginia Department of Housing and Community Development
600 E Main Street, Suite 300
Richmond, VA 23219

RE: US 58 Corridor Broadband Expansion Project

Dear Dr. Holmes:

I am writing in support of the LENOWISCO Planning District Commission's application for a Virginia Telecommunications Initiative (VATI) grant through the Virginia Department of Housing and Community Development (DHCD). This regional initiative, in cooperation with Scott County Telephone Cooperative (SCTC) and Powell Valley Electric Cooperative (PVEC), will generate an immediate and self-sustaining benefit to southwest Virginia. I would like to offer my strong support of the project.

The goal is to construct a Fiber-to-the-Premises project that will provide a broadband G-PON connection to support up to ten (10) gigabit of bandwidth to each customer site. If approved, the availability of broadband service will enhance Lee County's ability to operate more efficiently and attract new businesses, thus promoting economic development, improving the virtual learning/educational opportunities for all students and teachers, increase tele-working/tele-health capacity, as well as improving the quality of life for each individual in the areas to be served. This VATI grant will be vital to the Caylor, Bethany Rd, Sand Cave Rd, Kesterson Mill, Curtis Russell, Cooney Hollow and Big Hill communities in Lee County, and will pass 387 total residential locations.

I feel all partners involved are dedicated to meet the goals of the VATI Program in the vital deployment of broadband. I strongly support the application of the LENOWISCO Planning District and urge favorable consideration by the DHCD. Please feel free to contact anytime with questions.

Thank you for your time and consideration of these comments.

Sincerely,

A handwritten signature in black ink that reads "Terry G. Kilgore". The signature is written in a cursive style with a prominent "T" and "K".

Delegate Terry G. Kilgore
First District

cc: Mr. William J. Franklin, Scott County Telephone Cooperative
Mr. Randell Meyers, Powell Valley Electric Cooperative
Mr. Duane A. Miller, LENOWISCO

SENATE OF VIRGINIA



TODD E. PILLION

40TH SENATORIAL DISTRICT

ALL OF GRAYSON, LEE, SCOTT, AND WASHINGTON
COUNTIES; ALL OF THE CITY OF BRISTOL; AND PART
OF SMYTH, WISE, AND WYTHE COUNTIES

851 FRENCH MOORE JR. BOULEVARD
ABINGDON, VIRGINIA 24210
(276) 220-1209

COMMITTEE ASSIGNMENTS:
AGRICULTURE, CONSERVATION AND
NATURAL RESOURCES
GENERAL LAWS AND TECHNOLOGY
LOCAL GOVERNMENT
TRANSPORTATION

August 3, 2020

Ms. Tamarah Holmes, Ph.D
Director, Office of Broadband
Virginia Department of Housing and Community Development
600 E Main Street, Suite 300
Richmond, VA 23219

RE: US 58 Corridor Broadband Expansion Project

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As a native of Lee County and now its representative in the Senate of Virginia, I know the challenges these communities face. It is why I have advocated for additional funding provided through VATI—to turn those challenges into opportunities that improve quality of life and enhance educational and economic development in rural Virginia.

I appreciate your consideration of this request. Please let me know if I may be of further assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read 'T. Pillion'.

Todd Pillion
Senator, 40th District



August 12, 2020

Lee County Board of Supervisors

LEE COUNTY
P.O. Box 367
Jonesville, Virginia 24263-0367

COUNTY ADMINISTRATOR
Telephone 276-346-7714
Fax 276-346-7712
www.leecova.org

Ms. Tamarah Holmes, Ph.D
Director, Office of Broadband
Virginia Department of Housing and Community Development
600 E Main Street, Suite 300
Richmond, VA 23219

RE: US 58 Corridor Broadband Expansion Project

Dear Dr. Holmes:

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Sincerely,

D. Dane Poe

cc: Mr. William J. Franklin, Scott County Telephone Cooperative
Mr. Randell Meyers, Powell Valley Electric Cooperative
Mr. Duane A. Miller, LENOWISCO

CDBG Derivation of Cost

Product	Total	VATI	Non-VATI	Source of Estimate	Date
EXAMPLE					
<u>Construction</u>					
<i>200 LF of fiber @\$150/LF</i>	\$30,000	\$15,000	\$15,000	Company A	9/5/2016
<i>Tower</i>	\$100,000	\$80,000	\$20,000	Company B	9/5/2016
<i>Engineering</i>	\$20,000	\$0	\$20,000	ABC Engineering Firm	9/5/2016
Product	Total	VATI	Non-VATI	Source of Estimate	Date
Kesterson Mill - Outside Plant Construction Costs	\$ 187,943	\$ 112,766	\$ 75,177	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 14,280	\$ 8,568	\$ 5,712	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ 54,400	\$ 32,640	\$ 21,760	W. Metts Engineering	8/4/2020
Engineering	\$ 41,588	\$ 24,953	\$ 16,635	W. Metts Engineering	8/4/2020
Central Office Electronics					8/4/2020
PON Cabinets and Splitters	\$ 4,900	\$ 2,940	\$ 1,960	W. Metts Engineering	8/4/2020
Total	\$ 303,111	\$ 181,867	\$ 121,244	W. Metts Engineering	8/4/2020
Bethany Road - Outside Plant Construction Costs	\$ 63,533	\$ 38,120	\$ 25,413	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 6,300	\$ 3,780	\$ 2,520	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ 17,000	\$ 10,200	\$ 6,800	W. Metts Engineering	8/4/2020
Engineering	\$ 15,208	\$ 9,125	\$ 6,083	W. Metts Engineering	8/4/2020

CDBG Derivation of Cost

Central Office Electronics					8/4/2020
PON Cabinets and Splitters	\$-	\$-	\$-	W. Metts Engineering	8/4/2020
Total	\$ 102,041	\$ 61,225	\$ 40,816	W. Metts Engineering	8/4/2020
Curtis (Curt) Russell Rd - Outside Plant Construction Costs	\$ 365,722	\$ 219,433	\$ 146,289	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 39,270	\$ 23,562	\$ 15,708	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ -	\$ -	\$ -	W. Metts Engineering	8/4/2020
Engineering	\$ -	\$ -	\$ -	W. Metts Engineering	8/4/2020
Central Office Electronics	\$ 12,000	\$ 7,200	\$ 4,800		8/4/2020
PON Cabinets and Splitters	\$ 12,000	\$ 7,200	\$ 4,800	W. Metts Engineering	8/4/2020
Total	\$ 428,992	\$ 257,395	\$ 171,597	W. Metts Engineering	8/4/2020
Sand Cave Road- Outside Plant Construction Costs	\$ 158,529	\$ 95,117	\$ 63,412	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 20,370	\$ 12,222	\$ 8,148	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ 13,600	\$ 8,160	\$ 5,440	W. Metts Engineering	8/4/2020
Engineering	\$ 33,414	\$ 20,048	\$ 13,366	W. Metts Engineering	8/4/2020
Central Office Electronics	\$ -	\$ -	\$ -		8/4/2020
PON Cabinets and Splitters	\$ 4,900	\$ 2,940	\$ 1,960	W. Metts Engineering	8/4/2020
Total	\$ 230,813	\$ 138,488	\$ 92,325	W. Metts Engineering	8/4/2020
Caylor - Outside Plant Construction Costs	\$ 295,375	\$ 177,225	\$ 118,150	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 30,660	\$ 18,396	\$ 12,264	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ 68,000	\$ 40,800	\$ 27,200	W. Metts Engineering	8/4/2020
Engineering	\$ 64,402	\$ 38,641	\$ 25,761	W. Metts Engineering	8/4/2020
Central Office Electronics	\$ 30,000	\$ 18,000	\$ 12,000	W. Metts Engineering	8/4/2020
PON Cabinets and Splitters	\$ 4,900	\$ 2,940	\$ 1,960	W. Metts Engineering	8/4/2020
Total	\$ 493,337	\$ 296,002	\$ 197,335	W. Metts Engineering	8/4/2020

CDBG Derivation of Cost

Big Hill Road - Outside Plant Construction Costs	\$271,425	\$162,855	\$108,570	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$30,660	\$18,396	\$12,264	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$-	\$-	\$-	W. Metts Engineering	8/4/2020
Engineering	\$-	\$-	\$-	W. Metts Engineering	8/4/2020
Central Office Electronics	\$30,000	\$18,000	\$12,000	W. Metts Engineering	8/4/2020
PON Cabinets and Splitters	\$12,000	\$7,200	\$4,800	W. Metts Engineering	8/4/2020
Total	\$344,085	\$206,451	\$137,634	W. Metts Engineering	8/4/2020
Cooney Hollow - Outside Plant Construction Costs	\$ 120,109	\$ 72,065	\$ 48,044	W. Metts Engineering	8/4/2020
Customer Premise Electronics and Installation	\$ 11,550	\$ 6,930	\$ 4,620	W. Metts Engineering	8/4/2020
Make Readies Costs (Utility Poles)	\$ -	\$ -	\$ -	W. Metts Engineering	8/4/2020
Engineering	\$ -	\$ -	\$ -	W. Metts Engineering	8/4/2020
Central Office Electronics	\$ 12,000	\$ 7,200	\$ 4,800	W. Metts Engineering	8/4/2020
PON Cabinets and Splitters	\$ 4,900	\$ 2,940	\$ 1,960	W. Metts Engineering	8/4/2020
Total	\$ 148,559	\$ 89,135	\$ 59,424	W. Metts Engineering	8/4/2020
Total for Project - Outside Plant Construction Costs	\$ 1,462,636	\$ 877,582	\$ 585,054	W. Metts Engineering	8/4/2020
Total for Project - Customer Premise Electronics and Installation	\$ 153,090	\$ 91,854	\$ 61,236	W. Metts Engineering	8/4/2020
Total for Project - Make Readies Costs (Utility Poles)	\$ 153,000	\$ 91,800	\$ 61,200	W. Metts Engineering	8/4/2020
Total for Project - Engineering	\$ 154,612	\$ 92,767	\$ 61,845	W. Metts Engineering	8/4/2020
Total for Project - Central Office Electronics	\$ 84,000	\$ 50,400	\$ 33,600	W. Metts Engineering	8/4/2020
Total for Project - PON Cabinets and Splitters	\$ 43,600	\$ 26,160	\$ 17,440	W. Metts Engineering	8/4/2020
Grand Total of the Project - Kesterson Mill, Bethany Road, Curtis (Curt) Russell Road, Sand Cave Road, Caylor, Big Hill Road, and Cooney Hollow)	\$ 2,050,938	\$ 1,230,563	\$ 820,375	W. Metts Engineering	8/4/2020



Calix Quotes 1 of 3
Via Telephone
Purchase Order

PO# _____

Billing Address
PO Box 487
Gate City, VA 24251
276-452-9117

DATE 8/3/2020
CUSTOMER ID:

VENDOR Calix
ATTN Michael Bockhaus
ADDRESS: 1035 N. McDowell Blvd.

SHIP TO: Scott County Telephone Cooperative
ATTN: Jeff Flanary
3840 Daniel Boone Rd.
Gate City, VA 24251

Petaluma, CA 94954
Phone: 707-766-3000
Fax: 707-283-3771
Email: michael.bockhaus@calix.com

Phone: 276-452-9117
Fax: 276-452-4040
eMail: jeff@sctc.org

SHIPPING METHOD	TERMS	JOB/WO #	DELIVERY DATE
Best Way	Net-30		
FORWARD COMPLETED PO:		Mail Copy:	Christy Harris, Jeff Flanary, Gwen, Roger, & Matt Hill
PO COMPLETED BY:		Matthew Hill	

QTY	MFR PN	DESCRIPTION	COST	EXT COST	ACCT
Caylor, Kesterson Mill Rd / Bethany Rd Switching Cabinet					
1.00	100-04665	E7-2 GPON-8 R2 Card	\$ 9,096.50	\$ 9,096.50	
1.00	000-00372	E7-2 Field Install Package	\$ 646.75	\$ 646.75	
3.00	100-05121	GPON SFP OIM 20Km	\$696.50	\$ 2,089.50	
2.00	100-01423	Direct Attach SFP/SFP+ Copper Cable 3m	\$ 72.15	\$ 144.30	
2.00	100-01510	SFP+ 10G 40Km	\$1,478.15	\$ 2,956.30	
Big Hill Switching Cabinet					
1.00	100-04665	E7-2 GPON-8 R2 Card	\$ 9,096.50	\$ 9,096.50	
1.00	000-00372	E7-2 Field Install Package	\$ 646.75	\$ 646.75	
2.00	100-05071	GPON SFP OIM 60Km	\$ 906.50	\$ 1,813.00	
2.00	100-01423	Direct Attach SFP/SFP+ Copper Cable 3m	\$ 72.15	\$ 144.30	
2.00	100-05121	GPON SFP OIM 20Km	\$696.50	\$ 1,393.00	
2.00	100-01510	SFP+ 10G 40km	\$1,478.15	\$ 2,956.30	

SUBTOTAL	\$ 30,983.20
SUBTOTAL PAGE 2	\$ 141,252.37
SHIPPING	
SALES TAX	\$ 9,128.49
TOTAL	\$ 181,364.06

Calix GPON blades and optics for Lee County VATI Project

Department Head Approval _____ Date _____

Managers Approval _____ Date _____

Calix Quotes 3 of 3
Via Telephone

Page 2 Subtotal: \$ 141,252.37



1425 DAVE LYLE BLVD
 ROCK HILL SC 29730-4247
 Phone: 704-602-7022
 Fax: 704-392-5596

To: Powell Valley Electric Cooperative
 400 Straight Creek Road
 NEW TAZEWELL TN 37825
 Attn: Hoy Watson
 Phone: XXX-XXX-XXXX
 Fax:
 Email: josh.hoyle@graybar.com

Date: 05/29/2020
Proj Name:
GB Quote #: 0235412566 Rev-2
 Release Nbr:
 Purchase Order Nbr:
 Additional Ref#
 Valid From: 05/20/2020
 Valid To: 06/19/2020
 Contact: JOSH HOYLE
 Email: josh.hoyle@graybar.com

Proposal

We Appreciate Your Request and Take Pleasure in Responding As Follows

Item	Item/Type	Quantity	Supplier	Catalog Nbr	Description	Price	Unit	Ext.Price
100	500,000 EA	500,000	PRYSMIAN	F-ADLS1025-24- HB-144-E3		\$834.86	1000	\$417,430.00
Item Note: Long Span ADSS (SafeStrain), 1025 LB MRCL, Single Jacket 24F/Tube, 12F Binder Groups, Gel-Filled Tube(s) 144 Fiber Single Mode (ITU G.652.D) 0.35/0.35/0.25 dB/km at 1310/1383/1550 nm (1383 nm uncabled) GR-20; RUS CFR-1755-900; ANSI/ICEA S-87-640; IEEE1222 ****250k Late June, 250K July, 500k from there on out*****								
210	500 EA	500	PREFORMED LN	2872004C1E1	LTD TENSION DE WCLEVIS & LINK	\$37.98	1	\$18,990.00
GB Part #: 25170993 UPC #:								
300	200 EA	200	PREFORMED LN	4450200S	FIBERLGN AL SUSP- SHACKL/EYENUT	\$37.23	1	\$7,446.00
GB Part #: 25414898 UPC #: ***Item Note:*** 5-6 WEEKS								
400	500 EA	500	PREFORMED LN	4450100	FIBERLIGN ALUM SUP. ASSEMBLY	\$30.31	1	\$15,155.00
GB Part #: 25062725 UPC #: ***Item Note:*** 5-6 WEEKS								

This equipment and associated installation charges may be financed for a low monthly payment through Graybar Financial Services (subject to credit approval). For more information call 1-800-241-7408 to speak with a leasing specialist.

To learn more about Graybar, visit our website at www.graybar.com 24-Hour Emergency Phone#: 1-800-GRAYBAR

Subject to the standard terms and conditions set forth in this document. Unless otherwise noted, freight terms are F.O.B. shipping point prepaid and bill. Unless noted the estimated ship date will be determined at the time of order placement.

To: Powell Valley Electric Cooperative
400 Straight Creek Road
NEW TAZEWELL TN 37825
Attn: Hoy Watson

Date: 05/29/2020
Proj Name:
GB Quote #: 0235412566 Rev-2

Proposal

We Appreciate Your Request and Take Pleasure in Responding As Follows

Total in USD (Tax not included): \$459,021.00

This equipment and associated installation charges may be financed for a low monthly payment through Graybar Financial Services (subject to credit approval). For more information call 1-800-241-7408 to speak with a leasing specialist.

To learn more about Graybar, visit our website at www.graybar.com

24-Hour Emergency Phone#: 1-800-GRAYBAR

Subject to the standard terms and conditions set forth in this document. Unless otherwise noted, freight terms are F.O.B. shipping point prepaid and bill.
Unless noted the estimated ship date will be determined at the time of order placement.

To: Powell Valley Electric Cooperative
400 Straight Creek Road
NEW TAZEWEEL TN 37825
Attn: Hoy Watson

Date: 05/29/2020
Proj Name:
GB Quote #: 0235412566 Rev-2

Proposal

We Appreciate Your Request and Take Pleasure in Responding As Follows

GRAYBAR ELECTRIC COMPANY, INC. TERMS AND CONDITIONS OF SALE

1. ACCEPTANCE OF ORDER; TERMINATION - Acceptance of any order is subject to credit approval and acceptance of order by Graybar Electric Company, Inc. ("Graybar") and, when applicable, Graybar's suppliers. If credit of the buyer of the goods or services ("Buyer") becomes unsatisfactory to Graybar, Graybar reserves the right to terminate upon notice to Buyer and without liability to Graybar.
2. PRICES AND SHIPMENTS - Unless otherwise quoted, prices for goods shall be those in effect at time of shipment, which shall be made F.O.B. shipping point, prepaid and bill. Unless otherwise indicated in the applicable quotation or statement of work, prices for services shall be those in effect at the time of completion. The contract price for goods and or services shall be increased by the amount of any applicable tariff, excise, fee, assessment, levy, charge or duty of any kind whatsoever, imposed, assessed or collected by any governmental body, whether or not reflected in the costs charged to Graybar, and Graybar may increase its cost for goods and or services appropriately to take into account such increases in Graybar's costs.
3. RETURN OF GOODS - Credit may be allowed for goods returned with prior approval. A deduction may be made from credits issued to cover cost of handling. Returns will not be accepted for services or any material which has been modified at the request of or by Buyer. In addition, no custom orders may be returned.
4. TAXES - Prices shown do not include sales or other taxes imposed on the sale of goods or services. Taxes now or hereafter imposed upon sales, shipments or services will be added to the purchase price. Buyer agrees to reimburse Graybar for any such tax or provide Graybar with acceptable tax exemption certificate.
5. DELAY IN DELIVERY - Graybar is not to be accountable for delays in delivery of goods or services occasioned by acts of God, failure of its suppliers to ship or deliver on time, or other circumstances beyond Graybar's reasonable control, including, but not limited to, sourcing, shipment or delivery issues caused by, related to or resulting from COVID-19 or other similar national or global health situations. Factory shipment or delivery dates are best estimates, and in no case shall Graybar be liable for any consequential or special damages arising from any delay in provision of services, shipment or delivery.
6. LIMITED WARRANTIES - Graybar warrants that all goods sold are free of any security interest and will make available to Buyer all transferable warranties (including without limitation warranties with respect to intellectual property infringement) made to Graybar by the manufacturer of the goods. Buyer acknowledges that the performance of any service which alters the manufacturer provided goods as indicated in the statement of work may void the manufacturer's warranty. Graybar shall use the same care and skill a similarly situated provider of like services would exercise following commonly accepted industry practices in the performance of its duties under this agreement. GRAYBAR MAKES NO OTHER EXPRESS OR IMPLIED WARRANTIES, AND SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PURPOSE. UNLESS OTHERWISE AGREED IN WRITING BY AN AUTHORIZED REPRESENTATIVE OF GRAYBAR, PRODUCTS SOLD HEREUNDER ARE NOT INTENDED FOR USE IN OR IN CONNECTION WITH (1) ANY SAFETY APPLICATION OR THE CONTAINMENT AREA OF A NUCLEAR FACILITY, OR (2) IN A HEALTHCARE APPLICATION, WHERE THE GOODS HAVE POTENTIAL FOR DIRECT PATIENT CONTACT OR WHERE A SIX (6) FOOT CLEARANCE FROM A PATIENT CANNOT BE MAINTAINED AT ALL TIMES.
7. LIMITATION OF LIABILITY - Buyer's remedies under this agreement are subject to any limitations contained in manufacturer's terms and conditions to Graybar, a copy of which will be furnished upon written request. Furthermore, Graybar's liability shall be limited to either repair or replacement of the goods, re-performance of the services, or refund of the purchase price, all at Graybar's option, and IN NO CASE SHALL GRAYBAR BE LIABLE FOR INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES. In addition, claims for shortages, other than loss in transit, must be made in writing not more than five (5) days after receipt of shipment. Unless otherwise agreed in the applicable statement of work, acceptance of services will occur not more than five (5) days after completion of performance.
8. WAIVER - The failure of Graybar to insist upon the performance of any of the terms or conditions of this agreement or to exercise any right hereunder shall not be deemed to be a waiver of such terms, conditions, or rights in the future, nor shall it be deemed to be a waiver of any other term, condition, or right under this agreement.
9. MODIFICATION OF TERMS AND CONDITIONS - These terms and conditions, and any associated statement of work, supersede all other communications, negotiations, and prior oral or written statements regarding the subject matter of these terms and conditions. No change, modification, rescission, discharge, abandonment, or waiver of these terms and conditions shall be binding upon Graybar unless made in writing and signed on its behalf by a duly authorized representative of Graybar. No conditions, usage of trade, course of dealing or performance, understanding or agreement, purporting to modify, vary, explain, or supplement these terms and conditions shall be binding unless hereafter made in writing and signed by the party to be bound. Any proposed modifications or additional terms are specifically rejected and deemed a material alteration hereof. If this document shall be deemed an acceptance of a prior offer by Buyer, such acceptance is expressly conditional upon Buyer's assent to any additional or different terms set forth herein.
10. REELS - When Graybar ships returnable reels, a reel deposit may be included in the invoice. The Buyer should contact the nearest Graybar service location to return reels.
11. CERTIFICATION - Graybar hereby certifies that these goods were produced in compliance with all applicable requirements of Sections 6, 7, and 12 of the Fair Labor Standards Act, as amended, and of regulations and orders of the United States Department of Labor issued under Section 14 thereof. This agreement is subject to Executive Order 11246, as amended, the Rehabilitation Act of 1973, as amended, the Vietnam Veterans' Readjustment Assistance Act of 1974, as amended, E.O. 13496, 29 CFR Part 471, Appendix A to Subpart A, and the corresponding regulations, to the extent required by law. 41 CFR 60-1.4, 60-741.5, and 60-250.5 are incorporated herein by reference, to the extent legally required.
12. FOREIGN CORRUPT PRACTICES ACT - Buyer shall comply with applicable laws and regulations relating to anti-corruption, including, without limitation, (i) the United States Foreign Corrupt Practices Act (FCPA) (15 U.S.C. §§78dd-1, et. seq.) irrespective of the place of performance, and (ii) laws and regulations implementing the Organization for Economic Cooperation and Development's Convention on Combating Bribery of Foreign Public Officials in International Business Transactions, the U.N. Convention Against Corruption, and the Inter-American Convention Against Corruption in Buyer's country or any country where performance of this agreement or delivery of goods will occur.
13. ASSIGNMENT - Buyer shall not assign its rights or delegate its duties hereunder or any interest herein without the prior written consent of Graybar, and any such assignment, without such consent, shall be void.
14. GENERAL PROVISIONS - All typographical or clerical errors made by Graybar in any quotation, acknowledgment or publication are subject to correction. This agreement shall be governed by the laws of the State of Missouri applicable to contracts to be formed and fully performed within the State of Missouri, without giving effect to the choice or conflicts of law provisions thereof. All suits arising from or concerning this agreement shall be filed in the Circuit Court of St. Louis County, Missouri, or the United States District Court for the Eastern District of Missouri, and no other place unless otherwise determined in Graybar's sole discretion. Buyer hereby irrevocably consents to the jurisdiction of such court or courts and agrees to appear in any such action upon written notice thereof.
15. PAYMENT TERMS - Payment terms shall be as stated on Graybar's invoice or as otherwise mutually agreed. As a condition of the sales agreement, a monthly service charge of the lesser of 1-1/2% or the maximum permitted by law may be added to all accounts not paid by net due date. Visa, MasterCard, American Express, and Discover credit cards are accepted at point of purchase only.
16. EXPORTING - Buyer acknowledges that this order and the performance thereof are subject to compliance with any and all applicable United States laws, regulations, or orders. Buyer agrees to comply with all such laws, regulations, and orders, including, if applicable, all requirements of the International Traffic in Arms Regulations and/or the Export Administration Act, as may be amended. Buyer further agrees that if the export laws are applicable, it will not disclose or re-export any technical data received under this order to any countries for which the United States government requires an export license or other supporting documentation at the time of export or transfer, unless Buyer has obtained prior written authorization from the United States Office of Export Control or other authority responsible for such matters.
17. CANCELLATION; CHANGES FOR SERVICES - Buyer may cancel or make changes to a statement of work up to five (5) business days prior to commencement of the work. All changes and cancellations after such date are subject to Graybar's prior written approval in Graybar's sole and absolute discretion. Buyer shall pay to Graybar amounts necessary to cover cancellation, restocking fees and other charges applicable to the cancelled goods or services including those incurred or committed to by Graybar.

Signed: _____

This equipment and associated installation charges may be financed for a low monthly payment through Graybar Financial Services (subject to credit approval). For more information call 1-800-241-7408 to speak with a leasing specialist.

To learn more about Graybar, visit our website at www.graybar.com

24-Hour Emergency Phone#: 1-800-GRAYBAR

Subject to the standard terms and conditions set forth in this document. Unless otherwise noted, freight terms are F.O.B. shipping point prepaid and bill.
Unless noted the estimated ship date will be determined at the time of order placement.

Contract No. 1125

DRAFT CONSTRUCTION AGREEMENT

Between

SCOTT COUNTY TELEPHONE COOPERATIVE (SCTC)

And

POWELL VALLEY ELECTRIC COOPERATIVE, INC. (PVEC)

THIS CONSTRUCTION AGREEMENT is entered into effective as of _____, 2021 (the "Effective Date") between Scott County Telephone Cooperative (the "Company") and Powell Valley Electric Cooperative (the "Contractor").

W I T N E S S E T H:

WHEREAS, the Company owns and operates a fiber optic broadband system in Tennessee and Virginia (the "**System**"); and has designed a project (called the Lenowisco 2021 VATI Project) for installing broadband facilities and providing broadband services in Lee County, Virginia (the "**2021 Lenowisco 2021 VATI Project**"); and

WHEREAS, Contractor is experienced in constructing fiber optic cable systems;

NOW, THEREFORE, in consideration of the mutual covenants and considerations hereinafter set forth, and other good and valuable consideration, the parties hereto agree as follows:

1. AGREEMENT TO CONSTRUCT A FIBER SYSTEM

Contractor will install fiber backbone (the "**Work**"), as directed by the Company within the Project area. The Company shall provide all engineering, and job and material specifications. The Company will be responsible for providing all rights-of-way required for accommodating the installations, including permission to attach to any third-party poles. The Contractor shall furnish qualified and experience personnel to perform the work.

2. PAYMENT

A. Rates and Charges. In consideration of Contractor's performance of the Work described herein, the Company shall pay Contractor in accordance with the rates and charges as set forth in **Appendix 1 – Bid Pricing**.

	Lee County 2021 VATI Project Unit Pricing			
ENGR BY: Charles "Bo" Goodin				
Exchange: Lee County				
Route: Lee County				
	Footage	Miles		
Main Line Aerial	386,135	73		
Main Line Buried	0	0		
Aerial Drop	339,500	64		
Buried Drop	0	0		
Lee County				
Units/ Description	QTY	Labor	Total Labor	TOTAL
CO-144-ADSS	216,382	\$1.13	\$244,511.66	\$244,512.79
CO-96-ADSS	152,981	\$1.13	\$172,868.53	\$172,869.66
CO-48-ADSS	16,772	\$1.13	\$18,952.36	\$18,953.49
Vaults 36X60X24	2	\$250.00	\$500.00	\$750.00
Coyote 9.5"X28" Enclosure	9	\$250.00	\$2,250.00	\$2,500.00
Coyote 6X22 Enclosures	679	\$175.00	\$118,825.00	\$119,000.00
SEABF2	14,369	\$1.40	\$20,116.60	\$20,118.00
SEAF2	339,500	\$0.45	\$152,775.00	\$152,775.45
NETXTENDFLEX27 Cabinet	2	\$2,500.00	\$5,000.00	\$7,500.00
Template/Rectifier/Battery Kit	2	\$500.00	\$1,000.00	\$1,500.00
Mast Clamps	679	\$5.25	\$3,564.75	\$3,570.00
Splicing	2,880	\$23.00	\$66,240.00	\$66,263.00
HO1D	679	\$23.00	\$15,617.00	\$15,640.00
			Total Labor	\$825,952.39

B. **Billing.** The Contractor will bill the Company for the Work that it performs under this agreement within ninety (90) days of the Work being performed. The Company will pay the invoices within thirty (30) days of the date it receives the invoice. If the Company does not pay Contractor within thirty (30) days, the

Contractor may assess a late payment penalties not to exceed 1.5% per month or 18% per annum.

3. TERM AND TERMINATION

- A. **Effective Date.** The term of this Agreement shall commence on the date first written above (the "**Effective Date**") and continue until March 01, 2023.
- B. **Termination for Convenience.** This Agreement may be terminated earlier by either party for any reason, at any time, in whole or in part, upon 30 days written notice to the other party.

4. EQUAL OPPORTUNITY EMPLOYER

The Contractor asserts that it is a Rural Utilities Services ("RUS") Borrower and that it is an equal opportunity employer.

5. SUBCONTRACTORS

The Contractor reserves the right, at its sole discretion, to employ qualified subcontractors in the performance of the Work. Such subcontractors must meet RUS requirements.

6. INDEMNIFICATION; INSURANCE

- A. **Indemnification:** Each party (Contractor or Company) agrees to indemnify and hold harmless the other party from and against any and all liability, costs, attorneys' fees incurred, expenses, claims and demands, including payment under any workman's compensation laws or under any plan for employee's disability and death benefits, for damage to property, and/or injury to or death of persons, including but not limited to, injuries to and death of its employees when such damage to property or injury to or death of persons arises out of, results from, or is caused by any of its acts or the acts of its employees.
- B. **Insurance:** Each party (Contractor or Company) agrees to carry insurance, with contractual endorsements necessary to protect the other party from and against any and all claims, demands, actions, judgments, costs, expenses, and liabilities of every name and nature which might arise or result, directly or indirectly, from its undertakings to the other party in the paragraphs written above. The amounts of such insurance against liability due to damage to property or liability due to any one accident shall be one million dollars (\$1,000,000.00). Each party also agrees to carry such insurance as required by laws in effect that may be applicable to it. All insurance required shall be procured prior to commencement of any of the services covered by this contract and shall remain in effect for the entire life of this agreement. The company(ies) issuing such insurance shall furnish copies of the policies issued under this agreement and a certificate that it will not cancel nor

change said policies except after 30 days written notice to the other party. Such policies shall be replaced by the applicable party prior to the expiration date or this contract will terminate on said expiration date of insurance coverage.

7. MISCELLANEOUS

- A. **Relationship of the Parties.** Nothing in this Agreement shall be deemed to create any relationship between Contractor and the Company other than that of independent parties contracting with each other solely for the purpose of carrying out the provisions of this Agreement.
- B. **Audit Rights.** Company will have the right to audit project related portions of the Contractor's work order system at any time to determine total accumulated costs. Contractor will have the right to audit Company collections of project related revenue pursuant to this Agreement.
- C. **Notices.** All notices, demands, requests, or other communications which may be or are required to be given, served, or sent by any party to any other party pursuant to this Agreement shall be in writing and shall be mailed by first-class, registered or certified mail, return receipt requested, postage prepaid, or transmitted by overnight courier, hand delivery (including delivery by courier), telegram, telex, or facsimile transmission, addressed as follows:

If to Contractor:

Powell Valley Electric Cooperative
Attention: Mr. Randell W. Meyers
P.O. Box 1528, New Tazewell, TN 37824
Telephone No.: (423) 626.0702
rmeyers@pve.coop

If to the Company:

Scott County Telephone Cooperative
Attention: Mr. William J. Franklin
149 Woodland Street
Gate City, Virginia 24251
Billfranklin.sctc@gmail.com

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed on their behalf to be effective as of the date first above written.

THE COMPANY:

Scott County Telephone Cooperative

By: William J. Franklin
Name: William J. Franklin
Title: CEO

CONTRACTOR:

Powell Valley Electric Cooperative

By: Randell W. Meyers
Name: Randell W. Meyers
Title: General Manager/CEO

(1)

Melissa Jessee

From: Saved by Internet Explorer 11
Sent: Wednesday, July 22, 2020 8:44 AM
Subject: Draft Copy « Form 477 « FCC
Attachments: Untitled attachment 00065.css; Untitled attachment 00068.dat; Untitled attachment 00071.dat

Skip to footer and contact information



Federal Communications Commission

FRN:

0002069862

Data as of:

Dec 31, 2019

Operations:

ILEC

Submission Status:

Revised - Submitted

Last Updated:

May 29, 2020 10:58:11

Filer Identification

Section	Question	Response
	Company Name	Scott County Telephone Cooperative
	Holding Company Name	Scott County Telephone Cooperative
Filer Information	SAC ID	190248
	499 ID	804426

Section

Question

Response

Section	Question	Response
Data Contact Information	Data Contact Name	Rebecca McDavid
	Data Contact Phone Number	(276) 452-7238
	Data Contact E-mail	rmcdavid@sctc.org
	Emergency Operations Name	Roger Fraysier
Emergency Operations Contact Information	Emergency Operations Phone Number	(423) 416-0649
	Emergency Operations E-mail	rfaysier@sctc.org
	Certifying Official Name	Daniel Odorn
Certifying Official Contact Information	Certifying Official Phone Number	(276) 452-9119
	Certifying Official E-mail	dano@sctc.org

Data Submitted

Form Section	File Name	Date & Time	Number of Rows
Fixed Broadband Deployment	sample_fbd.csv	May 29, 2020 10:57:13	1346
Fixed Broadband Subscription	Broadband census tract subscription info.csv	May 29, 2020 10:57:13	196
Fixed Voice Subscription	SCTC line count.csv	May 29, 2020 10:57:13	15

Fixed Broadband Deployment

Census Block Counts by State, DBA Name and Technology

State	DBA Name	Technology	Blocks
Tennessee	Scott County Telephone Cooperative	Asymmetric xDSL	2
		Optical Carrier/Fiber to the End User	67
Virginia	Scott County Telephone Cooperative	Asymmetric xDSL	401
		Optical Carrier/Fiber to the End User	876
Total			1346

Fixed Broadband Subscription

Fixed Broadband Subscriptions by State, Technology and End-user Type

State	Technology	Subscriptions		
		Census Tracts	Consumer	Business / Govt
Tennessee	Asymmetric xDSL	2	2	0
	Optical Carrier/Fiber to the End User	27	411	12
Virginia	Asymmetric xDSL	30	3179	78
	Optical Carrier/Fiber to the End User	137	5961	574
Total		196	9553	664

Fixed Broadband Subscriptions by Bandwidths and End-user Type

3.000	Upstream Bandwidth (in Mbps)		Total
	Downstream Bandwidth (in Mbps)	Consumer	
	0.768	2824	266
			3090

	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
5.000	1.000		1025	52	1077
10.000	1.000		4002	115	4117
10.000	2.000		135	49	184
25.000	5.000		1505	137	1642
30.000	5.000		22	0	22
50.000	10.000		6	12	18
100.000	20.000		34	33	67
	Total		9553	664	10217

Fixed Broadband Subscriptions by Technology, Bandwidths and End-user Type

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
Asymmetric xDSL	3.000	0.768	1182	44	1226
	5.000	1.000	508	12	520
	10.000	1.000	1417	18	1435
	10.000	2.000	74	4	78
Optical Carrier/Fiber to the End User	3.000	0.768	1642	222	1864
	5.000	1.000	517	40	557

State	Wholesale	UNE-L
Virginia	0	0
Total	0	0

VGE Lines Provided to End Users by State, Bundle and Product Type

State	by Bundle			by Product Type		
	Sold w/ Internet	Sold w/o Internet	Total	Consumer & No PIC	Bus-Govt & No PIC	& PIC & PIC
Tennessee	40	25	65	11	0	54
Virginia	2885	1673	4558	491	343	3403
Total	2925	1698	4623	502	343	3457

VGE Lines Provided to End Users by State, Ownership and Last-mile Medium

State	by Ownership				by Last-mile Medium			
	Owned	UNE-L	Resale	Total	Coax	Fixed Wireless	Copper	Total
Tennessee	65	0	0	65	58	0	0	7
Virginia	4558	0	1552	4558	1552	0	0	3006
Total	4623	0	1610	4623	1610	0	0	3013

(2)

Melissa Jessee

From: Saved by Internet Explorer 11
Sent: Wednesday, July 22, 2020 8:37 AM
Subject: Draft Copy « Form 477 « FCC
Attachments: Untitled attachment 00043.css; Untitled attachment 00046.dat; Untitled attachment 00049.dat

[Skip to footer and contact information](#)



Federal
Communications
Commission

FRN: 0002069862

Data as of: Jun 30, 2019

Operations: ILEC

Submission Status: Revised - Submitted

Last Updated: May 29, 2020 10:55:32

Filer Identification

Section	Question	Response
	Company Name	Scott County Telephone Cooperative
	Holding Company Name	Scott County Telephone Cooperative
Filer Information	SAC ID	190248
	499 ID	804426

Section	Question	Response
	Data Contact Name	Rebecca McDavid
Data Contact Information	Data Contact Phone Number	(276) 452-7238
	Data Contact E-mail	rmcdavid@sctc.org
	Emergency Operations Name	Roger Fraysier
Emergency Operations Contact Information	Emergency Operations Phone Number	(423) 416-0649
	Emergency Operations E-mail	rfraysier@sctc.org
	Certifying Official Name	Daniel Odorn
Certifying Official Contact Information	Certifying Official Phone Number	(276) 452-9119
	Certifying Official E-mail	dano@sctc.org

Data Submitted

Form Section	File Name	Date & Time	Number of Rows
Fixed Broadband Deployment	Broadband census block info.csv	May 29, 2020 10:51:52	1346
Fixed Broadband Subscription	Broadband census tract subscription info.csv	May 29, 2020 10:51:52	196
Fixed Voice Subscription	SCTC line count.csv	May 29, 2020 10:51:52	15

Fixed Broadband Deployment

Census Block Counts by State, DBA Name and Technology

State	DBA Name	Technology	Blocks
Tennessee	Scott County Telephone Cooperative	Asymmetric xDSL	2
		Optical Carrier/Fiber to the End User	67
Virginia	Scott County Telephone Cooperative	Asymmetric xDSL	401
		Optical Carrier/Fiber to the End User	876
	Total		1346

Fixed Broadband Subscription

Fixed Broadband Subscriptions by State, Technology and End-user Type

State	Technology	Subscriptions		
		Census Tracts	Consumer	Business / Govt
Tennessee	Asymmetric xDSL	2	2	0
	Optical Carrier/Fiber to the End User	27	410	10
Virginia	Asymmetric xDSL	30	3179	78
	Optical Carrier/Fiber to the End User	137	5933	554
	Total	196	9524	642
				10166

Fixed Broadband Subscriptions by Bandwidths and End-user Type

3.000	Upstream Bandwidth (in Mbps)		Total
	Downstream Bandwidth (in Mbps)	Business / Govt	
	0.768	2824	3090
		266	

	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
5.000	1.000		1025	52	1077
10.000	1.000		4000	114	4114
10.000	2.000		134	49	183
25.000	5.000		1479	116	1595
30.000	5.000		22	0	22
50.000	10.000		6	12	18
100.000	20.000		34	33	67
	Total		9524	642	10166

Fixed Broadband Subscriptions by Technology, Bandwidths and End-user Type

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
Asymmetric xDSL	3.000	0.768	1182	44	1226
	5.000	1.000	508	12	520
	10.000	1.000	1417	18	1435
	10.000	2.000	74	4	78
Optical Carrier/Fiber to the End User	3.000	0.768	1642	222	1864
	5.000	1.000	517	40	557

Technology	Downstream Bandwidth (in Mbps)	Upstream Bandwidth (in Mbps)	Consumer	Business / Govt	Total
	10.000	1.000	2583	96	2679
	10.000	2.000	60	45	105
	25.000	5.000	1479	116	1595
	30.000	5.000	22	0	22
	50.000	10.000	6	12	18
	100.000	20.000	34	33	67
	Total		9524	642	10166

Fixed Voice Subscription

VGE Lines and VoIP Subscriptions by State and End-user Type

State	Total VGE Lines	Consumer VGE Lines	Total VoIP Subscriptions	Consumer VoIP Subscriptions
Tennessee	65	65	0	0
Virginia	4692	3980	0	0
Total	4757	4045	0	0

Fixed Voice Subscription (VGE Lines)

VGE Lines Provided to Unaffiliated Providers by State

State	Wholesale	UNE-L
Tennessee	0	0

State	Wholesale	UNE-L
Virginia	0	0
Total	0	0

VGE Lines Provided to End Users by State, Bundle and Product Type

State	by Bundle			by Product Type		
	Sold w/ Internet	Sold w/o Internet	Total	Consumer & No PIC	Bus-Govt & No PIC	& PIC & PIC
Tennessee	40	25	65	11	54	0
Virginia	2975	1717	4692	506	3474	358
Total	3015	1742	4757	517	3528	358

VGE Lines Provided to End Users by State, Ownership and Last-mile Medium

State	by Ownership			by Last-mile Medium		
	Owned	UNE-L	Total	Coax	Fixed Wireless	Copper
Tennessee	65	0	65	58	0	7
Virginia	4692	0	4692	1600	0	3092
Total	4757	0	4757	1658	0	3099



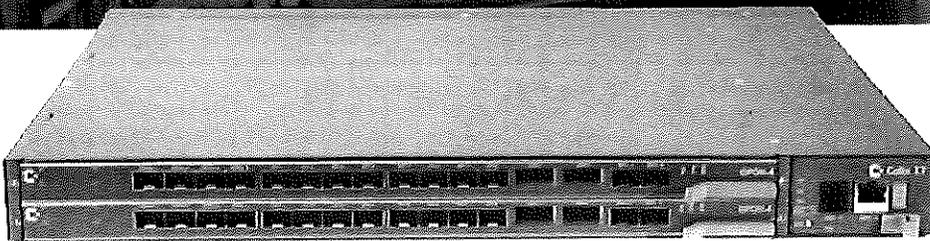
Calix E7-2 Ethernet Service Access Platform

DESCRIPTION

What could unparalleled flexibility and network convergence mean to you?

The E7 is a highly extensible, standards-based Ethernet service access platform that offers service providers a modular chassis-based option to address the emerging bandwidth challenges of today's world. As next-generation Ethernet services gain momentum in the marketplace and begin to extend out from the metropolitan area networks, they will drive demand for versatile, cost-effective aggregation out at the network edge.

By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. The AXOS E7-2 leads a rapidly expanding family of AXOES E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



FUNCTIONAL DESCRIPTION

ETHERNET SERVICE ACCESS PLATFORM:

Residential and business services are converging as more subscribers work from home offices and internet "over the top" video services consume an increasing percentage of both enterprise and service provider network capacity. IP and Ethernet are the dominant network and transport protocols, and all services – voice, data, and video – are rapidly migrating to a packet-based architecture. High performance applications demand high performance solutions; the Calix E7-2 Ethernet Service Access Platform meets the demanding requirements of Ethernet services access networks.

The Calix E7 delivers a wide array of high performance applications, including 10GE Ethernet transport, delivery of high density residential triple play services over copper pairs (VDSL2/ADSL2+), GPON and point-to-point Ethernet, Metro Ethernet Forum (MEF) compliant business services, mobile backhaul, and protected GE aggregation of Calix E7, C7, B6 and E5 platforms.

HIGH DENSITY SUBSCRIBER ACCESS

With two cards per system, the E7-2 provides flexible, high density subscriber access options in a 1RU shelf:

- 96 VDSL2/ADSL2+ & POTS Combo (48 Overlay)
- 16 GPON and 8 GE ports (1024 ONTs)
- 48 point-to-point GE ports (48 ONTs)
- 8 XGS-PON/NG-PON2 ports

With Multi-dwelling unit (MDU) ONTs, the subscribers per 1RU system can exceed several thousand.

MODULAR CHASSIS ARCHITECTURE

The Calix E7-2 modular chassis enables a pay-as-you-grow architecture, combining the most advantageous attributes of a small form factor product with a large chassis-based system.

- 1RU design can expand from a single slot, for very low first install cost, to multiple chassis, to add subscriber growth yielding a near linear cost curve
- Twenty line cards are managed as a single chassis for operational efficiency
- Mix and match line cards in a common chassis – no common control equipment required
- Line cards can be added or replaced without uninstalling/installing power, alarms, or cables – reducing MTR from hours to minutes
- Subscribers are easily aggregated and network resources efficiently shared across protected trunk facilities
- Hardened 1RU system delivers GPON and Ethernet with 10GE transport from CO, cabinet or pole mount
- Resilient, hot-swappable line cards and fan tray

With the E7-2, service providers no longer need to decide between a single service product and a high growth chassis solution. E7-2 provides low first install cost, operational efficiency and near linear incremental cost per subscriber, enabling Calix customers to maximize their business return.

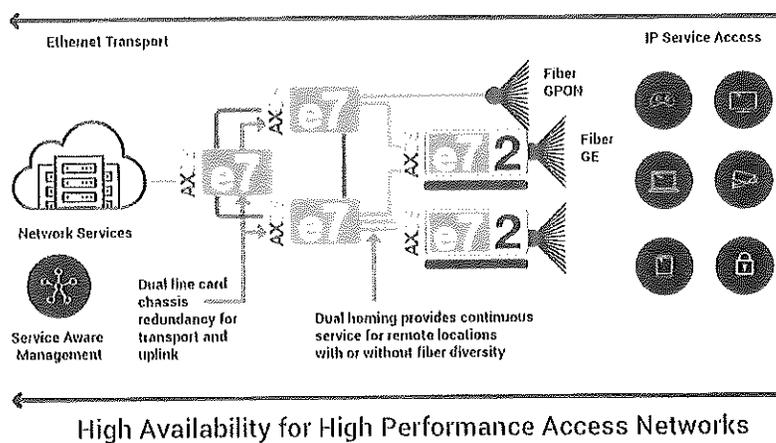
FULL SPECTRUM OF SERVICES

The E7 delivers a full spectrum of access services over GPON and Point-to-Point Ethernet using the family of Calix ONTs, including Single Family Unit (SFU), Small Business Unit (SBU), Multi-Dwelling Unit (MDU), and rack-mount models.

- IPTV – broadcast and Video on Demand (VoD)
- MEF compliant business services
- High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support
- T1 services
- CATV video: RF video overlay with RF return

Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

NETWORK CONVERGENCE



DELIVERING "QUALITY OF EXPERIENCE"

The E7 provides per-subscriber and per-service hierarchical QoS to deliver uncompromised triple play and business services. A powerful collection of classification, policing, queuing and scheduling algorithms let operators manage per-subscriber and per-service traffic flows to maintain priority/delay/loss service differentiation within the E7 network.

SCALABLE IPTV SUPPORT

IPTV services are by far the most demanding in terms of quality, and user expectations are very high. The E7 supports industry standard IGMP snooping to identify and replicate multicast video sent between the set-top box and the video distribution network, providing efficient, scalable, high-quality IPTV distribution on both GPON and Ethernet interfaces.

INTEGRATED HIGH-CAPACITY AGGREGATION

The E7 is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. This capacity makes the E7 ideal for aggregation and transport of IP/Ethernet services across the access network. The E7 platform supports industry standard pluggable modules for all service and network interfaces, including ITU G.984 compliant GPON, Small Form-Factor Pluggable (SFP) Gigabit Ethernet, XFP 10GE ports, and SFP+ 10GE ports.

NETWORK RESILIENCY

The Calix E7 supports a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink applications.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation

SERVICE AWARE MANAGEMENT

The E7, along with the Calix Management System (CMS), allows operators to manage services while understanding their relationship to the network infrastructure. Service-oriented management includes rapid service provisioning, service templates and policies, and service assurance. Comprehensive network management tools let operators create physical and logical topology maps, engineer traffic flows, and manage network commissioning and software upgrades. Network inventory, alarm surveillance and PM collection are enabled by the E7 system. The E7 provides locally hosted Web GUI, CLI, and SNMP interfaces

BACKPLANE BANDWIDTH

100 Gbps between slots

SLOTS

2 universal line card slots
1 Fan Tray slot

DIMENSIONS (W x H x D)

17.5 x 1.7 x 11.45 inches
44.5 x 4.3 x 29.1 cm
Height is 1 RU

WEIGHT

5.9 lb (2.7 kg) E7 shelf
7.4 lb (3.4 kg) shelf with Fan Tray

OPERATING ENVIRONMENT

Temperature: -40 to +65° C
(-40° F to +149° F)
Humidity: 10 to 95%
(non-condensing)
Operating altitude: 10,000 ft
(3,049 m)

STORAGE ENVIRONMENT

Temperature: -40 to +85° C
(-40° F to +185° F)
Humidity: 5 to 95%

MANAGEMENT SUPPORT

Calix CMS network management
Calix CLI and Web GUI for local
management interface
SNMP v2c and v3 performance
and fault monitoring

MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45
connector on Calix E7-2 Fan
Tray)
Ethernet 10/100 (RJ-45
connector on back of Calix E7-2)
RS-232 (RJ-11 connector on
Calix E7-2 Fan Tray)

SYNCHRONIZATION

Synchronization is enabled by
the E7-2 line cards as
required
External reference timing
Built-in Stratum-3 clock
Hardware-ready to support
Synchronous Ethernet

ALARM I/O INTERFACES

Wire wrap pin access on E7 back
User definable alarm inputs:
7; outputs: 1

FIBER INTERFACES

All optical ports use pluggable
optics (SFP, XFP, SFP+)
LC or SC connectors on modules

ANALOG/METALLIC INTERFACES

Two standard 25-pair RJ-21
connectors per slot

TIMING I/O INTERFACES

Access through wire wrap pins
on the back of the Calix E7

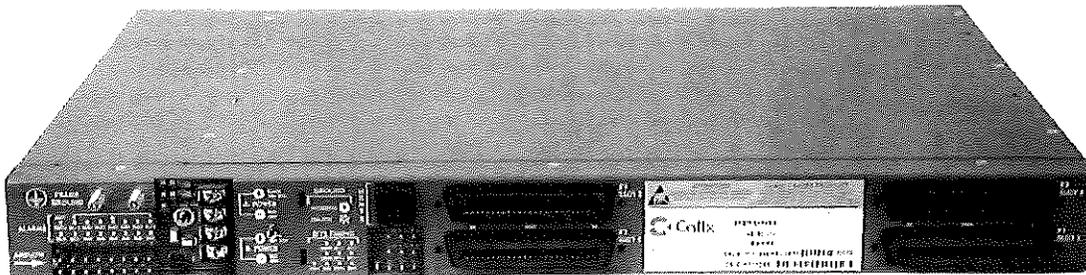
BITS clock (sink and source)

STANDARDS COMPLIANCE

NEBS Level 3 compliance
(GR-63-CORE, GR-1089-
CORE, GR-3028)
UL 60950
FCC Part 15 Class A

POWER FEEDS

Integrated power management
on Calix E7-2 line cards
Redundant -48/60 VDC battery
feeds (A and B)
Input Range: -42.5VDC to
-72VDC
Fuse: 7.5 Amps (A and B)



FAN TRAY ASSEMBLY (100-01451)

FANS

4 fans housed in fan tray
Resilient design maintains
system cooling with one fan
failure

MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45
connector)
RS-232 (RJ-11 connector)

SYSTEM INFORMATION

7-segment LCD display
System Controller (MGT) –
GREEN

SHELF ALARM INDICATOR

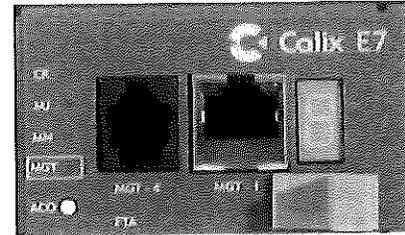
Critical (CR) - RED
Major (MJ) - RED
Minor (MN) - AMBER
Alarm Cut-Off (ACO) button

POWER SPECIFICATIONS

Min Input Power:
22 Watts @ -48V
Max Input Power:
65 Watts @ -48V

MAINTENANCE

Field-replaceable air filter (not
used in RT locations)
Hot-swappable fan tray
assembly



FAN TRAY ASSEMBLY-2 (100-03590)

FANS

4 fans housed in fan tray
Resilient design maintains
system cooling with one fan
failure

Variable speed operation
depending on operating
temperature*

MANAGEMENT INTERFACES

Ethernet 10/100 (RJ-45
connector)
RS-232 (RJ-11 connector)

SYSTEM INFORMATION

7-segment LCD display
System Controller (MGT) –
GREEN

SHELF ALARM INDICATOR

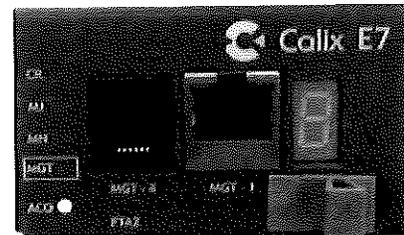
Critical (CR) - RED
Major (MJ) - RED
Minor (MN) - AMBER
Alarm Cut-Off (ACO) button

POWER SPECIFICATIONS

Min Input Power:
8.5 Watts @ -48V
Max Input Power:
48 Watts @ -48V

MAINTENANCE

Field-replaceable air filter
(not used in RT locations)
Hot-swappable fan tray
assembly





NOTES

For GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers, Direct Attach cables, and all transceivers used in CSFP Option 2 sockets, only products purchased directly from Calix are supported. The use of GPON OIM, Active Ethernet CSFPs, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

- SFP modules may also be used in CSFP Option 2 sockets, and in SFP+ sockets at 1GE rate

- Copper Direct Attach cables can operate in SFP, CSFP Option 2, and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

CALIX E7-2 ETHERNET SERVICE ACCESS PLATFORM

000-00372..... E7-2 Chassis with Fan Tray Assembly and Installation Kit

100-01451 E7-2 Fan Tray Assembly

000-00228..... E7-2 Fan Tray Assembly Filter, Package of 10 units

100-03590..... E7-2 Fan Tray Assembly 2 (FTA2)*

000-00760..... E7-2 Fan Tray Assembly 2 (FTA2) Filter, Package of 10 units

* Variable speed operation under software control requires a minimum of E7 Release 2.2 software. In releases prior to 2.2, the FTA2 fan speeds are identical to the original FTA

CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

CSFP Option 2..... 1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules

SFP 1GE and 2.5GE optical and copper Small Form-factor Pluggable (SFP) modules

SFP+..... 10GE optical Enhanced Small Form-factor Pluggable (SFP+) modules

Direct Attach..... Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables

XFP 10GE optical Small Form-factor Pluggable (XFP) modules

GPON OIM..... 2.5Gbps GPON (Class B+ ODN with minimum 28dB link budget, up to 1:64 splits)

ER-GPON OIM 2.5Gbps Extended Reach GPON (up to 58 km with 1:4 split)

CALIX MOUNT KIT

100-03382 E7-2 ETSI Rack Mount Kit



Calix E7-2 AXOS GPON-8 r2

DESCRIPTION

Looking to future-proof your next-generation GPON network in preparation for launching advanced services?

As North America's most widely deployed access system, the Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The AXOS E7-2 leads a rapidly expanding family of AXOS E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



FUNCTIONAL DESCRIPTION

GPON AND POINT-TO-POINT ETHERNET:
The Calix E7-2 AXOS GPON-8 r2 card provides multiservice capability over IP/Ethernet-based networks. Each GPON-8 r2 provides eight GPON OLT ports that subtend up to 128 ONTs each, for a card capacity of 1024 GPON ONTs, or 2048 per E7-2 1RU chassis. An additional four SFP/CSFP sockets per card can provide high-bandwidth, point-to-point Ethernet services to individual subscribers or be used to aggregate other Ethernet devices. The Calix E7-2 GPON-8 r2 card can co-exist with other Calix E7-2 AXOS line cards in a shelf.

KEY FEATURES AND CAPABILITIES

GPON-8 r2 card features and capabilities include:

- Based on ITU G.984 GPON family of standards—including G.988
- GPON: 2.488 Gbps downstream, 1.244 Gbps upstream
- GEM (Ethernet) based GPON
- Interoperable with Calix ONTs, including the GigaFamily
- Integrated 10GE and GE/2.5GE aggregation and transport
- Class B+ ODN, +28 dB link budget, up to 20 km at 32-way splits
- Class C+ ODN, +32 dB link budget with Forward Error Correction (FEC), up to 35 km at 32-way split, up to 60 km at 2-way split
- Hardened for central office and remote terminals

INTEGRATED HIGH-CAPACITY AGGREGATION

The E7-2 AXOS GPON-8 r2 card is built on a core Layer 2 and Layer 3 switch capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. Each GPON OLT port has a dedicated 2.5Gbps switch interface. Industry standard pluggable modules are used for all interfaces, including ITU G.984 compliant GPON, GE and 2.5GE optical SFP, 10GE XFP, and 10GE SFP+. The GPON-8r2 supports (4) CSFP (Compact SFP) modules that are mechanically compatible with the industry-ubiquitous SFP module. Each CSFP module supports two independent bidirectional transceivers (1490nm Tx / 1310nm Rx), each capable of operating at a 1 Gbps bi-directional rate. The SFP+ ports also support SFP modules and Direct Attach copper cables.

IP SERVICES DELIVERY

The Calix E7-2 AXOS GPON-8 r2 card delivers a full spectrum of IP access services over GPON and Point-to-Point Ethernet networks.

- Secure AES encryption on the PON
- IPTV – broadcast and Video on Demand (VoD)
- MEF compliant business services
- High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support
- T1 services
- CATV: 1550nm RF video overlay; 1610nm RF return

NETWORK RESILIENCY

All Calix E7-2 AXOS GPON-8 r2 cards support a flexible set of standards-based network topology protocols for use in aggregation, ring-based transport, and uplink.

- ITU G.8032 Ethernet Ring Protection Switching (ERPS)
- ITU G.8032v2 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation
- ITU G.983.5 – Type B Protection and enhanced survivability for GPON OLTs

MOBILE BACKHAUL

With integrated network synchronization, hierarchical QoS and support for T1 services, the E7-2 AXOS GPON-8 r2 card transport uncompromised mobile broadband traffic while also supporting triple play residential and MEF certified business services from a single platform. A powerful collection of classification, policing, and scheduling algorithms let operators manage per-subscriber and per-service traffic flows to maintain priority/delay/loss service differentiation within the E7 network.

SCALABLE IPTV SUPPORT

The E7 supports industry standard IGMP snooping to identify and replicate multicast video sent between the set-top box and the video distribution network, providing efficient, scalable, high-quality IPTV distribution on both GPON and Ethernet interfaces.

MINIMUM SYSTEM REQUIREMENTS

Calix AXOS Software Release 3.1.3

DIMENSIONS (W x H x L)

14 x 10.1 x 0.78 inches
35.6 x 25.7 x 2 cm

WEIGHT

2.08 lbs. (0.94 kg)

PORTS

8 GPON OLT ports
8 CSFP 1GE ports (4 CSFP sockets, also support SFP modules)
2 SFP+ ports supporting 10GE and GE optical modules
2 XFP ports supporting 10GE optical modules

PACKET SWITCHING

CAPACITY

Wire speed forwarding across all Ethernet and GPON OLT ports
64,000 MAC addresses per system
9,000 byte jumbo frames
2,000 byte frames over GPON
4,096 VLANs
4,000 IGMP Multicast channels

QUALITY OF SERVICE

Service classification based on port, SVLAN-ID, CVLAN-ID, P-Bit
Port and flow-based policing to 1Mbps increments
8 CoS queues per port
Strict priority scheduling with minimum bandwidth guarantee
Congestion avoidance: Tail Drop

STANDARDS AND RFC

SUPPORT

TR101 VLAN Service models
IEEE802.1ag Connectivity Fault Management (G.8032 support)
IEEE 802.1D Rapid Spanning Tree
IEEE 802.1p CoS Prioritization
IEEE 802.1Q VLAN tagging
IEEE 802.1ad VLAN stacking (Q-in-Q) support
IEEE 802.1w RSTP
IEEE 802.3ad/802.1AX Link Aggregation
RFC 2236 IGMP v2
RFC 3376 IGMP v3
RFC 3046 DHCP Relay Agent Information Option ("Option 82")
RFC 4541 IGMP snooping
RFC 4553 Structure-Agnostic Time Division Multiplexing (TDM) over Packet (SAToP)
ITU-T G.8032 Ethernet Ring Protection Switching (ERPS)/Enhanced EAPS
ITU-T G.8032v2 Ethernet Ring Protection Switching (ERPS)
ITU-T G.984 GPON
ITU G.984.1 Type B Protection Dynamic Bandwidth Assignment (DBA)
NIST Advanced Encryption Standard (AES)

SYNCHRONIZATION

Synchronization enabled by E7 line cards
External reference timing
Built-in Stratum-3 clock
Hardware-ready to support Synchronous Ethernet, IEEE 1588v2

COMPLIANCE

NEBS Level 3 compliance (GR-63-CORE, GR-1089-CORE, GR-3028)
UL 60950
FCC Part 15 Class A
CE Mark

POWER SPECIFICATIONS

GPON-8 r2 power/heat dissipation: 85 Watts (Maximum) 75 Watts (Typical)

OPERATING ENVIRONMENT

Temperature: -40° to +65° C (-40° F to +149° F)
Humidity: 10 to 95% (non-condensing)

STORAGE ENVIRONMENT

Temperature: -40° to +85° C (-40° F to +185° F)
Humidity: 5 to 95%



NOTES

For AXOS GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables, and all transceivers used in CSFP Option 2 sockets only products purchased directly from Calix are supported. The use of GPON OIM, 10GE XFP, 10GE SFP+ pluggable transceivers and Direct Attach cables not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

- Only AXOS GPON OIMs are supported by the E7-2 AXOS GPON-8 r2 card
- SFP modules may also be used in SFP+ sockets at 1GE rate.
- Copper Direct Attach cables can operate in SFP and SFP+ sockets at 1GE, 2.5GE, and 10GE data rates as supported by the card type.

CALIX ONTs

The E7-2 AXOS GPON-8 r2 card supports the Calix family of ONTs, including 700GX, 700GE, 836GE, and 800G GigaFamily. Calix ONTs support auto sensing GPON and GE network interfaces, allowing service providers to manage service changes without subscriber onsite technical support.

CALIX E7-2 AXOS LINE CARDS

100-04665..... E7-2 AXOS GPON-8 r2 (8x GPON OIM, 4x GE SFP, 2x 10GE SFP+, 2x 10GE XFP)

CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Datasheet (#250-00191) for a complete list of modules and specifications.

SFP..... 1GE and 2.5GE optical and copper Small Form-factor Pluggable (SFP) modules

SFP+ 10GE optical Enhanced Small Form-factor Pluggable (SFP+) modules

CSFP Option 2... 1GE optical dual-port Compact Small Form-factor Pluggable (CSFP) Option 2 modules

XFP 10GE optical Small Form-factor Pluggable (XFP) modules

Direct Attach..... Multi-rate copper Small Form-factor Pluggable (SFP/SFP+) cables

AXOS GPON

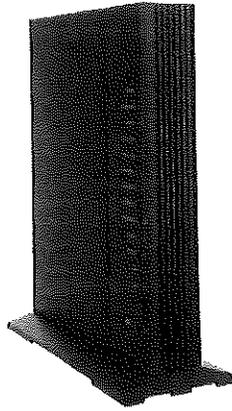
B+ OIM..... 2.5Gbps GPON (Class B+, 20km, C-Temp, AXOS) 2.5Gbps GPON (Class B+, 20km, I-Temp, AXOS)

AXOS GPON

C+ OIM..... 2.5Gbps GPON (Class C+, 60Km, I-Temp, AXOS)

PRODUCT DATASHEET

844G and 854G GigaCenters | ANSI



DESCRIPTION

The Calix 844G and 854G GigaCenters are next generation residential premises service delivery platforms that extend the access network into the home and act as a strategic location for control of the gigabit experience. Supporting broadband connectivity within the home and managing subscriber voice, data and video services, this intelligent, high-performance service platform integrates a 2.5 GPON optical interface with switching and routing functions that manage premises network traffic at speeds up to 1 Gbps. The GigaCenter service interfaces include: carrier class wireless networking with 802.11ac Wi-Fi and four Gigabit Ethernet (GE) ports for IPTV video and data services, two integrated voice lines supporting carrier grade VoIP and network-based TDM voice circuits, a USB port for home networking services, and an option for RF video.

GIGABIT SUBSCRIBER EXPERIENCE: The 844G and 854G GigaCenters are integrated access and gateway solutions that deliver advanced network management and software features to unleash the gigabit experience throughout a subscriber's home. The GigaCenter service delivery platform terminates a GPON fiber optic link at the subscriber's premises and provides carrier class Wi-Fi and Gigabit Ethernet interfaces for customer multi-media devices. The 844G and 854G GigaCenters enable residential subscribers to receive gigabit broadband data, IP video, and VoIP or TDM based voice on a single fiber. Using the latest 802.11ac 5GHz technology incorporating 4x4 multi-user multiple-input and multiple-output (MU-MIMO) and beamforming, the 844G and 854G GigaCenters allow service providers to extend the access network inside the home and establish a strategic location for the delivery and control of broadband services. A USB port is available for home networking with other Ethernet appliances. The GigaCenter family also includes the option of RF signaling for broadcast video services over existing Hybrid Fiber Coax (HFC) networks.

Calix engineered the 844G and 854G GigaCenters for optimal whole-home coverage with simultaneous dual-band 2.4GHz and 5GHz operation and dynamic beamforming at 5GHz. For maximum performance, the GigaCenter supports high-power 2x2 MIMO spatial diversity at 2.4GHz and 4x4 MU-MIMO at 5GHz. The 844G and 854G GigaCenters support the entire 5GHz band including DFS channels and can be provisioned to support 80MHz bandwidth at 5GHz. The GigaCenter solution delivers HD video and data throughout a subscriber's home with control and management of an increasingly video-rich and mobile broadband environment.

EASY TO INSTALL, ACTIVATE, AND MAINTAIN: With the 844G and 854G GigaCenters, Calix has redefined how to install and activate residential services at a subscriber's premises. Using the Calix Smart Activate feature and a phone or laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office. Calix also provides the innovative Compass software portfolio, including Consumer Connect, which allows the service provider to configure, activate and upgrade the GigaCenter quickly from a remote location using in-band management or TR-069. Extensive troubleshooting capabilities, remote software downloads, and easy-to-use service activation ensure that services are delivered and maintained without needless truck rolls and hardware upgrades. Employing GigaCenters allows service providers to reduce their operational expenses while effectively delivering the gigabit experience to their subscribers.

TRUE CARRIER GRADE VOICE SOLUTION: The 844G and 854G GigaCenters deliver a truly agile and responsive service platform with lifeline voice in the event of local AC power loss. A carrier grade 120-240 VAC, 50-60 Hz AC to 12 VDC Uninterruptible Power Supply (UPS) provides battery backup of voice services compliant to Telcordia GR-909. The 844G and 854G GigaCenters can monitor battery status, battery charge and battery life, and report results through the Calix Management System (CMS).

844G and 854G GigaCenters | ANSI

KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), ITU-T GPON compliant
- Home Gateway:
 - Layer 2 bridge and Layer 3 routing for High Speed Internet (HSI) data and IPTV video services
 - DHCP server options
 - DHCP (IPoE) and PPPoE network connections
 - Network Access Translation (NAT), public to private IP addressing
 - Configurable IP address schemes, subnets, static-IP addresses
 - DNS server
 - Bridge port assignment and data traffic mappings
 - Port forwarding
 - Firewall and security
 - Application and website filtering
 - Selectable forwarding and blocking policies
 - DMZ hosting
 - Parental controls, time of day usage
 - Denial of service
 - MAC filtering
 - Time/Zone support
 - Universal Plug-and-Play (UPnP)
- Wireless:
 - 2.4GHz and 5GHz, simultaneous dual-band
 - 5GHz 802.11ac certified, 802.11a/g/n compatible
 - 2.4GHz 802.11n certified, 802.11b/g compatible
 - WPA/WPA2
 - WPS push-button
 - WEP 64/128 bit encryption
 - Eight SSIDs per band with factory default SSIDs
 - MAC filtering
- Two voice lines:
 - FXS ports, ANSI
 - Carrier grade SIP, H.248, MGCP VoIP
 - TDM GR-303/TR-08 Mode 11/GR-57, GR-08 (TR-08 Mode 1) voice services
- Four Gigabit Ethernet (GE) interfaces:
 - Symmetrical 1 Gbps bandwidth for residential IPTV and data services
 - Multi-rate 10/100/1000 BaseT Ethernet, auto-negotiating
- USB port:
 - USB 2.0 - Type A configured as a host interface
- RF video bandwidth to 1 GHz for extended digital programming
- Supports multiple data service profiles
- Traffic management and Quality of Service (QoS):
 - 802.1Q VLANs
 - 802.1p service prioritization
 - Q-in-Q tagging
 - Multiple VLANs
 - Rate limiting
 - DiffServ
 - Pre-defined QOS on service type
- IPTV, IGMPv2, IGMPv3:
 - IGMP Snooping and Proxy
 - IGMP Fast Leaves
- Complete OAM&P support via Calix Management System (CMS)
- Gateway Management:
 - TR-069
 - Local Home Gateway GUI, access provisionable
 - Remote WAN side GUI access
 - Default username/password
 - Set-up persistence, factory reboot support
- Indoor mounting:
 - Wall and Structured Wiring Enclosure (SWE) mount with fiber management
 - Desktop mounting stand
- Optional voice lifeline service power source with in-home battery backup and alarm monitoring
- AC to 12 VDC power adapter available for non-lifeline services.

SPECIFICATIONS

844G and 854G GigaCenters | ANSI

DIMENSIONS

Width: 7.9 in (20.0 cm)
Height: 10.6 in (26.9 cm)
Depth: 1.8 in (4.6 cm)
Weight: 28 oz. (.8 kg)

PON CHARACTERISTICS

Max. split: 64 GPON
Max. reach: 58 km (36 miles) with C+/FEC
Maximum Optical Distribution Network (ODN) Attenuation:
GPON Class B+, 28 dB
GPON Class C+, 32 dB
1490 ± 10 nm optical receiver:
-27.0 to -8.0 dBm
1310 ± 20 nm optical transmitter:
0.5 to 5.0 dBm

INTERFACES

Wireless: 2.4GHz 2x2 and 5Hz 4x4 internal antennas
Telephony: Two RJ-11 connectors
Data/PTV: Four 10/100/1000 BaseT Ethernet ports, RJ-45 connectors
USB: USB 2.0 Type A
RF Video: F-connector, 75 Ohms
PON: Single 9/125 μm (single mode) fiber, SC/APC connector, minimum 50 dB return loss
Power: 8-pin connector

TELEPHONY

General: SIP, H.248, MGCP or TDM Gateway (GR-303, GR-57, TR-08 Mode I, TR-08 Mode II)
Number of lines: 2
RENs per line: 5 maximum
RENs per unit: 10 maximum
Drop length: Maximum 500 feet (152.4 m)
DSO Output: 23.5 mA

DATA

Drop length: 328 feet (100 m) maximum using CAT5 cable
Auto MDI/MDIX crossover for 1000BASE-TX, 100BASE-TX, and 10BASE-T ports
Traffic Management and QOS: 802.11Q VLAN; 802.11p voice, video, data and management priorities; Q-in-Q tagging; Rate limiting

WIRELESS

2.4GHz 802.11 b/g/n
2x2 MIMO, high-power
5GHz 802.11 a/g/n/ac
4x4 MU-MIMO, implicit/explicit dynamic beamforming
2.4GHz and 5GHz simultaneous
8 SSIDs per band (2 SSID subscriber default)
Auto channel selecting and interference detection
WPS, WPS push button
Wireless Security: Wi-Fi protected access (WPA/WPA2) WEP, MAC address filtering
Wi-Fi multimedia (WMM)

VIDEO-ANALOG RF OUTPUT

Bandwidth: 54 to 550 MHz
Return loss: 10 dB minimum
Signal strength (with AGC range):
18 ± 2 dBmV
Flatness: ± 1.0 dB
Tilt: 1.0 dB ± 1.0 dB from 54 to 550 MHz

VIDEO-DIGITAL RF OUTPUT

Bandwidth: 550 to 1003 MHz
Return loss: 8 dB minimum
Signal strength (within AGC range):
12 ± 2 dBmV
Flatness: ± 1.5 dB
Tilt: 4.0 dB ± 1.0 dB from 550 to 1003 MHz
Modulation Error Ratio (MER): 33 dB

VIDEO-DIGITAL RF INPUT

Optical Input (GPON)
Wavelength: 1555 ± 5 nm
Signal strength at 3.5% OMI (within AGC range):
-6.0 to 2.0 dBm

REMOTE MANAGEMENT

OAM&P via CMS
TR-069 remote management
TR-064 CPE management
TR-098 Internet Gateway Device Data Model

ENVIRONMENTAL

Operating temperature: Indoor ambient temperature, 0° to 40°C (32° to 104° F)
Operating/storage relative humidity: 8 to 95 % non-condensing
Altitude: -200 to 10,000 feet (-61 to 3,048 m) above sea level

CERTIFICATION AND COMPLIANCE

Emissions:
FCC Part 15 Class B, IC ICES-003 Class B
CISPR-22
Safety:
UL 60950 and UL 1697 approved
IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q
Wi-Fi Alliance Certified
802.11ac and 802.11n



USB-IF Compliance
USB 2.0



POWERING AND ALARMS

8-pin connector with 7-conductor power and alarm cable
Input voltage: 12 VDC (nominal), 10 VDC (min.), 15 VDC (max)
External Power Adapter: 12 VDC, 2.5 A
Residential battery backup source: UPS mounted at subscriber's residence
Battery backup time rated capacity: 8 hours based on Telcordia GR-909 calculation methods using recommended UPS.

ORDERING INFORMATION

844G and 854G GigaCenters | ANSI

Calix 844G and 854G GigaCenters

100-04011.....844G-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB -UPS Power Interface
100-04013.....854G-1 GigaCenter, 2 POTS, 4 GE, Dual Wi-Fi, 1 USB, 1 RF -UPS Power Interface

Calix 844G and 854G UPS and UPS Cords

100-04068.....Indoor UPS, 12V 7.2AH 36W, Black - AM Type B Grounded
100-03893.....Indoor UPS Power Cord, 7 pin UPS to 8 pin ONT Male, 1M Black
100-03894.....Indoor UPS Power Cord, 7 pin UPS to 8 pin ONT Male, 3M Black
100-03895.....Indoor UPS Power Cord, Un-terminated to 8 pin ONT Male, 6M Black



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250-00331, Rev.11

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Page 4



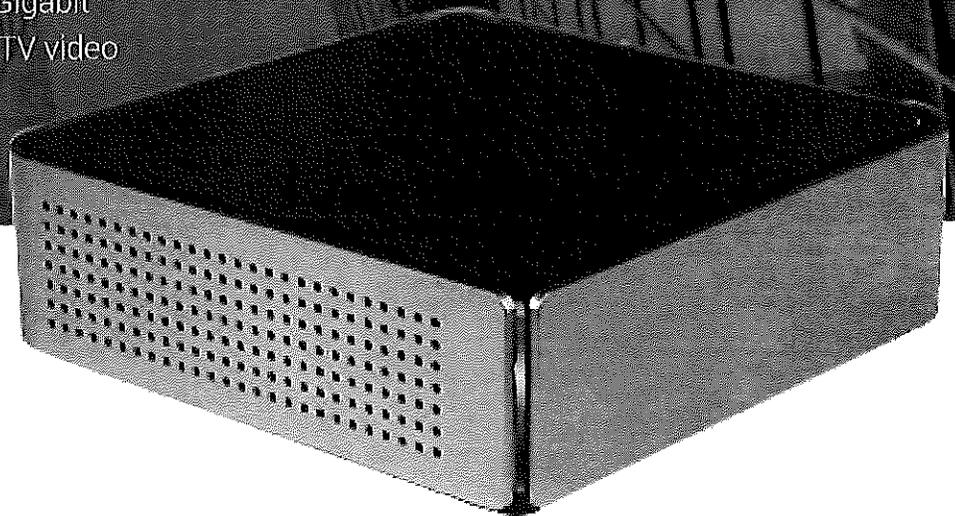
GigaPoint[®] (GP1000X)

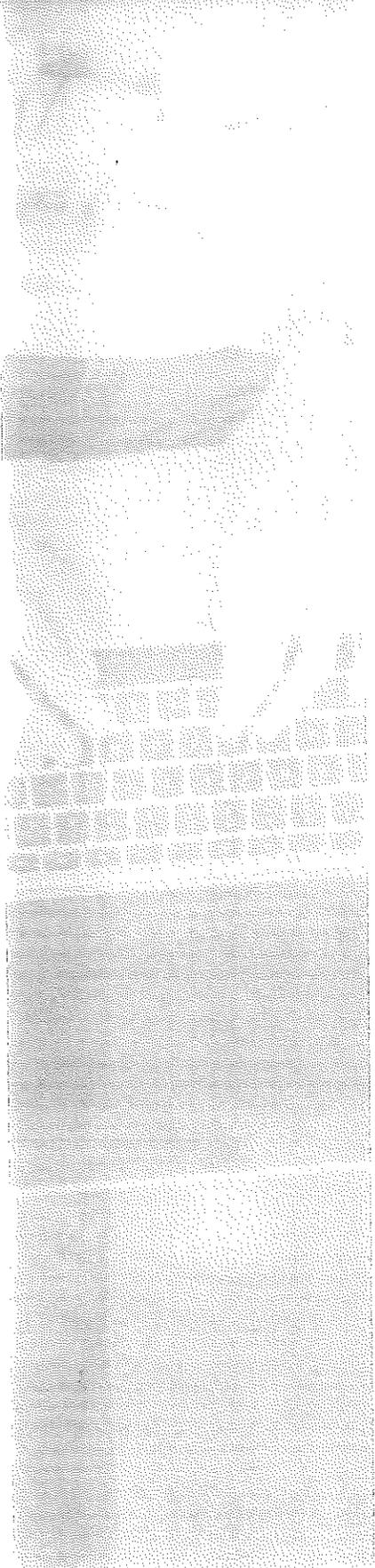
POWERED BY EXOS

DESCRIPTION

The Calix GP1000X GigaPoint[®] is a small form factor service delivery terminal that delivers broadband connectivity to the subscriber using the XGS-PON standard.

This high-performance terminal integrates a XGS-PON optical WAN interface that enables residential and symmetrical business network traffic at speeds up to 10 Gbps. The GP1000X GigaPoint includes one 10 Gigabit Ethernet (10 GE) port for IPTV video and data services.





10 GIGABIT SUBSCRIBER EXPERIENCE

The GP1000X GigaPoint is an integrated access device that delivers advanced network management and software features to enable the 10 Gigabit experience. The GP1000X GigaPoint terminates an XGS-PON fiber-optic link at the subscriber's premises and provides an industry-standard 100/1000/10G BASE-T interface for the customer premises equipment. The GP1000X GigaPoint enables residential subscribers to receive 10 Gigabit broadband data and IP video on a single fiber.

EASY TO INSTALL, ACTIVATE, AND MAINTAIN

With the GP1000X GigaPoint, Calix has redefined how to install and activate residential and business services at a subscriber's premises. Using the Calix Smart Activate feature and laptop, a field technician can install and apply the subscriber's service profile without special equipment or assistance from the central office. Employing the GP1000X GigaPoint allows service providers to reduce their operational expenses while effectively delivering the 10 Gigabit experience to their subscribers.

POWER OPTIONS

The GP1000X GigaPoint power options include a 120-240 V AC, 50-60 Hz to 12 V DC power adapter.

KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), XGS (G.9807.1) compliant
- One 10G BASE-T Gigabit Ethernet (GE) interface
 - Symmetrical 10 Gbps bandwidth for residential IPTV and data services
 - Multi-rate 100/1000/10G BASE-T Ethernet, auto-negotiating
- Supports multiple data service profiles
- Traffic management and Quality of Service (QoS):
 - 802.1Q VLANs
 - 802.1p service prioritization
 - Q-in-Q tagging
 - Multiple VLANs
 - Rate limiting
 - DiffServ
 - Pre-defined QoS on service type
- IPTV, IGMPv2, IGMPv3 ASM:
 - IGMP Snooping
 - IGMP Fast Leaves
- Complete Calix Smart Activation
- Indoor mounting options:
 - Wall mount
 - Desktop mount: horizontal or vertical
- AC to 12 V DC power adapter



SPECIFICATIONS

DIMENSIONS

Height: 2.38 in (6.0 cm)
Width (square): 6.88 in (17.5 cm)
Height: 2.3 in (5.8 cm)
Weight: 20 oz (0.58 kg)

PON CHARACTERISTICS

Max. split*: 128 XGS-PON
Max. reach*: 20 km (12.4 miles), N1 Class
Maximum Optical Distribution Network (ODN) Attenuation: XGS, 29 dB
Optical receiver 1577nm: -28dBm
Optical transmitter 1270nm: +4 to +9 dBm

INTERFACES

Data/IPTV:
One 10G BASE-T 10G Ethernet port
PON: Single 9/125 μ m (single mode) fiber, SC/APC connector, minimum 50 dB return loss
Power: 8-pin connector

DATA

Drop length: 180 feet (55m) maximum, using CAT6 cable; 328 feet (100m) maximum, using CAT6A or CAT7 cable
Auto MDI/MDIX crossover for 100/1000/10G BASE-T ports
IEEE 802.3an and IEEE802.3-2012
Traffic Management and QoS: 802.1Q VLAN, 802.1 video data and management priorities; Q-in-Q tagging; rate limiting

ACTIVATION MANAGEMENT

Calix Smart Activation

CERTIFICATION AND COMPLIANCE

Emissions:
FCC Part 15 Class B
CISPR-22
Safety:
UL 60950 and UL 1697 approved
IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q

ENVIRONMENTAL

Operating temperature:
Indoor ambient temperature, 0° to 40°C (32° to 104° F)
Relative humidity (non-condensing):
Operating/Storage: 5%-90%
Shipment/Storage: 5%-95%

POWERING AND ALARMS

8-pin connector
Input voltage: 12 V DC (nominal), 10 V DC (min), 21 V DC (maximum)
External Power Adapter: External Power Adapter: 12 V DC, 2.5 A
Maximum power consumption: 13.6 W

*Not necessarily simultaneously

ORDERING INFORMATION

Calix GP1000X GigaPoint

100-04647 GP1000X 10G GigaPoint, 10 GE and 12 V DC US Power Adapter
100-04992 GP1000X GigaPoint, 1 10GE – UPS Power Interface
100-04141 Power Adapter CPA5 12 V 2.5 A – EU Type C w/ 8-pin connector
000-01057 GP1000X GigaPoint, 1 10GE -UPS Power Interface and 12 V DC EU Power Adapter

Note: Calix believes the information in this publication to be accurate as of publication date, and is not responsible for error. Product Specifications are subject to change without notice.

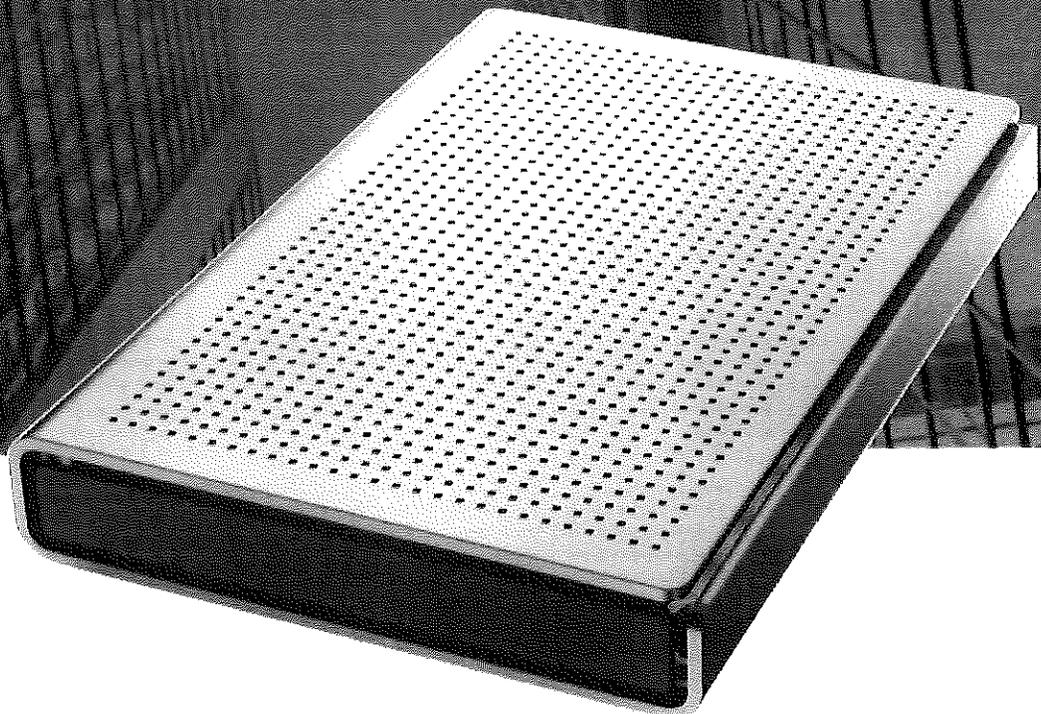


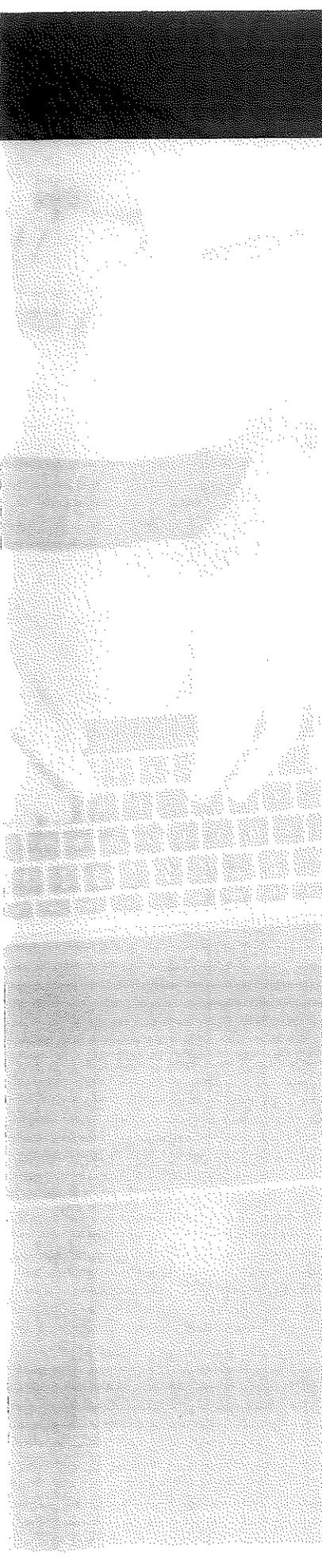
GigaPro (GPR3000X)

POWERED BY EXOS

DESCRIPTION

The GPR3000X GigaPro business Ethernet services edge device delivers 10 Gigabit broadband connectivity using the XGS standard to the enterprise environment. This high-performance device delivers IP and Carrier Ethernet services in compliance with MEF CE 2.0. Flexible SFP+ XGS optical WAN interface assures traffic speeds up to 10 Gbps. The GPR3000X service interfaces include: one 10G SFP+ Ethernet port and two 10/100/1000 BASE-T Ethernet ports for business and data services.





10 GIGABIT BUSINESS EXPERIENCE

The Calix GPR3000X GigaPro delivers advanced network management and software features with MEF CE 2.0 E-LINE support. The GigaPro business Ethernet platform has an SFP+ optical WAN interface to terminate an XGS fiber-optic wavelength link at the business premises, providing one 10 Gigabit and two Gigabit Ethernet interfaces for customer multi-media devices. Both the 10 Gigabit and two Gigabit Ethernet interfaces have the flexibility to be configured for UNI or I-NNI applications. Multiple services of the same or different types can be multiplexed on the same Ethernet interface to create a multiservice, multi-subscriber demarcation. The GPR3000X enables business and enterprise subscribers to receive 10 gigabit broadband data on a single fiber.

ETHERNET SWITCHING

The GPR3000X GigaPro supports multiple EVCs per UNI with policing to provide CE 2.0-compliant multi-Class of Service (CoS) capabilities. You can apply bandwidth profiles on the GPR3000X on a per-CoS basis in an EVC. Each GPR3000X GigaPro can support up to 80 EVCs. Scheduling options include Strict Priority Queuing (SP) and Deficit Weighted Round Robin (DWRR). The Ethernet interfaces support 8 CoS egress queues with scheduling, marking of DEI based on classifiers, and minimum/maximum rate controls. The GPR3000X supports an MTU of 9,600 Bytes.

PERFORMANCE ASSURANCE

The Calix GPR3000X GigaPro is compliant with MEF CE 2.0 manageability requirements through support for IEEE 802.1ag and ITU Y.1731 standards. The GPR3000X also supports Service Activation Testing (SAT) based on ITU Y.1564, and MEF 48, where the GigaPro acts as reflector or load generator/collector for single ended measurements.

EASY TO INSTALL, ACTIVATE, AND MAINTAIN

The GPR3000X GigaPro supports zero-touch commissioning. A field technician can install without a configuration file, command line interface, special equipment, or central office assistance. Calix also provides the innovative Operations Cloud software portfolio that includes management via Activate and birth, allowing Calix to configure, activate, upgrade and meet MEF CE 2.0 compliance quickly from a remote location. Extensive troubleshooting capabilities and easy-to-use service activation ensure that broadband services are delivered and maintained without needless truck rolls and hardware upgrades.

CARRIER-GRADE BUSINESS ETHERNET SOLUTION

The GPR3000X GigaPro delivers a truly agile and responsive business Ethernet service platform with high availability. The GPR3000X supports carrier grade 120-240 V AC, 50-60 Hz AC to +12 V DC power adapter.

KEY ATTRIBUTES

- Standards-based Full Service Access Network (FSAN), XGS (G.9807.1) compliant
- Two Gigabit Ethernet (GE) interfaces:
 - Symmetrical 1 Gbps bandwidth for business services
 - Multi-rate 10/100/1000 BASE-T Ethernet, auto-negotiating
- SFP+ XGS uplink port
- One 10 GigaBit Ethernet SFP+ interface
- Access, traffic management and Quality of Service (QoS):
 - 2r3c policing
 - 802.1Q VLANs
 - 802.1p service prioritization
 - Q-in-Q tagging
 - Multiple EVCs, Multiple VLANs
 - DiffServ
 - Pre-defined QoS on service type
 - Broadcast, Multicast and Destination Lookup Failure (DLF) Storm Control
- Network timing:
 - G.987.3 time of day (TOD) distribution
- Indoor mounting options:
 - Wall mount
 - 19" horizontal rack mounting in 1 RU with mounting bracket
 - Desktop mount: horizontal or vertical
- AC to +12 V DC power adapter

SPECIFICATIONS

DIMENSIONS

Height: 9.0 in (22.8 cm)
Width: 6.5 in (16.5 cm)
Depth: 1.66 in (4.2 cm)
Weight: 23 oz (0.7 kg)

PON CHARACTERISTICS

Max. split**: 128 GPON
Max. reach**: 20 km (12.4 miles), N1 Class
Maximum Optical Distribution Network (ODN) Attenuation: XGS, 29 dB
Optical receiver 1577nm: -28dBm
Optical transmitter 1270nm: +2.0 to +7 dBm

INTERFACES

Data/Business Ethernet:
Two 10/100/1000 BASE-T Ethernet port RJ 45 connectors
One SFP+ 10G Ethernet port
SFP+ XGS uplink port
PON: Single 9/125 μm (single mode) fiber, SC/APC connector, minimum 50 dB return loss
Power: 8-pin connector

DATA

Drop length: 328 feet (100 m) maximum, using CAT6 or CAT6A cable
Auto MDI/MDIX crossover for 10/100/1000 BASE-T ports
Traffic Management and QoS: 802.1Q VLAN, data and management priorities; Q-in-Q tagging; ingress port policing at LAN and WAN

STANDARDS SUPPORT

IEEE Bridging
IEEE 802.3 Ethernet
VLAN Cross-Connect – based on Outer, Outer and Inner VLAN tags
IEEE 802.1p Prioritization
IEEE 802.1Q VLAN tagging
IEEE 802.1ad VLAN stacking (Q-in-Q) support
IEEE 802.1ag Connectivity Fault Management
Y.1731 OAM functions and mechanisms for Ethernet based networks
Y.1564 Ethernet service activation test methodology
MEF 6.1.1 – L2CP aspects Amendment to 6.1

MEF 10.3 Service Attributes

MEF 11/13/20 UNI type 1 and 2
MEF 23.1 Class of Service Phase 2 Implementation Agreement
MEF 30 Service OAM Fault Management Implementation Agreement
MEF 35 Service OAM Performance Monitoring Implementation Agreement
MEF 45 Multi-CEN L2CP
MEF 48 Service Activation Testing
MEF 49 Service Activation Testing Protocol and PDU Formats

CERTIFICATION AND COMPLIANCE

Emissions:
FCC Part 15 Class B
CISPR-22
Safety:
UL 60950 and UL 1697 approved
IEEE: 802.3, 802.3AB, 802.3U, 802.11p, 802.11Q

SPECIFICATIONS (... CONTINUED)

TIMING

ITU G.987.3 10-Gigabit-capable passive optical networks

SyncE SSM per ITU-T G.781
Synchronization Layer Function

ENVIRONMENTAL

Operating temperature:

Indoor ambient temperature,
0° to 40°C (32° to 104° F)

Relative humidity (non-condensing):

Operating/Storage: 5% to 90%

POWERING AND ALARMS

8-pin connector

Input voltage: 12 V DC (nominal),
10 V DC (min), 15 V DC (max)

External Power Adapter: External Power
Adapter: 12 V DC, 2.5 A

QUALITY OF SERVICE

Classification based on Ethernet and IP
header

Priority bit (Pbit) and DSCP mapping
capability at the subscriber edge

Priority bit based CoS queuing: 8 queues
per egress interface and 4 CoS queues
per shaped service

MEF-compliant single level policing

Ingress Policing per service, per classified
traffic

Egress Policing per service, per classified
traffic

Color blind policers

Burst size

Weighted Random Early Detection
(WRED) per queue

Advanced Scheduling options: Strict
Priority, and Deficit Weighted Round
Robin. A combination of these
scheduling options can be used on an
egress interface.

SERVICE ACTIVATION TESTING (SAT)

Support Generator/Collector for Two-
Way SAT, frame delivery, SCT (cir,
eir+cir, policing), SPT (cir)

Keeps up to 5 of the last test results which
can be referenced via the "
transaction_id", i.e tid (persists across
reboot)

Supports both tagged (FL-PDU) and un-
tagged (IPV4) subscriber test frames

Support testing multiple EVCs and CoS on
a single interface simultaneously (up
to 64 frame-sets) (only one active SAT
test per interface)

Frame Delivery (unicast, multicast, and
broadcast)

Bad frame testing supported, CVLAN
preservation testing

Delay measurement for SCT (cir, cir+eir,
policing), and SPT

Supports both fixed packet and emix
profile testing for SCT/SPT (bandwidth
profile testing and performance testing)

Supports testing DSCP/filtering setting for
untagged frames

Supports blocking of EVC traffic from
subscriber ports for both generator and
reflector

Auto configure parameters from traffic
management configuration system

Support Per EVC (up to 64 simultaneous)
latching loopback interface

Supports packet lengths up to full ethernet
frame sizes of 9,600+ bytes.

Supports auto-configuration required by
SAT YANG model, as well as specific
user-defined test settings such as:

- CIR/EIR
- CVID+CPBIT settings (auto-selects
lowest values when un-specified)
- DSCP value to use (auto-selects
lowest value when un-specified)

ETHERNET OAM

802.1ag & Y.1731

Supports CFM, SOAM and Maintenance
End Points

Peer to Peer Delay Measurements

2-way Delay Measurement

Y.1564 based Service Activation Testing

Service Activation Testing: Multi-Gigabit
Load generation, Multi-Gigabit Loop
back

Interoperable with systems supporting
802.1ag and Y.1731

RFC2544 based Service Activation
Testing

Continuity Check Message at 100
milliseconds interval

MANAGEMENT SUPPORT

Performance monitoring and statistics

Network Configuration Protocol
(NETCONF)

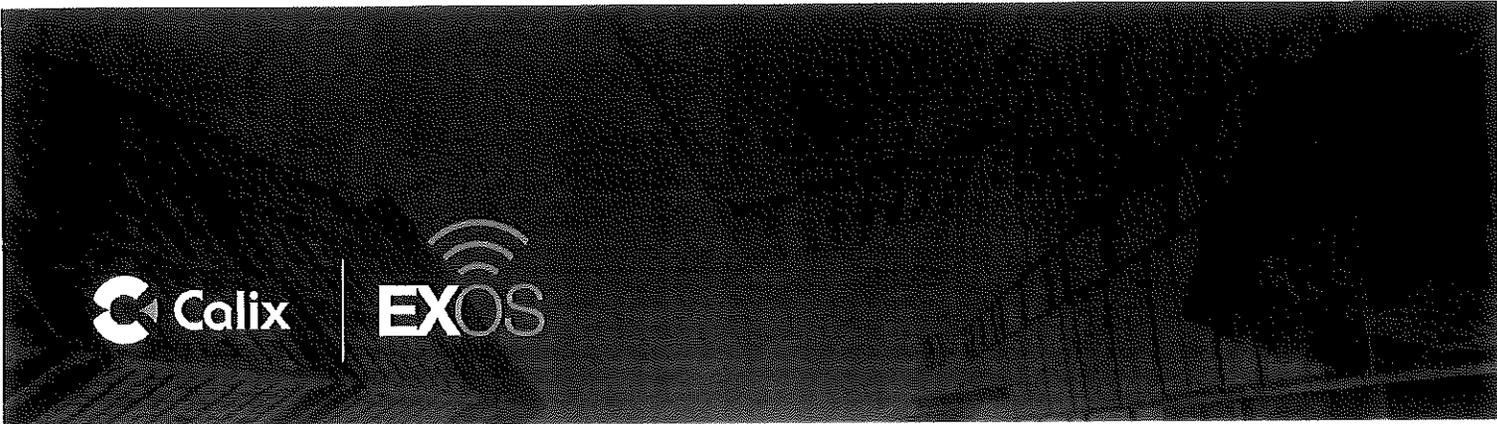
MEF 31 YANG equivalent Service OAM
Fault Management Definition of
Managed Objects

MEF 38 YANG equivalent Service OAM
Fault Management YANG Modules

PERFORMANCE MANAGEMENT

Internet Protocol Flow Information Export
(IPFIX)

**Not necessarily simultaneously



ORDERING INFORMATION

Calix GPR3000X GigaPro

- 000-01101 GPR3000X (100-04811) and XGS-PON SFP+ optical module
1270/1577nm, single fiber transceiver, I-Temp (100-04531)
- 100-04811 GPR3000X 10G GigaPro, 2 GE, 1 SFP+10GE, AM Power Adapter
- 100-04994..... GPR3000X 10G GigaPro, 2 GE, 1 SFP+10GE, UPS Power Interface
- 100-05088..... GPR3000X 19 inch rack mount bracket and accessories

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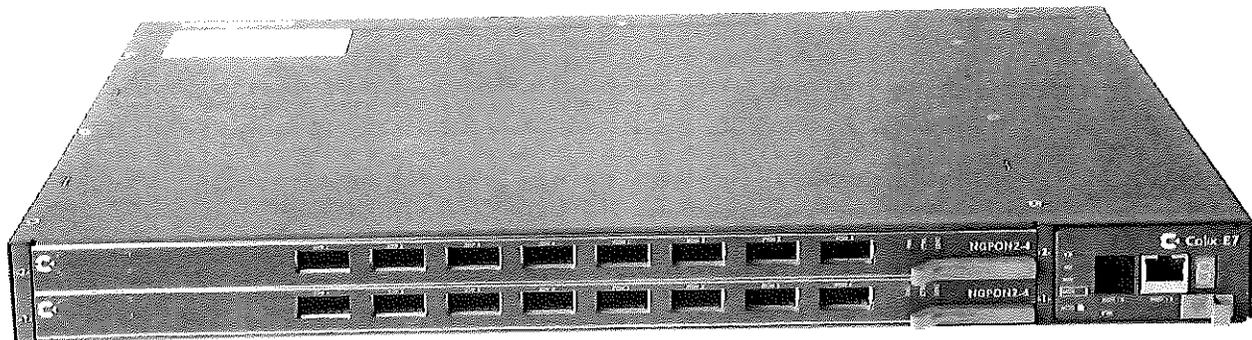


Calix E7-2 A AXOS NGPON2-4

DESCRIPTION

Looking to future-proof your next-generation GPON network in preparation for launching advanced services?

As North America's most widely deployed access system, the Calix AXOS E7-2 Intelligent Modular System is a breakthrough evolutionary system that provides a transformational path to next generation networks, fiber technologies, and Software Defined Access. The E7-2 is the industry's benchmark for a modular, small form factor, environmentally hardened access solution for service providers. By adding the AXOS platform, the E7-2 is now even more of a disruptive and compelling enabler to next generation networks that connect the world. The AXOS E7-2 leads a rapidly expanding family of AXOES E-Series systems capable of supporting both centralized and decentralized network architectures that range from the data center edge, central office, or headend, to the remote cabinet, or MDU.



FUNCTIONAL DESCRIPTION

10 GIGABIT PON:

The Calix AXOS E7-2 NGPON2-4 line card provides all the benefits of Calix AXOS while bringing both NG-PON2 and XGS-PON technology to the access network. Each card provides 4 XGS-PON or NG-PON2 OLT channel termination ports that subtend up to 128 ONTs each, for a capacity of 512 ONTs per card and 1024 ONTs per E7-2 1RU chassis. Each port can be independently provisioned to support NG-PON2 or XGS-PON.

KEY FEATURES AND CAPABILITIES

The NGPON2-4 card features and capabilities include:

- Based on ITU G.989 NG-PON2 and XGS-PON family of standards
- 9.953 Gbps downstream, 9.953 Gbps upstream
- Supports up to 4 TWDM wavelengths (one per physical port, upgradeable to 8 wavelengths in future) and the XGS-PON wavelength
- Supports NG-PON2 wavelength mobility
- Leveraging OMCI and GEM (Ethernet) based provisioning model as GPON
- Interoperable with Calix Next Generation 10G PON Residential SFUs and MDUs as well as Business ONTs
- Class N1 +29 dB link budget, up to 1:128 splits
- Integrated 10GE aggregation and transport
- Hardened for central office and remote terminals

IP SERVICES DELIVERY

The Calix AXOS E7-2 NGPON2-4 line card delivers a full spectrum of IP access services over PON fiber networks.

- 4K IPTV – broadcast and Video on Demand (VoD)
- MEF CE 2.0 compliant business services
- Ultra-fast High-Speed Internet (HSI) access
- Voice – Native SIP/VoIP and TDM Gateway support

INTEGRATED HIGH-CAPACITY TRANSPORT

Built on a core Layer 2 and Layer 3 switch, the AXOS E7-2 NGPON2-4 line card is capable of full-duplex, line rate forwarding at all frame sizes and traffic types across all interfaces. Each PON port has a dedicated 10 Gbps switch interface. Four 10 GE XFP uplinks provide support for backhaul of all traffic.

NETWORK RESILIENCY

The Calix AXOS E7-2 NGPON2-4 line card supports a flexible set of standards-based network topology protocols for use in point to point or ring based transport.

- ITU G.8032v2 Ethernet Ring Protection Switching (ERPS)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.3ad/802.1AX Link Aggregation

MOBILE BACKHAUL & FRONTHAUL

With integrated network synchronization, Ethernet OAM and advanced timing capabilities, the AXOS E7-2 NGPON2-4 line card can be used to transport mobile front haul as well as backhaul traffic while also supporting triple play residential and MEF certified business services from a single platform.

UNIFIED ACCESS INFRASTRUCTURE

With advanced QoS and intelligent NG-PON2 card architecture, operators have a cost-effective way to start with XGS-PON for high density MDU residential services such as Gfast. Then, operators can seamlessly migrate to TWDM

optics and further monetize their investment by offering SLA-driven business and mobile hauling capabilities. The AXOS E7-2 NGPON2-4 line card will thus offer ultra-high bandwidth residential IPTV services, mobile and business services over a single unified access infrastructure.

**MINIMUM SOFTWARE
RELEASE**

Calix E7 AXOS Release 3.0

DIMENSIONS (W x H x L)

14 x 10.1 x 0.78 inches
35.6 x 25.7 x 2 cm

WEIGHT

2 lbs. (1 Kg)

PORTS

4 XFP interfaces for 10G/10G,
10G/2.5G PON Access
Links (4 TWDM channels
per card)

4 XFP interfaces for
10GE network uplink

WAVELENGTH SUPPORT

XGS-PON: 1577nm Down,
1270

nm Up
NG-PON2: Up to 4
TWDM wavelengths:
1596-

1599 Down, 1532-1535 Up [one
wavelength pair per OLT
port]

SPLIT RATIO*

XGS-PON: 1:128

NG-PON2: 1:128

(*Refer to Calix PPG
for engineering
design guidelines)

QUALITY OF SERVICE

Service classification based
on port, SVLAN-ID,
CVLAN-ID,
p-bit

Strict priority and Weighted
Round Robin (WRR)
based scheduling with
minimum bandwidth
guarantees

Congestion avoidance: Tail
Drop

**STANDARDS AND RFC
SUPPORT**

ITU-T G.989.2 a1 NG-PON2

ITU-T XGS-PON

ITU-T G.8032v2 Ethernet Ring
Protection Switching
(ERPS)

TR-101 VLAN Service models
IEEE 802.1p CoS
Prioritization IEEE 802.1 MAC
Bridges

IEEE 802.1Q VLAN tagging

IEEE 802.1ad VLAN

stacking

(Q-in-Q)

support RFC 2236

IGMP v2 RFC

3376 IGMP v3

RFC 3810 MLDv2

RFC 3046 DHCP Relay Agent
Information Option ("Option
82")

RFC 4541 IGMP Proxy

RFC 4553 Structure-Agnostic
Time Division Multiplexing
(TDM) over Packet
(SAtOP)

Dynamic Bandwidth Allocation
(DBA)

Advanced Encryption
Standard (AES)

Forward Error Correction (FEC)

PACKET SWITCHING

CAPACITY

9216 byte frames over NGPON2/
XGS-PON

4,096 VLANs per system

4,096 IGMP Multicast channels

SYNCHRONIZATION

Integrated Stratum-3 reference

Timing Options: BITs, Synch,
1588v2 (TC, OC, BC)

COMPLIANCE

NEBS Level 3 compliance

(GR-63-CORE, GR-
1089-CORE, GR-
3028)

UL 60950

FCC Part 15 Class

A CE Mark

POWER AND

HEAT

DISSIPATION

NGPON2-4 power consumption:

125 Watts (typical with
optics)

OPERATING ENVIRONMENT

Temperature: -40° to +65° C

(-40° F to +149° F)

Humidity: 10 to 95%
(non-condensing)

STORAGE ENVIRONMENT

Temperature: -40° to +85° C

(-40° F to +185° F)

Humidity: 5 to 95%



NOTES

For XGS-PON XFP, NG-PON2 XFP, and 10GE XFP, only products purchased directly from Calix are supported. The use of XGS-PON XFP, NG-PON2 XFP, and 10GE XFP pluggable transceivers not purchased directly from Calix is not supported and will void all product warranties covering the Calix equipment to which such third-party materials are connected.

CALIX ONTs

The AXOS E7-2 NGPON2-4 line cards support operation with the Next Generation GigaFamily of ONTs using fixed (XGS- PON) and tunable TWDM wavelengths.

CALIX E7 LINE CARDS

100-04636..... E7-2 NGPON2-4 (4x XGS-PON/NG-PON2 XFP, 4x 10GE XFP)

CALIX PLUGGABLE TRANSCEIVER MODULES

The E7-2 supports pluggable modules for all service and network interfaces. Refer to the Calix Optical Transceiver Modules Dalasheet (#250-00191) for a complete list of modules and specifications.

XFP.....10GE optical Small Form-factor Pluggable (XFP) modules

XGS-GPON XFP10Gbps XGS-PON optical Small Form-factor Pluggable (XFP) modules

NG-PON2 XFP10Gbps NG-PON2 optical Small Form-factor Pluggable (XFP) modules (CO use only)

Telecommunications Needs Assessment and Development of Remedial Strategies for Southwest Virginia

Prepared for:

The Virginia Department of Housing and Community Development

The Town of Nickelsville

LENOWISCO, Cumberland Plateau, and Mount Rogers PDCs

May 8, 2019

Prepared by



and



1 Table of Contents

2	EXECUTIVE SUMMARY	3
3	INTRODUCTION	6
3.1	Project Area.....	6
3.2	Project Team	7
	Thompson and Litton Engineers.....	7
	Blue Ridge Advisory Services Group.....	8
3.3	Deliverables.....	9
3.4	Methodology.....	9
3.5	Accomplishments in Southwest Virginia.....	10
4	Regional Needs	11
5	PRIORITIZATION OF COMMUNITIES	13
5.1	Broadband – Target Areas for Improvement.....	13
	PDC 1 -- Broadband.....	13
	PDC 2 -- Broadband.....	14
	PDC 3 -- Broadband.....	15
5.2	Broadband Prioritized Target Areas for Improvement; All PDCs	16
5.3	Cellular – Target Areas for Improvement.....	17
	PDC 1 -- Wireless.....	17
	PDC 2 -- Wireless.....	18
	PDC 3 -- Wireless.....	18
	Wireless Service in the Future.....	18
	5 th Generation Wireless (5G).....	19
6	Recommendations and Next Steps	20
6.1	Recommendations.....	20
7	ATTACHMENTS AND APPENDICES	22
7.1	COMMUNITY NEEDS APPENDIX	22
	LENOWISCO	22
	Cumberland Plateau.....	25
	Mount Rogers.....	28
7.2	Sources of Funding Appendix	34
	National Funding	34
	State Level Awards Granted.....	34
	Regional Awards Granted	34
	Pending Applications at the Tobacco Commission.....	35
	Funding Strategy	36
7.3	Addressable Market Appendix.....	41
	Market Overview	41
7.4	Service Provider Appendix	44

2 EXECUTIVE SUMMARY

This report documents a comprehensive needs assessment of the telecommunications services in thirteen counties and three cities in Planning Districts 1, 2 and 3 in Southwest Virginia.

The rural parts of Southwest Virginia are largely under-served, with some areas completely *unserved*, by broadband providers. The low population density in the region and the highly challenging geography -- the Appalachian Mountain range -- make it unlikely that the region's leaders will be able to rely on the private sector to solve this problem -- if there were a market-based business case, the investor-owned service providers would already be serving.

With few exceptions, the Incumbent Local Exchange Carriers' traditional copper and cable networks are insufficient to meet the current and future bandwidth needs of the region. Due to the financial impracticality of deploying current-technology networks, most incumbent local exchange carriers have neglected to extend, upgrade, or expand their networks in the region. Through public and private investment funds, others have built middle-mile fiber along the main corridors but generally without a last-mile solution.

This lack of ubiquitous, affordable, reliable broadband has had an ongoing impact on the region. In many areas covered in this study, populations are declining. Communities are having difficulties retaining youth. Economies are stagnant and lacking the means to grow. Residents are frustrated and, in some cases, indignant about the lack of broadband and wireless. Students are falling behind. Small businesses cannot compete. Larger businesses are moving out of the region. Not all of these maladies are caused by lack of sufficient broadband services, but it is certainly a contributing factor.

The need and demand for broadband communications services is great. The demand is sufficient to justify a long-term public investment. The total projected cost for broadband is estimated at \$52 Million. This represents a high-level estimate of the total cost to solve the last-mile issue at 62 high-priority communities within the three Planning Districts. This cost estimate is based upon leveraging the existing investments made by the Virginia Tobacco Region Revitalization Commission, the Virginia Coalfield Economic Development Authority, the EDA, and other providers of capital in the regional communications infrastructure. The plan calls for approximately -372 miles of new backbone fiber and 931 miles of drops, resulting in an estimated cost of \$ 7,584 per home. The investment will pass over 9,800 homes and it is estimated 6,884 will subscribe to service. It must be noted that these unserved and underserved 62 communities are the most difficult to reach with the sparsest population density. Also, once the backbone is built to serve these communities, additional incremental (those not subscribing to service in the initial buildout) can be added for approximately \$2,200 per residence, depending upon drop length.

The following table displays the breakdown of the residences to be served, the miles of backbone and drops, and total estimated cost to remediate the targeted areas by Planning District.

Cost Estimate	Regional Total	PDC 1	PDC 2	PDC 3
Homes Passed	9,831	1,368	4,574	3,889
No. of Customers (at take rate)	6,884	957	3,202	2,725
Miles of Backbone	372	70	126	177
Miles of Drop	931	130	433	368
Total Cost (EST)	\$ 52,207,296	\$ 8,662,984	\$ 20,566,494	\$ 22,977,817
Cost per Home	\$ 7,584	\$ 9,052	\$ 6,423	\$ 8,432

This \$52 million investment will not solve all of the regional connectivity problems. It will however, address access to high-speed Internet service for the communities in the greatest need.

Additionally, this plan does not address wireless services (cellular) in the region. Simply put, there is no path forward to improving commercial wireless services in the region without a partnership/collaboration with one of the major wireless operators. The region has immense potential to build upon the wireless infrastructure deployed for the 4g project, but it is fruitless to build additional towers, distributed antennae systems, or microcells in hopes that a wireless service provider will use the assets. Wireless operators are inscrutable in their network planning and never use assets simply because they have been made available.

The prioritized list of communities to be addressed are presented in Section 5 of this report. For implementation of this plan we recommend that the regional leaders find a way to formalize a relationship with Scott County Telephone Cooperative, Citizens Telephone Cooperative, and CPC Broadband. All three of these organizations have displayed a long history of *purpose-over-profit* and shared values with the regional planning leaders to improve the quality of life in the region and drive economic development. For any collaboration to work, shared values is the most important characteristic for success.

To fund this plan Section 7.2 of the Appendices lists the resources available to improve the lack of broadband services in the identified communities. It is recommended that a separate legal entity be organized to address the connectivity issues (broadband and

wireless) in the 13 -county region. Additionally, that Executive Director must be tasked with specific accountabilities (and rewards) to seek funding for these high priority communities. In short, all of rural America will be competing for these funds. The regional leaders must become tireless advocates for the region's communications needs.

Intuitively, everyone understands there is a correlation between investments in broadband and economic development. The relationships are well studied and there are a number of scholarly articles that quantify the impacts of investment in rural broadband and economic growth, specifically:

- Gross Domestic Product Per capita Increase,
- Median Household Income Increase, and
- Productivity Increase

One of the more recent studies commissioned by the World Bank, studied the economic impact in developing economies:

Digital Dividends. Exploring the Relationship Between Broadband and Economic Growth,
by Michael Mingos, 2016.

The study concludes that a 10 percentage point increase in fixed broadband penetration would increase GDP growth by 1.21% in developed economies and 1.38% in developing ones. The GDP of the 13 county region is approximately \$12 Billion annually. The resulting economic impact in the region from the proposed investment can be expected to yield between \$145 Million and \$166 Million of economic growth, recurring annually.

There are hundreds of scholarly articles supporting this expectation.

3 INTRODUCTION

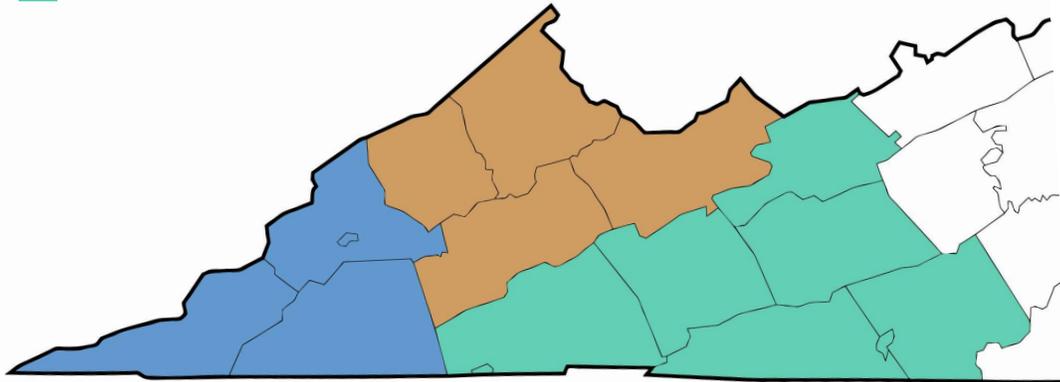
This report documents a comprehensive needs assessment of the telecommunications services in thirteen counties and three cities in Planning Districts 1, 2 and 3 in Southwest Virginia.

3.1 Project Area

Broadband Project Assessment Area – SW VA

Legend

- LENOWISCO PDC 1
- Cumberland Plateau PDC 2
- Mount Rogers PDC 3



Despite the fact that Southwest Virginia has seen over \$160 mm in capital investment over the last 20 years to improve the communications infrastructure, the region still has significant gaps in coverage. In 2016, a study by the Virginia Chamber of Commerce indicated that only 53 percent of rural Virginians had access to broadband Internet compared to urban areas with 96 percent.

During the course of this study, many communities have come forward to highlight the fact that there are areas completely unserved and underserved, and that many services are unaffordable. This outcry prompted leaders within the planning districts to strive to help improve high-speed Internet service, emergency communications service, and wireless service.

The areas studied are outlined in the following table. Across the region, population densities are low, and counties and cities are losing population due to the lack of vibrant economies. To support a growing economy, the region must have sufficient infrastructure and technologies.

Region	2010 Census	2018 Estimate	Percent Change	Square Miles	Density per Sq. Mile
Bland	6,824	6,432	-6%	358	18
Bristol city	17,835	16,877	-5%	13	1,297
Buchanan	24,098	21,576	-10%	503	43
Carroll	30,042	29,141	-3%	475	61
Dickenson	15,903	14,516	-9%	331	44
Galax City	7,042	6,587	-6%	8	799
Grayson	15,533	15,330	-1%	442	35
Lee	25,587	23,994	-6%	436	55
Norton City	3,958	3,908	-1%	7	522
Russell	28,897	27,057	-6%	474	57
Scott	23,177	22,121	-5%	536	41
Smyth	32,208	30,475	-5%	451	68
Tazewell	45,078	41,973	-7%	519	81
Washington	54,876	53,992	-2%	561	96
Wise	41,452	38,386	-7%	403	95
Wythe	29,235	28,650	-2%	462	62
Total/Average	401,745	381,015	-5%	5,977	211

3.2 Project Team

Thompson and Litton Engineers

Thompson & Litton Engineers (T&L), a local professional services firm, was selected to develop the study. T&L teamed with Blue Ridge Advisory Services Group, Inc. (Blue Ridge) to complete a comprehensive needs assessment and identify potential remedial solutions for the LENOWISCO (PDC 1), Cumberland Plateau (PDC 2), and Mount Rogers (PDC 3) planning districts.

T&L has over 100 employees in eight offices, offering an array of engineering, architectural, surveying, planning and construction services throughout Southwest Virginia, Tennessee, and West Virginia. T&L has designed 15 broadband projects and numerous wireless deployment projects since 2006.

With offices in Wise, Tazewell, and Chilhowie, T&L has a presence in each PDC associated with this study and is committed to providing superior service to the people within the region, as it has since 1956.

T&L's related project experiences include:

- Roanoke Valley Broadband Authority
- Citizens Telephone Cooperative
- Bristol VA Utilities/Cumberland Plateau
- Virginia Coalfield Coalition
- Verizon Wireless
- AT&T Mobility
- Nextel Communications
- SBA Communications
- Roanoke County, Virginia
- Virginia State Police

Blue Ridge Advisory Services Group

Blue Ridge Advisory Services Group (Blue Ridge) is a professional services firm that has been serving the telecommunications sector for 20 years. The firm provides strategies, business plans, feasibility studies, financial modeling, and other value-added related services to bring about actionable plans to improve communities.

Blue Ridge's related project experience includes:

- Dominion Energy Telecommunications,
- DukeNet,
- CaroNet,
- TVA Telecom,
- Bonneville Power Telecom,
- Mid-Atlantic Broadband (and LIT Networks),
- Virginia Coalfield Coalition 4g Wireless.
- LENOWISCO LLC
- Roanoke Valley Broadband Authority
- Consolidated Cooperative FTTH Initiative

The study is being funded by a grant from the Appalachian Regional Commission (ARC) and Virginia Department of Housing and Community Development (DHCD). It is sponsored by the Town of Nickelsville, the Cumberland Plateau, LENOWISCO and Mount Rogers PDCs, and the Virginia Coalfield Coalition (VCC). The results of this study will serve to increase awareness and knowledge of where the broadband gaps are and hopefully lead to improved broadband choices for all residents, businesses, and visitors in Southwest Virginia.

3.3 Deliverables

The final deliverables of this study include this written report, as well as two presentations to the management team. The first presentation was made in February 2019 and was followed by a second presentation in April 2019. All work products are the property of the ARC, DHCD, the VCC, the three PDCs, and the Town of Nickelsville.

3.4 Methodology

T&L and Blue Ridge worked with a cross-functional management team of regional representatives to define:

- Accomplishments in the Region,
- Community Needs,
- Regional Needs,
- Remedial Strategies and Associated Costs,
- Prioritized List of Communities in Greatest Need,
- Potential Funding Sources and Strategies, and
- Potential Service Providers.

To identify the specific needs of each community (as well as the regional needs identified in Section 7.1 of the Appendices to this report) Blue Ridge conducted 40 interviews with key stakeholders in the region, covering 13 counties and 3 cities in Southwest Virginia, including:

- 8 with LENOWISCO
- 6 with Cumberland Plateau
- 8 with Mount Rogers
- 7 with industry leaders/stakeholders in the region
- 11 with telecom service providers that are active in the region

3.5 Accomplishments in Southwest Virginia

Over the past 20 years, approximately \$168 Million dollars of public investments have been made in Planning Districts 1, 2 and 3 to enhance broadband communication. The following table shows a breakdown of those investments by planning district.

Planning District	Amount Invested
LENOWISCO	\$ 71,579,167
Cumberland Plateau	\$ 45,758,931
Mount Rogers	\$ 50,383,291
Total Public Investment in Planning Districts 1, 2, & 3	\$167,721,389

Beginning in 2000, the PDCs, realizing that the Internet was more than a passing fad, began to aggressively integrate broadband planning into their regional planning. Attitudes towards broadband gradually shifted from being considered an *amenity* to being recognized as a *necessity*. Broadband has become a quality of life issue and a necessity for ensuring economic development in every region. Essentially, it is the modern day equivalent of the Rural Electrification Act from the 1930s that brought electricity to rural America. In fact, today many are calling broadband “*the fifth utility*.”

On a national level, investments are being made in tele-health, school system technology, distance learning, and emergency preparedness. Telecommunications grants and loans are being made to improve services in each of these critical areas within the study area.

While some of these grant awards were single purpose and would not allow broadband operators to maximize their use by connecting all classes of commercial and residential customers in some cases, technology investment has driven and enhanced economic development in certain areas. A prime example of this is the Southwest Virginia Technology Center of Excellence, which is a software development and systems integration facility in the town of Lebanon in Russell County. CGI Group Inc., the fifth largest independent information technology and business process services firm in the world, invested in the area because of the grant-funded fiber optic backbone. Northrop Grumman Corporation, an American global aerospace and defense technology company, is also located in Lebanon.

Other examples include DP Facilities, Inc. data center in Wise County and Sykes Enterprises’ call centers in Buchanan and Wise Counties. Norton (PDC 1) has a Medicare transportation call center and one of its partners – the medical records data center - is in Duffield (Scott County). It is billed as “the first Tier 4 commercial data center in the US.”

4 Regional Needs

The region's needs to support technology-enabled, quality-of-life-improving applications were identified by interviewing key stakeholders throughout the three planning districts. Regional leaders view broadband as a necessity - a "4th utility." Some county leaders have taken the lack of broadband into their own hands and have begun their own initiatives to secure better services (Grayson County's RFP, for example).

Major Trends

These viewpoints and initiatives demonstrate the following major trends/needs that were identified during the interview process:

- Plenty of middle-mile fiber exists in the region but there is **very little last mile connection**, especially in the more rural areas/off the main corridors. This presents a real need for a last-mile solution, as several providers have deployed fiber in the region along the major corridors but haven't extended the lines. The existing last mile providers, the incumbent local exchange carriers (ILECs), have not invested in upgrading their networks to adequately serve customers or ensure reliability in service.
- Broadband is available in areas with higher densities (cities such as Bristol and/or Norton), but issues include **unaffordable prices, lack of competition, and low quality of service**
- Some areas lack the basics - *cable TV* and/or reliable *landline* service
- **Cellular service is spotty** throughout parts of the region; there is no comprehensive cellular solution. *Some areas still run on 3G.*
- Residents in the more rural areas seem to tolerate the lack of coverage. Visitors and prospective investors -- who are accustomed to better services -- do NOT. They take their business elsewhere.

Impact on Economic Development

While there is adequate connectivity to most of the industrial parks in the region, the lack of broadband in many areas has a profound impact on economic development.

- **Attracting Investment** - Prospective companies expect broadband to be available & won't wait for it to be built to suit. If a business expects to locate, high speed broadband with 4G is anticipated. Potential investors who cannot place a phone call from their cell phones are immediately turned off.
- **Tourism** - Tourists don't come back without cell service.
- **Infrastructure** - Broadband infrastructure is key to economic survival. Can't "get in the game" or even "sit on the bench" without it.
- **Workforce** - It's a serious "workforce issue" for retaining employees or getting new hires to relocate. Non-traditional, virtual jobs, and work from home will become more and more the future.

- **Innovation** - Broadband is necessary to foster innovation and to retain young people -- largest export is educated youth.
- **Real Estate** - Impacts home sales, as there is a noted lower demand for homes without access to broadband
- **Farming** - Impacts farming as operations become more technology-driven

Impact on Citizens

- **Options** - Without fiber and broadband, communities are unable to develop and provide advanced services
- **Price** - Consumers experience substantial pricing differentials across the region, depending on the level of competition
- **Speeds** – There is a gap between what’s advertised and what residents are experiencing, plus asymmetry between upload and download speeds

Impact on Emergency Medical Services

- Seamless emergency services communication is necessary
- A large concern by EMS is reaching tourists who cannot place cellular calls from remote areas
- Some people have to use landlines to call 911. As an illustration, in Haysi, if a call doesn’t go through, it doesn’t get forwarded, and callers have no access to emergency service.

Impact on Educational System

- Schools are well connected, but there is a major disconnect between school and home accessibility, also known as the “homework gap”

5 PRIORITIZATION OF COMMUNITIES

To prioritize the communities, the following methodology was agreed upon and used:

Rank	Criteria	Weight
1	Level of Need	50 points
	a) Un-served	
	b) Underserved	
2	Number of Potential Connections	30 points
3	Cost	20 points
	a) Backbone Connection Cost	
	b) Cost Per Connection (wireless, fiber)	

5.1 Broadband – Target Areas for Improvement

The following areas have been identified as targets for remediation in descending order of priority.

PDC 1 -- Broadband

PDC 1 - LENOWISCO								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Lee	District 5 (north of 58 Alt)	62	\$ 8,100	43	3	6	\$ 348,313
2	Scott	Gate City to Duffield	366	\$ 10,688	256	24	35	\$ 2,736,206
3	Wise	Appalachia - Stonega	268	\$ 6,388	188	7	25	\$ 1,201,032
4	Wise	Appalachia - Exeter	260	\$ 6,578	182	8	25	\$ 1,197,236
5	Wise	Coeburn	150	\$ 7,005	105	5	14	\$ 735,528
6	Wise	Guest River	103	\$ 10,309	72	6	10	\$ 742,264
7	Wise	Birchfield	91	\$ 12,389	64	7	9	\$ 792,921
8	Lee	Blackwater	39	\$ 19,884	27	6	4	\$ 536,867
9	Wise	Hurricane	29	\$ 18,631	20	4	3	\$ 372,618
TOTAL - PDC 1			1,368	\$ 9,052	957	70	129	\$ 8,662,984

PDC 2 -- Broadband

PDC 2 - CUMBERLAND PLATEAU								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Tazewell	Baptist Valley	712	\$ 3,671	498	2	67	\$ 1,828,233
2	Dickenson	Haysi	37	\$ 5,454	26	1	4	\$ 141,813
3	Russell	Cleveland to Carbo	690	\$ 4,246	483	6	65	\$ 2,050,899
4	Buchanan	Council to Davenport	473	\$ 3,415	331	0	45	\$ 1,130,458
5	Tazewell	Abbs Valley	370	\$ 3,899	259	2	35	\$ 1,009,884
6	Tazewell	Gratton Valley	341	\$ 5,317	239	6	32	\$ 1,270,687
7	Dickenson	Honey Camp	85	\$ 9,467	60	5	8	\$ 568,009
8	Buchanan	Conaway	77	\$ 10,159	54	5	7	\$ 548,573
9	Buchanan	Big Rock	76	\$ 7,936	53	3	7	\$ 420,621
10	Tazewell	Richlands to Jewell Ridge	248	\$ 7,172	174	9	23	\$ 1,247,892
11	Buchanan	Dismal River Rd to Whitewood	234	\$ 11,460	164	17	22	\$ 1,879,384
12	Dickenson	Clinchco	112	\$ 4,267	78	1	11	\$ 332,822
13	Tazewell/Buchanan	Jewell Ridge to Bearwallow	63	\$ 13,490	44	6	6	\$ 593,565
14	Tazewell	Thompson Valley	167	\$ 11,241	117	12	16	\$ 1,315,201
15	Russell	Green Valley Rd	139	\$ 7,311	97	5	13	\$ 709,206
16	Russell	Belfast Mills	129	\$ 7,011	90	4	12	\$ 630,976
17	Tazewell	Tannersville	122	\$ 13,576	85	11	12	\$ 1,153,952
18	Buchanan	Home Creek	105	\$ 7,835	74	4	10	\$ 579,798
19	Buchanan	Hurricane Creek	89	\$ 9,166	62	5	8	\$ 568,297
20	Dickenson	Breaks	78	\$ 8,462	55	4	7	\$ 465,385
21	Buchanan	Hurley	57	\$ 9,021	40	3	5	\$ 360,833
22	Dickenson	Hill Ridge	56	\$ 6,974	39	2	5	\$ 271,981
23	Dickenson	Lick Creek	79	\$ 16,872	55	10	7	\$ 927,987
24	Buchanan	Bearwallow to Peapatch	35	\$ 22,402	25	6	3	\$ 560,039
TOTAL - PDC 2			4,484	\$ 209,957	3,139	126	425	\$ 20,566,494

PDC 3 -- Broadband

PDC 3 - MOUNT ROGERS								
Priority	County	Target Area for Improvement - Broadband	Homes Passed	Cost per Customer	Customers (at take rate)	Backbone Miles	Drop Miles	Total Estimated Cost
1	Washington	South of Glade Spring	182	\$ 7,733	127	7	17	\$ 982,091
2	Bland	Ceres	39	\$ 6,271	27	1	4	\$ 169,327
3	Grayson	Providence to Fries	374	\$ 4,548	262	4	35	\$ 1,191,642
4	Smyth	Sugar Grove	301	\$ 4,910	211	4	29	\$ 1,035,967
5	Bland	Clear Fork	113	\$ 13,752	79	11	11	\$ 1,086,374
6	Smyth	Rich Valley	443	\$ 6,863	310	14	42	\$ 2,127,419
7	Bland	Bland to Holly Brook	283	\$ 10,703	198	19	27	\$ 2,119,121
8	Carroll	Hillsville to Fancy Gap	254	\$ 7,132	178	9	24	\$ 1,269,484
9	Washington	Damascus	182	\$ 3,768	127	1	17	\$ 478,483
10	Wythe	Austinville	175	\$ 5,955	123	4	17	\$ 732,497
11	Bland	Grapefield	96	\$ 16,083	67	11	9	\$ 1,077,560
12	Grayson	Independence to Elk Creek	185	\$ 9,485	130	10	18	\$ 1,233,007
13	Bland	Dry Fork	151	\$ 8,958	106	8	14	\$ 949,500
14	Grayson	Baywood	76	\$ 6,313	53	2	7	\$ 334,601
15	Washington	Mendota	63	\$ 4,959	44	1	6	\$ 218,205
16	Grayson	Galax to Old Town	60	\$ 5,962	42	1	6	\$ 250,419
17	Washington	Hayter's Gap	45	\$ 9,927	32	3	4	\$ 317,649
18	Smyth	Chilhowie Industrial Park	1	\$ 88,852	1	1	0	\$ 88,852
19	Bland	Little Creek	119	\$ 15,516	83	13	11	\$ 1,287,826
20	Carroll	Dugspur to Laurel Fork	105	\$ 15,285	74	11	10	\$ 1,131,108
21	Grayson	Independence to Bridle Creek	101	\$ 9,296	71	5	10	\$ 660,010
22	Wythe	Castleton Road	98	\$ 9,239	69	5	9	\$ 637,484
23	Carroll	South of Woodlawn	73	\$ 8,112	51	3	7	\$ 413,735
24	Wythe	Barren Springs	53	\$ 8,221	37	2	5	\$ 304,195
25	Grayson	East of Troutdale	25	\$ 7,217	18	1	2	\$ 129,910
26	Grayson	Mouth of Wilson to Rugby	87	\$ 14,762	61	9	8	\$ 900,503
27	Grayson	Rte 58 to Providence	77	\$ 12,331	54	6	7	\$ 665,873
28	Grayson	Elk Creek to Comers Rock	74	\$ 9,816	52	4	7	\$ 510,407
29	Grayson	Bridle Creek to Mouth of Wilson	54	\$ 17,752	38	7	5	\$ 674,567
TOTAL - PDC 3			3,889	\$ 349,720	2,725	177	368	\$ 22,977,817

5.2 Broadband Prioritized Target Areas for Improvement; All PDCs

Ranking	PDC	County	Target Area for Improvement - Broadband	Ranking	PDC	County	Target Area for Improvement - Broadband
1	PDC2	Tazewell	Baptist Valley	32	PDC1	Wise	Coeburn
2	PDC3	Washington	South of Glade Spring	33	PDC2	Russell	Green Valley Rd
3	PDC3	Bland	Ceres	34	PDC2	Russell	Belfast Mills
4	PDC2	Dickenson	Haysi	35	PDC3	Grayson	Baywood
5	PDC2	Russell	Cleveland to Carbo	36	PDC3	Washington	Mendota
6	PDC2	Buchanan	Council to Davenport	37	PDC3	Grayson	Galax to Old Town
7	PDC3	Grayson	Providence to Fries	38	PDC3	Washington	Hayter's Gap
8	PDC2	Tazewell	Abbs Valley	39	PDC3	Smyth	Chilhowie Industrial Park
9	PDC2	Tazewell	Gratton Valley	40	PDC2	Tazewell	Tannersville
10	PDC3	Smyth	Sugar Grove	41	PDC3	Bland	Little Creek
11	PDC3	Bland	Clear Fork	42	PDC3	Carroll	Dugspur to Laurel Fork
12	PDC2	Dickenson	Honey Camp	43	PDC2	Buchanan	Home Creek
13	PDC2	Buchanan	Conaway	44	PDC1	Wise	Guest River
14	PDC2	Buchanan	Big Rock	45	PDC3	Grayson	Independence to Bridle Creek
15	PDC1	Lee	District 5 (north of 58 Alt)	46	PDC3	Wythe	Castleton Road
16	PDC3	Smyth	Rich Valley	47	PDC2	Buchanan	Hurricane Creek
17	PDC1	Scott	Gate City to Duffield	48	PDC2	Dickenson	Breaks
18	PDC3	Bland	Bland to Holly Brook	49	PDC3	Carroll	South of Woodlawn
19	PDC1	Wise	Appalachia - Stonega	50	PDC2	Buchanan	Hurley
20	PDC1	Wise	Appalachia - Exeter	51	PDC2	Dickenson	Hill Ridge
21	PDC3	Carroll	Hillsville to Fancy Gap	52	PDC3	Wythe	Barren Springs
22	PDC2	Tazewell	Richlands to Jewell Ridge	53	PDC3	Grayson	East of Troutdale
23	PDC2	Buchanan	Dismal River Rd to Whitewood	54	PDC1	Wise	Birchfield
24	PDC3	Washington	Damascus	55	PDC3	Grayson	Mouth of Wilson to Rugby
25	PDC3	Wythe	Austinville	56	PDC2	Dickenson	Lick Creek
26	PDC2	Dickenson	Clinchco	57	PDC3	Grayson	Rte 58 to Providence
27	PDC3	Bland	Grapefield	58	PDC3	Grayson	Elk Creek to Comers Rock
28	PDC2	Tazewell/Buchanan	Jewell Ridge to Bearwallow	59	PDC3	Grayson	Bridle Creek to Mouth of Wilson
29	PDC3	Grayson	Independence to Elk Creek	60	PDC1	Lee	Blackwater
30	PDC2	Tazewell	Thompson Valley	61	PDC2	Buchanan	Bearwallow to Peapatch
31	PDC3	Bland	Dry Fork	62	PDC1	Wise	Hurricane

5.3 Cellular – Target Areas for Improvement

PDC 1 – Wireless

PDC 1	
County	Target Area for Improvement - Cellular
Lee	Blackwater
Lee	Ewing
Lee	Flatwoods
Lee	Keokee
Lee	LMU Vet School
Lee	Rose Hill
Lee	St Charles
Norton	Flag Rock Recreation Area
Norton	Hawthorne Drive
Scott	Clinchport to Dungannon
Scott	Dungannon
Scott	Fort Blackmore
Scott	Gate City to Duffield
Scott	Gate City to Nickelsville
Scott	Nickelsville
Scott/Russell	Nickelsville to Lebanon (Russell County, 30 mi)
Scott	Rye Cove
Scott	Twin Springs
Wise	Airport
Wise	Appalachia
Wise	Coeburn
Wise	Guest River area (NW of Norton, N of Blackwood)
Wise	Pound
Wise	Wise (past the airport towards Dickenson County)

PDC 2 – Wireless

PDC 2	
County	Target Area for Improvement - Cellular
Buchanan	US 460 Vasant to Richlands
Buchanan/Dickenson/Russell	Route 80/Scenic Bike Trail
Dickenson	Clintwood to St. Paul
Dickenson	Edwards Ridge
Dickenson	Haysi
Dickenson	Lick Creek
Russell	Cleveland
Russell	Dante
Russell	Honaker
Russell	Lebanon to Hansonville
Russell/Washington	Hansonville to Abingdon

PDC 3 – Wireless

PDC 3	
County	Target Area for Improvement - Cellular
Bland	Ceres
Bland	Clear Fork
Bland	Dry Fork
Bland	Grapefield
Bland	Holly Brook
Bland	Little Creek
Carroll	Dugspur
Carroll	Laurel Fork
Carroll	S of Woodlawn/NE of Lambsburg
Washington	Abingdon

Wireless Service in the Future

Unlike Broadband Service, little can be done by the regional leaders to improve wireless communications without the full cooperation and assistance of a major wireless carrier.

It is impossible to forecast the total capital cost to improve the wireless coverage in these unserved communities. The recent 4g wireless project undertaken by the Virginia Coalfield Coalition resulted in significant regional coverage expansion (estimated at 90% of the population in PDCs 1 and 2) for \$15 Million, with a matching capital expenditure by a carrier. It is reasonable to estimate that a similar budget would be required to achieve 100% coverage.

One thing is clear from the initial 4g wireless initiative. There can be no economic development, eco-tourism, smart communities, smart electric grid, autonomous vehicles, or anything of the like without solid wireless communications network.

5th Generation Wireless (5G).

The next evolution of wireless communications (mobile point-to-multipoint communications, sometimes called “cellular”) is called 5th Generation Wireless or 5G. 5G is a standards-based protocol that enables much higher data transmission speed to wireless devices than any previous standard.

Why is 5G important? 5th generation wireless will enable speeds of up to 4 gigabits per second. That is 80 times faster than the speeds experienced on a 4g LTE network. Our world is becoming increasingly more dependent upon mobile data. Things like Smart Cities, Smart Grid, Hi-definition Tele Health, and Autonomous Vehicles will all require 5G.

What is the network like? 5G operates at a much higher wave frequency than any of the previous generation’s networks. This means the signals will travel shorter distances and not be able to travel through impediments. However, the frequencies will carry much greater data payloads.

The FCC concluded its first 5G spectrum auction this year in the 28 GHz band, and its auction of 24 GHz spectrum is taking place right now. Later this year, the FCC will auction the upper 37 GHz, 39 GHz, and 47 GHz bands.

5G will require a completely different network architecture and infrastructure than is currently in place. Instead of 200 foot-tall towers with large macro cells that can cover miles of territory, 5G will require small-cell or micro-cell architecture that broadcasts only a few hundred feet. It is generally believed that 5G cells will be required every thousand feet or so. Cells will be placed on light poles, utility poles, rooftops, and sides of buildings. The cells are small and require less power than macro cells. A key component of the network is fiber optic cable, as all cells must be connected with fiber to meet the bandwidth and latency requirements.

When will 5G be deployed? Carriers are working on beta tests and early network testing in a handful of metropolitan markets. The complete spectrum auction being managed by the FCC will not be completed until the end of 2019. Mobile handset makers like Apple will not release a 5G phone until late 2020 or 2021. 5G will not be widely available for several years. The initial deployments that have been announced are all major metropolitan areas. It is unknown how long, if ever, 5G will be deployed in rural markets like our three Planning Districts. ***There is nothing expected from 5G that would disrupt the plan outlined in this document for the foreseeable planning horizon.***

6 Recommendations and Next Steps

It is neither the purpose nor the intention of this study to point out the obvious to the leadership of PDCs 1, 2, and 3. The situation is plainly known to every planner, politician, stakeholder, and citizen in the region – **the communications infrastructure in Southwest Virginia is woefully inadequate to move the region forward.**

There are areas of breakthrough performance that can be pointed to as major successes:

1. LIT Networks bringing direct fiber connectivity and terabit speeds to the region from Ashburn thus enabling the development of critical data centers. Lowering the cost of wholesale Internet for all regional service providers. And providing diversity to the major Internet NAPs in Atlanta Georgia with ring protection.
2. Scott County Telephone's, Citizens Telephone's, and Sunset Digital's Fiber to the Home (FTTH) initiatives delivering gigabit speeds to residential customers.
3. The VCC 4g wireless project which enabled 4th generation wireless services to reach a reported 90% of the population of PDC's 1 and 2 (excluding Scott and Tazewell Counties).
4. CPC Broadband (formerly CPC OptiNet) is a subsidiary company of the Cumberland Plateau PDC. It was organized to serve Russell, Dickenson, Tazewell, and Buchanan Counties. Partnering with Point Broadband the Company has obtained over \$37 million in grant funding for the construction of 700 miles of fiber optic broadband backbone that is now serving almost 900 industrial, commercial, governmental and educational institutions in the region, including Northrup Grumman, Sykes, Pyott-Boone, and Dickenson County Public Schools.

Yet, despite these successes, the plain truth is that without service **ubiquitously** in the region, there can be no sustainable economic development, job creation and retention, and work force development.

The purpose of this report is to identify a prioritized inventory of areas to address; presented in Section 5. Our recommendations for implementing improvement are as follows:

6.1 Recommendations

1. Address the broadband problem on a regional basis as three PDC's, not individually, competing against one another for scarce resources. Consider forming a separate legal entity (or repurposing an existing one like the VCC) specifically to attack solving the broadband problems in the region. Hire a

dedicated Executive Director and task him/her with time-specific and measurable goals. Link compensation to goal attainment.

2. This report presents a priority list by PDC, and a single integrated list. There are economies of scale to network deployment. It may be far more cost effective to attack the highest priority from PDC 3 and a middle priority from PDC 2 at the same time. This should be considered before undertaking a strict buildout of the presented priorities.
3. Formalize agreements with SCTC, Citizens, and CPC Broadband that outline the mechanics of how network will be funded, deployed, operated, and maintained, including any revenue sharing.
4. Continue to encourage WISPs such as iGo, HillCom, and Gigabeam to deploy their wireless networks in unserved markets. While wireless is neither as robust nor as high-a-quality service as fiber, this is a situation where anything is better than nothing for the unserved customer. The encouragement can come in the form of discounted costs for tower attachment, access to dark fiber, and assistance with grant/loan programs.
5. Ignore the notion that some communities may eventually be served by virtue of the Connect America Fund. The FCC Connect America Fund recipients are not obligated to serve customers for up to six years. The unserved residents of Southwest Virginia need service NOW.
6. Attain legislative assistance, particularly for wireless (cellular) deployments. Several times in this report it has been noted that there is no path forward for wireless expansion without a carrier's participation. When the VCC implemented the 4g wireless program in 2011, it was only possible because of the leadership of Delegate Kilgore and the Tobacco Commission striking a deal with a commercial wireless provider.
7. Strive to get Southwest Virginia broadband worked into the annual state budget. Governor Northam has noted several times that rural broadband is a priority for his administration. In December 2018, the Governor announced plans to ask the General Assembly to commit \$46 million in the state's upcoming budget to assist rural areas of Virginia to get broadband Internet access. The Southwest Legislative Delegation should strive for a specific earmark for the region.

7 ATTACHMENTS AND APPENDICES

7.1 COMMUNITY NEEDS APPENDIX

LENOWISCO

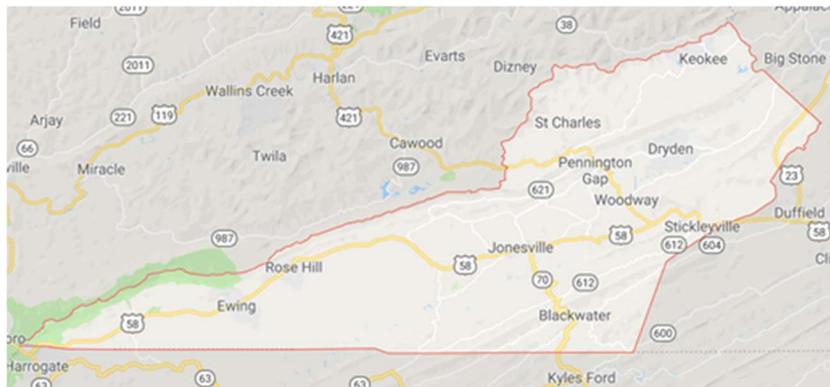
The following table shows the population change and density per square mile for PDC 1 – LENOWISCO (Lee, Norton, Wise, and Scott).

PDC 1	2010 Census	2018 Estimate	Percent Change	Square Miles	Density/Sq. Mile
Lee	25,587	23,994	-6%	436	55
Norton City	3,958	3,908	-1%	7	522
Wise	41,452	38,386	-7%	403	95
Scott	23,177	22,121	-5%	536	41
Total/Average	94,174	88,409	-5%	1,382	68

Lee County

Lee County is served by Comcast and Verizon with additional services provided by Sunset Digital Communications.

Pennington Gap and Jonesville are the main population centers within the county and are relatively well served. However, St. Charles and the surrounding communities are not as well served. A few areas reported no telephone service in inclement weather and a complete void of multi-channel video service. Of course, high speed Internet service is non-existent. Business services are limited.



From Rose Hill westward toward Cumberland Gap, complaints about broadband service have been ongoing for years.

Verizon, the Incumbent Local Exchange Carriers (ILEC) in the region, is offering broadband services using DSL in some portions of the region. DSL has a physical

Wise County communities identified as high-priority for broadband expansion are:

- Powell Valley
- Appalachia and the immediately surrounding coal camps
- Blackwood
- Areas north of the City of Norton
- West of US. 23
- Areas outside of Coeburn toward Scott County
- Smaller communities northeast of the Town of Wise
- Coeburn Mountain area (including Airport Road)
- Northwest of St. Paul
- Pound

Scott County

Scott County Telephone Cooperative is the Incumbent Local Exchange Carrier for the county. SCTC has been very active in providing advanced telecom services throughout the county and region. Residents and businesses located near SCTC's central offices, remote access nodes, and switching centers receive excellent service. However, communities located further from the main exchanges don't have all of the bandwidth necessary to power their digital needs.



All schools in the county are well served; however, the lack of last-mile connectivity to residents hampers the full digital curricula potential.

The lack of adequate wireless (cellular) coverage throughout the county continues to be a challenge, with routine complaints coming in from various governmental entities within the county.

Specific communities in need for improved cellular service include:

- Nickelsville
- Fort Blackmore
- Rye Cove and
- Dungannon

“Our biggest obstacle is not the infrastructure, but our vision of how to use that infrastructure.” – Danny Dixon, Vice Mayor of Nickelsville

City of Norton

The City of Norton has enjoyed robust communications services for years as a result of Verizon hosting a major Central Office in the downtown area. Economic development has taken advantage of that situation by successfully recruiting several digital businesses over the years including the Dual Party Relay Center providing services for the entire Commonwealth of Virginia through a contract with AT&T. That center recently closed as a result of contract changes and consolidation of services elsewhere. Verizon has also placed a directory assistance center within the city as has the statewide service that arranges Medicaid transportation services for their clients.

Cumberland Plateau

The following table shows the population change and density per square mile for PDC 2 – Cumberland Plateau (Buchanan, Dickenson, Russell, and Tazewell Counties).

PDC 2	2010 Census	2018 Estimate	Percent Change	Square Miles	Density/Sq. Mile
Buchanan	24,098	21,576	-10%	503	43
Dickenson	15,903	14,516	-9%	331	44
Russell	28,897	27,057	-6%	474	57
Tazewell	45,078	41,973	-7%	519	81
Total/Average	113,976	105,122	-8%	1,826	56

Buchanan County

Buchanan County is deep within the Coalfields of Virginia, adjacent to both Kentucky and West Virginia. The greatest communications network challenges in Buchanan County are the steep mountain terrain. However, a certain “can do” attitude exists which has fostered creative solutions to many problems.

This theme carried throughout the interviews conducted in the county. When solutions weren’t forthcoming from the service providers, local leaders took the initiative to raise funds and, in some cases, worked directly with the incumbent providers to extend services into communities where a business case could be made.

Educational institutions have created strong demand for broadband and wireless services, making communications a critical success factor for the region. A private law school and college of pharmacy have been operational in Buchanan County since 1994 and 2003,



“Poor cellular coverage results in unsatisfying tourism experiences for our visitors” - Rita Surratt, Director, Dickenson County Chamber of Commerce

Russell County

Service providers in Russell County include Shentel, Verizon, and the Cumberland Plateau Company through a partnership with Sunset Digital. Russell County has capitalized on the “gig economy” by successfully recruiting call centers and software development centers to the region.

High-speed fiber lines were first placed in Lebanon nearly two decades ago which allowed the creation of data center and software development jobs.

However, connectivity beyond the Lebanon and the transportation corridors is still a problem for most of the county.



Affordability of broadband services was mentioned as a particular issue in Russell County.

When interviewees were asked about particular Russell County needs, **“all areas beyond Lebanon”** was the response.

Particular communities outlined regarding cellular wireless service needs included:

- Lebanon to Gate City - 71 - No service 75% of the time (1 hr. drive)
- Lebanon to Hansonville - Dropped calls/spotty coverage
- Lebanon to Abingdon - Dropped calls/spotty coverage
- Dante (near St. Paul) - Dropped calls/spotty coverage
- Cleveland - Dropped calls/spotty coverage
- Swords Creek -- Dropped calls/spotty coverage

The most pressing concern however was the inability to foster innovation and retain young people without dependable, affordable, quality broadband communications.

From an economic development perspective, “you can’t ‘get in the game’ or even ‘sit on the bench’ without broadband infrastructure.” – Rachel Patton, WIA One Assistant Director

Bland County

Bland County, the least populated county studied, was recently awarded a \$459,764 grant from the Appalachian Regional Commission for a 33-mile fiber build to businesses and institutions in the county. The fiber run will start in Rocky Gap, then south through Bastian, then to Bland. The fiber will run along the Route 52 corridor. Once the fiber construction is finished, an ISP partner will use wireless technology to reach additional locations off Route 52. The project will make Internet access available to 37 businesses, as well as Bland County Schools, the Board of Education offices and the Bland County Medical Clinic, a federally qualified health center.



The existing providers in Bland County primarily use fixed wireless and existing DSL network plant to provide service and include:

- Sunset - Middle-mile fiber along Rt. 42 to Bland Correctional Facility
- CenturyLink – Some 10 MBPS service over copper but mostly 3 MBPS
- Verizon
- Gigabeam – Serving approximately 200 residents using towers throughout the county. They provide 50 MBPS service for \$79/mo. and 25 MBPS for \$30/mo.

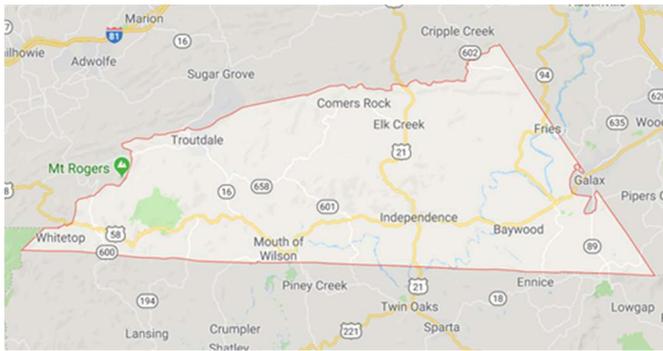
Bland currently has a public-private partnership with Gigabeam Networks for up to 2 gig wireless.

Currently, the residential needs are not being met. The following areas were identified as having the greatest needs:

- Ceres (agriculture, tourism, 42/52 split)
- Grapefield
- Dry fork, Clear Fork, and Little Creek
- Hollybrook

Carroll County

Carroll County has a population of approximately 29,724. Parts of the county are adequately served (the north side of Hillsville, for example), but other areas (specifically the south side of Hillsville) can only get about 1.5 MBPS, or “barely enough to e-mail.” In terms of cellular coverage, U.S Cellular has “good coverage” along main transportation corridors.



Resident complaints stem from CenturyLink and the lack of responsiveness to customers. The county has good broadband in the industrial parks, but workforce is the big issue for economic development.

CenturyLink is using its incumbent network (DSL) to serve customers

and used CAF funding to make it look as if customers had access to broadband when, in fact, they didn't.

Areas of greatest need include:

- Pipers Gap
- Laurel Fork
- Dugspur Region
- South of Woodlawn/Northeast of Lambsburg (FastLink has about 300 customers north of Lambsburg)

Grayson County

Grayson County has been very proactive in pursuing solutions to its communities' broadband needs. In fall 2018, Grayson County issued an RFP for Broadband Services.

While a high level of detail on Grayson County's specific needs can be found in the RFP, a high level assessment is that most of the county is underserved or unserved.

- 77%, or 5,222 households have documented need for improved broadband
- Broadband is the number one need in the community. After Broadband, "Roads" are the number two need.
- Real estate sales and values are impacted by the degree to which broadband is available in a community.
- There is a potential growth opportunity for farmers to implement enabling technologies to better manage farm operations, but these technologies often require a broadband infrastructure
- Population retention & recruitment is a top priority for the Grayson County government. Broadband is considered #1 opportunity to solve this problem.



- As a former health care administrator, the County Administrator sees the value of connectivity to the entire population to improve health outcomes, especially in an area such as Grayson with a “graying population.”
- A lack of high speed communications is also contributing to the loss of young people after graduation.
- Areas of greatest need in the county (from current RFP):
 - Wilson & Elk Creek Districts; Mouth of Wilson, Rugby, East of Troutdale, Comers Rock
 - Providence, Elk Creek and Old Town; Elk Creek, Independence, Baywood
 - Wilson & Elk Creek Districts; East Mouth of Wilson, Buck Mountain, Big Ridge, Bridle Creek
 - Wilson District; West Mouth of Wilson, Whitetop
 - Providence, Old Town Districts; Fries, Baywood (east)
- Existing providers include:
 - CenturyLink
 - HughesNet and Exceed (WildBlue)
 - Comcast
 - Lingo (via Wired Road)
 - Citizens Telephone
- There are 13 total towers in the County but providers lack the incentive to upgrade.

“High speed communication is a driver and enabler for the community. After Broadband, ‘Roads’ are the number two need.” – Bill Shepley, Grayson County Administrator

Smyth County

Smyth County has some fiber assets in the area through Sunset but, like many other counties in the planning districts covered in this report, needs a last mile solution. The business community’s needs are not being met and are at risk of leaving.

Providers serving Smyth County include CenturyLink, Comcast, and Sunset. There are no competitive local exchange carriers in the area. Cell phone service is “totally unreliable” in certain areas (northern and southern bands of the county), but providers won’t locate off the towers in the area. The majority of the complaints are about CenturyLink’s service.



The communities within Smyth County with the greatest need are:

- Sugar Grove
- Rich Valley.

Washington County



In Washington County, business needs are being met only along I-81 corridor and within the Town of Abingdon and the City of Bristol. Beyond a three-mile radius from that corridor, businesses are either underserved or unserved. Residential needs are even greater. Mendota, Glade Spring and Damascus are all in need of service. Complaints from residents are frequent.

Service providers include Sunset, Charter, CenturyLink, and Comcast. Cellular wireless providers include VZW, T-Mobile and AT&T.

The specific communities within the county with the greatest needs include:

- Mendota
- Glade Spring
- Damascus

Wythe County



In general, the industrial parks have good service. Businesses located along the transportation corridors are considered adequately served due to the amount of fiber available. However, residential coverage is spotty. The county has been suffering from economic stagnation in recent years. Historically, Wythe had been slowly growing while counties to the west were losing population. Only recently has the trend changed in Wythe as well. The current population is just over 29k.

The level of coverage in Wythe County varies depending on the part of the county. The denser areas (the eastern end of the county including Max Meadows and Austinville) have more coverage than less dense areas.

The current providers include CenturyLink and Shentel (which bought Rural Retreat Cable). Shentel offers “higher” speeds in Rural Retreat (up to 10 Mbps). The Chairman

of the BoS lives on Chapman road (the road running parallel to I-81/77 corridor (south side of Interstate) and is very dissatisfied with options and speeds available.

The Fort Chiswell/Lead Mines area is the one of greatest need. Also, the eastern end of the county is the largest growth area.

City of Galax

Galax is more dense than other areas with the planning district. Also, it is part of Wired Road and is a Regional Broadband Authority, so the businesses and residents' needs are being met for the most part.

- Big businesses include Albany Industries, Moag Industrial, Vaughn Bassett furniture company, etc. CrossRoads Facility is a business incubator, and XM Radio call center has about 150 employees.
- There are about 7,000 people over 8 square miles, so a bit denser than other areas in the planning district.
- Wired Road forced providers to upgrade and expand their networks
- Perceived positive impact on real estate (byers won't consider moving to homes without broadband)
- Important for small businesses' online sales
- Schools are seeing higher enrollments and were using Lingo, which is one of the Wired Road providers. They are now using CenturyLink.
- Galax is upgrading some cell towers to ensure reliability
- Fiber runs east up to Airport Road

The main regional service providers in Galax include:

- Comcast – up to 130 meg residential in some areas; has a retail store in downtown Galax.
- CenturyLink – up to 25 meg
- Wired Road RBA

7.2 Sources of Funding Appendix

National Funding

In December 2018, US Department of Agriculture (through RUS) announced a \$600 million grant and loan Broadband Program, ReConnect, to assist with building rural broadband infrastructure. Telecommunications companies, rural electric cooperatives and utilities, Internet service providers, and municipalities may apply for funding. To be eligible, communities must have populations smaller than 20,000 people with no broadband service or where service is slower than 10/1. Loan applications are due April and May 2019, depending on the program applied for.

State Level Awards Granted

The state of Virginia, through Governor Northam, is heavily invested in the vision of equitable broadband coverage throughout the state. The Governor's vision is statewide broadband coverage within 10 years. The two agencies that have deployed the most capital to support broadband connectivity are the Virginia Tobacco Region Revitalization Commission (Tobacco Commission) and the Virginia Department of Housing and Community Development (DHCD). Part of receiving funding is a requirement that communities/localities have a "granular plan" for ensuring coverage.

Virginia Coalfield Economic Development Authority (VCEDA)

VCEDA has been involved with regional broadband expansion efforts for many years. They have been a provider of capital for the LENOWISCO Fiber-to-the-Home initiative, the Cumberland Plateau Company network expansion, and the Virginia Coalfield Coalition 4g Wireless project.

VCEDA indicated that "the more broadband deployed in the region, the more economic development is enhanced."

VCEDA identified the following communities as high potential candidates for broadband deployment:

- Haysi
- Nickelsville
- US 460 (between Richlands and Vansant)
- Hurley
- Whitewood
- Clinchco.

Regional Awards Granted

Appalachian Regional Commission (ARC)

The Appalachian Regional Commission, or ARC, believes that “access to advanced telecommunications infrastructure for all Appalachian communities is essential for the Region to reach economic parity with the nation.”

ARC partners with public entities, non-profits, and the private-sector to spread access to telecommunications infrastructure and applications throughout the Region.

Specifically, ARC’s POWER program is a congressionally funded initiative that targets federal resources to help communities and regions that have been affected by job losses in coal mining, coal power plant operations, and coal-related supply chain industries due to the changing economics of America’s energy production. Virginia will receive 5 grants totaling more than \$2.8 million as part of this program.

One of the grants will go to Bland County (in the amount of \$459,764) for a 33-mile fiber build to businesses in the county. The fiber run will start in Rocky Gap, then south through Bastian, then to Bland. The fiber will run along the Route 52 corridor. Once the fiber construction is finished, an ISP partner will use wireless technology to reach additional locations off Route 52. The project will make Internet access available to 37 businesses, as well as Bland County Schools, the Board of Education offices and the Bland County Medical Clinic, a federally qualified health center.

Pending Applications at the Tobacco Commission

- Fiscal year 2019 pending last mile broadband applications to the Tobacco Commission for Southwest Virginia are outlined in the following table:

FY 2019 Last Mile Broadband - Pending Applications for SWVA

Req #	Organization	Project Title	Request Amount
3535	Carroll County Industrial Development Authority	The Wired Road/Carroll County Last Mile Neighborhood Pole Project	\$200,000
3531	Cumberland Plateau Company	Cleveland Broadband Expansion Project	\$544,137
3530	Grayson County	Connect Grayson	\$325,000
3522	Industrial Development Authority of Dickenson County	Honey Camp Last Mile Broadband	\$65,000
3519	Scott County Telephone Cooperative	Weber City Broadband Fiber-to-the-Home Initiative	\$1,500,000
3525	Tazewell County Industrial Development Authority	Tazewell County Wireless Service Authority Broadband Expansion Phase III	\$150,000
3527	Industrial Development Authority of Russell County VA	North Central Russell / South Buchanan Counties Broadband Expansion Project	\$1,900,000
Total Potential Funding for SWVA			\$4,684,137

Funding Strategy

Identify the highest potential providers of capital, including government and private sources, to fund the highest priority communities. Start at the regional level, then state, then national.

- Virginia Rural Broadband Planning Initiative (VRBPI)
- Connect America Fund
- Rural Utility Services
- Community Development Block Grants (CDBG)

Potential Funding Sources

The following table outlines a more comprehensive list of potential funding sources that have been identified by the Tobacco Commission.

Source	Opportunity	Brief Description	Application Timeline
State Funding Opportunities			
Department of Housing and Community Development (DHCD)	Community Development Block Grant Planning Grant http://www.dhcd.virginia.gov/index.php/community-partnerships-dhcd/79-community-development-block-grant-cdbg-planning-grant.html	Funds available for 3 areas: planning grants, local innovation grants, implementation and economic development, and large scale local level projects.	January – September
Department of Housing and Community Development (DHCD)	Virginia Telecommunication Initiative http://www.dhcd.virginia.gov/	Provides financial assistance to supplement construction costs by private sector providers to extend services to areas that are presently unserved by any broadband provider. Definition of unserved; speeds <= 10 Mbps/1 Mbps. Eligible applicants: towns, cities, counties, EDA/IDA, broadband/wireless authorities, PDC, etc.	Fall

Virginia Tobacco Region Revitalization Commission	TRRC Last-mile Grant and Loan Fund https://www.revitalizeva.org/grant-loan-program/grant-programs/research-development-grant-program/	Provides grants and loans to public/private partnerships between localities and ISPs to construct projects within its service area.	Announced annually
Virginia Resources Authority (VRA)	Virginia Pooled Financing Program http://www.virginiareources.org/page/virginia-pooled-financing-program/	Provides financing to local governments for essential projects. All VRA's authorized project areas are eligible for financing in the Virginia Pooled Financing Program (VPFP). Since inception in 2003, over 100 local governments in Virginia have utilized this program to finance or refinance over \$2 billion in infrastructure projects.	Multiple windows annually

Federal Funding Opportunities

United States Department of Agriculture Rural Development (USDA)	Community Connect Grant program https://www.rd.usda.gov/programs-services/community-connect-grants	This program helps fund broadband deployment into rural communities where it is not yet economically viable for private sector providers to deliver service.	Announced periodically
United States Department of Agriculture Rural Development (USDA)	Rural Broadband Access Loan and Loan Guarantee https://www.rd.usda.gov/programs-services/rural-broadband-access-loan-and-loan-guarantee	This program offers financial assistance to eligible applicants that will construct, improve, or acquire facilities and equipment needed to provide service at the broadband lending speed as defined in the most recent funding announcement in eligible rural areas.	Announced periodically
United States Department of Agriculture Rural Development (USDA)	Telecommunications Infrastructure Loans & Loan Guarantees https://www.rd.usda.gov/programs-services/telecommunications-	This program provides financing for the construction, maintenance, improvement and expansion of telephone service and broadband in rural areas.	Applications are accepted on a continuing basis

	infrastructure-loans-loan-guarantees		
United States Department of Agriculture Rural Development (USDA)	Distance Learning and Telemedicine Program https://www.rd.usda.gov/programs-services/distance-learning-telemedicine-grants	This program helps rural communities use telecommunications to connect to each other and to the world for the purposes of distance learning and telemedicine.	Announced periodically
United States Department of Agriculture Rural Development (USDA)	Community Facilities Direct Loan & Grant Program https://www.rd.usda.gov/programs-services/community-facilities-direct-loan-grant-program	This program provides affordable funding to develop essential community facilities in rural areas.	Applications are accepted on a continuing basis
Federal Communications Commission (FCC)	Connect America Fund https://www.fcc.gov/general/connect-america-fund-caf CAF I, \$1.5B over 10 years to 103 companies. CAF II \$1.98 B over 10 years. Bidding ended 8/2018. Awards pending.	Provider funding for FCC eligible areas only. Eligible areas map: https://www.fcc.gov/reports-research/maps/connect-america-phase-ii-initial-eligible-areas-map/	No longer active for new bidders.
Federal Communications Commission (FCC)	FCC Mobility Fund Phase II https://www.fcc.gov/mobility-fund-phase-2	The FCC plans to make up to \$4.53 billion in funding available to mobile operators that are building out 4G LTE networks to underserved rural markets. The funding will be made available over a 10-year period. Operators that receive the support from the auction will build out 4G LTE mobile service that will deliver at least 10 Mbps to customers in markets that lack access to unsubsidized 4G LTE.	Not yet active
Federal Communications Commission (FCC)	E-Rate Funding http://www.fcc.gov/encyclopedia/e-rate-schools-libraries-usf-program	The schools and libraries universal service support program, commonly known as the E-Rate program, helps schools and libraries to obtain affordable broadband.	Winter-Spring
Universal Service Administration Co. (USAC)	Lifeline Support https://www.usac.org/li/	Lifeline is a federal program that lowers the monthly cost of phone and Internet for eligible customers. Participating companies in Virginia: http://www.lifelinesupp	Applications are accepted on a continuing basis

		ort.org/Is/companies/CompanyListing.aspx?state=VA&stateName=Virginia	
Universal Service Administration Co. (USAC)	Rural Health Care – Healthcare Connect Fund https://www.usac.org/rhc/healthcare-connect/default.aspx	This program provides a 65 percent discount on eligible expenses related to broadband connectivity to both individual rural health care providers (HCPs) and consortia, which can include non-rural HCPs, if the consortium has a majority of rural sites.	Winter - Summer
Universal Service Administration Co. (USAC)	Rural Health Care – Telecommunications Program https://www.usac.org/rhc/telecommunications/default.aspx	This program provides reduced rates to rural health care providers (HCPs) for telecommunications services related to the use of telemedicine and telehealth.	Winter - Summer
US Economic Development Administration (EDA)	Planning Program and Local Technical Assistance Program https://www.grants.gov/web/grants/view-opportunity.html?oppld=301936	This program assists eligible recipients in developing economic development plans and studies designed to build capacity and guide the economic prosperity and resiliency of an area or region.	Applications are accepted on a continuing basis
US Economic Development Administration (EDA)	Public Works and Economic Adjustment Assistance Programs https://www.grants.gov/web/grants/view-opportunity.html?oppld=294771	Grants made under this program will leverage regional assets to support the implementation of regional economic development strategies designed to create jobs, leverage private capital, encourage economic development, and strengthen America's ability to compete in the global marketplace.	Applications are accepted on a continuing basis
Department of Education (DOE)	Promise Neighborhoods Competition http://www2.ed.gov/programs/promiseneighborhoods/index.html	This program provides funding to support eligible entities to significantly improve the educational and developmental outcomes of children and youth in our most distressed communities.	Spring
Appalachian Regional Commission (ARC)	ARC Project Grants https://www.arc.gov/funding/arprojectgrants.asp	ARC funds a number of telecommunications activities, including strategic community planning, equipment	Announced annually

		acquisition, and hardware and software for network building. ARC funds can be used for strategic telecommunications planning activities, telecommunication service inventory and assessment activities, aggregation of demand projects, among other activities.	
Federal Reserve	Community Reinvestment Act (CRA) https://www.dallasfed.org/cd/pubs/digitaldivide.aspx	The Federal Reserve has issued guidance on how to leverage a bank's CRA resources in digital equity initiatives.	Ongoing
Tribal Funding Opportunities			
U.S. Department of Housing and Urban Development (HUD)	Indian Community Development Block Grant http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/icdbg	Provides funds to eligible grantees for housing rehabilitation, land acquisition, community facilities, infrastructure construction, and economic development activities. Eligible applicants for assistance include any Indian tribe, band, group, or nation.	Winter
U.S. Department of Housing and Urban Development (HUD)	Indian Housing Block Grant (IHBG) program http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/ih/grants/ihbg	The provision of broadband is eligible under this program. Eligible IHBG recipients are Federally recognized Indian tribes or their tribally designated housing entity (TDHE), and a limited number of state recognized tribes who were funded under the Indian Housing Program authorized by the United States Housing Act of 1937 (USHA).	Winter
Institute of Museum and Library Services	Native American Library Services https://www.ims.gov/nofo/native-american-library-services-basic-grants-fy16-notice-funding-opportunity	Basic Grants are available to support existing library operations and to maintain core library services. Indian tribes, Alaska native villages, regional corporations, and village corporations are eligible to apply for funding under the Native American Library Services grant program.	Spring

7.3 Addressable Market Appendix

Market Overview

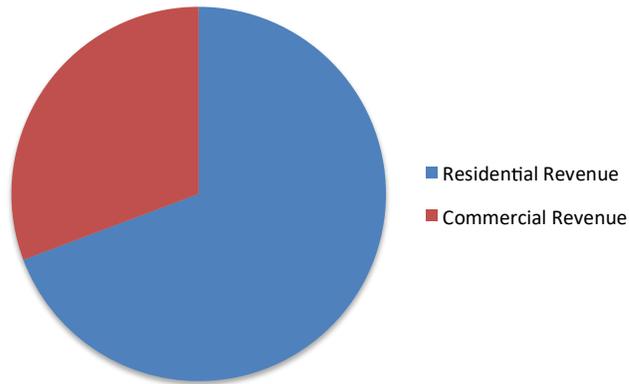
The telecommunications market in Southwest Virginia is estimated at \$289 Million annually for voice, video, data, and wireless services. This estimate is based on the following key factors:

Key Economic Index Factors	SWVA Region
Residential	
Population (2018)	401,745
Households (BRASG 2018 Estimate)	84,270
Median Household Income (BRASG 2018 Estimate)	\$38,945
Economic Index (Income Relative to US)	68%
Economic Index (Income Relative to VA)	56%
Commercial	
Businesses (BRASG Estimate)	7,430
Employment (BRASG Estimate)	49,423

On average, approximately 4% of household income is spent on all communication services.

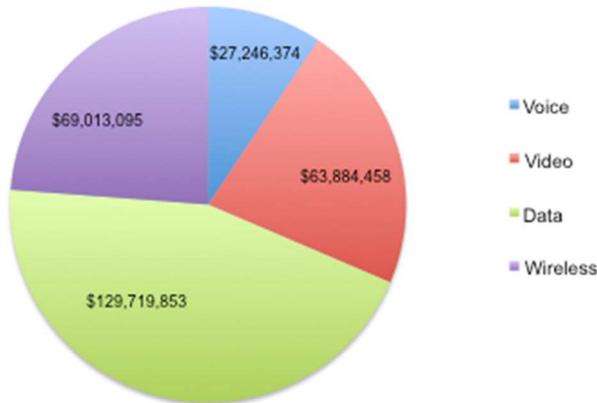
The overall market is roughly split between 31% commercial and 69% residential services.

Total Revenue – Residential vs. Commercial



By service, the revenue distribution is outlined in the following table, with broadband services driving most of the growth:

Total Annual Telecom Revenue at Year 1



The important market dynamics that will influence this addressable market are threefold:

- Cable TV Cord Cutting.** As wireless service becomes more reliable and ubiquitous, and as broadband becomes more available, there will be a continued defection not only from landline voice to wireless but also from cable tv to digital, a-la-carte streaming services. Cisco predicts that nearly four-fifths (79 percent) of the world’s mobile data traffic will be video by 2022.
- Mobile Data Demand.** The explosion in mobile data demand only continues. It grew 23% in 2017 in North America. The increasing number of wireless devices and connections will continue to drive the surge in demand for wireless data.

3. **5G Technology.** The evolution of 5th Generation, or 5G, networks, holds the promise to deliver faster speeds. However, it is likely that rural areas such as Southwest Virginia may be last in line to see the carriers upgrade, as they will target the larger markets initially. A strong fiber backbone will still be needed to service the 5G network. 4G will carry most of the traffic for the next 10 years or so.

These trends will drive demand for expanded fiber and wireless-dependent services in the region, presenting an opportunity for service providers. However, the issue remains. The associated costs of upgrading networks to meet that demand is still extremely high due to the low population densities and challenging geography of the region. Regional leaders must find ways to partner with providers to bridge the gap so that their communities are not left behind.

7.4 Service Provider Appendix

Following is a brief description of the regional service providers and their capabilities:

Burkes Garden Telephone Company

Burkes Garden Telephone Company (BGTCO) is a small, investor-owned telephone company offering “triple-play” services via a fiber-optic system of approximately 72 fiber miles. The service area is tucked in the eastern edge of Tazewell County, adjacent to Bland County, Virginia. BGTCO migrated from copper to fiber over approximately two years.

The service area covers approximately 75 Sq. Miles from the top of Rich Mountain through Little Creek through Burkes Garden. The service area sits within a crater-like bowl with a mountain ridge totally surrounding the region. The customer count includes 160 full-time with as many as 185 during the summer season. Approximately 100 customers receive broadband, which equates to a take rate of 62%.

GPON and active Ethernet are utilized to serve these customers providing 15/10 Mbps service priced at \$32.95/mo. There are no business customers on the system and approximately 13 or 14 customers are considered to be Amish and as such only utilize the telephone service.

Charter Communications

Charter / Spectrum is the second largest cable provider in the United States (third largest multi-channel video service provider when AT&T / DirecTV are considered) but has limited network operations in Southwest Virginia. Spectrum’s local network is primarily in Buchanan and Tazewell counties, with some network in Russell County. Charter has an operational office in Richlands, with a head-end site in Cedar Bluff. Spectrum’s network covers the Town of Tazewell, a good portion of Tazewell County, Grundy, and Richlands. Charter utilizes a hybrid-fiber-coaxial cable network architecture. 100 MBPS asynchronous service is Charter’s standard/basic service at \$44.99 per month. This price is dependent upon various bundling schemes.

Citizens Telephone Cooperative

Citizens is a regional ILEC with full-service communications offerings, including land-line telephone, VoIP, IPTV Video, web and e-mail hosting, DSL, and FTTP (Fiber to the Premise, and Business Ethernet. Citizen’s serves portions of 7 counties in Southwest Virginia. Based in Floyd, Virginia, Citizens network is still 90% copper based, but they are rolling out gigabit FTTP.

There is some overlap of their services and a few counties within PDC’s 1, 2, &3, including Carroll County, Grayson County, and Wythe County. Citizens’ network stops at the Smyth County line. Their fiber runs from 58 to 16 (BVU/Sunset) and 221 to Sparta. They just completed a build on 221 (North) to Roanoke Co., passing over 1,000 homes with FTTH.

Century Link

CenturyLink is the incumbent local exchange carrier in many parts of the study region. CenturyLink still has their legacy network in place and have not invested in upgrading their network. As a result, customer satisfaction rates due to speed and reliability, were low across the board. The biggest complaint related to customer service and the perception of a total “lack of response.”

Comcast

Comcast is the largest cable provider in the United States (second largest multi-channel video service provider when AT&T / DirecTV are considered). Comcast operates a hybrid-fiber-coaxial system throughout the study area. Comcast is doing little in terms of upgrades, with some limited upgrades in PDC 1. In PDC 2, one respondent placed Comcast quality of service at the middle of the pack of the 5 service providers available in that area. Another respondent in the northwestern portion of PDC 2 listed Comcast as “adequate” with 4 stars. Still another official in the southwestern portion of region 3 gave Comcast high marks for quality of service.

CPC Broadband

CPC Broadband (formerly CPC OptiNet) is a subsidiary company of the Cumberland Plateau PDC. It was organized to serve Russell, Dickenson, Tazewell, and Buchanan Counties. Partnering with Bristol Virginia Utility's OptiNet division (now Point Broadband) the Company has obtained over \$37 million in grant funding for the construction of 700 miles of fiber optic broadband backbone that is now serving almost 900 industrial, commercial, governmental and educational institutions in the region.

iGo Technologies

iGo, founded in 1994, is a Virginia-based Internet service company, providing wireless and fiber high speed Internet service to its customers who include residential and commercial clients, individuals and small to mid-size and large business. In 2017, iGo also began offering telephone service to its Internet customers.

iGo coverage areas include parts of Buchanan, Russell, Tazewell, Washington and Wise counties, with additional operations in Tennessee and West Virginia. iGo utilizes one VCC tower to reach unserved residents of the region.

iGo is mainly a fixed wireless provider with 6-8 towers, 520 customers, and 12 employees. Although existing customers are mostly wireless, iGo has successfully competed for USDA Community Connect grants for FTTH build outs. They are underway with a \$1.78M project awarded in 2016 which will include 21 miles of fiber in the Buchanan County area north of Oakwood.

In 2017, they were awarded an additional \$3.0M project for a buildup Garden Creek Rd toward Honaker. iGo was just awarded \$455,581 to extend the build into Russell County and add interconnection with SCTC along Virginia Route 624.

The current build includes 468 customers passed. iGo is an essential element of solving the problem of unserved residents in the region.

Gigabeam Networks

Gigabeam Networks, a wireless Internet service provider, or WISP, provides service in Southwest Virginia, West Virginia and southeastern Kentucky. Their network is completely wireless, including the backhaul. Gigabeam is a small entrepreneurial venture owned by Michael Clemens. They have approximately 200 subscribers in Bland and utilize towers throughout the county. Their service packages include \$79/mo. for 50 meg and \$30 for 25 meg.

HillCom

HillCom, Inc is a family-owned wireless Internet service provider located in Dickenson County. The company started in 2016 out of necessity when a local resident was unable to access adequate Internet service but was able to create his own wireless broadband network solution. By 2017, HillCom had responded to neighbors requesting the service and grew to 20 customers. They then purchased DCWin (Dickenson County Wireless) and now have approximately 600 customers (95% in Dickenson County), with a mission to provide service to the entire county.

Most of the service requests HillCom receives are from the following areas within the county:

- Lick Creek
- Honey Camp
- Breaks

Point Broadband

Formerly BVU OptiNet, Point Broadband was organized in 2018 as the combination of Duffield-based Sunset Digital and Bristol-based BVU OptiNet. The organization is part of a family of telecommunications enterprises headquartered in West Point, Georgia called ITC Holding Company, LLC. ITC began as The West Point Telephone and Electric Company, founded in 1896. Point Broadband is in the process of an organization period, and their exact strategy is unknown. As with many other providers in the region, Point Broadband is attempting to determine how to affordably build out and maintain their network. Point Broadband is the recipient of a multi-million-dollar CAF II award for the study region including Lee County, and the Cumberland Plateau counties of Dickenson, Russell, and Tazewell.

Scott County Telephone Cooperative

Scott County Telephone Cooperative (SCTC), a local provider headquartered in Gate City, is a key player in the region. It serves 420 square miles of Scott County with some service in Tennessee. Their current service territory includes parts of Russell, Wise, Dickenson, and Lee Counties, and the City of Norton. They provide voice, video, and data Voice,

video, data, and security, primarily over a traditional copper/ILEC network but have been upgrading to eventually deploy and utilize an all fiber network to provide enhanced broadband services.

Using primarily grant funding, SCTC has upgraded about 100 miles of its network to fiber, with builds to 5 exchanges in the following areas:

- Ft. Blackmore
- Duffield
- Nickelsville
- Dungannon
- Clinchport

SCTC has approximately 7,000 access lines (about 5,000 in ILEC area and 2,000 in CLEC area). Additionally, they have about 7,000 high speed Internet customers.

Shentel

Shentel, or Shenandoah Telecommunications Company, is a publicly traded telecommunications company headquartered in Edinburg, Virginia. Shentel has digital wireless and wireline network in rural Virginia, West Virginia, Maryland and Pennsylvania. Shentel is also an affiliate of Sprint with wireless coverage in Pennsylvania, Maryland, Virginia, West Virginia, Kentucky and Ohio. It owns its own cell site towers built on leased land and leases space on these towers to both affiliates and non-affiliated service providers. Shentel has invested over \$200 million in the past two years upgrading and expanding its wireless networks, primarily in rural markets. Shentel also provides fiber services to commercial and wholesale customers along its 5,641-mile fiber network across four states.

Shentel's cable segment provides video, Internet and voice services in franchise areas in Virginia, West Virginia, and portions of western Maryland and leases fiber optic facilities throughout its service area. It does not include video, Internet and voice services provided to customers in Shenandoah County, Virginia.

Shentel's wireline segment provides regulated and unregulated voice services, DSL Internet access and long-distance access services throughout Shenandoah County and portions of Rockingham, Frederick, Warren and Augusta Counties, Virginia. The segment also provides video services in portions of Shenandoah County and leases fiber optic facilities throughout the northern Shenandoah Valley of Virginia, northern Virginia and adjacent areas along the Interstate 81 corridor, including portions of West Virginia and Maryland.

Shentel has over 5,400 fiber route miles with fiber to over 325 cell sites, but with network in only Carroll and Russell counties. It has cable plant in Lebanon, Honaker, Swords Creek, Rye, Dante, Wytheville, and Rural Retreat.

Shentel does not actively pursue grant funding, as they have not been very successful in the past doing so.

Wired Road

The Wired Road Authority is a collaborative effort between private sector service providers, the local governments of Grayson County, Carroll County, and the City of Galax, and the Carroll-Grayson-Galax Regional Industrial Facilities Authority (dba Blue Ridge Crossroads Economic Development Authority). Its purpose is to provide the critical enabling infrastructure to transform the regional economy into a dynamic, small business, and entrepreneurial economy. This transformation, enabled by The Wired Road and a complementary economic development focus on attracting and supporting entrepreneurs and small businesses, will allow the region's economy to spawn new businesses, generate jobs, create wealth, and protect the rural character of our region.

The Wired Road network has been in operation for over ten years and is a true public/private partnership with two service providers offering last mile services on the network. The Wired Road is an open access, fully integrated fiber and wireless regional broadband network offering "big broadband" 100 megabit and Gigabit fiber connections and multi-megabit wireless connections in Carroll County, Grayson County, and Galax.

Currently, the Wired Road is finishing a network extension which will connect fiber in Galax with fiber in Hillsville. It is also expanding its wireless coverage and constructing "community poles" to get service to areas that couldn't be reached before. Fiber Wireless Providers

The bill will allow Dominion Energy and Appalachian Power to provide or make available broadband capacity to service providers in unserved areas. It also authorizes the utility to own or lease broadband capacity equipment.

With existing infrastructure that already serves almost every resident and business in rural areas, utilities are uniquely positioned to bridge the gap between middle mile networks and last mile consumers.

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