

Application to DHCD Submitted through CAMS

Madison County

Madison County Broadband Pilot Project

Application ID: 59811052018142640
Application Status: Incomplete
Program Name: Virginia Telecommunications Initiative 2019
Organization Name: Madison County
Organization Address:
Profile Manager Name: Jack Hobbs
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Project Name: Madison County Broadband Pilot Project
Project Contact Name: Tracey Gardner
Project Contact Phone: (540) 948-4455
Project Contact Email: tgardner@madisonco.virginia.gov
Project Location: Madison County
Madison, VA 22727-0705
Project Service Area: Madison County, Madison Town

Total Requested Amount: \$80,000.00
Required Annual Audit Status: Accepted

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Budget Information:

Cost/Activity Category	DHCD Request	Other Funding	Total
Telecommunications	\$80,000.00	\$51,000.00	\$131,000.00
Construction	\$68,000.00	\$0.00	\$68,000.00
Other: ground station and antenna	\$3,000.00	\$8,000.00	\$11,000.00
Other: end-point antennas	\$0.00	\$26,000.00	\$26,000.00
Other: Blakey repeater antenna	\$4,000.00	\$12,000.00	\$16,000.00
Other: admin	\$5,000.00	\$5,000.00	\$10,000.00
Total:	\$80,000.00	\$51,000.00	\$131,000.00

Budget Narrative:

The plan is to install a ground station with source antenna for wireless service. Ground station antenna points to Blakey REC tower, where repeater antennas will be mounted to reach four end-points around the county. End-Points will get a tower built, and antennas mounted to provide local service to homes, averaging 75 homes per tower. These are 75 foot towers, high enough to provide adequate line-of-sight from tower to homes. Grant funds will be used for the end-point tower construction, and the first antenna pair from ground station to the REC Blakey tower. Applicant funds and in-kind value will cover all additional expenses of any kind; minimum applicant cost is \$51,000.

Questions and Responses:

1. Project Area

Provide a map and description of the proposed geographic area including specific boundaries of the project area e.g.; street names, local and regional boundaries, etc. Explain why and how the project area(s) was selected. Attach a copy of your map(s).

Answer:

The project area is Madison County, Virginia. There are six specific site locations. (MAP #2).

Site #1 is for a ground-station in or near the Town of Madison (MAP#3). There are three possible locations under consideration; these locations already have vertical assets of appropriate height. Each location has fiber available within 100 feet, on Main Street; fiber owner is LUMOS. Both Madison County and Madison Gigabit Internet have existing service from LUMOS. This ground station consists of fiber-tap electronics, network switches, computer servers, display and keyboard, power conditioning, and ethernet cable out to one or more antennas. The primary ground station antenna is a 24 GHz full-duplex antenna aimed at site (2) the Rappahannock Electric Coop (REC) tower at Blakey Ridge peak.

Site #2 is the REC tower at Blakey Ridge (MAP#3), 8 miles northwest of Town, a small site where there are three towers. This site will be a signal repeater location, fanning radio signals out to four end-points (sites 3-6). The REC tower is the tallest, with antenna space available at 110 feet. There will be five antennas at that height. Antenna #1 is aimed back at the ground station. Antenna #2 is aimed at Wolftown. Antenna #3 is aimed at Rochelle. Antenna

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#4 is aimed at Brightwood. Antenna #5 is aimed at Criglersville. All the antennas on the REC tower are the same 24 GHz antenna as the ground station, for maximum throughput. These antennas cost \$3000 each; they operate in tuned pairs. The first pair is the backhaul from Blakey to the ground station.

Site #3 is Wolftown (MAP #7). At this site, we will construct a 75 foot tower. It will have one 24 GHz antenna mounted on it, aimed at Blakey Tower. It will have four 90-degree sector antennas mounted just below; these antennas will provide radio service directly to customer homes.

Site #4 is Rochelle (MAP #6). At this site, we will construct a 75 foot tower. It will have one 24 GHz antenna mounted on it, aimed at Blakey Tower. It will have four 90-degree sector antennas mounted just below; these antennas will provide radio service directly to customer homes.

Site #5 is Brightwood (MAP #5). At this site, we will construct a 75 foot tower. It will have one 24 GHz antenna mounted on it, aimed at Blakey Tower. It will have four 90-degree sector antennas mounted just below; these antennas will provide radio service directly to customer homes.

Site #6 is Criglersville (MAP #4). At this site, we will construct a 75 foot tower. It will have one 24 GHz antenna mounted on it, aimed at Blakey Tower. It will have four 90-degree sector antennas mounted just below; these antennas will provide radio service directly to customer homes.

Construction of the towers for sites 3-6 will take place approximately one per month, so that there is adequate time to learn everything that can be learned about doing such construction and configuring the antennas and electronics before proceeding to the next one.

It may prove that Etlan (north of Criglersville) is a better location in terms of potential customer count; we will be investigating this early in the project.

The service area was selected based on known (but proven to be) underserved areas where the most users could be reached at the lowest cost at the earliest date.

Maps for the project area are in the attachment file "ProjectAreaMaps".

2.

Describe your outreach efforts to identify existing providers in the selected project area. Provide a map and list of all existing providers (fixed and wireless), and speeds offered within the project area. Provide a detailed explanation of how this information was compiled and the source(s).

Answer:

Census Tract Eligibility Research Method

Madison Gigabit, and all Internet Service Providers, are required to file the "FCC 477" report to the FCC (Federal Communications Commission) every six months. This information is then matched with the US Census Bureau's data to determine eligibility for broadband expansion grants and other government funds.

To determine which census blocks are Served, Unserved, or Underserved, MGI used this methodology:

There are two Census Tracts in Madison, 7 census block groups, and 1000 census blocks (some of which are quite tiny, as small as a single house). There is no correlation between the block size and the population present.

The FCC 477 data shows that most of the county is "covered" by one provider or another, but these numbers are misleading. There are two sets of numbers, actual customers, and potential customers. For a WISP (Wireless Internet Service Provider), the fact that a radio signal reaches into/over a census block allows that block to be called "covered" at a particular speed, when there may in fact be no actual customers being served. That set of assumptions allows for a map like this:

_____ SEE MAP "FCC477providerdata" attachment _____

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It includes all download speeds 10 megabits and above. Providers under 10 megabits are not real players in this business.

A different flavor variation of this map is online at:

<https://broadbandmap.fcc.gov/#/location-summary?version=jun2017&lat=38.362909&lon=-78.287923>

and shows the count of providers in census blocks, not service speeds (although those are related).

Each of the “polygon” outlines is a census “block”. The size varies crazily, so there isn't any real meaning to that aspect.

The several white blocks can't possibly be “unserved” when they are surrounded by blocks that are at least served by satellite, so this suggests omissions/flaws in the FCC data.

The green blocks are where Comcast reports service, although Comcast does not fill those green blocks. This includes their coax service and fiber presence.

The blue are the lesser services, with the caveat about flawed data. They should probably be red.

The red blocks are those served best by satellite; this reaches nearly the entire county (and probably reaches the blue blocks, too, but the FCC data says not). It is our measured experience that although the FCC data says 25/3 megabits for satellite, 8/1 megabits is the reality, which means that most of the county falls in the FCC “unserved” category. Because satellite does cover the county there is already substantial service overlap.

The FCC provider coverage data from the Form 477 shows the following providers of home service across the county:

Skycasters

HighSpeedLink.net

ViaSat (Exede)

Verizon

DishNet (Hughes)

Virginia Broadband

Comcast

Madison Gigabit is new enough to not be present in the dataset yet. MGI filed its first FCC 477 at the end of summer; this data is from the end of June.

Of these providers, only these claim to offer service better than 10 megabits:

12 HighSpeedLink.net

12 ViaSat Inc

15 Verizon Virginia LLC

25 HughesNet

25 Virginia Broadband, LLC

95 Madison Gigabit

200 Comcast

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Interestingly, AT&T is not listed in this FCC data, but their hotspot-cell-based service can be very good where it is available.

We know that ViaSat offers 25 megabit service, but 12 megabits is all that shows in the FCC data. Skycasters appears to have no customer base in Madison; a casual survey of in-county Facebook Friends suggested no one has ever heard that name here. The FCC data for Skycasters is 2 megabits, so they are not a serious player as an ISP.

HighSpeedLink.net claims 12 megabits in the FCC data, but the same casual Facebook survey suggests no customers in Madison.

This is the Comcast Madison coverage map: (Comcast is buried coax cable, so not broad areas)
_____ MAP "CompetitionDetailMaps" attachment

The correspondence to the green census blocks on page four is obvious, but nowhere does Comcast cover all the space the census blocks and FCC data would suggest. (The pink "line" is wide for visibility, not as geographic coverage.)

Comcast is the real competition, and we will avoid those areas for now.

The Virginia Tech Broadband-availability map (<https://broadband.cgib.vt.edu/IntegratedToolbox/>) shows that Madison

has very little unserved or underserved area (because satellite covers it all), but the "not available" and "needs improvement" responses cover pretty much the entire county.

We will be providing service speed greater than 25 megabits because we believe that is barely sufficient for today's needs, and inadequate for future needs. MGI's current wireless service speed is 100/25 and will jump to 100/100 for this new system.

Another thing we have found regarding satellite service is that the terrain shadowing caused by Madison's geography makes for two homes being a short distance apart north/south can be unserved and served by satellite because of hills.

We also have the CIT survey raw data, and can plot specific kinds of service across the dataset. It does not distinguish between providers of the same kind of service, but there are only two satellite providers.

3. Project Need/Description

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 10 Mbps/1 Mbps or less, and with less than 10% service overlap within the project area. Describe the anticipated service overlap with current providers within the project area.

Answer:

From the 2017 CIT survey results: The survey results strongly indicate that there is widespread need. The number of responses and comments saying so were substantial, well above 50%.

MAP #1 in the attached document, "ProjectAreaMaps".

MAP #2, from the CIT survey, is the plot of georeferenced responses. Each red dot indicates responses where "inadequate service" was reported. There is a concentration in several areas that will address this need.

In 2009 there had been a previous survey conducted by CIT in Madison, on a far smaller basis, receiving only 100 responses. Reading that final report you notice two things: half the responses came from people who were still using dialup, and the same %s of responses said "we want better". In addition, the written comments were nearly

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identical: “expand my business”, “sell my house”, “schoolwork”, etc.

The RUOnlineVA survey data says the same things within the statistical confidence variation.

<https://www.cit.org/assets/1/17/Release-RUOnlineVAreport.pdf>

<https://www.wired.virginia.gov/sites/default/files/RUOnline%20Virginia%202016%20Report.pdf>

This map from the CIT survey results shows a heat map of reported inadequate service over census blocks:

_____ MAP #1 in attachment ProjectAreaMaps _____

It correlates to Wolfstown (Hood), Rochelle, Brightwood, and near Criglersville (Banco), which are the locations we are targeting with this proposal.

From the 2017 survey, 65% of the responses said “I want better service”. 7% of the responses said “I do not have service of any kind” and 10% said “no service is available at all.” That is more than 80% of the county.

The top three reasons given for being dissatisfied with the existing service were “too slow”, “too expensive”, and “service unreliable”. All those issues will be addressed by the Madison Gigabit Internet solution. Other surveys say essentially that same thing.

The comments included such things as “I could expand my home-based business if I had better service” and “I could sell my house for more money if I had better service”. MGI has a customer now that is renting a house in town vacated by the homeowner because the available service was poor (or perhaps too expensive; in town, Comcast coax is available, can perform quite well, but is not cheap). An anecdote reported in Fauquier County's own survey: a resident was forced to reduce the asking price to sell his house by \$50,000 because high-speed service was not available there.

Business in America, in general, needs or demands good internet access itself. A county with poor internet service options cannot attract new businesses when neighboring counties have better; this is no different than the quality of local roads or local schools.

In schools, online access is a requirement now, yet the service in Madison doesn't meet the needs of children. An unknown number of them (estimated to be 500 per week) use the library regularly, including the library's free (but limited) WiFi after the library closes at night, or use the free WiFi at McDonalds. Good schools are a driver of economic success.

Anecdotal evidence, from many conversations with local citizens, indicates that if we could deliver better service county-wide today, we could sign up most residents immediately.

Internet access is like roads and electricity—more is better, all the time. And it will lead to things we cannot even imagine yet.

Statistics from the CIT survey analysis:

Residential

67% state their home Internet is inadequate

64% of those depend on cellular, satellite or dial-up services

17% state they have NO access at all

30% of residents would telecommute if they had better access.

30% of respondents have K12 students, 12% are homeschooled

45% of respondents use the Internet for school and work purposes

26% of respondents report home based businesses

Businesses

25% of respondents own a business

62% of businesses state they need better access than they have today

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87% of business owners say the Internet is important/critical to their businesses

67% of businesses depend on inadequate services; cellular, satellite and DSL

26% (of all respondents) have home based businesses

From these statistics, and conversations with county residents, it is clear that everyone here wants more than what they have, and it is also clear that in a few years we will all want more than that.

Amazon's announcement of building a new corporate headquarters in Northern Virginia really necessitates improving infrastructure at least 100 miles out all around, and boosting educational capabilities. We need to move forward quickly on this, because the spill-over from the economic expansion that causes will reach this far within 10 years.

In the full proposal document attached, on page 22, there is a simple map which contains georeferenced locations for people in Madison who have expressed interest in better service directly to MGI through its website registration.

Other than the concentration in town, associated with early, experimental users, the interest is relatively evenly distributed around the county (it extends outside the border also, into Greene, Orange, and Culpeper counties, although not all are shown here). The CIT map reflects this same distribution, on a larger scale.

4. Describe population both in terms of absolute numbers within the project area and the eligible users that will be served by the proposed project. Describe the basis for these projections.

Answer:

Total county population is 13,000. Population density averages 40 per mile.

Our current estimate of potential customer base at the four sites is:

Wolfstown: 75 homes, approximately 200 people

Rochelle: 150 homes, approximately 300 people

Brightwood: 75 to 100 homes, approximately 250 people

Criglersville: 75 homes, approximately 200 people

We counted houses in the Google Maps satellite imagery based on being within one mile of specific sites for end-point antennas, and compared against the county's real estate parcel map, and estimate 2-3 people per house. Our GIS software won't quite allow us to combine every piece of information in order to produce a better-computed answer.

5. Indicate the numbers of businesses and community anchor institutions the proposed project will pass in the project area.

Answer:

Wolfstown: 20

Rochelle: 25

Brightwood: 16

Criglersville: 16

We counted responses in the CIT survey that were reporting as business locations, based on being within a mile of the above-named sites for end-point antennas, and estimated upward from the response rate.

6. Provide the anticipated take rate for the proposed service within one year of project completion and describe the

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basis for the estimate. Also provide all actions to be implemented to reach the identified potential customers within the project area.

Answer:

Customer Take Rate

It is only a question of when--not if, or who; it will eventually be 100%. Of current residents, there will be some who do not ever have a computer, a smart phone/tv. While that may last some years, it will not last forever. No one lives without the internet any more, whether they know it or not. All banking uses the internet somehow. Schooling requires the internet. Most shopping/commerce uses the internet, directly or indirectly. The internet has enabled the creation many new things, ones not conceivable 30 years ago. The future of the internet will do even more of that.

All progress will need expanded internet service and access. If we are not moving forward we are falling behind. Our experience is that everyone wants it. The neighbors of someone who has said they want it probably also want it and just haven't said so yet.

Microspots, where a pole serves a handful of homes, are one approach on a small scale; microspot approaches are often multiple-hop daisy-chains of repeater nodes where the customer ends up with unhappily low service speed. Our approach, while similar, but larger scale, is a better starting point because the service capability is greater. And in the end the target is gigabit service over fiber, because the future will require it and we should plan towards it now.

Our current estimate of potential customer base at the four sites is:

Wolfstown: 75 homes, approximately 200 people

Rochelle: 150 homes, approximately 300 people

Brightwood: 75 to 100 homes, approximately 250 people

Criglersville: 75 homes, approximately 200 people

These number come from a distance estimate using the radio-coverage images and counting the real estate parcels with actual homes in them, and comparing against Google Maps satellite images of the same areas. We did not make a distinction between business and residential locations in those numbers.

100% uptake is over 300 customer sites, more than enough to be paying for itself very quickly, with an ROI recovery near the end of the calendar year.

7. A statement whether the proposed project is targeting the "last mile," "middle mile," or "backbone" portion of the broadband infrastructure.

Answer:

The project will be all three dimensions.

Backhaul: from the ground station (fiber tap) in town to the Blakey tower repeater site

Middle-mile: from Blakey to the proposed end-point locations (Wolfstown, Rochelle, Brightwood, Criglersville)

Last mile: service to homes from the end-point locations.

On the MAP #2, Last Mile is the four black outer circles, Middle Mile goes from those circles to the black dot that is Blakey, Backhaul goes from the black dot to the ground station in/near Town.

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8. **For wireless projects only:** Please explain the ownership of the proposed wireless infrastructure. Will the wireless co-applicant own or lease the radio mast, tower, or other raised structure onto which the wireless infrastructure will be installed?

Answer:

Madison Gigabit Internet will be the owner and maintainer of all the components built under this contract. Existing towers and other facilities will continue in their current ownership with rights to attach procured on a lease/contract basis.

9. Provide a description of the broadband service to be provided, including estimated download and upload speeds, whether that speed is based on dedicated or shared bandwidth, and the technology that will be used. This description can be illustrated by a map or schematic diagram, as appropriate.

Answer:

The incoming service from the fiber provider is initially going to be symmetric 100 megabit service, which means download and upload speed is the same (100/100); in practice there is always a slight difference between them (likely 98/96). The incoming fiber service, at the point of presence, is a dedicated guaranteed-uptime service from LUMOS (<http://www.lumosnetworks.com/>), with 99.99% reliability.

The service for customers is a shared service of that 100/100, among the receivers at the highest speed possible with the selected hardware. Shared service will be best when everyone's usage is light; many will be able to stream a movie at the same time, but will be direct-beam transmitted to a shared repeater node at REC Blakey tower, passed through to four outgoing antennas via a gigabit network switch.

The radio systems at the customer end (CPE) currently operate 120-200 megabits (there is a distance from the tower aspect, with a sweet spot). The backhaul and middle mile radios and antennas are full-duplex units, which means that they transmit and receive at the same time, i.e., they are symmetric as well; the units we will use are faster than the CPE. So initially the limit will be the incoming service. Eventually the limitation will be the radios, but that speed to customers will feel amazing.

Once the customer count passes 125, the fiber trunk will be boosted to 300 megabits incoming. At 250 customers, the fiber speed will be boosted to 500 megabits. Higher trunk speed will reduce congestion at that bottleneck, but will not also boost speed at the customer.

10. 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. Also describe specific advantages of using this technology. Provide a detailed explanation on how this information was compiled and source(s). For wireless projects, provide a propagation map including the proposed project.

Answer:

Network System design.

The system currently in use at Madison Gigabit Internet is an incoming 100/100 line. This point-of-presence feeds an omni-directional antenna on the office building roof. There are seven directly connected customers on that antenna.

In addition, one of those customers is a repeater node with a second omni-directional antenna that feeds service further south in town. There is some data-speed degradation through the repeater node.

This system, while still experimental, has been in operation 24x7 since May 2018, with no downtime except that of external trouble at customer homes when the power goes out.

The network design for this project expands that daisy-chained concept on a larger scale, with more powerful

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radios and antennas, a larger intermediate repeater node, and final distribution nodes that reach to individual houses.

It is our experience that a neighborhood of homes is a good group to constitute an approximate computer subnet. If the network speeds from the customer locations are all sufficiently greater than the incoming fiber service speed, everyone will get the maximum possible through that source until the fiber speed is upgraded beyond it.

It is also the case that a radio data-speed reported by a hardware vendor is only a theoretical value, and will be considerably greater than the operational field-deployed performance, where a speed measurement is subject to various other interferences.

11. Project Readiness

What is the current state of project development (i.e. planning, preliminary engineering, final design, etc.)? Prepare a detailed project timeline or construction schedule, which identifies specific tasks, staff, contractor responsible(s), collection of data, etc., and estimated start and completion dates. The timeline should include all activities being completed within 12 months of contract execution with DHCD.

Answer:

The concept is in final design. We have existing service on a smaller scale now, using the same concept in town. (Concept early planning began in 2017.)

The engineering is in preliminary design, in that we know almost exactly what we will do, but each site will have some specific details we cannot know until sites are examined in detail.

Project Timeline

Contract award: Month 0 Execution begins: Month 1

End: Month 9

Month	Location	MGI Lead, Clint Hyde	Madison Lead, Jack Hobbs, Tracey Gardner
1	All	Tower location site surveys. Antenna acquisition and testing. Basic advertising including newspaper ads and site-specific local temporary signage. Obtain rights from landowners for tower locations.	Process invoicing and payments.

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2	Ground station, Blakey.	Setup; antenna install. Marketing. County permits.	Process invoicing and payments.
3	Wolftown	Tower build. Antenna install. Customer marketing, installs begin.	Process invoicing and payments.
4	Rochelle	Tower build. Antenna install. Customer marketing, installs begin.	Process invoicing and payments.
5	Brightwood	Tower build. Antenna install. Customer marketing, installs begin.	Process invoicing and payments.
6	Crigersville	Tower build. Antenna install. Customer marketing, installs begin.	Process invoicing and payments.
7	All	Customer installs.	Process invoicing and payments.
8	Project conclusion	Final report.	Process invoicing and payments. Final report.

Advertising/marketing will begin immediately after a win announcement, via all local communication channels including Facebook. The county government will promote the new service on its economic development website and e-newsletter blast service. We already have specific local contacts waiting to help spread the word.

We expect to start in March, and finish in November.

The "Project Management" attachment covers this same schedule.

12. Matching funds: Provide a description of the matching funds the applicant and co-applicant will invest in the proposed project, (VATI funding cannot exceed 80% of total project cost). The Funding Sources Table should be completed.

i. For each element of matching funds in the description, indicate the type of match (cash, salary expense, or in-kind contribution).

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ii. Identify whether the applicant or co-applicant is responsible for providing each element of the proposed matching funds.

iii. Include copies of vendor quotes or documented cost estimates supporting the proposed budget.

Answer:

Matching funds will come from two places: in-kind support from Madison County (the applicant), to include salary hours spent on meetings and presentations.

Madison Gigabit Internet (the co-applicant/private partner) will supply all remaining funds needed. This will cover the antennas, all networking devices and compute servers, cabling, mounting hardware, project administration, etc.

13. Identify key individuals, including name and title, who will be responsible for the management of the project. Describe their role and responsibilities for the project. Present this information in table format.

Answer:

Key Personnel:

Name	Title	Description
Clint Hyde	President, Madison Gigabit	BSEE, 1981. Decades computing experience
Jack Hobbs	Madison County Administrator	Senior admin oversight.
Tracey Gardner	Madison County Director of Economic Development and Tourism Executive Director, Madison County Chamber of Commerce	County project lead.
Patrick Mauney	Executive Director, RRRC	Administrative advisor
David Hutchins	MGI Chief Technical Officer	Years computing center experience
Mitch Dickey	Wireless Networking Specialist	Years large-scale wireless experience
Clarke Security	Sub-contractor	Tower construction.

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Further detail:

Clint Hyde, Owner/President, Madison Gigabit Internet. BSEE Virginia Tech, 1981. More than 40 years in computing, designing and building distributed systems and networks.

Jack Hobbs, Madison County Administrator.

Tracey Gardner, Madison County Director of Economic Development and Tourism and Executive Director, Madison County Chamber of Commerce. County project lead.

Patrick Mauney, Executive Director, Rappahannock-Rapidan Regional Commission, Culpeper. Will provide administrative oversight, reporting coordination, and project management activities in support of the grant.

Clarke Security Services, Brightwood. Tower construction. Has installed hundreds of miles of networking cable in the general Washington DC area, built other towers, security systems for various clients including US Government.

David Hutchins, MGI Chief Technical Officer. University of Virginia UVACollab Infrastructure Architect, previously Director of Enterprise Information Systems at Norfolk State University. General Class Amateur Radio Licensee.

Mitch Dickey, MGI. Certified Wireless Network Expert #250. Cisco Certified Network Associate Router/Switch/Wireless. Senior Network Engineer, Loudoun County Public Schools. Amateur Radio, W4LAN.

14. Applicant and Co-Applicant: A description of the public-private partnership involved in the project. Detail the local government assistance: Local government co-applicants should demonstrate assistance to project that will lower overall cost and further assist in the timely completion of construction, including assistance with permits, rights of way, easement and other issues that may hinder or delay timely construction and increase cost.
 - i. If the partnership is formalized in a written agreement provide a copy of that agreement.
 - ii. If the partnership has not been formalized, provide a short description of the project management role, financial commitment, or other contribution to the project for the applicant and co-applicant and any additional partners.

Answer:

The Madison County Board of Supervisors passed the following motion to support a proposal by Madison Gigabit Internet, Inc. to pursue grant funding through the Virginia Department of Housing and Community Development's Virginia Telecommunication Initiative (VATI) program during its meeting on December 11, 2018:

Whereas, Madison County is currently underserved by internet services in that many areas have slow and unreliable service, if they have any service at all; and

Whereas, the Madison County Board of Supervisors desires to support the proliferation of internet services to heretofore underserved areas of Madison County; and

Whereas, Madison Gigabit Internet, Inc. (MGI) has proposed a project with the following features that will relieve the situation in several parts of the County:

- Two main tower-mounted transmission antennae that will communicate between Blakey Ridge and Hyde's office in downtown Madison.

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- Distribution antennae on smaller poles or towers that will communicate between the Blakey tower and serve approximately 300 users in a 1+/- mile radius in the Wolftown, Criglersville, Rochelle and Brightwood communities.
- Up to 80% funding of capital costs by the Virginia Department of Housing and Community Development's Virginia Telecommunication Initiative (VATI) program; Mr. Hyde would provide any other required cash, and County staff time spent on the project would be offered as part of the "match" requirement.
- Project administration by the Rappahannock-Rapidan Regional Commission.
- A series of contracts and other paperwork developed and approved by the Board if the grant monies are approved to the effect that the County would be a pass-through agent for the funding; and.

Whereas, the project was presented as a public private partnership as required by the funding program with the understanding that MGI would be taking all of the risk of the projects success or failure, the County would not be liable for anything, and his project has lower priority than many other issues currently before the County, Now, Therefore, Be It Resolved that the Madison County Board of Supervisors supports the project and authorizes the County Administrator to participate in filing the funding application with the understanding that any contracts must be processed through the County Attorney's office prior and approved by the Board prior to signature and that budget amendments must be approved prior to the expenditure of any funds supporting the project; and.

Be it Further Resolved that, if the funding is approved, the Madison County Board of Supervisors agrees to enter into a an appropriate contractual relationship articulating the above with Madison Gigabit Internet, Inc. that holds Madison County and its agents harmless, conveys all assets to Madison Gigabit Internet, Inc. as allowed by the funding agency; and

Be it Further Resolved that Madison County agrees to provide an in-kind contribution of to \$5,000 in staff time and other non-financial support for the project.

15. Project Budget and Cost Appropriateness

Applicants shall provide a detailed budget as to how the grant funds will be utilized, including an itemization of equipment and construction costs and a justification of proposed expenses. Expenses should substantiated by clear cost estimates.

Answer:

Grant funds will be used to buy one 24 GHz antenna for the ground station, one matching antenna for the Blakey REC tower repeater node, and to construct four 75-foot end-point towers at Wolftown, Rochelle, Brightwood, and Criglersville.

Each tower cost is \$2000 for the components, construction cost is \$14000 (includes digging, rebar, concrete, labor), management overhead is \$1000. Total is \$17000.

All other costs will be born by the applicant partnership: \$24000 for middle-mile antennas, \$8000 for last-mile antennas on the four towers, \$200/home for CPE, and all other costs.

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16. 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. Finally, the three component scores are averaged together and converted to a 30 point scale to form a composite score.

Answer:

Total cost for the project is \$131,000.

Grant/state share of the total cost is \$80000, 61%.

Applicant share is \$51000 for known costs, and whatever incidentals occur during execution, plus the cost of CPE, estimated at \$200 per customer, which could reach \$40,000. Total is 39%.

The initial service speed will be 100 megabits incoming and outgoing, minus whatever loss occurs in the intermediate repeater points. We will be using antennas capable of speeds greater than that, so that the limiting is the incoming fiber. When possible, we will increase the incoming fiber speed (it is a configurable setting on the fiber vendor's side). Our target is to ultimately have gigabit service incoming, and direct to homes.

If the state's cost is \$17000 each for four towers, plus \$6000 for the backhaul antennas and \$5000 admin, and we average 75 customers per tower (total 300), the state portion of cost per customer is \$267.

17. A description of applicant and co-applicant's history or experience with managing grants and constructing broadband communications facilities in the Commonwealth of Virginia and elsewhere.

Answer:

Statement of Experience

In May 2017, CIT executed a survey for Madison County. There were over 1000 responses, with street addresses. The essence of the results were that most of the people in Madison want better service than whatever they may have, if indeed they have service at all.

Excerpts from the final report are used in this proposal. This report is available on the Madison County website at:

https://www.madisonco.virginia.gov/sites/default/files/fileattachments/economic_development/page/2797/broadband_-_madison_survey_analysis_27june2017_by_cit.pdf

In 2009, there had been a previous survey conducted by CIT in Madison, on a far smaller basis, receiving only 100 responses. Reading that final report you notice two things: half the responses came from where people were still using dialup, and the same %s of responses said "we want better". In addition, the written comments were nearly identical: "expand my business", "sell my house", "schoolwork", etc. No further action arose out of the 2009 survey.

Madison Gigabit Internet

Following the 2017 survey report from CIT, Mr Clint Hyde realized that the need and desire in Madison was greater than had been previously understand, and that it was time to move forward. He immediately began the project, and incorporated Madison Gigabit Internet early in 2018 to tackle the project.

Clint Hyde has been in the computing world since 1976. He has designed, coded, and built various medium-sized distributed software systems over the years, primarily for DARPA and US military services.

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Madison Gigabit Internet is currently providing 100 megabit service in the Town of Madison, since May 2018. There are currently 10 customers today, with two additional pending in town, and others being scouted. This entrepreneurial company's Facebook "friends" list and website registration has hundreds more who are waiting.

Rappahannock-Rapidan Regional Commission

The Rappahannock-Rapidan Regional Commission (RRRC) is one of 21 Planning District Commissions in Virginia. RRRC has provided grant management for both local and regional projects and programs for more than 40 years, including federal and state grants administered by the Department of Housing and Community Development and other Virginia state government agencies. Staff that will be assigned to this project have more than 30 years' combined experience at RRRC in project administration, grant financial management and reporting.

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Tracey Gardner, has many years of service in the community and has been on multiple project management teams that achieved tourism promotion and community development/streetscape improvements.

Jack Hobbs, has extensive experience in municipal engineering, planning and management and direct project management experience in numerous grants and loan-financed public sector projects.

18. Service

Describe the Internet service offerings to be provided after completion of this project and your price structure for these services. The service offerings should include all relevant tiers.

Answer:

Service Offering

There are two possible pricing models:

1) Price by byte. This is a consumption-based model, the version for "data plans", where you are paying \$X per month for Y gigabytes of data. This model is often used by ISPs that have their own data limitations. People generally despise this model, fearing the cost of accidentally/unexpectedly going "over the cap", or getting "throttled" down to dialup speed. 1. The "overage" outcome is one of two things: (a) pay more, which is often quite expensive, or (b) speed throttled down to nearly useless. Anecdotal evidence is that both are hated. 2) Flat rate. This is an access-based model, which is like taxes that pay for roads—you pay the amount, and you drive as much as you need (the traffic model that is consumption-based is toll roads; no one likes toll roads). Typically it is also associated with a speed: \$50 per month for 50 megabit service.

MGI uses the second model, a flat rate. MGI's incoming service has no data limit, and is gigabit-capable immediately. MGI's service price is \$75 per month, flat rate, with no initial hookup fess, or long term contracts. Our experience is that the wireless hardware we use today (Ubiquiti, <http://www.ubnt.com/>) is capable of symmetric 100-megabit speed, which makes for a very fast and pleasant experience online. We do not expect more than that from the wireless approach; the incoming service line can provide gigabit speed, and the eventual fiber installations will handle far more than that.

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19. Additional Information

Any other equitable factor that the applicant desires to include.

Answer:

Images/pictures are all in the full proposal, as well as several subset documents also included as attachments.

The full written proposal is attached here in addition to the required attachments, because it tells the story better with the images inline where they should go.

Madison Gigabit Internet has only been in business since February 2018, so there is only one FCC 477 to include here, the mid-year data supplied once the experimental service was begun.

A separate Program Management Plan attachment is included.

Attachments:

(Optional) || Competition-Detail-Maps

CompetitiondetailmapsSM1213201864842.pdf

Derivation of Cost (Project Budget)

DerivationofCostsWorksheet1212201825046.xls

Project Management Plan

VATIProjectManagementPlan1213201821829.xls

Supporting documentation for costs estimates

121318TowerInstallationProposal1213201853101.pdf

Map(s) of project area, including proposed infrastructure

ProjectareamapsSM1213201842021.pdf

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Map(s) or schematic of existing broadband providers (inventory of existing assets)

FCC477providerdatapng1212201813437.pdf

Documentation of relationship between applicant and co-applicant (formal or informal)

BroadbandProjectmotionapproved1812111214201842852.pdf

Two most recent Form 477 submitted to FCC

FCC477lists1212201883154.xls

Documentation for in-kind contributions, including value(s)

Inkindcontribution1212201832802v21214201842537.pdf

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

Vendorcosts1212201835048.pdf

Documentation of source of match funding

Matchfundingsource1212201813612.pdf

Documentation that proposed project area is unserved based on VATI criteria

Underservedareas21212201815001.pdf

Documentation that proposed project area is not designated for Connect America Funding (CAF)

CAF2mappng1212201813455.pdf

Funding Sources Table

VATIFundingSourcesTable9242018933231212201825651.pdf

(Optional) || Full proposal

VATI2019ProposalSM1213201861728.pdf

(Optional) || Program Management Plan

ManagementPlan1213201821746.pdf

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Notes:

The attachment for FCC form 477 is a spreadsheet. 477 has two components, Deployment and Subscription. They are on two different name-labeled tabs in the spreadsheet. The "Full Proposal" attachment is the entire proposal written as a single document. It is included here because the overall story flows better. The content has been cut into appropriate pieces for the 19 questions. The document was condensed into a couple smaller pieces consisting of images only, separated to match the 19 questions.