

Alabama Broadband Accessibility Fund
2020 Round One Grant Application and Guide



broadband.fund@adeca.alabama.gov

Street Address: 401 Adams Avenue, Suite 560
Montgomery, Alabama 36104-4325

Mailing Address: Post Office Box 5690
Montgomery, Alabama 36103-5690

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2020 Grant Application Guidelines

An application workshop will be held at 10:00 a.m. on Tuesday, October 1, 2019 in the Alabama Center for Commerce 7th floor Auditorium. Seating is limited; therefore, all attendees must register by calling (334) 242-5292 or emailing broadband.fund@adeca.alabama.gov. An online version of the workshop and questions and answers from the workshop will be posted on the Alabama Department of Economic and Community Affairs (ADECA) website after the workshop, at <http://adeca.alabama.gov/broadband>.

Applications shall be submitted in PDF format by email to broadband.fund@adeca.alabama.gov. Applications will be accepted starting on October 1, 2019. Completed applications must be submitted by 11:59 PM, CST, on December 30, 2019. Any applications received after the deadline will not be considered. All applications must be complete; however, ADECA reserves the right to contact applicants for additional information and/or clarifications. All applications received will be posted on ADECA's website at <http://adeca.alabama.gov/broadband>.

Existing service providers shall have from December 31, 2019 through February 11, 2020 to file objections to the eligibility of the proposed projects. All objections must be filed by email to broadband.fund@adeca.alabama.gov and must include verifiable documentation to support the challenge.

An applicant may submit more than one application; however, each project must have a separate application and budget. Each project must stand alone in meeting the Alabama Broadband Accessibility Fund program requirements.

Eligibility

An eligible applicant is a non-government entity that is a cooperative, corporation, limited liability company, partnership, or other private business entity that provides broadband service.

Funding

Projects must be completed within two years of the effective date of the grant agreement. The grant will be in the form of a reimbursement of eligible costs up to the award amount in the grant agreement. Reimbursement will be made within 30 days of project completion and final inspection by ADECA.

All projects will be scored based on the established rating criteria. The criteria can be found at <http://adeca.alabama.gov/broadband>. Those eligible projects receiving the highest scores will be selected for funding. The number of projects funded will be determined by the funds available and the total amount of requests made. ADECA may request amended projects and/or offer reduced grant participation.

ADECA shall ensure that not less than 40 percent of the funds awarded will be awarded to projects serving unincorporated areas. Further, grants awarded for middle mile and anchor institution projects shall not exceed 40 percent of the total funds appropriated for grants on an annual basis.

Individual grant awards will be for projects in unserved areas, and may not exceed the lesser of 35 percent of the project cost, or \$1,500,000 for projects that will be capable of transmitting broadband signals at or above the minimum service threshold.

Definitions

END USER. A residential, business, institutional, or government entity that uses broadband services for its own purposes and does not resell such broadband services to other entities. An internet service provider (ISP) and mobile wireless service provider are not an end user for the purposes of this act.

MIDDLE MILE PROJECT. A broadband infrastructure project that does not provide broadband service to end users or to end-user devices.

MINIMUM SERVICE THRESHOLD. A connection to the Internet that provides capacity for transmission at an average speed per customer of at least 25 megabits (25 Mbps) per second downstream and at least three megabits (3 Mbps) per second upstream.

RURAL AREA. Any area within this state not included within the boundaries of any incorporated city or town having a population in excess of 25,000 inhabitants, according to the last federal census.

UNSERVED AREA. Any rural area in which there is not at least one provider of terrestrial broadband service that is either: (1) offering a connection to the Internet meeting the minimum service threshold; or (2) is required, under the terms of the Federal Universal Service Fund or other federal or state grant, to provide a connection to the Internet at speeds meeting the minimum service threshold by March 28, 2023.

APPLICANTS MUST USE THE FOLLOWING APPLICATION FORMAT, COMPLETE IT IN ITS ENTIRETY, AND LABEL ATTACHMENTS AS INSTRUCTED. FAILURE TO DO SO, MAY RESULT IN A LOSS OF POINTS.

2020 Round One Grant Application

Applicant Information

Project Name: CAEC Zone 2

Legal Name of Entity: Central Alabama Electric Cooperative (CAEC)

Mailing Address: 103 Jesse Samuel Hunt Blvd, Prattville, AL 36066

Name and Title of CEO: Mr. Tom Stackhouse, President/CEO

Name and Title of Contact: Ms. Julie Young, Vice-President, Business & Administrative Services

Phone Number and Email of Contact: 334-782-6552, jyoung@coop.caec.com

Autonomous System Number (ASN): 397976

List Internet Exchange Membership (if any): N/A

PeeringDB entries (www.perringdb.com): Not Peering, have no entries in the database

A. Project Description

This section is worth up to 25 points. Up to an additional 10 bonus points may be available to applicants adequately demonstrating the criteria listed in number 7 below. Points will be awarded based on verifiable information only.

Please complete the project description sections below. Any additional documentation can be included in an attachment file titled Attachment A, Project Description.

1. A discussion of the area served including boundaries, number of households, businesses, and any community anchors (libraries, schools, police and fire stations, hospitals, etc.). This response shall also identify if the project area is located within an unincorporated area and provide information regarding how the area meets the definition of rural (US Census data). Please complete the following table.

Number of Households to be Served	343
Number of Businesses / Industries to be served	38
Number of Community Anchors to be served	1

This project area will serve 343 households, 38 businesses and 1 community anchors (churches). The entire project area is in an unincorporated area. The project area is not included within the boundaries of any incorporated city or town having a population in excess of 25,000 inhabitants,

according to the last federal census. Shape files and two PDF maps are attached depicting the project area. The number of households, businesses and community anchors is determined from CAEC's existing customer database.

2. A discussion of the technology to be deployed (fiber, cable, DSL, etc.). Additionally, include a discussion of future usage projections and the ability to upgrade.

This Last-Mile Broadband network infrastructure proposed in this design will enable CAEC to rapidly connect fiber to homes at a reasonable pricing point and provide a FTTP network capable of providing up to 1Gbps speeds up and down. This network will tie into the network that CAEC is building out, which will provide services for its own needs. This will allow the services to be expanded into the project area with minimal additional equipment as the central office, routers, and backhaul will already be in place.

The advanced broadband services proposed in this application will be delivered on a fiber-based network consisting of both transport and distribution elements. The system will be highly redundant utilizing two redundant dedicated internet access links. These links will also be connected to our data center in a fiber diverse, highly redundant path. The planned network will be connected to the core router by two independent 10 Gbps links. The distribution network will be made up of Passive Optical Network (PON) elements delivered over a FTTP distribution plant. Passive 1 X 32way splitters, and distributed splits will be strategically placed to ensure service is able to be provided to all residents within the project area and allow for future growth. Additional fibers will be available for Active Ethernet distribution if required for any special case customer needs by public or private needs, such as schools, law enforcement, medical, etc.

The Last-Mile subscribers will be served via PON nodes scaled as appropriate to meet subscriber bandwidth demands. These services will specifically be served via a "Gigabit Passive Optical Network" (GPON), which will use passive optical splitters to concurrently deliver signals to multiple users within a cable footage of 20 kilometers (12.4 miles). The design is to use a 1 X 32 split optical ports. This will ensure that each customer will be able to have a reliable and robust broadband

service. The network is designed so that upgrades can be easily accomplished by just changing the electronic equipment or optical cards at the nodes to increase services as demand is increased.

CAEC will have a main site to house the core router switches, middle-mile gear, and the Adtran TA 5004 chassis and cards. We will connect via fiber on a 10G or 100G circuit using the TA 5004 shelves to serve the customers in the project area. This will house the GPON optical port cards that will serve the surrounding area up to 20 kilometers (12.4 miles) of cable distance. (Please note that eligible grant work will only be completed in the mapped project area.) CAEC will be using the Adtran 401 or 411 indoor Optical Network Terminals (ONTs) as the customer interface.

The proposed network that CAEC is designing will have ample capacity with the 10 Gig or 100 Gig fiber links and backhaul to handle the additional load customers. CAEC has been in contact with other co-ops that have built out a similar network and are providing similar service to make sure they have adequate bandwidth. In communication with other providers providing at least 100 Mb of service, they have found that peak demands will be less than 1 Gig for these additional customers. CAEC will monitor bandwidth usage and will take measures to increase as needed if they start reaching peak demands of more than 80%. The services that will be available are broadband and voice (see Table 1 -- Proposed Service Offerings). The technology *is a FTTP GPON architecture. This design can provide up to 2.4 Gbps download and 1.2 Gbps upload per port.* The ONTs will support a 1 Gbps symmetric connection. The project will be capable of providing service to 100% of the households at the offered services. CAEC will be attaching to its existing power poles with existing ROW, and/or utility easements. A map depicting community support for this project is attached and shows the number of people who have already paid the \$25 in this grant zone.

3. A discussion of internet speeds, service tier and pricing levels, data caps, etc.

Table I

Speeds up to:	Price:	Add Ons:	Price:
200 Mbps	\$59.99	In home Wifi	\$5.00
500 Mbps	\$79.99	Phone	\$19.95
1 Gb	\$99.99		

No contracts. No data caps. No expiring promotional rates.

4. A preliminary technical evaluation of the project that is certified by an engineer. The evaluation shall include a project cost estimate, project schedule and timeline to include a completion date of no more than two years, and maps showing the proposed project area. **Maps shall be in .shp, .kml, or .kmz formats.**

Additionally, maps shall clearly show area eligibility (unserved areas and rural areas). Generally, applicants may establish that an area is unserved by using the ADECA Broadband map showing unserved areas (<http://adeca.alabama.gov/broadband>). **Other methodology to document an area is unserved, such as household surveys, may be acceptable, but shall be pre-approved by ADECA.**

Please see attached.

5. A discussion of the operator’s technical and managerial capabilities to complete the project within two years of the effective date of the grant award. Please be aware that grants shall be conditioned on project completion within two years of awarding of the grant. If a recipient fails to complete a project within the two-year deadline due to reasons other than delay caused by a government entity, ADECA may revoke the grant in its entirety

Central Alabama Electric Cooperative (CAEC) has provided decades of service, knowledge and support to the area since 1938. CAEC’s customers are consistently satisfied with our service and rank us a full ten points higher than the national average of the utility industry according to the American Consumer Satisfaction Index. Electrical Service is far from the only thing that CAEC does in the community, however. First, they’ve had a subsidiary, Central Alabama Cooperative Services (CACS), since 2000. It was formed so they could engage in community and economic development activities locally. Secondly, they have extensive experience with Government

contracts. They operate under Government regulations for RUS loans, and have pertinent experience with a 50-year contract with the U.S. Government for the Privatization of the Electrical Distribution Systems at Maxwell Air Force Base (AFB) and Gunter Annex. CAEC has established subsidiaries for related industries, both on its own and in partnership with sister cooperatives and operated them successfully for over a decade. This experience prepared us well for our latest endeavor into rural broadband.

Just as electric cooperatives had to step up and provide the “last mile” electric service to rural and unserved areas eighty years ago, CAEC and other cooperatives nation-wide are stepping up to provide broadband to these same customers. CAEC has completed 5-year pro-forma financial projections for the new broadband business. Take rates are assumed to be at 35% in year one and 65% by year 6 and positive operating margins are realized by year two of service. Broadband is increasingly considered an essential utility, and just as CAEC has provided quality electric service to underserved communities for eighty years, it will also provide quality broadband service for years to come. Electric Cooperatives across the country are stepping in to fill the broadband gap and can be counted on to be sustainable partners.

In 2018, CAEC formed Central Access (CA), a wholly-owned subsidiary Internet Service Provider (ISP) and began advertising for the hiring of one employee for Central Access, the Vice-President. Twenty-five candidates were considered, and Chris Montgomery was selected. Chris began employment in April 2019 and is currently the only employee of Central Access, however CAEC recently advertised for a Network Administrator for CA and received 18 resumes/applications and interviews were held in late December 2019. We do anticipate adding more jobs as needed. CAEC owns the fiber/broadband infrastructure and is thus the applicant. The infrastructure will be leased to CA.

The board, management team, and employees of CAEC are 100% committed to finding the best local employees to undergo training and gain hands-on experience to operate the new broadband service at the appropriate level. CAEC’s in-house expertise will provide immediate

assistance on installation, billing, customer service, outages, accounting and executive management of CA rural broadband.

CAEC has the ability to complete the fiber construction within the grant area(s) well within the 2-year timeframe. Based on our current project, which is to construct 400 miles of mainline fiber and 350 miles of lateral lines, we began the construction project in August 2019 with a completion date of November 2020. As of December 2019, we are on schedule if not a little ahead of schedule having placed 100 miles of mainline fiber and 100 miles of lateral lines. We anticipate a completion date prior to November 2020.

As a utility, we're accustomed to working with the various regulatory agencies and know how to plan for the approval process of permits as we work to complete a project. Additionally, we are predominately utilizing our electric distribution easements to hang the fiber network; therefore, time delays with extending this new infrastructure are avoided. In those cases where we will extend fiber service beyond our system, we will have joint-use agreements in place.

"Central Alabama" is who we are, and our highly recognized and respected brand is well known throughout the project area and will provide instant credibility to the operations and marketing of the broadband service. To the consumers, "Central Alabama" broadband can be trusted to provide high quality, reliable and affordable service to its members and customers.

6. A discussion of the applicant's average pole attachment rates charged to an unaffiliated entity (does not apply to a utility as defined under Section 37-4-1 (7)a).

N/A, CAEC is a utility as defined under Section 37-4-1 (7)a

7. A discussion of the applicant's plan to use vendors and subcontractors that have been certified as a Minority Business Enterprise by the Alabama Minority Business Enterprise program and/or certified by another government entity as being a Disadvantaged Business Enterprise.

N/A

- 8. A discussion of Middle Mile Projects (if applicable). The applicant shall demonstrate that the project will connect other service providers eligible for grants under this section with broadband infrastructure further upstream in order to enable such providers to offer broadband service to end users; provided that eligible projects under this subdivision may include projects in (i) an unserved area or (ii) a rural area that does not meet the definition of an unserved area but otherwise meets the requirements of this section, for which the grant applicant demonstrates, by specific evidence, the need for greater broadband speeds, capacity, or service which is not being offered by an existing service provider.**

N/A

- 9. A discussion of hospital, public school, public safety, or economic development projects that do not meet the definition of unserved area, but otherwise meets the requirements of the program (if applicable). The applicant must demonstrate by specific evidence, the need for greater broadband speeds, capacity, or service which is not being offered by an existing service provider.**

N/A

B. Application Budget

This section is worth up to 25 points. Points will be awarded based on verifiable information only.

For the table, please complete the shaded boxes. The unshaded boxes will populate automatically. If you are unable to use the formulas in the table, use the following formulas to calculate the percentages: i) 65 percent of total project cost is calculated by multiplying the total project cost by .65, ii) 35 percent of total project cost is calculated by multiplying the total project cost by .35. The total grant amount cannot exceed the lesser of 35 percent of total project costs, or \$1,500,000. If federal funds are involved in the project, please see number 4 below.

Total Project Cost	\$826,000.00
65% of Total Project Cost (minimum match)	\$536,900.00
35% of Total Project Cost (grant maximum)	\$289,100.00
Total Grant Amount Requested (not to exceed \$1.5 million)	\$289,100.00

Please complete the project budget sections below. Any additional documentation can be included in an attachment file titled Attachment B, Project Budget.

1. Itemize eligible project expenses. Generally, eligible expenses will be limited to construction and construction related costs of broadband infrastructure. Operating expenses will not be eligible expenses. Any additional expenses associated with the project, but not part of the grant budget, should be included.

Budget Item	Total Cost	Grant	Match
Engineering/Design	\$ 54,988.28	\$ 19,245.90	\$ 35,742.38
Materials	\$ 242,619.82	\$ 84,916.94	\$ 157,702.88
Labor	\$ 460,486.07	\$ 161,170.13	\$ 299,315.95
Construction/Installation	\$ 0	\$ 0	\$ 0
Other (please specify)	\$ 67,905.83	\$ 23,767.04	\$ 44,138.79
Total	\$ 826,000.00	\$ 289,100.00	\$ 536,900.00

2. A discussion of the applicant's necessary financial resources to:
 - a. sustain service to the project area (business model); and

With the help of a consultant, CAEC designed a rate structure that, along with debt financing already provided for, will sustain service to the project area. Debt financing for capital costs is provided by FFB (Federal Financing Bank) backed by RUS (Rural Utilities Service). Since this

project is for the use and benefit of CAEC's members, the majority of operational expenses will be covered by systems (billing, payment, accounting, finance, utility poles, etc.) and staff (customer service, finance, accounting, operations and maintenance) that are already in place. CAEC is hiring a network administrator for the ISP and did hire an ISP Manager. We do anticipate adding more jobs as needed, and therefore except for capital costs for fiber and components, there will be a minimal increase in operating expenses.

- b. provide adequate project financing (additional documentation may be requested by ADECA).

Since the use of the fiber system will be to provide additional services to our members, debt will be borne by the cooperative. As a cooperative, we have the benefit of working with loan vendors that tailor to our specific needs at lower rates than traditional financing institutions. With the initial project, we currently have an approved loan for \$20,000,000 with National Rural Utilities Cooperative Finance Corporation. We will seek additional funding as needed when additional projects are approved by the board. This project has already been approved by the board and we are attempting to secure as much grant funding as possible so that we can provide more broadband to more members.

3. A discussion of any partners or subcontractors associated with the project's deliverables including but not limited to adoption, deployment, and service delivery. Please describe each party's role in the project.

Partners and subcontractors already associated with the project's deliverables include engineering and design contractor Fiber Rise, and installation contractor Heritage. Adoption and service delivery will be provided by CAEC's wholly-owned ISP subsidiary, Central Access (CA). CAEC will own and maintain the entire broadband infrastructure and will utilize a portion for its own purpose and use while Central Access will lease the remaining portion at a competitive rate on an as-needed basis for retail.

4. A discussion of any federal funds associated with the project. Please explain if the following provisions apply to your project.

N/A

- a. Projects to serve unserved areas in which the grant applicant is either or both: (i) an existing or future service provider which has or will receive support through federal universal service funding programs designed specifically to encourage broadband deployment in an area without broadband access; or (ii) an existing or future service provider which has or will receive other forms of federal or state financial support or assistance, such as a grant or loan from the United States Department of Agriculture.**

N/A

- b. Any award of state funds under this act, when combined with other forms of state or federal support or assistance dedicated to the project, other than interest—bearing loans, may not exceed 60 percent of the total project costs.**

N/A

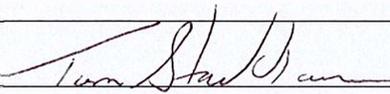
C. Other Program Priorities

Please answer each of the following questions either “yes” or “no.” For each “yes” answer, please provide a brief narrative and any supporting documentation in an attachment labeled Attachment C, Other Program Priorities. Any claims that cannot be verified will receive zero points in our scoring system. “No” answers will receive zero points in our scoring system. **“Yes” answers (that can be verified) will receive up to 10 points.**

- | | | | |
|---|--|---|--|
| Does this project seek to leverage grant funds through private investment? | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Will this project be an extension of existing infrastructure? | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Does project serve locations with demonstrated community support? | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Will this project serve the highest number of unserved homes, businesses, and community anchor points for the least cost? | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Does this project emphasize the highest broadband speeds? | YES
<input checked="" type="checkbox"/> | NO
<input type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Will this project provide material broadband enhancements to hospitals located in rural areas? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Will this project support local libraries in this state for the purpose of assisting the libraries in offering digital literacy training pursuant to state library and archive guidelines? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |
| Is the applicant a certified Minority Business Enterprise under the Alabama Minority Business Enterprise Program? Or is it certified under another Disadvantaged Business Enterprise Program? | YES
<input type="checkbox"/> | NO
<input checked="" type="checkbox"/> | If yes, include an explanation and documentation in a file titled Attachment C |

D. Certifications

1. The applicant certifies that it is a non-governmental entity.
2. The applicant certifies all new customers served as a result of this project will have access to an internet connection that provides a capacity for transmission at an average speed per customer of at least 25 Mbps download and at least 3 Mbps upload.
3. The applicant certifies that all new customers served as a result of this project are not located within the boundaries of any incorporated city or town having a population in excess of 25,000 inhabitants, according to the last federal census.
4. The applicant certifies that it has the technical and managerial capabilities to complete the project within two years of the effective date of the grant agreement.
5. The applicant certifies that the area to be served does not have at least one provider of terrestrial broadband service that is either: (1) offering a connection to the Internet meeting the minimum service threshold; or (2) is required, under the terms of the Federal Universal Service Fund or other federal or state grant, to provide a connection to the Internet at speeds meeting the minimum service threshold by March 28, 2023.

Certification	
I the undersigned am authorized to obligate my entity and enter into agreements for my organization. I understand that the above certifications do not guarantee funding and a grant agreement will be executed prior to project funds being expended. I further understand that if the above statements cannot be verified, no grant funds will be awarded under this program. Finally, to the best of my knowledge the above certifications are true and correct.	
Signature of Applicant: 	Date: 12/16/19
Title of Applicant:	President/CEO

For more information regarding the Alabama Broadband Accessibility Fund, please send questions to Maureen Neighbors at broadband.fund@adeca.alabama.gov, or call (334) 242-5292 between the hours of 8:00 a.m. to 4:00 p.m., Monday through Friday.

Attachment C

Does this project seek to leverage grant funds through private investment?

Yes. We currently have an approved loan for \$20,000,000 with National Rural Utilities Cooperative Finance Corporation.

Will this project be an extension of existing infrastructure?

Yes. Please see attached PDF map titled "infrastructure," where existing broadband infrastructure is shown and it is described how this project will be an extension of this infrastructure.

Does this project serve locations with demonstrated community support?

Yes. Please see attached PDF map titled "community support," which identifies on a map existing CAEC electric customers who either expressed interest in purchasing broadband or expressed interest and paid \$25 towards their first broadband bill as a demonstration of support. The indication on the community support map was a snapshot in time and those numbers have since increased. All customers within the identified zone have the potential to be connected.

Zone 2: 21 electric customers expressed interest in broadband and paid \$25 towards their first broadband bill and 11 additional electric customers expressed interest in broadband.

Will this project serve the highest number of unserved homes, businesses, and community anchor points for the least cost?

Yes. Because CAEC can use its existing poles at no additional cost and use its existing internal infrastructure for billing and customer service, CAEC can serve the highest number of unserved for the least cost.

Does this project emphasize the highest broadband speeds?

Yes. This project will provide 1 Gig up and down with no data caps. *PC Magazine* says that local gigabit internet service providers (ISPs) run by local electrical utilities "are the best hope we all have for seeing major gains in connectivity speed," as the fastest speed provided by an ISP in 2018 was 278.4 megabits per second upload/download.

<https://www.pcmag.com/article/361765/the-fastest-isps-of-2018>

Zone 2

Infrastructure

Existing Build Out Area

144 count fiber line
To be completed mid 2020

By mid 2020 a 144 count fiber will be in place along HWY 14 . High speed internet service is provided to customers that are adjacent to this fiber. Customers in ZONE 2 will be provided access to high speed internet as an extension of CAEC's 144 count fiber.

Chilton

Autauga

Dallas

Selma

Legend

- 144 Fiber Ring
- Fibe Laterals & Drops
- Grant Zone
- Current Build Out Zones
- Lakes & Rivers
- Served
- Unserved
- Incorporated Area

Zone 2

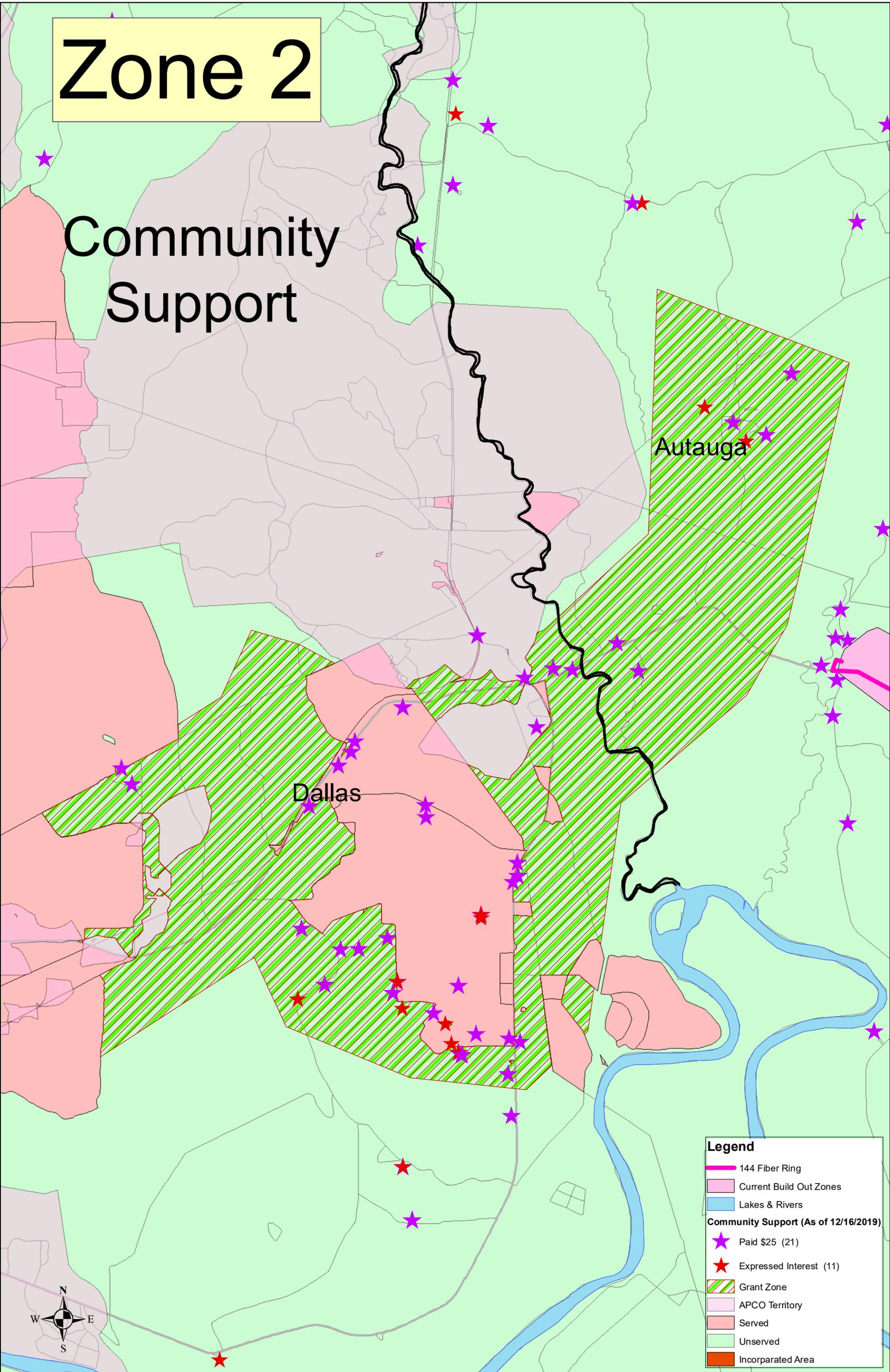
Community Support

Autauga

Dallas

Legend

- 144 Fiber Ring
- Current Build Out Zones
- Lakes & Rivers
- Community Support (As of 12/16/2019)**
 - Paid \$25 (21)
 - Expressed Interest (11)
- Grant Zone
- APCO Territory
- Served
- Unserved
- Incorporated Area





Preliminary Technical Project Evaluation

For

Broadband Projects Zones 1-8

Completed by:

Jimmy Gray, P.E.

Technical Evaluation

The advanced broadband services proposed in this application will be delivered on a fiber-based network consisting of both transport and distribution elements. The system will be highly reliable utilizing two redundant dedicated internet access links. These links will also be connected to our data center in a fiber diverse, highly redundant path. The planned network will be connected to the core router by two independent 10 Gbps links. The distribution network will be made up of Passive Optical Network (PON) elements delivered over a FTTP distribution plant. Passive 1 X 32 way splitters, and distributed splits will be strategically placed to ensure service is able to be provided to all residents within the project area and allow for future growth. Additional fibers will be available for Active Ethernet distribution if required for any special case customer needs by public or private needs, such as schools, law enforcement, medical etc.

The Last-Mile subscribers will be served via PON nodes scaled as appropriate to meet subscriber bandwidth demands. These services will specifically be served via a “Gigabit Passive Optical Network” (GPON), which will use passive optical splitters to concurrently deliver signals to multiple users within a cable footage of 20 kilometers (12.4 miles). The design is to use 1 X 32 split optical ports. This will ensure that each customer will be able to have a reliable and robust broadband service. The network is designed in such a way that upgrades can be easily accomplished by just changing the electronic equipment or optical cards at the nodes to increase services as demand is increased.

System Details

CAEC will have a main central office location. The main site will house the core router switches, middle-mile gear, and the Adtran TA 5004 chassis and cards. We will connect via fiber on a 10G or 100G circuit using the TA 5004 shelves to serve the customers in the PSFA. This will house the GPON optical port cards that will serve the surrounding area up to 20 kilometers (12.4 miles) of cable distance.

Proposed Network

The proposed network that CAEC is designing will have ample capacity with the 10 Gig or 100 Gig fiber links and backhaul to handle the additional load customers. CAEC has been in contact with other co-ops that have built out a similar network and are providing similar service as well as working closely with Fiber-Rise to make sure they have adequate bandwidth. In communication with other providers providing at least 100 Mb of service, they have found that peak demands will be less than 1 Gig for these additional customers. Bandwidth usage will be monitored and measures will be taken to increase as needed if they start reaching peak demands of more than 80%. The only upgrades to the existing network will be two GPON port cards (one at each of the two existing nodes, and the addition of one new node and equipment, transport fiber to the node, and the distribution (last-mile) fiber network. The services that will be available are broadband and voice. The technology is a FTTP GPON architecture. This design is capable of providing up to 2.4 Gbps download and 1.2 Gbps upload per port. The ONTs will support a 1 Gbps symmetric connection.

The design parameters for the PON network will be a maximum cable distance of 20 kilometers (12.4 miles) from the node location to the service location anywhere within the project area. This ensures that every potential customer is within the link budget for number of splices, fiber distance, splits and any pre-connectorized connections. Installation parameters will require that no premise will have an optical power loss greater than -19db. The backhaul is set up at 10 Gbps links. Splitters will be distributed at 28 passings per splitter, which will allow for an additional growth in any portion of the project area. Each splitter port will be capable of providing 2.4 Gbps download and 1.2 Gbps upload. Given that the service will predominately be to residential customers, broadband traffic will follow diurnal patterns with peaks in the late afternoon and evenings. Peak demands are not projecting any interval to exceed 1 Gbps and sustained traffic over 30 minute intervals to fall at or below the 200 – 400 Mbps range. Average bandwidth will be substantially less than 1 Gbps for the project area and will easily be handled by the 10 Gbps transport and backhaul links. Most traffic will be influenced or dominated by OTT video traffic.

Ability to Complete the Project within Two Years:

CAEC has the ability to complete the fiber construction within the grant area(s) well within the 2-year timeframe. Based on our current project, which is to construct 400 miles of mainline fiber and 350 miles of lateral lines, we began the construction project in August 2019 with a completion date of November 2020. As of December 2019, we are on schedule if not a little ahead of schedule having placed 100 miles of mainline fiber and 100 miles of lateral lines. We anticipate a completion date prior to November 2020.

As a utility, we're accustomed to working with the various regulatory agencies and know how to plan for the approval process of permits as we work to complete a project. Additionally, we are predominately utilizing our electric distribution easements to hang the fiber network; therefore, time delays with extending this new infrastructure are avoided. In those cases where we will extend fiber service beyond our system, we have joint-use agreements in place.

Project Timeline:

Engineering and Design: up to 6 months

Includes Design, Permits, & Make Ready required work

Make Ready Work: 2 months

Construction:

Bid construction work (may negotiate with existing contractor)

Begin Construction approximately 9 months after award date

Require 12 month construction timeline based on grants awarded. 6 separate construction crews could build all 8 zones in less than 12 months.

Zone 1: 1 crew 15 weeks to construct

Zone 2: 1 crew 18 weeks to construct

Zone 3: 1 crew 31 weeks to construct

Zone 4: 1 crew 45 weeks to construct

Zone 5: 2 crews 34 weeks to construct

Zone 6: 1 crew 36 weeks to construct

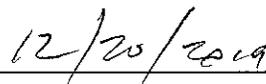
Zone 7: 1 crew 38 weeks to construct

Zone 8: 1 crew 18 weeks to construct

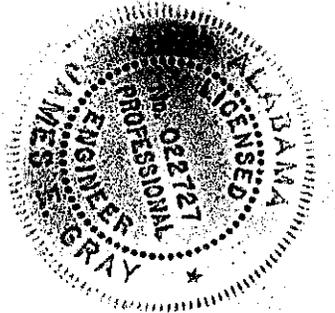
This technical evaluation, project and construction timeline is hereby certified:



Jimmy Gray, PE



Date



Zone 2 Cost Estimate

Zone 2

Budget Item	Total Cost	Grant	Match
Engineering/Design	\$ 54,988.28	\$ 19,245.90	\$ 35,742.38
Materials	\$ 242,619.82	\$ 84,916.94	\$ 157,702.88
Labor	\$ 460,486.07	\$ 161,170.13	\$ 299,315.95
Construction/Installation		\$ -	\$ -
Other (please specify) Make Ready	\$ 67,905.83	\$ 23,767.04	\$ 44,138.79
Total	\$ 826,000.00	\$ 289,100.00	\$ 536,900.00