Last Mile Project Narrative

Project Description and Timeline

Nature of the improvements

The Pinal County Last Mile Project is a partnership between Pinal County, the Pinal County Education Service Agency (Pinal County Schools Superintendent), OneTel, and Zayo Group and proposes to use fixed wireless (CBRS) to deliver broadband service to each home within the county by installing thirty six 60-foot private LTE towers throughout the region. Pinal County recently completed (June 2021) a $34 million 320+ mile state-of-the-art-fiber network to all of our schools and libraries countywide using E-Rate Program funding. This fiber network has excess capacity beyond what is needed by the schools and libraries, themselves, and it is this excess capacity we contemplate using to solve the unmet needs in our residents and businesses by installing these towers to deliver service for the "Last Mile" to businesses, students and residents at their homes or offices. We believe this solution provides the best value for our area, ensures the fastest deployment, and enables a solution for the entire county for the most reasonable financial investment.

From a technical perspective, this system will use a centralized EPC, Core SAS housed at 75 N. Main Street (or other Pinal County data center) in Florence, Arizona. The towers as initially designed have the capacity to serve over 200,000 connections with initial speeds of 25M x 5M assuming maximum utilization. Increasing tower density improves capacity and coverage. The Pinal County Last Mile Project is based on an existing proven partnership and can offer a high confidence level that the project will get done on time and within budget.

Project Background and Analysis

In 2018, Pinal County Education Service Agency and Zayo Group assessed Pinal County to determine the areas of highest need including areas with minimal (underserved) or no (unserved) broadband services. Based on this assessment, 320+ miles of dense fiber infrastructure was installed at all public schools and libraries throughout Pinal County. This infrastructure is owned by Zayo Group. The project was completed in June 2021 and brought broadband capacity to each community including rural areas in Pinal County.

The fiber project served as the starting point to build a dedicated wireless network (CBRS). Furthermore, this middle mile project established the partnerships essential to the success of the Pinal County Last Mile Project. Pinal County proudly partners and serves ten incorporated communities, four tribal communities, and seventeen census designated places within the unincorporated areas of Pinal County. Other valued partners include the twenty-one Pinal County School Districts and the thirteen Pinal County Public Libraries.

Pinal County and its partners seek to deliver broadband internet access equitably to rural Arizona who have either no internet, slow internet, or unaffordable internet. With the fiber network complete and excess capacity

available, there is the potential for building on this infrastructure by installing additional fiber and towers to deliver service for the “Last Mile” to all residents and businesses within Pinal County.

In an increasingly connected world, students and businesses need the benefit of high-speed internet to be successful and like many areas across the country, Arizona’s broadband is unevenly distributed. Robust and affordable internet is critical for the economic vitality of our businesses, the success of our students, and critical to our government and healthcare industries. Unfortunately, rural communities do not have the population density to attract private industry to make the initial investment needed to provide service to end users.

Taking a broader perspective, this project could serve as a model for other counties in Arizona. By building on the E-Rate Program school/library fiber network, Pinal County can deliver the most sensible and affordable solution, demonstrating conscientious stewardship of taxpayer resources. Solutions to rural internet challenges are complex and expensive. This project will leverage multiple partnerships in both the private sector and government providing a systematic and attainable road map for others to follow. Because the fiber has already been installed, Pinal County’s project will serve a larger benefit population through a more cost effective way. Installing direct fiber can be cost prohibitive and benefit fewer households. Whereas, installing towers will provide reliable, fast broadband to everyone.

Pinal County proposes to install these towers on either county-owned facilities, schools, or library property to reduce permitting requirements and eliminate the need for land acquisition. We believe this will reduce schedule risks as well and ensure we can meet an aggressive build schedule. Below are the identified locations for tower installations (specific addresses are included in the appendix of this proposal if you prefer more detail).

[redacted]

As one of our proposed project partnerships, once the towers are installed, Pinal County Education Service Agency will also provide SIM cards through the E-Rate Program to all K-12 students to use on school provided devices as an additional match. The E-Rate program will continue to pay these student costs. For delivery of service to homes and businesses, Pinal County will partner with public companies (last mile providers) who will be able to purchase capacity and sell service to homes and businesses. We have met with multiple providers and have identified multiple partners, including Simply Bits who is currently looking to expand operations into our area. The general public may also access federal subsidies to assist with keeping the cost of broadband low at Affordable Connectivity Program - Universal Service Administrative Company (usac.org).

Pinal County's project establishes a privately-owned LTE cellular network made of multiple components, including radio hardware (both indoors and outdoors), mobile core software, SIM cards and a network orchestration software that can be configured to support an enterprise's specific requirements. In early 2020, the Federal Communications Commission opened up a part of the radio spectrum called Citizens Broadband Radio Service (CBRS) for unlicensed use in the United States. CBRS opened up the opportunity for organizations to privately build and operate their own local LTE networks. With performance (speed and coverage), reliability, control, and security in mind, new technology advances and the Federal Communication Commission's (FCC) decision make additional spectrum available for entities to build and operate their own private LTE or even 5G network to its own specifications.

Private LTE networks use the same technology as commercial public LTE, but without having to pay one of the main mobile operators (Verizon, AT&T, T-Mobile) to use their network. Just like the public LTE network, mobile and cellular devices can connect to the private wireless network. The difference is a private LTE network, can control where the network covers, what devices can connect, which devices have priority over one another, and which applications should be protected with a specific throughput, latency and packet error service level - also known as the SLA (Service Level Agreement). This level of reliability and control is critical for applications that require guaranteed connectivity and performance, such as Internet of Things (IoT)-enabled devices in a factory setting or healthcare facilities where always-on connectivity is a must.

Pinal County's project will provide General Availability Access (GAA) and/or Priority Access License (PAL) lease space on the CBRS spectrum, which guarantees a specific range of cellular spectrum. This allocated space is where the private LTE signals may broadcast through. Access to the CBRS spectrum is a key component for organizations looking to utilize private LTE at any level. Utilizing the CBRS spectrum allows organizations to broadcast their own cellular signals without having to rely on third-party cellular providers, or public infrastructure.

The LTE standard allows LTE-enabled cellular devices to connect to the network by transmitting data across various bands of the radio spectrum. One of the primary components of a private LTE network is something called the Evolved Packet Core (EPC). The EPC is the "brains" of the private LTE network. This will be located at 75 N. Main in Florence or at another Pinal County provided data center. EPC operations consist of different components that all work together to help direct, authenticate, and prioritize network traffic.

Private LTE networks also give network administrators more control over data security. For example, the private LTE network can be easily divided to separate guest traffic from HIPAA-compliant networks that handle private health information. Private networks are owned and controlled entirely by a single company that oftentimes partners with a mobile network operator to oversee maintenance, planning, and troubleshooting. Pinal County will have full control and decision making rights for the network with Zayo

serving as the mobile network operator. This investment and design allows for additional scalability in the future to enhance services and add capacity to new areas as growth occurs in the county.

How the proposed project addresses the broadband needs of the area it serves

Problems to be addressed:

1. Many parts of Pinal County do not have adequate internet service.
2. Remote student learning has increased as a result of the pandemic.
3. Remote working has increased as a result of the pandemic.
4. Local businesses require reliable internet access
5. Local governments need reliable internet access with high capacity. This includes government services such as fire districts and libraries.
6. Telemedicine needs have increased as a result of the pandemic.
7. Economic development requires infrastructure to attract and retain businesses.

Pinal County chose to install towers as their last mile project over fiber because LTE (Long Term Evolution) is a connectivity method used to connect to the mobile network. Faster than 3G, the connection provides reliable service and faster speeds. LTE provides greater bandwidth, allowing increased data to be carried faster between provider and the LTE device being used. LTE, is IP-based and able to maintain data and voice/SMS on the same network with around 20Mbps of download speed.

LTE, with an LTE-enabled Mi-Fi router, can make LTE mobile and use data in areas that have LTE coverage. LTE has wider coverage because LTE is not based on a fixed line. LTE is less expensive than fiber to access and to install.

For most organizations, Wi-Fi is the norm. That's true today and will likely be true going forward. However, private LTE networks provide new options and enable new applications where Wi-Fi struggles to provide significant reliability, performance, security, capacity, and coverage. This is because Wi-Fi networks also tend to be congested with data traffic from guests and other applications. There are other types of networks available, including fiber networks, Ethernet, and even other wireless options like satellite and fixed wireless. However, most of these options are expensive and have issues one way or another that made them impractical for most applications.

Benefits of Private LTE include:

- Customization: design, architect, and optimize your private LTE network to your enterprise's specific needs. Designs can be tailored to specific objectives optimizing uptime through ultra-fast 5G IoT connectivity.
- Security: keep sensitive information and confidential data on the internal network instead of an outside network. This helps protect data by default through SIM authentication and allow for HIPAA/PCI compliant networks.
- Reliability: optimize for low latency and a level of reliability where Wi-Fi can't compete. Commercial LTE may have higher speeds, but it lacks the ability to have custom SLAs or filters to be applied.

- Capacity: expand capacity beyond what Wi-Fi could offer. Capacity can be customized based on objective. For example, designing private LTE for a baseball stadium would use different hardware than a private LTE deployment for a factory floor.
- Coverage: for large buildings and campuses, Wi-Fi lacks the power output needed to cover large spaces effectively and has challenges handling outdoor connectivity. Private LTE and 5G tend to offer SLA based wireless, interference free operation, and wider coverage than Wi-Fi on a per radio basis, especially outdoors. This is critical for enterprises with high performance requirements, mission-critical communications, or large spaces (like a building, complex, or campus).

Number of community anchor institutions served

There are an estimated 550 businesses and 57+ anchor institutions within the service coverage areas. All anchor institutions are fiber connected.

Number of households served

All Pinal County household, estimated over 141,000, will have equal access to low price broadband. (https://www.census.gov/quickfacts/fact/table/pinalcountyarizona,US/PST045219). Additionally, Pinal County Education Service Agency will provide up to 4,000 SIMS cards to all K-12 students to access the wireless network for free through E-rate program funding as part of this partnership..

Total population served

The project will install towers throughout Pinal County serving over 425,000 residents. (https://www.census.gov/quickfacts/fact/table/pinalcountyarizona,US/PST045219).

Anticipated economic development benefit achieved by construction of improvements

Significant economic development is built on the backbone of state of the art infrastructure. The proposed new network in Pinal County will enable large corporations and companies access to their other infrastructure investments to seamlessly integrate. New businesses are able to seamless connect to critical technology ecosystems including AWS, Azure (Microsoft), or Google.

Economic Development potential, as a result of this project, includes data centers, autonomous vehicle testing, and large enterprise. Pinal County has a growing economy including large private corporations such as Lucid Motors and Nikola. The Pinal County Last Mile Project will enable these existing corporations to have reliable access to the broadband capacity while attracting other private sector businesses.

Data centers such as Facebook, Amazon, Apple, and other large web-based companies require large geo-diverse data centers to deliver services to users. Large tracts of available land and competitive power pricing make areas like Pinal County desirable for this large scale type of investment if fiber connectivity is available.

Autonomous Vehicles Testing companies, similar to data centers, require robust connectivity both from a fiber and wireless perspective. Pinal County is a prime area for autonomous vehicle companies to invest because of available land, fiber infrastructure, and business friendly environment.

Large enterprise whether retail, manufacturing, construction or other verticals, have significant IT infrastructure in the major data center hubs (Bay Area, NYC, Atlanta, Seattle). Our recently installed fiber network provides seamless connectivity back to those locations making Pinal County an obvious choice for operations expansion.

Because of the robust nature of this network, Pinal County is in a unique position to augment connectivity capabilities by taking advantage of available CBRS spectrum to add a highly cost effective and robust wireless network. This network will enable businesses, non-profits, and educational entities to wirelessly connect at 50-100M speeds at or below current expenditures.

Private LTE is preferred and used by many types of industries including: Logistics & Warehousing, Supply Chain, K-12 Education, Smart Cities & Counties, Hospitals & Clinics, Colleges & Universities, Hotels & Event Venues, Stadiums & Arenas, Amusement & Theme Parks, Offices & Workplaces, Public Safety, Railroads, Buses, & Public Transportation, Airports & Airfields, Shipyards, Mines, Oil & Gas Fields, Manufacturing, Retail, Farming & Agriculture, Rural & Remote Areas. This illustrates the benefits and economic potential for Pinal County with access to a Private LTE network

Total mile of fiber installed/Location of new fiber (if applicable)

Over the past four years, Pinal County Education Service Agency and Zayo Group partnered to construct a [redacted]. This project was completed in June 2021 on time and on budget to provide fiber connectivity on a 100G internet backbone. This fiber project brought significant capacity to the public schools and public libraries throughout Pinal County. Due to the success and magnitude of the project, local municipalities and their residents, non-profits, colleges, businesses, and health organizations are looking to benefit from 10x+ speed enhancements at a fraction of current costs. This network was built for data intensive applications such as supporting multiple service provider partners in delivering internet to homes for rural communities. The fiber project was funded through the E-Rate program as a starting point to build a dedicated wireless network (CBRS). The proposed project will work with this existing infrastructure to complete the last mile and provide Pinal County residents with reliable broadband service. The project will include 67 new miles of last mile fiber to service the towers.

Commitment to operate and maintain the network for a minimum of five years after project completion.

Zayo Group is a private corporation established in 2007. "Zayo is the leading provider of infrastructure, with dense, high-quality networks in every major market in North America and many in Western Europe. Through partnerships with leading network providers, we provide our customers with global reach that takes them nearly anywhere they need to be. Our diverse lit and dark fiber networks provide critical connections to thousands of data centers, cloud providers, commercial and entertainment centers in more than 400 markets. And we're expanding all the time – providing mission-critical routes for customers, more density, diversity, latency and turnkey mobile infrastructure, laying the foundation for our 5G future." (https://www.zayo.com/about). Zayo is a committed partner who owns the fiber feeding the towers. Pinal County will contract with Zayo to maintain and service the Pinal County owned towers constructed with this investment. Both Pinal County and Zayo Group are committed to maintaining this infrastructure.

Party who will perform the infrastructure construction

Pinal County is required to conduct all procurement processes for the construction of the towers following federal, state, and local requirements and laws. Because the fiber feeding the towers is owned by Zayo Group, Pinal County has reviewed our requirements and believes this build will qualify for a sole source procurement and will use Zayo Group to design, construct, and maintain the towers along with their fiber infrastructure.

Intended uses of the funds regarding construction and/or planning

The support requested through the Arizona Commerce Authority FY2022 Arizona Broadband Development Grant will go towards the design and construction costs of the towers and fiber.

Section 1.4 applicability

- Provide broadband service to unserved and underserved areas actively providing speeds of 100/100 – Towers will be installed throughout Pinal County in unserved and underserved areas. These towers will provide initial speeds of 25M x 5M.
- Increase existing speeds to 100/100 at lower costs than urban areas – PCESA will provide free SIM cards to all K-12 students. Installing towers over direct fiber means the project will cost less overall. Therefore, the end user will not be taxed with high rates in order to recoup or make the project financially feasible. Subsidies are available for residents of lower incomes.
- Provide middle mile redundancy – Installing towers in addition to Pinal County's Middle Mile project which included installing fiber to the schools and libraries throughout Pinal County provides the redundancy to ensure access to high speed broadband.
- Leverage funds – Pinal County Education Service Agency will provide E-Rate funds in support of this project. See the attached letter of commitment. The Pinal County Board of Supervisors have also [redacted] of the county's American Rescue Plan Act State and Local Fiscal Recovery Funds towards the project. This was formalized during the January 19, 2022 Board of Supervisors meeting by a unanimous vote of approval.
- Execute agreement within 60 days – Pinal County is confident we will execute an agreement with the Arizona Commerce Authority within 60 days of award. The Pinal County Board of Supervisors is in full support of this project and meets several times per month allowing flexibility for obtaining formal approval of an agreement.

Timeline

[redacted]

Cash match including timing, use of match, source, and nature of commitment

Pinal County and the project team are deeply committed to this project. The Pinal County Board of Supervisors has [redacted] of the county's American Rescue Plan Act State and Local Fiscal

Recovery Funds for the project. This commitment was formalized during the January 19, 2022 Board of Supervisors meeting by a unanimous vote and these funds are available now to serve as matching funds for our request. Additionally, the Pinal County Education Service Agency will provide E-Rate funds to support the project and a letter of commitment is attached.

Why would this project not proceed without the ACA funding?

Like most governmental agencies, Pinal County has limited resources. ACA funding gives us the opportunity for a complete robust county-wide solution within a year and offers the advantage of savings through economies of scale. Without ACA funding, adequate internet services would be provided on a phased or ad hoc basis as private providers expanded their infrastructure over the course of the next decade, with many less-dense and geographically difficult areas left behind.

This project is the result of years of planning and analysis and is critical to our businesses and residents as evidenced by the support letters sent from the cities and towns of Apache Junction, Casa Grande, Eloy, Florence, Maricopa, and Queen Creek. It is also supported by the Pinal Partnership (a collaborative association of our business leaders) and the Pinal County Library District.

Type	Project	Applicant	GEOID
Rural	Pinal County	Pinal County - Zayo	04021000201
Rural	Pinal County	Pinal County - Zayo	04021000204
Rural	Pinal County	Pinal County - Zayo	04021000205
Rural	Pinal County	Pinal County - Zayo	04021000206
Rural	Pinal County	Pinal County - Zayo	04021000207
Rural	Pinal County	Pinal County - Zayo	04021000208
Rural	Pinal County	Pinal County - Zayo	04021000209
Rural	Pinal County	Pinal County - Zayo	04021000210
Rural	Pinal County	Pinal County - Zayo	04021000211
Rural	Pinal County	Pinal County - Zayo	04021000212
Rural	Pinal County	Pinal County - Zayo	04021000213
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