Ubiquitous Rural Broadband in support of AgTech implementation for Climate Adaptive Agriculture

Section 1: Program Description and Scope of Work:

Section 1a: *Ubiquitous Rural Broadband in support of AgTech implementation for Climate Adaptive Agriculture,* led by the Greater Yuma Economic Development Corporation, is partnering with the City of Tucson as part of the Southern Arizona Coalition for Climate Adaptation and Resilience.

Yuma County is building a county-wide middle-mile fiber network to incentivize commercial high-speed broadband service in rural underserved areas, with a projected completion date in summer 2023. However, service based on that network will not cover remote areas such as farm fields, areas with low-density housing, and indigenous residents. Without ubiquitous broadband service, including wireless broadband that covers all arable acres, the futuristic Agricultural Technology (AgTech) needed for climate-adaptive agriculture cannot be developed or implemented in Yuma County. There are approximately 230,000 acres of arable land throughout Yuma County and neighboring communities. Providing infrastructure for rural broadband service to farm acreage that may only have drones or other automated equipment passing through occasionally means no positive Return on Investment (ROI) for commercial internet service providers. Without that ROI, commercial internet providers are not attracted to provide the services needed, and AgTech will not be able to be utilized for Smart Ag and the *Future of Farming Hub* component to deliver the benefits required for climate adaptive agriculture. Funding will support the construction of approximately 16 fixed wireless towers (final number will be based on what is needed to accomplish full coverage) and their connection to power and the county-owned equal-access middle mile fiber network, in order to provide wireless broadband service throughout rural Yuma County's Ag production areas.

Section 1b: This project will provide equitable access to ubiquitous rural broadband in highly productive agricultural and remote areas of Yuma County, providing support for AgTech to fight the ongoing effects of climate change and equitable access to traditionally underserved populations, remote housing, and indigenous populations.

Key Milestones and Tasks:
Year 1: Through an RFP process, design and construction partners will be chosen. Working with six area irrigation districts over a six-month period, designated right-of-way will be selected and prepared for construction, for approximately 16 towers. All required materials will be ordered. Conversations will be ongoing with potential service providers, ensuring service access as quickly as possible post-construction.
Year 2: Working with selected construction partners over a 2-year period, approximately 16 towers will be constructed in six irrigation districts in Yuma County. Construction will be concurrent with county-wide middle-mile construction, projected for completion in June 2023.
Year 3: Construction is projected for completion by the end of Year 3, including connection to the county-wide middle-mile backbone.

Years 4+: Work with Yuma County, who will lease capacity and provide wireless service to end users in support of AgTech development and implementation plus broadband service to un- and under-served homes and businesses in rural Yuma County and tribal nations.

Deliverables: Once completed, ubiquitous rural broadband will be accessible in all agricultural production areas of Yuma County, create a myriad of opportunities for the Coalition, and provide translational research and development that allows more than 450 farms in the area to develop and utilize AgTech such as remote sensors, drones and automated harvesting equipment to fight the effects of climate change. In addition, it will be available to traditionally underserved populations, creating access to telemedicine, education, and more.

Section 2: Regional Industry Assets and Needs:

Section 2a: The *Ubiquitous Rural Broadband in support of AgTech implementation for Climate Adaptive Agriculture* primary service area is Yuma County, FIPS 04027, as well as secondary service areas of San Luis, Somerton, AZ, and the Town of Wellton, AZ. Congressional Districts: AZ-004 and AZ-003. Yuma County encompasses 5,514 square miles of land, with a total population of 213,787 (Chmura/JobsEQ). The regional economy is supported through agriculture, military and government services, healthcare, retail services, professional services, food processing, and industrial manufacturing. These major industries make up a $7.8 billion GDP, with agriculture accounting for by far the largest share. Even though Yuma County is in the middle of a desert, agricultural production is a $3.2B industry with 230,000 acres of farmland. Approximately 90% of all leafy green vegetables in the U.S are grown in Yuma County, making it the leading wintertime producer of fresh produce in North America. Yuma County also battles one of the nation's ongoing highest unemployment rates at 11.1% (U.S. Department of Labor).

By utilizing AgTech such as remote sensors, drones, AI and automation in the service of climate adaptive agriculture, for example successful drone pollination of Medjool date trees, the use of drones to monitor water delivery for irrigation plus many more existing and undiscovered technologies, Yuma County agriculture can thrive and lead the way for Southern Arizona to be a national model of sustainable and productive agriculture in the face of climate change. Successful implementation of AgTech will allow for increased food production with highly efficient water usage, in a critical year-round production area for North America's food supply.

Section 2b: Yuma County's CEDS prioritizes adequate infrastructure to accommodate economic development and growth, including internet infrastructure, to improve and expand economic opportunities for agriculture, specifically the use of new, more effective, and more productive technology in agricultural production and processing. This aligns with the Ubiquitous Yuma Broadband project, which will build the infrastructure to provide broadband service throughout the Ag production acreage of Yuma County, including remote areas of the Cities of Yuma, San Luis and Somerton, the Town of Wellton, and bordering tribal communities that otherwise would not be served.

The CEDS also prioritizes a Revolving Loan Fund proposed by the Coalition that is designed to serve the 63.8% Hispanic population and the 19.4 % living below poverty. New AgTech

Research and Development coupled with the ability to attract high growth industries will be enhanced through the Southern Arizona Fund for Economic Resilience, (SAFER) established in Yuma to serve the demography, entrepreneurial opportunities, and next stage AgTech. The Future Farming Hub out of the University of Arizona, will build, expand, and support a research and translational technology ecosystem with a focus on precision field agriculture, water conservation and indoor farming. Project STEALTH is a coalition partnership between Arizona Western College Yuma and Pima Community College. The two institutions will collaborate with employers to co-design programs including micro-pathways that stack into Certificates and Degrees, and continuing education courses that reskill and upskill the agriculture workforce who will be needed for the IoT transition in AgTech.

Section 3: Proposed Solution: Wireless towers will be installed throughout all six Yuma County irrigation districts, connecting to the county-wide middle-mile fiber network. This utilizes existing technology and will be feasible thanks to rights of way in the irrigation districts and fiber connectivity provided by the County's new middle-mile fiber backbone network. Through partnerships with service providers, wireless broadband service would be available to extremely remote and rural areas throughout Yuma County.

Truly ubiquitous broadband service would be transformational for both the implementation of AgTech capabilities such as remote sensing, artificial intelligence, machine learning, and automation as well as residential access to telecommunications, education, and telemedicine in remote areas. The desert agriculture industry can flourish and grow even in times of climate change and water scarcity with tools for early detection of microorganisms ensuring both food safety and crop productivity. A new, more technically savvy and highly paid workforce will be needed, creating an innovative and entrepreneurial ecosystem that will increase economic growth and private investment. Ag workers are being displaced as jobs become more technical and they do not possess the necessary training to be competitive. Ag employment is expected to decrease from 15,345 in 2020 to 14,886 by 2030 (AZ Office of Economic Opportunity). As Yuma County implements broadband and AgTech in the region there will also be a focus on upskilling the local labor force. GYEDC has already received EDA grant funding to advance higher education in Greater Yuma and submitted an application for the Good Jobs Challenge to fulfill Phase 3 of the Yuma Multiversity Campus project designed to reach 2,500 Good Job Wage earners across Yuma and Imperial Counties with a potential of $74 million in increased wages annually.

Yuma County will be setting an example in broadband and Agtech development that can be replicated by other agricultural communities nationwide. The Yuma Center of Excellence for Desert Agriculture and the University of Arizona-led *Regional Future of Farming Hub* will provide translational research that spurs product development around AgTech. The effects will reverberate throughout Southern Arizona, making the region more productive, sustainable, and competitive.

Agriculture is dependent on water from the Colorado River to irrigate crops. Warming, and aridification caused by climate change is already reducing the water flowing in the river, as well as increasing disease and pest pressure. With each additional 1 degree Celsius (1.8 degrees Fahrenheit) of warming, the Colorado River's average flow drops by 9.3%, according to the U.S.

Geological Survey. Efficient and sustainable solutions will be found in AgTech and broadband service throughout Ag production areas.

Ubiquitous Rural Broadband aligns with the EDA's Recovery and Resilience investment priority by building economic resilience and supporting long-term recovery in Yuma County, where agriculture will be severely impacted by climate change. The project also closely aligns with the EDA investment priority of Equity, providing equitable access to wireless broadband for traditionally underserved populations, which make up more than 65% of Yuma County and targeted service areas.

Section 4: Partners and Program Outreach: Yuma County and Greater Yuma EDC are well known for collaboration between public and private entities, foundations, schools and universities. Some of the partners connected to this project are:

Yuma County Government: Yuma County owns the county-wide middle-mile fiber network that will connect the ubiquitous rural broadband network to the larger internet. This connectivity, obviating the need for many miles of fiber construction to connect the towers, provides a large in-kind match to this project.

Municipalities: All Yuma County municipalities (City of Yuma, City of Somerton, City of San Luis and Town of Wellton) are participating in the middle-mile fiber backbone project.

Irrigation/Water districts: All 6 of Yuma County's irrigation/water districts (Wellton-Mohawk, Yuma, Yuma Mesa, North Gila Valley, Unit B and the Yuma County Water Users Association) have agreed to designate right-of-way use for the tower sites as an in-kind match.

Farm Organizations: Farm organization partners include the Yuma County Farm Bureau, part of a membership organization that represents production agriculture throughout the state of Arizona, the Western Growers Association, and the Yuma Fresh Vegetable Association, a membership organization that represents vegetable and melon production in Yuma County. These organizations are committed to sponsor and drive technology to this area, once the infrastructure is in place.

The University of Arizona: UArizona is leading the *Regional Future of Farming Hub* component of the Southern Arizona Build Back Better proposal, which will provide translational AgTech research and technology development utilizing this precision Ag "living lab." The UA Yuma Center of Excellence for Desert Agriculture, a public-private partnership, provides connectivity between top-notch researchers and producer/cooperators in the Ag industry.

The State of Arizona Broadband Office: An active partner for funding and implementation of the county-wide middle-mile fiber network, the State Broadband Director has been a key advisor on both the county middle mile project and this project.

Allo Communications: Allo Communications is a telecommunications company offering fiber telephone, long-distance, broadband, internet, and television to residents and businesses. Allo is contracted to build and operate the county-wide middle-mile fiber network for Yuma County

Dell Technologies: Provides end-to-end solutions and is providing early design advice to this project. If funded, they could be a design/implement consultant to the project.

Paige Wireless: They design, deploy and operate robust, secure broadband networks for mission-critical applications, especially in agriculture. Highly specialized in wireless network requirements, design and implementation for precision agriculture, utilities, municipalities and critical infrastructure. Paige could manage implementation and provide service over the ubiquitous broadband network.

<u>Section 4b:</u> Yuma is a minority-majority county, at almost 64% Hispanic, with more than 19% of residents living below the federal poverty line, 6% more than the state of Arizona. The Fort Yuma-Quechan Indian Tribe (3,200+) and the Cocopah Indian Tribe (1,200+) have almost 40% of tribal members living in poverty. These residents have been unable to access broadband internet service for needs such as remote learning, telemedicine, and virtual work – especially during the COVID-19 pandemic. Ubiquitous wireless broadband service would enhance agricultural operations and provide a lifeline to rural and tribal residents who have been left out of these capabilities.

<u>**Section 5: Measurable Goals and Impacts:**</u>

Goal 1 (EDA Investment Priority: Equity): Increase wireless broadband service access for traditionally underserved and indigenous populations, throughout agricultural, rural, remote, and low-density outlying areas.

Outputs: 52,000+ traditionally underserved populations benefitting from equitable technology accessibility; 15,000+ traditionally underserved populations 18 years of age or younger benefitting from virtual learning in times of health emergencies; 12,000+ traditionally underserved populations without vehicles benefitting from equitable internet access, including telemedicine and telecommunications.

SMART Outcome: By the end of Year 5, Yuma County will advance equity for traditionally underserved populations by demonstrating measurable wage improvements and higher educational outcomes with a goal of a 10-15 % increase in both areas. Increase AgTech access countywide by a minimum of 70%, resulting in the routine use of sophisticated technologies for agriculture and home technologies

Goal 2 (EDA Investment Priority: Recovery & Resilience): Increase use of AgTech to address the ongoing effects of climate change, such as the regional Colorado River drought crisis.

Outputs: Fixed wireless towers installed to provide wireless broadband across Ag production acreage; farms in all 6 Ag irrigation districts receiving broadband access; "living lab" provided for 300 agricultural producers adopting smart water-use and other climate-adaptive technology.

SMART Outcome: By the end of Year 5, over 70% of Yuma County agricultural areas will have access to rural and remote broadband access infrastructure by installing broadband towers capable of providing internet connectivity to mobile apps, drones, sensors and automated equipment that will assist agriculture's climate resilience by monitoring and managing Colorado River water consumption and water distribution facilities.

Goal 3 (EDA Investment Priority: Recovery & Resilience): Increase production of consumable produce through rural and remote AgTech connectivity.

Outputs: Fixed wireless towers installed; 6 agricultural irrigation districts receiving broadband access; 450+ farms benefiting economically from new technology.

SMART Outcome: By the end of Year 5, Yuma County will increase outreach of the county-wide middle-mile fiber network by a minimum of 90% enabling the EDA-funded fixed wireless towers to deliver AgTech connectivity to 230,000 square miles, and more than 450 rural agricultural producers historically impacted by the detrimental effects of climate change on production agriculture.

Section 6: Sustainability Plan: Once the towers are constructed and connected, access to the ubiquitous rural broadband network will be leased to service providers to cover maintenance and ongoing necessary upgrades and expansions. By providing the infrastructure needed, service providers can now lease access to ubiquitous rural broadband in order to provide service to agricultural and remote areas. The communities that will benefit from the ubiquitous rural broadband include Yuma County and the inclusive remote areas of Somerton, the Town of Wellton, and San Luis. The largest potential barrier for the project is cost of access regulated by partner service providers. With equal access for service providers to connect to the network with no capital expenditure, competing providers can step in and provide service if costs become prohibitive to the end users.