PROJECT NARRATIVE

PROJECT DESCRIPTION AND TIMELINE

The Mesa Public Access Broadband initiative is part of a larger scale program spearheaded by the City of Mesa and Sun Corridor Network to provide free public access services to the areas of the City where legacy infrastructure and socio economic factors have led to a disparity in the ability to get online.

In the 1st phase of the program, funded under the American Rescue Plan Act of 2021 State and Local Fiscal Recovery Fund (ARPA SLFRF), the City we demonstrated the viability of the architecture, deploying the same combination of technology to the City Downtown with planned deployments to up to the 10 square miles of southwest Mesa with the most need as documented by multiple sources. (Map i)

This proposal picks up where those projects end, extending coverage out to the areas still in need and covering over 80% of the Mesa census tracts with the most need of these services.

Based on our experience with Phase 1 deployments, a 2-year timeline is reasonable. Given the time bound nature of the grant, the target area was selected to be deliverable in this time span.

- Initial surveys and materials acquisition will take the majority of the first 6 months.
- Streetlight and fiber optic improvements will lay the groundwork for power and connectivity, beginning 3 months before network deployments.
- Installations of devices on poles will proceed at a minimum rate of 20 locations per week per crew. Up to 1040 locations can be deployed per year per crew employed.
- Estimated completion would be 21-24 months from project initiation.

NATURE OF IMPROVEMENTS

The proposed improvements consist of layers of networking infrastructure, built upon a solid existing foundation of the partner networks. These layers consist of the following:

- Sun Corridor Network backbone – Cross connections will be made to Sun Corridor from the City middle-mile fiber at an Internet backbone exchange in Phoenix. This will provide high quality Internet bandwidth, network monitoring, and DDoS protection services.
- City of Mesa fiber optic service – Will be spliced and connected where needed to extend out to the neighborhoods. Fiber travels along the light rail corridor and spreads outward in the city via a network built by Mesa's Innovation and Technology and Transportation Departments over the last 20+ years. (See Map ii)
- City Streetlights - Utilizing the City's streetlight infrastructure, slight improvements and scheduling prioritization will accelerate planned upgrades of streetlights to LED with smart controls. This will offset the electricity used by internet access equipment and provide the 24x7 power needs at the light poles. (See Map iii)

- mmWave Mesh network – The proposed system uses Terragraph technology from Siklu providing a cost-effective 2nd middle-mile infrastructure to extend fiber optic speeds into residential neighborhoods without the cost of digging. A meshing technology provides a secure redundant path for data traffic to get back to multiple points of fiber optic presence.
- Wi-Fi 6 (6e when available) – Providing high-speed wireless connectivity to the whole neighborhood and local businesses using a ubiquitous technology already available via most digital devices including computers, smart phones, and tablets. We estimate widespread availability of Wi-Fi 6e with new radio spectrum options for outdoor deployments will be available later in 2022. It is the project's intention to deploy the technology with the longest useful lifespan at the time of build.
- In Home Routers (Not in this proposal) – providing the ability to extend outdoor Wi-Fi and mmWave signal into homes, where practical. Part of the phase 1 projects and other grant applications pursued by the City and Mesa Public Schools will provide routers and hotspots for use on the network in targeted programs that work with the recipient families. Outreach and programming are being developed with the help of the Digital Equity Institute.

For depiction of system design see Technical Diagram iv

AREAS SERVED AND BENEFITS

The Areas targeted by the proposed project have been selected by the combination of community feedback and national data sources. (Map v)

For the 14 targeted census tract areas, a high rate of poverty and legacy infrastructure result in a potential of over 4000 households needing internet access. NTIA estimates potentially 14,754 people experiencing poverty in the last 12 months. Total population in this area is over 60,000 people. (See Table vi)

With these high rates of poverty, permanent housing addresses needed to connect a commercial terrestrial ISP service are not consistently available. Mesa Public Schools also reported a low response rate to surveys attempting to qualify students for assistance via existing programs.

Community anchor institutions in the proposed area include many campuses of Mesa Public Schools, Mesa Community College, Banner Health, multiple non-profit programs, and an estimated over 100 registered neighborhood communities. (See City of Mesa Registered Neighborhoods Map (arcgis.com))

The zip codes of the potential deployment zones are the home to 3544 businesses. Half of that area is represented by this proposal leading to our estimate of 1700 businesses served. (Reference AZ Geo Employers Having Five or More Employees, Maricopa and Pinal Counties, Arizona, 2020)

For communities lacking historic investment in broadband infrastructure and whose socio-economic factors lead to high rates of poverty, the burdens of working through commercial carriers to find and maintain quality internet access can be untenable. Therefore, we expect that easing this burden will lead to higher rates of achievement and ultimate workforce development through the opportunities that ubiquitous Internet access can bring.

OTHER INFORMATION

Total miles of fiber to be installed: Most new fiber installed for this project will be short runs to splice existing spans. Estimated less than 1 mi

Existing dark fiber to be lit and utilized: Over 100 linear miles

Location of new fiber: underground

Statement of commitment: The City of Mesa and Sun Corridor Networks intend to operate this network for a minimum of five (5) years from the deployment of the final layer Wi-Fi equipment. Our past experience with this type of hardware is an expected Arizona outdoor lifespan of 5-7 years. After that time the Wi-Fi portion of the system will be replaced according to usage during the first 5 years under the City's technology infrastructure lifecycle program. It is also our intent to continue development of the middle-mile infrastructure of fiber city-wide, hopefully making much of the mmWave hardware installed here obsolete in the 5-10 year timeframe.

The party or parties that will perform the infrastructure construction will be bid and/or existing contracts utilized as appropriate.
For phase 1, Koro BAS Inc of Phoenix AZ will be providing the wireless installation service crews under City of Mesa RFP 2022124.
For the downtown phase of the project BPG Technologies, LLC of Tempe AZ performed the fiber splicing under existing contract.
These vendors are provided for example purposes to show that the team applying here has experience and resources at the ready to begin work.

The intended uses of the ABDG Urban funds in respect to the construction or planning: The funds will be used primarily for equipment, installation, and wireless propagation studies to optimize placement of the wireless components.

The specific information required under Section 1.4 (to the extent relevant)
The proposed project will provide within twenty-four (24) months of the award date,

- broadband service to unserved or underserved areas by actively providing speeds of 100/100 to the intended beneficiaries of the project and
- increase existing speeds to 100/100 to the intended beneficiaries of the project at costs (free of charge) that are lower or substantially equal to urban areas and
- provide middle-mile redundancy to the region by lighting up dark fiber and providing multiple redundant mmWave paths for network traffic.

Disclosure of federally funded grants:
The City of Mesa is using American Rescue Plan Act of 2021 State and Local Fiscal Recovery Fund (ARPA SLFRF) to perform some of the cash match portion of this proposal. Specifically, any fiber optic improvements needed to splice existing fiber.

As previously stated, ARPA SLFRF is being used for the 1st phase of a wider similar effort on the part of the City of Mesa. The first 10 square miles is being developed under that program. This grant request builds upon that effort in the following ways:

- by extending the infrastructure into additional areas of the City,
- by adding additional bandwidth in partnership with Sun Corridor, and
- by increasing the intended delivery speeds past the 100/100 threshold for these new areas.

Additionally, approximately 16% CDBG funds are allocated to the City Streetlights LED replacement project. The purpose and intent of that funding is to renew the lighting capabilities in Mesa neighborhoods, to reduce electricity consumption by lighting. These purposes are not affected by the use of that's project's outcomes to provide power for broadband. As stated above, the proposed project under ABDG will accelerate and prioritize the installations of new LEDs needed to provide the power.

Description of the amount of the cash "match" contribution to be provided:

[redacted]

The above sources of match contributions are budgeted and approved uses of City funds.

Absent the ABDG-Urban funding portions of the match contributions would go forward at a slower rate, for example the streetlight conversions would take place as lights fail over the next 3-5 years. However, the use of these funds would not contribute to the creation of broadband infrastructure in the proposed areas without the ABDG.

PROJECT DESCRIPTION AND TIMELINE – DEVELOPMENT

Any future looking statements are purely speculative at this time. The proposed project will lay groundwork for future projects by interconnecting fiber and creating the mmWave mesh middle mile through several miles of urban landscape. The uses for this infrastructure are only limited by the imagination and future budget opportunities.

Future developments in the project area are largely unknown at present. That's the point of investing in these places. The areas where we'll deploy this connectivity are home to thousands of current and potential entrepreneurs. The intent of this project is connecting them to the world and letting them do the rest.

One prime example of this possibility is Mesa Community College and the Mesa Fiesta District Opportunity zone. Multiple improvement projects and spaces present enormous redevelopment opportunity. We feel this will be enhanced by local businesses and potential investors knowing that ubiquitous reliable internet services are freely available to everyone in the area.

For more information on the opportunities in this zone enhanced by the proposed project please see https://ondemand.aerialsphere.com/city-of-mesa/fiesta-district/

OTHER PROJECT OUTCOMES

While the primary purpose of the proposed project is to provide internet connectivity to the underserved sections of the City of Mesa, the technology architecture employed has enormous potential. The mmWave mesh system proposed has only been deployed at small scale for private ISPs. While mmWave has challenges in wet climates, Arizona's dry weather presents an opportunity for it to attain higher output of reliability than previously possible. Once deployed at scale, the technology will create a resilient network, linking ground-based fiber to gigabit capable airwaves.

The creation of this network creates additional opportunities for municipal use in Smart Cities applications. These include sensing and automation not possible before, enabling new levels of service for public health and safety, public transit, research, and education.

Table vi – Census tract statistics provided by NTIA Indicators of Broadband Need https://broadbandusa.maps.arcgis.com/

Name	Total house holds	Percent of House holds with No Device	Percent of House holds with No Internet Access	Potential Number of House holds Needing Internet Access	Percent Pop whose income in past 12 mo below poverty level	Form 477 Terrestrial Broadband : Max Advertised Consumer Download Speed (Mbps)	Form 477 Terrestrial Broadband : Max Advertised Consumer Upload Speed (Mbps)	Ookla Median Down load Speed (Mbps)	Ookla Median Up load Speed (Mbps)	Pop 2019 (FCC Estimate)	Potential Pop poverty in the last 12 months
Census Tract 4217.01	1989	10.1	13.4	267	20.9	1000	1000	101.443	10.619	5117	1069
Census Tract 4201.13	1624	5.2	10.8	175	18.7	1000	940	53.823	9.921	3651	683
Census Tract 4202.13	1205	11.6	24.6	296	8.6	1000	940	19.592	5.747	2405	207
Census Tract 4204.01	1669	12.4	16.2	270	32.8	1000	1000	88.471	9.856	5186	1701
Census Tract 4205.03	1332	18	20.3	270	35	1000	1000	98.887	9.99	3845	1346
Census Tract 4207.08	2174	16.7	25.5	554	21	1000	1000	54.307	9.402	4567	959

Census Tract 4207.10	1550	15.9	15.5	240	26.3	1000	940	78.844	9.771	3481	916
Census Tract 4211.02	2197	17.3	19.8	435	29.2	1000	50	74.92	9.424	5867	1713
Census Tract 4217.02	1537	14.1	19.2	295	46.2	1000	50	56.901	9.554	3828	1769
Census Tract 4222.03	2280	7.2	12	274	25.9	1000	1000	69.043	10.078	4922	1275
Census Tract 4222.04	1285	1.4	9.4	121	15.6	1000	940	75.293	11.614	3251	507
Census Tract 4223.01	1696	3.9	9.7	165	20.2	1000	1000	63.382	10.146	6304	1273
Census Tract 4226.24	1579	13.9	18.7	295	15.8	1000	1000	26.846	2.987	3680	581
Census Tract 4226.25	1942	25.8	22.1	429	17	1000	1000	64.878	10.034	4443	755
Total	24059			4087						60547	14754