Navajo Arcadian Fiber Project (I-40 East)

Part C – Project Narrative

Executive Summary

ABDG Funding Will Leverage Significant Other Past and Future Investments

Arcadian Infracom ("Arcadian") is seeking approximately [redacted] in partial funding for a [redacted] project to finalize the design and construction of middle mile fiber infrastructure in the state of Arizona. This underground, secure, highly scalable and accessible fiber route will be installed along the Interstate 40 Right-of-Way ("ROW") from the City of Flagstaff on the west to the Arizona/New Mexico border on the east. This route will continue on the west across Arizona to the California border and ultimately to Los Angeles and on the east ultimately to Dallas. However, these spans are not a part of this funding request. Arcadian itself has already invested over [redacted] into the Navajo Arcadian Fiber Project and has a scalable financial partnership for these kinds of opportunities with TIAA, who have a rich history of patient investments and bring significant financial stability to Arcadian's sustainable, commercial customer-based business plan.

A Well-Developed Project Plan

This Navajo Arcadian Fiber Project (I-40 East) ("Navajo Arcadian Fiber Project" or "Project") will enable robust broadband access services to unserved residences, businesses and anchor facilities interconnected to the Arcadian route. The Project is a long-planned, highly coordinated effort based on 2018 and 2020 Navajo legislation, conceived by Navajo Nation leaders and Arcadian. The separate but synergistic Arcadian route from Phoenix to Tuba City to Salt Lake City is engineering complete, materials have been ordered and is awaiting only a key federal permit to enable Summer 2022 construction kickoff, subject to final financial approval based on signed customer contracts and any other available funding support for that route.

An Experienced Execution Team

The Arcadian leadership team has 300+ years of collective experience having built, bought or operated 350,000+ miles of fiber networks across the globe. See attached resumes for the Arcadian team in Part G.

A Sustainable, Non-Discriminatory Access Business That Improves Rural & Tribal Broadband

Arcadian purposefully routes its new fiber routes away from existing internet backbone routes to create geographically diverse fiber routes to keep its commercial customers' data centers connected when existing fiber routes get cut. As a result, the Arcadian commercial business model naturally brings affordable high speed broadband access closer to remote rural and tribal communities currently far from existing internet backbones. When combined with Arcadian's non-discriminatory access policy at over 210 locations along this route, Arcadian expects to greatly improve access to broadband in these communities.

Project Completion Makes New Investments in FTTH Networks Technically and Economically Feasible

Currently, broadband providers in smaller communities far from existing internet backbones pay 10x to 100x more for internet access than they would in major markets. With affordable connectivity back to these major markets, remote communities can now provide affordable, scalable broadband services within their communities. With this lower cost, scalable connectivity to major markets, new local fiber network investments become newly technically and economically viable due to the Arcadian network.

Narrative

Project Map

The map for this Project in Part H depicts the proposed route for the route for which ABDG funding is sought. This will be the first ever long-haul fiber network to major internet access markets that has been built across the Navajo Nation. Moreover, all the routes in Arizona for Arcadian's middle mile network are conspicuously diverse from existing fiber routes within the State. A map illustrating Arcadian's broader planned middle mile network within the state of Arizona also is included in Part H of this application.

Fiber Networks Analogous to Highway Systems

As indicated on the maps noted above, the Navajo Arcadian Fiber Project offers new middle mile capacity in many remote markets and true bandwidth scalability and diversity in other markets. Arizona's broadband fiber infrastructure is like a highway system. Last mile service providers, both wired and wireless (like a town's streets and roads), connect all the households, businesses, and anchor institutions within and near to a community to one another. But that local network must ultimately be connected to the existing global internet backbone in sometimes distant major markets like Salt Lake City, Denver, Los Angeles, Dallas, and Phoenix. If that connectivity to the backbone is not affordable and scalable, the services on those local networks will not be affordable and scalable, creating a digital divide.

The Interstates and Local Roads are Both Necessary

Arcadian's middle mile network is the multilane interstate highway that connects all these local community networks (serving the buildings and neighborhoods within the community) to the rest of the digital world. This Project will make it possible to connect 1) the local fiber roadway systems that connect directly to the residences and businesses in rural and tribal communities directly to, 2) the global fiber backbone that exists in the major end point markets (Phoenix, Salt Lake City, Los Angeles, Dallas, Denver).

Ultimately, both local and interstate (middle mile) roadways are necessary to provide an affordable and scalable high-speed fiber network in a remote, smaller community. While the last mile fiber facilities ensure all end users have equal access to the local broadband network, Arcadian's middle mile interstate backbone is essential to ensure that these local networks have equal access to the existing internet backbone that each user is really accessing.

Local FTTH Investments Will Not Be Successful Without Associated Middle Mile Investments.

Last mile FTTH projects cannot be successful and historically have not been initiated due to the lack of access to affordable and scalable internet backbone services from the major markets where the internet backbone currently resides. Private investors and local network operators/service providers have not and will not undertake the significant investment required to build superfast local broadband networks that then just hit a narrow bandwidth bottleneck at the town border where backbone connectivity is limited or unaffordable.

Without middle mile connectivity local broadband providers and their customers will have no reliable, scalable, affordable pathway to the worldwide internet that currently exists in the distant major markets. Arcadian is the first high-speed broadband network provider to build fiber optic infrastructure that passes through Arizona's more rural and/or tribal regions and <u>will be openly available to all buyers and service providers</u>. As a result, the Navajo Arcadian Fiber Project will enable vital broadband access services to be provided by local, last mile service providers – and ultimately to Arizona's rural and tribal broadband end users.

Project Description and Timeline

Nature of the Improvements

Arcadian proposes to build fiber infrastructure that directly aligns with the Arizona Broadband Development Grant ("ABDG") policy goals od enabling affordable, scalable high-speed broadband services through even remote Arizona communities. The Project is a 159-mile construction project to be built along the Interstate 40 ROW and will traverse the state west to east from the City of Flagstaff to the Arizona/New Mexico border. This middle mile network will eventually become part of a larger border-to-border route that spans the state of Arizona from its border with California to its border with New Mexico – and ultimately an even larger long haul fiber route from Los Angeles to Dallas, providing services to businesses and rural and tribal communities along this entire Arcadian route. This middle mile network will consist of a network containing at least a 288-count fiber cable in one inner duct and six additional inner ducts to allow for decades of fiber capacity growth into the region. Arcadian's middle mile transport equipment is intended to support extremely large bandwidth applications (15.6 Terabyte capacity per fiber pair) for providing the international, regional and local carrier community with bandwidth that can then be utilized in each of those Arcadian customers' businesses and last mile providers to provide enhanced broadband services to communities along the Arcadian fiber route.

Arcadian's Commitment to the Broadband Needs of Rural Communities

The Navajo Arcadian Fiber Project will provide a long-term sustainable fiber solution essential for all local broadband services (whether wireless, wired or through future technology). This long-term commercial and technical sustainability is a result of:

- An underlying economically sustainable commercial business that will fund the millions of dollars of annual costs to maintain this network after construction,
- Having users of this network who include the largest, best funded technology companies on the planet, who provide advanced broadband and IT services,
- A policy of non-discriminatory sales and access to Arcadian's customer base that is hard-wired into its business plan as an infrastructure provider, who makes money only by selling to all service providers rather than as a service provider who may have conflicting business priorities when selling to competing service providers, and
- A customer driver requirement that Arcadian have direct operational and physical control over the fiber facilities to ensure the resulting network solutions can meet stringent service quality requirements imposed on it by its key customers.

As a result, the Arcadian business model requires that Arcadian itself design, construct, own and have direct operational control over the Arcadian long-haul fiber backbone routes. Consequently, Arcadian will create a stable and sustainable network that will focus on delivering the middle mile infrastructure necessary to enable public and private operators to deliver innovative last mile networks throughout rural and tribal communities at affordable rates.

Non-Discriminatory Access At Over 210 Locations

Arcadian will provide extensive access to the Project's fibers at 209 handholes as well as at the three equipment huts installed along the Interstate 40 corridor along this route. Arcadian's readily accessible middle mile broadband network will enable opportunities for last mile service providers to offer broadband services in unserved rural and tribal communities that either completely lack qualified broadband service or lack in a choice of affordable, scalable, reliable services.

Population/Households to be Served

The 159-mile route for the Navajo Arcadian Fiber Project lies within the Interstate 40 ROW and spans the state from Flagstaff to the New Mexico state line. This route consists of areas within Coconino, Navajo and Apache counties and includes 25 miles (or approximately 16% of the route) within the Navajo Nation. Rights of Way acquisition and preliminary engineering and permitting activities for this route have been started. The proposed route includes installation of conduit within 12 possible census tracts, as specified in Part H of this application

Project Provides Robust Access Where No Qualified Broadband Service Is Currently Available

Utilizing NTIA's Indicators of Broadband Need Map, of these 12 census tracts, four of the tracts do not have qualified (25/3) broadband service as recorded by the Ookla Speedtest Median. NTIA's Indicators of Broadband Need Map records the 2019 Census Tract Data total population for these 12 census tracts as 48,017. The Navajo Arcadian Fiber Project touches at least nine cities and towns as well as innumerable populated places (for which no demographic data is available). The 2021 data from the Arizona Gazetteer indicates population within these cities and towns (not including all the populated places) is 95,454 with the number of households recorded as 32,253[1]. The exact number of businesses and anchor institutions within this area is unknown. However, it should be noted that, as this Project proposes middle mile infrastructure, the serving area is not limited merely to the cities, towns and populated places along the route. In fact, this Project may provide high-speed broadband service to any Arizona resident anywhere along the route where a provider interconnects with the Arcadian fiber route. This includes many residents within Navajo Nation.

Anticipated Economic Development Benefits Achieved by Completion of the Project

Rural and tribal communities were bypassed during the long-haul fiber route builds that occurred in the late 1990's and early 2000's. Connecting those communities was too costly, took too long to build or represented too small of a market to serve. Completion of the Navajo Arcadian Fiber Project will enable accessible, reliable and affordable broadband service to these communities, and will generate positive social and economic impact to community residents. Broadband unlocks barriers to communication and creates access to knowledge. Middle mile fiber is the most basic building block that empowers these communities. Any community without reliable middle mile connectivity remains digitally isolated from the rest of the world.

From an economic development perspective, the Project will be a game changer for the future of these bypassed rural and Navajo communities. Recognized economic and social impacts of the Project are noted below. None of these capabilities are currently possible since current local fiber network investments have not been made, in part due to the lack of affordable middle mile connectivity to the more affordable internet access services available only in major markets where the global core internet access backbone services exist.

- Cash and Broadband Enabling Assets for Navajo Nation. Under the Navajo enabling Project legislation, Number 0185-20, Arcadian will provide to the Navajo Nation:
    - [redacted]
    - Dedicated dark fibers and collocation on Arcadian routes within the Nation to enable and accelerate local Navajo broadband network, at no cost, and

[1] Population and household data includes the cities/towns of Flagstaff, Winslow, Winslow West, Joseph City, Holbrook, Sun Valley, Sanders, Houck and Lupton. Note: Arizona Gazetteer demographic data for the City of Flagstaff is also included in Arcadian's I-40 West Middle Mile Project.

- Two terabits of connections to global interconnection cities for backhaul of Navajo broadband services, at no cost.

- Enabling Affordable High-Speed Broadband. Arcadian's core commercial business includes offering access to its network to last mile providers. Because the location of Arcadian middle mile infrastructure uniquely spans more sparsely populated areas, the proximity of this route to previously unserved tribal communities will provide more affordable access to high-speed broadband for any last mile provider, which in turn will facilitate more affordable broadband service to end user consumers.
- Enabling Remote Work-From-Home Capabilities. Direct broadband backbone access for a community offers its residents the ability to work-from-home or to work remotely allowing higher paying jobs with companies that are remote from the Nation.
- Enabling Home-Based Business and Entrepreneurship. Access to affordable, scalable broadband allows uninterrupted service for small business owners and can drive further entrepreneurship within rural and Navajo communities. Broadband accessible communities are more likely to start and operate small businesses as primary or secondary income.
- Enabling Remote Learning Capabilities. During the height of the pandemic, students were mandated to participate in a total online curriculum. While this was a temporary solution to an emergency situation, new access, increased speed, capacity and reliability will provide higher quality distance learning opportunities for students even after the end of these emergency conditions, permanently enabling engaged, immersive learning. Parents also will have the ability to access instructional resources as well as the ability to digitally monitor and engage with their students' progress. Aside from elementary and secondary education and degree-earning programs, high-speed broadband access will facilitate workforce development for training and certification courses.
- Enabling Enhanced Telemedicine Capabilities. Telehealth requires adequate service capabilities for both providers and patients. Affordable, scalable, reliable broadband services will provide both healthcare providers and patients uninterrupted access to one another and will nurture telehealth engagement within rural and Navajo communities, lessening public and individual exposure to illnesses and easing patient comfort under remote care.
- Enabling Improved Public Safety/911. Dispatchers and first responders in currently unconnected communities will be able to coordinate responsiveness faster and more reliably. Local governments will have the ability to transmit essential information to community members with the understanding that the messages are more likely to be received. This has the potential to directly impact lifesaving and disaster prevention measures.

Physical Description of the Project

As noted above, the portion of the Project to be funded in this application is comprised of 159 miles of a minimum 288-count fiber optic cable positioned along the Interstate 40 ROW with 133 miles located on non-tribal lands. The route is comprised of eight miles of planned aerial fiber, as dictated by geographic conditions. The 151 miles of underground construction consists of one two-inch conduit containing seven smaller innerducts, placed at a depth up to 36 inches within the applicable ROW. This underground fiber infrastructure facility can ultimately support 3000+ fiber strands and is configured to allow installation of advanced, future fiber technologies that may emerge over the 40 to 60 year lifecycle of the facility.

There are three planned optical equipment hut ("ILA" or"regen") sites along the route:

- In Winslow;
- Near Adamson Rd/Exit 30; and
- Near State Route 12/Exit 357.

Each ILA site will be located on a lot varying between one-quarter acre and one acre in size and will house Arcadian optical equipment to power the fiber route and provide convenient access points for local providers. For installation of the conduit and fiber, Arcadian will be required to obtain permits and/or easements from ADOT, Coconino National Forest, Arizona State Land Department, National Park Service (Petrified Forest), Bureau of Indian Affairs ("BIA") – Navajo, Navajo Allottees through BIA, possibly BIA-Southwest for Hopi, and some private landowners and local jurisdictions for the ILA sites. To the extent any environmental, biological and cultural studies are required, Arcadian will engage contractors to complete the studies and submit such studies to the appropriate local, state and federal agencies for review. Where terrain or environmental/cultural concerns will not allow placement, the conduit will be routed around the conflict to ensure no negative impacts are created.

Arcadian's Commitment

As set forth above, the Arcadian business model requires that Arcadian itself design, construct, own and have direct operational control over the Arcadian long-haul fiber backbone routes. Arcadian hereby commits to the ACA that it will operate and maintain its middle mile network for a minimum of five years upon completion of the improvements proposed under this Project. The Arcadian business model is based on a network economic lifecycle of up to 40 to 60 years.

Infrastructure Construction

Arcadian will initiate a competitive bidding process for the construction of the physical infrastructure for the Navajo Arcadian Fiber Project. Only qualified, licensed and bonded contractors will be considered, and all construction will be accomplished in accordance with all applicable laws and regulations. All construction performed by the winning contractor will take place under the supervision and direction of Arcadian.

Intended Use of ABDG Rural Funds

Arcadian intends to use any ABDG rural funds awarded as reimbursement for a portion of the total cost of the materials, engineering and construction costs for the Project. The budget details for these and all other elements of the Navajo Arcadian Fiber Project are provided in Part D.

Timeline for Completion of the Project

Provided below is a graphic representation of the activities of and estimated timelines/milestones for the Navajo Arcadian Fiber Project from the route planning, which is currently in the process, to the completion of the Project and deployment of the operational network. As illustrated on this timeline, many of the activities will be performed concurrently. Even given the complexity and scale of the Project, the date that Arcadian's broadband network is estimated to become operational will be within eight quarters or 24 months after route kickoff, pending award of funding and commercial viability. In addition, a Gantt chart timeline (using July 1, 2022 as the estimated start date) for the development of this Project is provided as Appendix 1 to this application.

Navajo Arcadian Fiber Project (I-40 East)

[redacted]

Cash Match Contribution. The full cost of the Los Angeles to Dallas build is estimated to exceed [redacted] million, with the 159 route miles within this Project estimated at [redacted]. If awarded ABDG funding of [redacted]. Arcadian can start construction of this route after completion of key rights of way and permitting processes have been completed and the route has reached a point of commercial viability to fund the remaining construction costs. Arcadian expects to work cooperatively on multiple tribal and non-tribal grant submissions to close that funding gap and is already in discussions with multiple other grant partners to that end. Arcadian has already submitted two significant grant applications to the NTIA with tribal partners for other portions of the Arcadian network.

ABDG Grant Would Accelerate Connectivity For This Region By Years

While Arcadian intends to design, build, own and operate the entire Los Angeles to Dallas Arcadian route, the timing for construction start of a route of this complexity and magnitude will ultimately be determined by commercial interest (paying customers) and alternative funding sources like ABDG funding and similar strategic partnerships, government partnerships, grants, etc. As such, any financial support from entities like ABDG will result in a positive impact on Arcadian's ability to start and complete its middle mile network through the entire strategic corridor outlined in this application and ultimately establish reliable, high-speed broadband connectivity for members of Arizona's rural and tribal communities.

Project Description and Timeline – Development

Nature and Scope of the Project

Arcadian proposes to build fiber infrastructure that directly aligns with the Arizona Broadband Development Grant policy goal – to help Arizona communities establish and accelerate the enhancement

of broadband infrastructure that strengthens their capacity and competitiveness for economic growth and thereby ultimately improves economic conditions and quality of life in rural and tribal Arizona. The Project is a 159-mile construction project to be built along the Interstate 40 Right-of-Way ("ROW") and will traverse the state west to east from the City of Flagstaff to the Arizona/New Mexico border. Route details are as follows: beginning at the planned Flagstaff 2 ILA facility near the intersection of Interstate 40 and Country Club Drive in the City of Flagstaff proceeding east on Interstate 40 for 159 miles to the New Mexico state line. This middle mile network will eventually become part of a larger border-to-border route that spans the state of Arizona from its border with California to its border with New Mexico – and eventually an even larger long haul fiber route from Los Angeles to Dallas, providing services to businesses and rural and tribal communities along this entire Arcadian route. This middle mile network will consist of a network containing at least a 288-count fiber cable, which will assure these communities of quality, high-speed broadband services for the foreseeable future.

In addition, Arcadian will provide full end-to-end project management services for the final design, engineering, rights of way acquisition, inspection and construction of the middle mile infrastructure facilities that will connect the local end user service providers to the existing internet backbone.

Technology Utilized

This Project will use fiber optic technology exclusively. There are many advantages associated with a fiber network, beginning with its reliability, scalability and flexibility. While the "core" of fiber optic cable has not changed over the years, new technology in the manufacturing processes has driven the size and weight of the cable down dramatically, allowing more fiber capacity to be installed in the Project over the multi-decade lifetime of the Project.

Signals are transmitted across fiber by 'lighting' the fiber with lasers on both ends of the fiber. These lasers use multiple colors of light to multiply the capacity of each fiber strand through dense wavelength-division multiplexing ("DWDM"). Arcadian intends to use 400 gigabit wavelength (or higher) equipment in its network.

This technology allows the Arcadian middle mile transport equipment to support extremely large bandwidth applications (15.6 Terabyte capacity per fiber pair) for providing the international, regional and local carrier community with bandwidth. This bandwidth can then be utilized in each of those Arcadian customers' businesses and last mile providers to provide enhanced broadband services to communities along the Arcadian fiber route. This infrastructure will be capable of serving end users at advertised broadband speeds in excess of 100 Mbps download and 100 Mbps upload - but is entirely dependent upon a local service provider's local network capability and not upon Arcadian's big pipe capacities. Arcadian has the capacity to deliver as much bandwidth as that local provider can consume.

Method of Construction Undertaken. As set forth above, at least 95% - or 151 miles - of the Project's infrastructure will be installed underground. The precise method utilized for each mile of the underground installation placed along the route of the Navajo Arcadian Fiber Project is itemized as follows:

- 24 miles will be constructed through simple underground trenching;
- 30 miles will be constructed through require underground boring;
- 89 miles will be constructed through plowing;
- 4 miles will be constructed through various complex underground construction techniques used in metropolitan areas; and

- An aggregate of 4 miles of construction will be through specialty crossing techniques for bridge crossings, interstate, river and gorge crossings and tunnels.

While all buried fiber infrastructure builds are inherently expensive, the rocky landscape in this region creates an especially challenging build environment. As a result, of the 151 underground miles described herein, 40 of these miles require very expensive rock boring techniques. Underground conduit will be placed up to a depth of 36 inches along the right of way. To the extent environmental, biological and cultural studies are required, Arcadian will complete the studies and submit such studies to the appropriate local, state and federal agencies for review. Up to ten miles of Arcadian's infrastructure may be aerial construction, and half of the budgeted aerial plant will be on newly placed poles and the other half on existing pole lines. The environmental impact for placement of cable on aerial plant is minimal.

Qualifications of Vendors/Contractors

As set forth above, Arcadian will conduct a competitive bidding process for a qualified construction contractor for the Navajo Arcadian Fiber Project. Arcadian only entertains bids from qualified vendors that have the experience with comparable projects and are of an appropriate size to handle the work. Our contractors must offer quality turnkey services and demonstrate a commitment to safety

Engineering Analysis

The engineering analysis is completed in stages, beginning with a high level "desktop" review of the route. This desktop review consists of mapping tools and online research to determine the most efficient route to construct and includes estimated average costs for the route to determine the scope of the project. After this initial step, further reviews and analysis will include a physical survey of the route (ride out), which further identifies problem areas that must be worked around and will result in a more well-defined cost estimate. The final engineering analysis is the full detailed Outside Plant ("OSP") design of the route, which defines the precise location within the right-of-way in which conduit and cable will be placed (i.e. – "5 feet from the back of the right of way"), resulting in permittable designs to be submitted to permitting agencies for construction.

Project Approach

Arcadian Infracom will approach this project in an aggressive manner to ensure rapid completion (within 24 months from financial viability to full completion). This is done by performing various tasks simultaneously to shorten the full schedule of construction.

Whereas a standard method of implementation is to work in a linear fashion (e.g., engineering work is complete before right of way acquisition is undertaken, and construction is not started until a significant portion of the permits are in hand for a route), Arcadian will perform ROW acquisition and engineering simultaneously, will secure permits for construction as manageable spans are ready and begin construction when permits and ROW are secured for large spans of the route, subject to project financial feasibility. This presents an opportunity, with detailed planning efforts leading the way, to be placing conduit and fiber on the route before all permits are secured, knowing that permits will be received on planned dates. This project approach also allows Arcadian to turn up smaller spans of the route as they are ready, providing connectivity to those nearby communities along the route earlier, thus relieving some of the broadband availability struggles for those communities prior to full completion of the Project.

Background of Project

In 2017 the Navajo Nation was informed the Navajo Generating Station ("NGS") coal-fired power plant on their land would be closing in 2019. NGS represented a significant portion of Navajo gross domestic product ("GDP") and provided employment for an estimated 3,000 workers. The loss for the Navajo

Nation would be tremendous. Representatives of the Navajo Nation approached the founders of Arcadian Infracom about a unique partnership possibility. Arcadian began quietly working with the Navajo Nation to develop a plan to bring fiber to and through their nation to support the Navajo goals of economic development, expanding access to modern online educational opportunities, and providing greater access to healthcare through telemedicine that is possible only with robust fiber connectivity. In 2018, and again in 2020, Navajo legislation was passed solidifying the Arcadian partnership with the Navajo Nation allowing Arcadian Infracom access to unique rights-of-way across Navajo land. As part of the resolution, the Navajo Nation will obtain a pro-rata gross percentage of the revenue that the new fiber network will generate. This revenue-sharing can help to offset the closure of the NGS.

Population/Households to be Served

As set forth in this section above on page 4 of this narrative, the total population for the census tracts touched by the Project is 48,017, based on NTIA's Indicators of Broadband Need Map, the 2019 Census Tract Data. Arcadian's I-40 middle mile route touches at least 15 cities and towns as well as innumerable populated places, and the 2021 data from the Arizona Gazetteer indicates population within these cities and towns (not including the populated places) is 95,454 with the number of households recorded as 32,253. The exact number of businesses and anchor institutions within this area is unknown. However, it should be noted that, as this Project proposes middle mile infrastructure, the serving area is not limited merely to the cities, towns, census tracts or even counties included in the route. In fact, this Project will provide high-speed broadband service to any Arizona resident in a community that connects to the Arcadian network.

Redundancy, Reliability and Sustainability

Creating multiple fiber paths between end points on a fiber network is a way of putting failover redundancy into a network. Fiber cuts (even of underground fiber) does occur despite best efforts of providers to patrol their routes and prevent third party damage to the network. By adding multiple fiber paths between major market end points, which are geographically distant from each other, customer networks experience higher 'up-times' and users experience fewer service outages that can occur when a fiber route is damaged. This Project creates a diverse connectivity pathway back to the major internet access points for any broadband provider using Arcadian's network. Arcadian's fiber facilities and the physical diversity from existing or other soon to be constructed fiber routes that will be used by Arcadian customers will offer a reliable network with long-term technical and economic sustainability.

The broadband infrastructure proposed by the Navajo Arcadian Fiber Project should have a lifetime of economic impact, exceeding 40 and perhaps 60 years, depending upon future technology innovations. However, the concept of project sustainability involves more than life cycle. A sustainable project should minimize the impact on the environment. support social development and ensure the business remains profitable.

As noted in a previous section, this Project will have a minimal effect on the environment, as the majority of the infrastructure will be installed along existing roadway rights of way. As described above, improved social and economic opportunities will be a by-product of the newly enabled broadband access along the Arcadian fiber routes, where currently households and businesses have limited or no access at all. Finally, given that Arcadian commits to own, operate and maintain this middle mile network for a period of at least five years (and more likely across multiple decades), Arcadian has the ability to ensure its network facilities remain a positive economic force within the communities located along its routes.

Part H

CENSUS TRACTS AND MAPS

1 Census Tract Data

2 Navajo Arcadian Fiber Project (I-40 East) Route – Arizona Only

3 I-40 East Extended Route

4 Overview of Navajo Arcadian Fiber Routes – Arizona Only

5 Overview of Arcadian Extended Routes

Census Tract	County	State	POP 2019	Ookla Speedtest Median	
				Download	Upload
4005000700	Coconino	AZ	3642	62	20.3
4005000600	Coconino	AZ	5537	57.7	20.5
4005001302	Coconino	AZ	5606	21.9	7.9
4005001500	Coconino	AZ	3459	8.7	1
4017960400	Navajo	AZ	3813	27	9.2
4017960500	Navajo	AZ	3849	10.7	5.5
4017960600	Navajo	AZ	4580	50	10.6
4017960100	Navajo	AZ	1943	11.6	4.8
4017960200	Navajo	AZ	3875	21.7	9
4001945100	Apache	AZ	2313	9.6	4.2
4001970200	Apache	AZ	5425	5.2	1.5
4001945002	Apache	AZ	3975	8.2	1.1
			48017		