Attachment E – Experience providing Broadband – Technical Capability Statement

ATC Communications has been providing telecommunication services since 1904. Through the years, ATC has deployed numerous advancements in technology to our customers. Initial broadband internet service offerings were a part of a fixed wireless build out that began in 2000. Shortly thereafter, ATC began deploying DSL, cable broadband, and fiber to the premise services. We have utilized many technologies for backhaul and interconnection which include point to point microwave, copper, and fiber. To date, we are serving approximately 3,000 customers throughout 40 rural communities in Nebraska with voice, broadband internet access, and video services.

ATC currently supplies broadband service at 100 Mbps Download and 100 Mbps Upload or greater to seven communities in Nebraska over existing optical networks. The density of ATC's fiber to the premise offerings is being expanded weekly with active construction projects. This experience in network deployment will be leveraged to complete the build out of the project area. ATC bases these assertions on historical data gained over twenty years of building, owning, and maintaining an existing broadband network infrastructure. Our company retains accurate information about subscription counts, available network resources, and latency on an individual platform basis. Best practice policies are implemented to prevent over utilization and create benchmark criteria to indicate where reinvestment or upgrades are required. These policies are based on engineering specifications, periodic maintenance, and testing of infrastructure.

The proposed project will provide new infrastructure that will ensure broadband connectivity to the community for 20 to 30 years. To ensure this life cycle, ATC will need to inspect physical components of the fiber transmission system on a bi-yearly basis; yearly maintain central office components and forecast their replacement over a 5 to 10-year period. Customer Premise equipment maintenance will be performed on an as needed basis with expected 5-year component viability.

ATC proposes a buried plant architecture for this project. Underground fiber plant will extend the useful life of the optical components. Fiber to the Premise designs with conservative loading can distribute broadband with virtually limitless capacity. To sustain this technology, ATC employs eight full-time field technicians. Three of the field technicians specialize in optical cable construction and repair. Five combo technicians perform installations, minor cable repairs, electronic and infrastructure maintenance. NOC technicians actively monitor for performance degrading hardware errors, utilization trends, and quality of experience metrics. ATC employs four lead technical staff who specialize in various technologies including CCNA (Cisco Certified Network Administrator) routing, CECP (Carrier Ethernet Certified Professional) specializing in data transport technologies (PBB, MPLS, etc.), Legacy Voice and VOIP certifications, RF and 3GPP certification, and degrees in electrical engineering, telecom engineering, and network management. Three helpdesk agents are available for troubleshooting and resolving individual customer concerns. The network team and helpdesk continually monitor, adapt, and optimize the broadband network to provide our customers with the best service possible. After-hours support is available to all ATC subscribers and 24/7/365 on-call technicians work to monitor, maintain, and/or repair the network continually.

ATC will deploy a GPON Fiber to the Home model. Core infrastructure will provide access to diverse upstream Internet Service Providers. A layer 2 network connects the service aggregation shelves containing the GPON OLT cards to the core routing and authentication services. The CO equipment fiber trunks distribute the services to GPON splitters located less than 1000 feet from the premises they are to serve. From the GPON splitters, no more than 32 individual fiber drops terminate the fiber network to outdoor ONT hardware at the customers location. CAT6 Electrical Ethernet wire is run from the ONT to a location in the home where the Wired/Wireless Residential Gateway hardware is installed. Uninterruptable Power Supplies (UPS) are provided to power the ONT and provide some additional uptime in power failure events protecting the outdoor electronics from power surges. In this style of deployment, Customer Premise Gateways and UPS hardware are the most susceptible to failure, as they are exposed to the power grid. Despite surge suppression, power variations can take a heavy toll on these electronics. Being isolated and having dedicated earth grounding, ONTs regularly survive the same power events but occasionally need software maintenance or reboots. Fiber drops, splitters, and trunk fiber need only occasional inspection to ensure splice enclosures are intact, and other events do not threaten the physical integrity of the transmission lines. Central Office equipment is located in a temperature-controlled building with power conditioners, extensive battery backup, and backup generators. In these conditions the electronic hardware is very stable and requires only regular software updates and miscellaneous maintenance.

In this build out ATC will bury 8,790 feet of trunk fiber, approximately 47,300 feet of drop fiber in duct, 14 splitters, and will deliver gigabit capable fiber services to 225 homes. Of that sample, 56 homes have current service offerings below the 100 Mbps download and 20 Mbps upload threshold.

Each Passive Optical Network (PON) has a 2.48 gigabit per second (Gbps) downlink capacity and 1.2 Gbps uplink with standard GPON service rates. In the most intensive use case, 32 residences may be connected to this shared uplink port. In a very conservative oversubscription ratio of 3:1; 233 Mbps Downstream and 112 Mbps Upstream per subscriber is achievable, surpassing the 100/100 current speed requirements. Additionally, this can be scaled up as demand increases to 10 Gbps XGS PON – providing 10 Gbps capacity to the same 32 potential subscribers. Finally, real-world take rates and use cases (100% subscription is rare and those subscribed rarely use all bandwidth available) further future proof the services that can be offered to subscribers over the expected lifespan of the network.