TILSON



# State of West Virginia Broadband Enhancement

**Solicitation Number 0327 COM 1800000001**

**COMPANY NAME**
TILSON TECHNOLOGY MANAGEMENT, INC.

**COMPANY ADDRESS**
16 MIDDLE ST.
PORTLAND, ME 04101
UNITED STATES

**CONTACT**
JAY FORD
DIRECTOR, CONSULTING

EMAIL: JFORD@TILSONTECH.COM
PHONE: (207) 591-6427
FAX: (207) 772-3427

COMPANY PROPOSAL // PREPARED FEBRUARY 2018

# Table of Contents




**COMPANY NAME :**
TILSON TECHNOLOGY MANAGEMENT, INC

**COMPANY ADDRESS :**
16 MIDDLE ST
PORTLAND, ME 04101


tilson

# 1.Attachment A - Vendor Response Sheet

## 1.1 Overview

### 1.1.1 Corporate Overview

Tilson Technology Management, Inc. (Tilson) provides broadband consulting and development services across a range of geographies. At Tilson, we are passionate about bringing universal broadband service to every community, and believe that broadband is a critical public utility that is required for a community's health and sustainability.

### 1.1.2 Organizational Experience

With more than 350 employees in 17 offices around the country, Tilson is a rapidly growing telecom consulting and services company that is recognized by its customers and peers for its rapid growth due to its commitment to excellence in fiber and wireless network business and engineering consulting, design, and deployment. Our consulting team has a successful history of working with project owners and project finance entities on telecom projects. We have provided valuable consulting assistance to state broadband programs in New York, Pennsylvania, Massachusetts, Maine, and Rhode Island.

We accomplish this with a team of experts working collaboratively on meaningful, impactful projects for great clients. Our team environment fosters intellectual curiosity, motivates employees, and cultivates talented people who work with purpose, mastery, and autonomy. We strive to listen to our clients, partner with them as a team, and accept their goals as our own. Our mission is to serve our customers by building, integrating, and maintaining the information technology and communications infrastructure that enables great organizations to innovate and deliver.

### 1.1.3 Subcontractors

#### *1.1.3.1 About CostQuest*

Since its founding in 1999, CostQuest Associates has grown to be the foremost leader in telecommunications network modeling and geospatial solutions worldwide. CostQuest provides network design services through our combined GIS, engineering, modeling, and costing knowledge. Whether we apply CostQuest network costing tools or business case analysis, CostQuest can accurately estimate network design, network rebuilds, or technology deployment costs.

CostQuest's analyses help clients study costs and business cases based on a variety of network deployment and last-mile options.

#### *1.1.3.1.1 Summary*

CostQuest has been engaged in large-scale work efforts with the U.S. Government (Federal Communications Commission and U.S. Department of Commerce), and with U.S. state governments such as Alabama, California, Idaho, Kansas, New York, Pennsylvania, Wisconsin and Wyoming. CostQuest assisted the FCC with the development of the National Broadband Plan and currently serves as the model consultant for the Connect America Fund. In addition to these project in the U.S., CostQuest has performed similar large-scale data collection and network modeling projects for the governments of Australia, Hong Kong and New Zealand. CostQuest has deep experience in the following applicable areas:

- Statewide Broadband Planning
- Broadband Mapping and GIS Application Development
- Cost and Network Modeling

#### *1.1.3.1.2 CostQuest Philosophy*

As described in the body of this document, CostQuest has been involved in the analysis of broadband deployment and planning and the construction of network cost models for many years. In most cases, the solutions we implement address questions which have either never been explored or quantified before. In short, we find that our work is about discovering and developing new approaches to complicated questions.

For this reason, our development process is unlike most other application development processes. There are several factors which highlight how we work.

a) We design for flexibility; we have found that a team typically learns more about the problem as the project progresses. This means our solution is constantly evolving and our approach gets refined as we discover new aspects of a problem. In terms of traditional analysis and design we would describe our process in terms of prototyping. This means that this design will expand as we learn more.

b) We implement approaches which are process oriented and driven by a sense of economic principles that have broad application across firms and industries. Working around the world with clients ranging from governments to private investors, we have learned that it is best to analyze a question using a consistent view of economics and business standards versus starting at an assumed answer and working backwards to support it.

c) We work to make our solutions flexible and driven by user inputs. We minimize assumptions and rules that are hard coded and beyond the reach of users. We focus efforts on educating the user about the inputs and informing those involved about the key drivers so that users can focus their limited time.

d) Where possible and relevant, we will base our work upon proven, existing approaches. Rather than try to develop from scratch for each client and project, we use as much proven existing solutions and algorithmic approaches as possible, albeit with changes to match the needs of the situation. Not only does this reduce cost for a client, it provides an approach that has a proven history of success in public efforts and legal proceedings.

### *1.1.3.1.3 Broadband Planning - State Government*

**CostQuest's Role in NTIA's State Broadband Initiative**

NTIA's State Broadband Initiative (SBI) implemented the joint purposes of the Recovery Act and the Broadband Data Improvement Act. The NTIA program supported data development, mapping, broadband planning, technical assistance and capacity building components. A major focus involved the development of accurate broadband presence and facility information. The CostQuest team surveyed broadband providers twice yearly to gather updates on the availability, speed, and location of broadband services, as well as the broadband services that community institutions, such as schools, libraries and hospitals, use. This data is used by NTIA to update the National Broadband Map, the first public, searchable nationwide map of broadband availability launched February 17, 2011. CostQuest developed and implemented all processes for provider NDA facilitation and data collection, GIS mapping and data development, cost/network modeling, statewide and local broadband plan development and more.

Since 2008, CostQuest has worked on SBI programs in the following six states:

- Alabama (2008-2015) – Managed the entire program as an SBI grant sub-recipient
- Idaho – (2009 – 2015) Managed the entire program as an SBI grant sub-recipient
- Kansas (2014) – Conducted pilot program across 7 communities
- West Virginia (2014) – Conducted economic models across 10 communities
- Wisconsin (2009 – Present) - Managed the entire program as an SBI grant sub-recipient
- Wyoming (2009 – 2015) - Managed the entire program as an SBI grant sub-recipient

In addition to the SBI efforts listed above, CostQuest works with the State of New York, through Empire State Development, to help manage the NEW New York Broadband Program's $500mil reverse auction program.

#### *1.1.3.1.4 Broadband Mapping and GIS Application Development*

**Statewide Broadband Mapping**

CostQuest was the first firm in the U.S. to conduct statewide broadband mapping. In 2005 CostQuest was engaged by the State of Wyoming to identify unserved areas across the State and determine paths to support build-out in those areas. CostQuest was again asked to perform similar work by the State of Alabama in 2008. CostQuest was then selected by four states to manage the State Broadband Initiative (SBI) broadband mapping and data development programs. This work started in 2009 and was completed in 2014.

**National Broadband Mapping**

CostQuest's mapping and GIS solutions are behind the nationwide models used by the FCC and USAC. The work on the National Broadband Plan and the Connect America Fund relies on geospatial applications developed by CostQuest. In addition to the work leveraged by the FCC and USAC, CostQuest has performed nationwide mapping of broadband for organizations such as CTIA.

**Local and Community Broadband Mapping**

CostQuest works for various governmental organizations and providers to map and model broadband availability in communities. CostQuest was engaged by states such as Idaho, Kansas, West Virginia and Wisconsin to map and assess fiber deployment in various cities and towns. In addition to the work, CostQuest has recently engaged with the City and County of San Francisco to map availability and assess viability of fiber and Wifi deployment scenarios across the City. CostQuest is currently conducting similar work in other municipalities in the U.S.

#### *1.1.3.1.5 Cost and Network Modeling Experience*

CostQuest has been involved in the construction of network cost/engineering models, Replacement Cost New models, network technologies and adoption for over 17 years, including deployment of the United States Federal Communications Commission's ("FCC") Broadband Assessment Model (BAM) to support the National Broadband Plan and the Connect America Model (CAM) to support the new broadband and voice funding model, referred to as the Connect America Fund.

CostQuest has been one of the leading forces in the development of network cost/engineering modeling platforms around the world. CostQuest was among the first to develop the full-census, proxy platform. CostQuest was the first to use geocoded customer data. CostQuest was the first to incorporate all services in the determination of the network and the calculation of the costs. CostQuest was the first to utilize roads as the medium to construct a realistic yet optimal forward-looking wireline network. And in regard to Replacement Cost New modeling of a wireline network, CostQuest's team has been at the forefront of analyzing and understanding network deployments across the world.

CostQuest has an in-depth understanding of the telecom market, regulation, engineering and economic principles from our prior efforts which include:

- The Gigabit City Project Model ("GigabitCity") used by Sanford Bernstein to understand Google's fiber deployment across the U.S.
- CAM which is a model constructed to help the FCC determine and distribute the public funds required to encourage carriers to deploy broadband networks in non-economically viable areas in the U.S. such that the FCC's goals of coverage can be attained.
- BAM which is a model constructed to help the FCC develop its National Broadband Plan. The model developed the 20-30 year business case of a hypothetical provider (fixed, mobile and cable) to deploy universal broadband access across the U.S.
- Developed the FCC's National Broadband Plan's first working paper, "Broadband Adoption and Use in America," which helped frame recommendations to promote digital inclusion.1
- Developed a 30 year forecast of broadband adoption driven by key demographic variables for the FCC's National Broadband Plan
- CQ-BAT (CostQuest Broadband Analysis Tool) which was sponsored by a coalition of fixed service providers in the U.S. and was a predecessor to the FCC's CAM model
- CostPro which is a forward looking model of the access plant that develops the cost to deploy efficient access networks. The model is able to model both copper and fiber access designs.
- CostProCORE which is a forward looking model of the switch and transport networks that develops the cost to deploy an efficient core network. The model was originally designed for the Commerce Ministry of New Zealand and has subsequently been used to model transport networks in over 25 U.S. states.

CostQuest has a proven track record of being able to combine geospatial data with engineering algorithms and appropriate economic costing logic to develop a network cost model that reflects the functionality required for the services provided to customers. CostQuest has the expertise and the experience to develop a modeled solution that utilizes and reflects the best information available.

It is CostQuest's unique combination of knowledge of telecommunication networks, databases, computer programming, telecommunication engineering, economic theory, knowledge of telecommunication and demographic data, knowledge of the telecommunications environment and successful implementation of Economic Network Models that are the core strengths of CostQuest's proposal.

### *1.1.3.1.6 Broadband for CostQuest Economic Cost/Engineering Models*

CostQuest economic cost/engineering models have been used in the telecommunications industry in many jurisdictions for a variety of purposes. Below is a list of some of the jurisdictions in which CostQuest Models have been employed.

- Unbundled Network Element (UNE) state proceedings (CostPro model): South Carolina, North Carolina, Georgia, Florida, Kentucky, Mississippi, Alabama, and Louisiana.
    - Model was well accepted
- FCC: National Broadband Plan (NBP), CAM (CAFII for price cap carriers), ACAM (CAFII for Rate of Return carriers)
    - Carriers have accepted funding, indicating costs calculated are reasonable
    - FCC NBP was presented to Congress
- Replacement Cost New (RCN): Connecticut, California, Washington, Colorado, North Carolina, Florida, Virginia, Massachusetts, Maryland, Oklahoma, Texas, Georgia, Kentucky, Michigan, Wisconsin, Nevada, Wyoming, Iowa.
    - Cable, Telco operators
    - Wide acceptance
- Universal Service Funding Proceedings: (Benchmark Cost Proxy Model, BCPM): Maine, Vermont, Texas, and Oregon.
- State Broadband Cost Model (SBCM): New USF efforts in states – NY, IL, NE, OR
    - Working on or in contract negotiations

- Wireless Models (using similar engineering-economic modeling methods): Utah, Georgia, Texas, Florida, California, North Carolina, Oklahoma, and Washington. Results have been run in all 50 states.
- California Universal Service Funding (Cost Proxy Model, CPM)
- International: Engineering-Economic models by CostQuest were utilized in New Zealand, Hong Kong, Australia, and Bermuda.

### *1.1.3.2 Camoin Associates*

Camoin is a leading economic development consulting firm with national experience. Camoin differentiates itself by measuring the success of the projects it consults on solely by tangible metrics, namely job creation and capital investment. Camoin's goal is to stimulate investment as the means of achieving the economic development objectives of its clients through strategy development, public policy evaluation, and project implementation.

Camoin has designed its service mix to provide the firm the capability to offer start-to-finish economic development solutions for organizations and communities that do not have or need this capacity full-time. Its main service areas include:

- Economic Development Strategic Planning
- Workforce Development Planning & Analysis
- Economic & Fiscal Impact Analysis
- Market & Feasibility Analysis
- Technology-led Economic Development

Since its founding in 1999, Camoin Associates has specialized in providing economic development solutions to both public and private sector clients. Through the services offered, Camoin Associates has had the opportunity to serve Economic Development Organizations and local and state governments from Maine to California; corporations and organizations that include Lowes Home Improvement, FedEx, Volvo (Nova Bus), Eastman Kodak Company, and the New York Islanders; as well as private developers proposing projects in excess of $4 billion.

Camoin's reputation for detailed, place-specific, and accurate analysis has led to projects in 30 states and garnered firm attention from national media outlets including NPR's Marketplace, Newsweek, the New York Times, Forbes Magazine, and The Wall Street Journal. Additionally, its marketing strategies have helped its clients gain both national and local media coverage for their projects to build public support and leverage additional funding.

## 1.1.4 Key Personnel

### *1.1.4.1 Tilson*

**Chris Campbell** is Principal Consultant in Tilson's Government and Institutional Consulting practice, where he leads a team of professionals who provide strategic consulting expertise to states, communities, and firms seeking to improve telecommunications infrastructure and services and manage or develop networks. At Tilson, Chris has led Tilson's engagement with the New York Broadband Program Office, and is currently advising the Commonwealth of Pennsylvania on the development of its new state broadband program. He has also worked on numerous engagements with municipal and county clients.

Chris has 20 years of experience in technology, public policy and community development. Prior to joining Tilson, Chris was the Executive Director of the Vermont Telecommunications Authority (VTA). At the VTA, Chris led efforts to build new fiber networks and expand access to broadband and cellular service. In addition to fiber optic construction and cell site development, Chris had oversight of commercial contract development, grant making, and federal grant seeking. Prior to the VTA, Chris served as Director for Telecommunications at the Vermont Department of Public Service and Assistant Chief Information Officer for the State of Vermont.

He holds a B.A. in Economics and Environmental Studies from the University of Pennsylvania and a Master's Degree in Regional Planning from the University of Massachusetts-Amherst.

**David Radin** is a Senior Consultant at Tilson. He has over 15 years of experience across IT, strategy consulting, and renewable energy. David developed the Reverse Auction Model that adjudicated and reported results for the New NY Broadband Program, and has worked on numerous engagements with municipal and county clients. Prior to joining Tilson, David was a Senior Research Manager for Energy & Industrials at GLG, the world's leading platform for professional learning, where he served hedge fund clients across a variety of engagements. David also has experience assisting Wildcat Venture Management, a boutique investment firm, in conducting due diligence for development of microwave low-latency networks connecting North American and European trading centers. Previously, David was a developer of energy facilities – wind farms and coal gasification plants – for Gamesa Energy USA and Process Energy Solutions. He had overall responsibility for development of the 200 MW Minonk wind farm in Minonk, IL, as well as fuel and land procurement for multiple gasification plants to convert petroleum coke to natural gas. David has significant prior consulting experience at Everest Group, a boutique strategy firm, as well as system development and IT at Ernst & Young.

David is a Certified Fiber to the Home Professional from the FTTH Council Americas. He has a B.S. in computer science from the University of Illinois at Urbana-Champaign and an M.B.A. from Northwestern University's Kellogg School of Management. In his spare time, he enjoys travel, discovering new restaurants, and being outside.

### *1.1.4.2 CostQuest Associates*

**Mary Hilvert.** Ms. Hilvert is a Project Manager and Analyst at CostQuest Associates supporting the acquisition and quality assurance of customer data for cost model development and USAC filings. In this role, Mary performs moderately complex data base activities and acts as a point of contact with clients for data collection.

Prior to her work at CostQuest Associates, Mary Hilvert had 20 years of experience as a system engineer, analyzing business requirements, designing, programming, project managing and implementing customer care and billing applications for North American and foreign telecommunication companies. She has most often been in client-facing roles and is dedicated to customer satisfaction and meeting commitments.

Ms. Hilvert has worked with major telecommunications clients in the wireless and wireline industry. Mary has worked with her clients to identify business objectives for system enhancements, conversions and new system implementation. Ms. Hilvert has a BS (Business Administration/ Information Systems) from Xavier University and has pursued course work in Geographic Information Systems.

Ms. Hilvert has been the project manager for AT&T Wireline Replacement Cost New project since joining CostQuest Associates. She has performed coding and implementation for CostQuest Wireline models, the FCC's National Broadband Plan model (BAM) and the FCC's Connect America Fund Cost model (CACM).

**Heyin Chen.** Ms. Chen, a GIS Expert/Data Analyst in CostQuest, assists in GIS support and data analysis. With six years of professional GIS study, Ms. Chen can offer a firm and broad skill set with an emphasis on spatial analysis, cartography, GIS application development, data analysis, model building, and GIS technical support. As an Analyst, Ms. Chen is involved in numerous projects to gather, analyze, integrate spatial data using GIS and update database, applying additional knowledge of spatial feature representations. Ms. Chen has also developed several geographic analysis tools used in the telecommunication projects.

Prior to her work with CostQuest, Ms. Chen was a Research Assistant for the United States Environmental Protection Agency (USEPA), where she conducted a research project on Sustainable Water Resources and Infrastructure Adaptation to Climate and Socioeconomic Changes based on GIS and modeling. Heyin was Analyst and GIS Support for the Connect America Fund model for High-Cost Funding (CACM), the CostQuest Wireline and CostQuest Wireless network modeling.

Ms. Chen has the following degrees:

- Bachelor of Science, Sun Yat-Sen University, Guangdong, China (Geographic Information Systems).
- Bachelor of Science, University of Cincinnati, Ohio, U.S. (Geography (GIS Emphasis)).
- Master of Science, University of Cincinnati, Ohio, U.S. (Geography (GIS Emphasis)).

**Luis A. Rodriguez.** Luis A. Rodriguez joined the CostQuest team in March of 2010 as the Project Manager for Economic Models & Policy Support. In his current role, Luis performs moderately complex database activities across various platforms and environments acting as the key point of contact for extracting, analyzing and communicating the data related to specific requests. Luis served 8 years at the CTIA – The Wireless Association, an influential non-profit telecommunications association located in Washington, DC. As the full-time Manager for Policy & Research he was primarily responsible for accurately capturing technical data on an aggregate basis for the wireless industry, via a semi-annual survey and reporting on such data findings at an executive level through the Wireless Industry Indices Report. He was also responsible for maintaining and processing of the Small Market Operators in the U.S. Wireless Marketplace report (a sub-segment of the before mentioned Indices Report). Luis has obtained both a BS and dual MBA and Masters in Technology Management from the University of Maryland. Mr. Rodriguez has contributed in a number of provider oriented tax modeling, USF distribution modeling, and Gigabit City Modeling among many others.

### *1.1.4.3 Camoin Associates*

**Michael N'Dolo, Principal.** Michael's understanding of the relationship between development and municipal finance, as well as his experience leveraging the benefits of commercial and industrial tax incentives. brings a vital financial perspective to the firm's economic development planning projects. His recent work includes a comprehensive cost/ benefit assessment of one of the largest high-tech/R&D facilities proposed in New York State.

Of particular interest to Michael is working with communities to better understand the fiscal implications of their planning efforts, both comprehensive plans and economic development strategic plans. Michael's ability to help communities recognize the likely impact of various economic development initiatives on an "average" taxpayer has been an invaluable asset to the firm as Camoin Associates works to develop economic development strategic plans that are based in reality and fully implementable.

Michael has successfully completed professional training in IMPLAN and LOCI, computer modeling systems for economic and fiscal impact analysis, and is currently the only economic development professional in New York State utilizing these combined programs to assess an economic development project's impact on a locality's municipal tax revenue. Michael has presented the firm's economic and fiscal impact modeling methodology at conferences of the New York State Economic Development Council (EDC), Wisconsin Economic Development Association, the New Hampshire Economic Development Association, as well as at regional conferences such as the New England Economic Developers Association. His work has been cited in The Wall Street Journal, The New York Times, Newsweek and Forbes, and has been featured in segments of National Public Radio's Marketplace show.

Michael has a Master of Public Administration degree from the Maxwell School of Syracuse University. Prior to working at Camoin Associates, he was involved in facilities planning at the University of Minnesota.

**Christa Franzi, Marketing and Communications Director.** Successful economic development initiatives require an interdisciplinary perspective, which is just what Christa brings to the Camoin Associates team. With a developed understanding of the complex interrelationships between economic development, land use, culture, workforce, quality of life, and environmental sustainability, she has devised and successfully implemented economic development projects that will be financially, environmentally, and socially sustainable for years to come.

Christa has contributed skill, insight, and innovative approaches to some of the firm's most challenging strategic planning, market analysis, and impact studies for clients in both the public and private sector. Her unique talent for creative problem solving helps communities make sense of complex systems and capitalize on otherwise "hidden" opportunities. Her passion is working with rural communities and small cities to address their distinct economic development needs with innovative marketing and planning strategies. From growing up in rural upstate New York, she has personal and professional knowledge of the economic development challenges faced by these communities.

With an intuitive sense for economic development marketing and communications, Christa leads Camoin's growing marketing service line. Christa has worked with clients on developing website content, newsletters and brochures, and targeted digital media strategies. As the chair of the Northeastern Economic Developers Association's (NEDA) Communications Committee, she is working to completely restructure the organization's communications and marketing strategy and was nominated as the organizations 2016 Member of the Year for her efforts. Christa also leads Camoin's own marketing and communications strategy including re-designing our website, developing and tracking online, email, and print-add campaigns; promoting the company via social media, and managing our blog the Economic Development Navigator.

Prior to joining Camoin Associates, Christa began her professional career as a planner in the New York Capital District. She holds a Masters in Geography, with a concentration in Natural Resource Planning and Management from Binghamton University where her thesis work included a study of exurban development and its effect on stream morphology in small watersheds. Christa also holds dual Bachelors of Science degrees in Environmental Science and Geography from the SUNY College at Oneonta.

## 1.1.5 Previous Experience

This section contains descriptions of prior relevant projects Tilson has worked on. Projects listed in this section are referenced throughout the document.

### *1.1.5.1 Maine Fiber Company*

Tilson helped the Maine Fiber Company, Inc. ("MFC") with business start-up, engineering, pole licensing on 30,000 utility poles, permitting, and construction management of a dark fiber optic network in Maine, New Hampshire, and Massachusetts. Tilson had early involvement with Maine Fiber Company to aid

in the design, permitting, municipal outreach, construction, vendor management, grant compliance, and close out of this 1,100-mile dark fiber network. Additionally, Tilson provided administrative, executive and financial support to MFC as an entity during their start up years. Tilson also provided dark fiber market analysis, and deal negotiations with the first carrier, utility, government, and enterprise users. Today, MFC engages with Tilson for multiple services including route engineering, permitting, and make ready management for its last mile connections.

**Project Manager: Kelly Brewer | kbrewer@tilsontech.com | (207) 229-3699**

### *1.1.5.2 MassBroadband 123*

Tilson served as owner's engineer and project manager for the $91 million, Department of Commerce, National Telecommunications and Information Administration funded MassBroadband123 project, a 1,300-mile fiber optic network build out to over 900 public safety and other state facilities including E911 centers, state police barracks, and fire/rescue locations. Our responsibilities included strategic planning, route design, business modeling, cost estimation, test and acceptance procedure design, intergovernmental coordination between Department of Transportation, public safety agencies, and industry, and project and construction management services in this engagement. This has included developing a comprehensive construction cost estimate for the design build requirements and managing over 20,000 Verizon, Western Mass Electric Company, National Grid, Unitil, and municipal light district-owned utility poles in licensing and make ready. Tilson network engineers developed next generation interoperability and design standards for Dense Wavelength Division Multiplexing (DWDM), routing, voice, and switching facilities. Tilson has also provided consulting and analysis for MBI's planning of its last mile initiatives, including a 2012 study of fiber and wireless last mile broadband options, and a 2016 evaluation of responses to MTC's cable line extension RFQ.

**Project Manager: Kelly Brewer | kbrewer@tilsontech.com | (207) 229-3699**

### 1.1.5.3 MaineCom Services

Tilson manages over 230 route miles of fiber for MaineCom Services, a subsidiary of energy company Iberdrola USA. Since 2010, MaineCom has contracted with Tilson to manage and expand its installed network of aerial and underground fiber route miles in central and southern Maine. Tilson provides ongoing network management services including fiber maintenance and repair, maintaining pole attachment rights, permitting, engineering, business development, new construction management, and contract negotiations. The MaineCom network has 225 miles of aerial fiber and five miles of underground conduit with 140 separate customers.

**Project Manager: John Costa | jcosta@tilsontech.com | (207) 239-1605**

### 1.1.5.4 Commonwealth of Pennsylvania

Pennsylvania retained Tilson to advise it on how to structure an ambitious program to improve broadband access in rural, unserved, and/or underserved parts of the state. Working with CostQuest, we are designing the foundation of the state's approach to addressing the digital divide. Tilson's current scope includes:

- Analyzing federal funding opportunities, especially through the Federal Communications Commission (FCC), and identifying strategies for maximizing opportunities for federal funding to the state
- Reviewing broadband infrastructure in the state and advising on possible ways to use that infrastructure
- Analysis and recommendations on proposed broadband agreements with third parties
- Review of map and GIS data generated by CostQuest to identify patterns in un/underserved areas, demographics, and cost estimates to serve in order to arrive at a list of targeted areas to support
- Using all the above, advise on the design of a state broadband program.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

### 1.1.5.5 New NY Broadband Program

Tilson provided services to the New New York Broadband Program Office (BPO) in connection with its New NY Broadband Grant Program. This program allocates up to $500 million in state grants to subsidize broadband providers in building their networks to unserved and underserved parts of New York State. Grants were allocated via a reverse auction process that Tilson designed and implemented. Services provided included technical and financial reviews of proposed projects, program design, and consultation on policy issues. Project work has included providing an interface with broadband service providers and structured collection of data requested by the BPO. Tilson provided project management of a consulting team on the review of New NY grant applications, including the BPO's GIS vendors. Tilson also consulted as part of the BPO's advisory team on the application of geospatial analysis to programmatic questions, especially the development of grant-eligible census blocks and partial blocks from service-provider data, FCC Form 477 data, and future Connect America Fund-eligible areas.

Following Tilson's performance in Phase 1, the Broadband Program Office (BPO) re-engaged Tilson in the same capacity for Phase 2 of the New NY Broadband Grant Program. Services provided in this phase included pre-evaluation planning efforts, technical and financial reviews of proposed projects, program design, and consultation on policy issues. The pre-evaluation planning efforts consisted of leveraging Phase 1 efficiencies, minor tweaks, the mechanization of certain application materials, a streamlined Reverse Auction tool, and mechanization of the final reports generated by the results of the Reverse Auction. Because of these process efficiencies, Tilson could meet the thirty (30) day timeframe associated with Phase 2 of the program despite twice the volume of applications received in Phase 1.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

### 1.1.5.6 ConnectNY Broadband Program Field Audits

Prior to the New New York Broadband Program, Tilson provided services around the State Grant Awards issued under the ConnectNY Program. Services provided included interviews with the awardees, conducting field verification, and generating reports on a sample of projects selected by the BPO for desktop review. Interviews with the awardees were centered on a status update in regards to their Project Milestones and Key Project Indicators (KPIs), any potential red flags while constructing their awarded network, and required follow up items by the BPO. The sample of field audits looked to verify that

the awardees' networks have been built according to the documented KPIs, Project Milestones, submitted address points, proposed broadband speeds, and constructed to industry standards.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

### *1.1.5.7 Broadband Strategies for City of Topeka and County of Shawnee, Kansas*

In 2014, the Kansas Department of Commerce (KDOC) commissioned an economic impact study of the installation of a high-speed broadband network in the City of Topeka and Shawnee County. The Topeka and Shawnee County Joint Economic Development Organization (JEDO) would now like to formulate and execute a plan to form public-private partnerships necessary to build and operate a fiber-to-the-premise network or wireless ISP infrastructure within the City and County. In 2017, JEDO commissioned Tilson to help it better understand four potential business models for these options and provide actionable strategies for proceeding. Prior work had included economic analysis by CostQuest, which developed an edition of its industry-standard Gigabit Cities financial model for the City of Topeka.

The 2017 project scope included:

- Tilson produced a high level design fiber to the premises network for not only Topeka but also the part of Shawnee County outside City limits. We also produced a high level design for a fiber-fed wireless network to provide broadband services in Shawnee County outside Topeka.
- Tilson used our active network engineering experience to develop updated cost estimates for the fiber and wireless options.
- Using the updated costs, CostQuest re-ran its Gigabit Cities Model with four potential operating models reflecting the most likely options for network ownership and operation, plus the alternative wireless approach.
- Camoin Associates provided a peer review and updated projections from the 2014 economic impact study.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

### 1.1.5.8 Southeastern Colorado Counties

*Baca, Bent, Crowley, Kiowa, Otero, and Prowers Counties, Colorado*

Tilson is currently working with a six-county region in southeastern Colorado to develop a strategic broadband plan that will enable the region to improve its infrastructure in a manner that leverages existing national, state and private resources. Tilson is currently assisting the region with defining broadband goals, mapping current broadband infrastructure and service availability, conducting community education and input workshops, developing and administering a survey, documenting national, state and private broadband efforts underway, identifying broadband gaps, developing design solutions for a sample of unserved areas, and providing an overview of operating model options. The result of the project will be a strategic plan document and series of community meetings with each county to educate residents and receive input on desired solutions. Following the successful completion of this project, the region will have a plan in place to build out connectivity subject to funds availability and political desire to do so.

**Project Manager: Liza Quinn | equinn@tilsontech.com | (207) 318-9032**

### 1.1.5.9 City of Cambridge, MA (Broadband Assessment & Feasibility Study)

Tilson conducted a comprehensive inventory of existing broadband services in the City of Cambridge and proposed three alternatives for FTTP encompassing different levels of capital commitment and connectivity. As part of this project, Tilson assisted the City's Broadband Task Force and City staff develop recommendations to the City Council. First, Tilson developed and implemented a community engagement plan to seek input from residents and businesses from all areas of the City, which included facilitating two large-group public meetings. Next, Tilson identified the service gap to define desired broadband service levels and determine underserved areas, then quantify their level of service compared with other parts of the City. Third, Tilson worked with the City and stakeholders to develop a range of alternatives for improving access. Finally, recognizing the community's desire for and the suitability to its needs of a fiber-based solution, Tilson proposed three discrete fiber network buildout plans suiting different capital commitment levels and service improvement goals. For each, Tilson provided a high-level network design and cost estimate. Tilson also advised the City on the tradeoffs and implications associated with different business and financing models for a municipal-scale network.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

### 1.1.5.10 New Shoreham, Rhode Island (Block Island)

Tilson performed an assessment of existing broadband infrastructure, advised the Town regarding technology and business model options for a town-wide broadband network, estimated its costs, conducted an RFI and helped the town select an ISP partner, and created a detailed cost estimate and engineering plan for a town-wide FTTH network. Tilson has also completed field surveys of all utility poles on island as part of the engineering of a hybrid GPON FTTH network with Active Ethernet overlay. Tilson also advised the Town on its purchase of the local electric utility. This included an assessment of the synergies associated with joint ownership of an electric utility and broadband service provider. Tilson continues to support New Shoreham as the Town debates financing the project, having already selected Tilson as a design-build contractor once funding is secured. Separately, Tilson has assisted Verizon Wireless to design, permit and implement their eastern New England pilot for ultra-dense small cell high speed LTE networks in this community.

**Project Manager: David Radin | dradin@tilsontech.com |(224) 430-2800**

### 1.1.5.11 City of Sanford, ME

Tilson prepared three distinct network designs and cost estimates, developed five alternative operating models, conducted a telecommunications asset inventory, and led vendor selection activities that identified a viable network operator and county partner. During the RFP, Tilson met with likely bidders to provide information and answer questions regarding the City's requirements, handled distribution of the RFP, held a pre-bid call with potential respondents, and prepared responses to vendor technical questions prior to review and scoring of vendor responses and the ultimate recommendation of vendor. Tilson also provided negotiations support which included meeting facilitation between the respondents and City stakeholders and negotiation support to secure the letter of intent from the chosen vendor.

The City applied for and won an Economic Development Administration (EDA) grant to fund the construction of Tilson's final design, a 35 mile municipal network connecting 87 community anchor institutions and businesses. Tilson is currently implementing an EDA-compliant RFP process for construction services to build the network.

**Project Manager: David Radin | dradin@tilsontech.com | (224) 430-2800**

### 1.1.5.12 Somerset County, ME

Tilson assisted the Kennebec Valley Council of Governments in securing a grant from the ConnectME Authority for broadband planning. Using the grant funds, Tilson partnered with a local wireless ISP to design a hybrid fiber-wireless network capable of providing high speed internet services to a significant portion of currently unserved or underserved towns in the county. The comprehensive solution also included a plan to provide affordable internet service and equipment, cultivate digital literacy, and provide publicly accessible computers. Deliverables included a high-level network design and cost estimate, business case analysis, and digital inclusion approach.

**Project Manager: David Radin | dradin@tilsontech.com | (224) 430-2800**

### 1.1.5.12 Middlebury, VT

Tilson's client for this project was the Middlebury Business Development fund (a cooperative effort between the Town of Middlebury, Vermont and Middlebury College). The Town of Middlebury, Vermont is a community with a population of approximately 8,500.

Tilson supported conversations with stakeholders, including Middlebury College, towns and school districts in the region, local health care providers, and key business users, to gauge and cultivate support for the Town's broadband improvement project. As part of this project, Tilson conducted a high-level inventory scan of the current broadband infrastructure and services in the region, identifying the broadband services offered in the area and the companies offering them with the objective of defining the service gaps in the Town. Tilson took the broadband standard sought and defined by the Middlebury Office of Business Development and identified the technical characteristics of such a network, including upload bandwidth, download bandwidth, latency, resilience, quality of service, identifying the range of applications that a network built to this standard would support, in particular applications relevant to the key stakeholders in the education, health care and economic development fields. As part of this work, Tilson also developed a high-level network design and cost estimate to implement a solution that met the community standard. In addition, Tilson provided business model alternatives and advice on selecting from among the alternatives as well as an analysis of financial models for a project, including different phases. Tilson also provided guidance and lessons learned from network build-outs in other similar communities and provided ongoing support for the Town's conversations with potential funders for a network.

**Project Manager: Chris Campbell | ccampbell@tilsontech.com | (802) 793-5439**

## 1.1.6 References

**Commonwealth of Pennsylvania**
Mark Smith, Director of Broadband Initiatives
markwsmith@pa.gov
(717) 736-2929

**Empire State Development, State of New York**
Jeffrey Nordhaus, Executive Vice President
jeff.nordhaus@esd.ny.gov
(212) 803-3515

**ConnectME Authority**
David Maxwell, FirstNet (formerly ConnectME)
david.w.maxwell@maine.gov
(207) 624-9793

**City of Sanford, Maine**
Steven Buck, City Manager
srbuck@sanfordmaine.org
(207) 324-9172

**Joint Economic Development Organization Shawnee County, Kansas**
Mark Biswell, Topeka IT Department
mbiswell@topeka.org
(785) 368-3718

## 1.1.7 Project Approach

Tilson has great experience in the various scope items requested. We are confident that we can perform all requested activities. We realize, however, that the full breadth of scope outlined in the RFP will not be feasible to accomplish within the 400 hours per year that the Council envisions. Therefore, we will work with the Council to determine which scope items to pursue and prioritize.

# 1.2 Scope of Items from Attachment A

## 1.2.1 Research Existing Infrastructure (§ 4.4.1 in RFP)

We will conduct a desktop analysis and field survey of broadband resources within the state, including fiber, cellular sites and towers, conduit, and rights of way. Tilson proposes to use the following resources to identify broadband infrastructure within the State:

- State's FiberLocator subscription
- Optionally, FiberLocator's cellular data layer. This is a premium data offering from FiberLocator. If the State does not currently subscribe to this Layer and would like access to this data, Tilson will procure a subscription upgrade on behalf of the State, and pass along the cost without markup.
- Mapping data obtained in 2014 via the State Broadband Initiative
- Public databases, like the FCC's Antenna Structure Registry
- Public and proprietary data the State may have on any State infrastructure or fiber, such as public safety or emergency management fiber resources

Tilson has extensive experience both performing field surveys for a wide variety of network owners, and interpreting map data for broadband consulting clients. We are familiar with all of the above types of data and will use that familiarity to develop a plan for targeted field surveys that makes the most efficient use of limited project hours. Field survey work may investigate fiber, tower, and other data amassed to verify that infrastructure listed in the database is present in the field, and develop a general understanding of the infrastructure's condition and suitability for use by the state or other interested party. Given time and budget constraints, this survey will by necessity not be comprehensive of the entire state. Our experience, however, is that the set of infrastructure available and useful for making improvements in broadband service is usually a subset of the available infrastructure, and much useful information can be identified by an experienced review correlating multiple mapped data sets. This will allow us to target our fieldwork to ensure it is collecting information about infrastructure likely to have a meaningful impact in achieving the state's goals and that we cannot glean from existing data sources.

Tilson can not only collect available data and develop new data from field survey, it can analyze and categorize the infrastructure based on its usefulness and strategic value to the state in meeting its goals. This may include:

- Last-mile infrastructure. What is the migration path for the different types of existing last-mile broadband networks toward supporting the types of services desired by the state? Where are there last-mile networks that appear to have an easy vs. a difficult migration path?
- Middle-mile infrastructure. What types of users are existing middle-mile networks oriented to serve? Have they been built and are they owned and operated in a manner consistent primarily with serving a limited number of business and institutional users, or are they good platforms for supporting last-mile services? Which networks in which areas provide robust options for delivering bulk Internet bandwidth into communities, and in which areas are the existing middle-mile networks (or lack thereof) bottlenecks?
- Public Assets. Are public assets, like towers or fiber, located and available in a manner that are useful for addressing gaps? Do they actually address a problem that would need to be solved in order to improve broadband service? Is there good information about capacity and availability.

Based on our analysis, Tilson will develop a set of recommendations on the best way to coherently use the disparate assets present in West Virginia to increase broadband availability and speeds in the State. Tilson has extensive experience assisting network owners design and deploy fiber and wireless networks, as well as advising public officials on broadband policy. This experience gives us understanding of how different types of infrastructure are useful for deploying different types of service.

The chief scheduling constraint is ensuring access to the data listed above. If these data are made available in a timely manner, Tilson can complete this analysis within 180 days. Tilson has an extensive pool of field resources in regions across the country, which will enable us to make available the needed resources to complete the surveys required within the schedule.

Relevant past projects:

- Commonwealth of Pennsylvania
- New New York Broadband Program
- Topeka and Shawnee County, Kansas
- Southeastern Colorado Counties
- City of Cambridge, MA
- New Shoreham, Rhode Island
- Somerset County, ME

## 1.2.2 Speed Test Portal and GIS (§ 4.4.2 in RFP)

The State already operates an Ookla server and does not wish to replace it at this time. Tilson will work with the State to evaluate and organize the State's Ookla data in a manner most conducive to supporting the State's broadband efforts. In addition, we will evaluate the State's existing GIS layers and suggest new ones that would be useful to prospective broadband or other telecommunications providers who are investigating West Virginia for their operations.

If the Council wishes to deepen its analysis of available speed test data, Tilson can also augment West Virginia's Ookla test server data with free, publicly-available speed test data from Measurement Labs. A partner with Google, Measurement Labs is another speed test provider whose approach is somewhat different from Ookla's. Ookla typically locates its speed test servers on ISP networks, so its test results tend to reflect the speed over the last mile connection to the customer. Measurement Labs intentionally selects speed test servers that are not located near the customer. Their results, therefore, provide a more "real world" speed test reflective of the path that data must travel over the broader Internet. In West Virginia's case, speed tests are conducted between the State's Ookla server and customers. This data may provide an interesting "middle ground" of testing where data must traverse a more limited set of networks than in a Measurement Labs test.

In any event, Tilson will analyze the State's Ookla data and the Measurement Labs data to arrive at a clearer picture of broadband in the state. We will incorporate the FCC's Form 477 data in this analysis and compare advertised speeds with actual speeds West Virginia residents experience.

For GIS support and analysis, Tilson proposes proposes CostQuest as a subcontractor on this portion of the project. CostQuest is the leading broadband analysis and mapping firm in the United States. Judicious use of CostQuest resources will allow the project to benefit from CostQuest's considerable expertise while remaining within budget.

We propose to have CostQuest do the following as part of this scope item, in order to make the most efficient use of time and resources:

- Set up an online GIS data repository to house available data and produce mapping exports
- Develop a Data Request for State Agencies form to request available mapping data that various agencies may have, with one round of followup communications for clarification. Working with the State's GIS office to the extent possible will help keep costs down.

- Build a GIS speed layer based on Ookla and other data we discover
- Gap Analysis costing GIS layer showing indicative capital and operations/ maintenance costs on a per-census block or block group level.

Relevant past projects include:

- New New York Broadband Program
- Southeastern Colorado Counties
- City of Cambridge, MA

## 1.2.3 Develop Technical Broadband Plan (§ 4.4.3 in RFP)

In addition to the information obtained in items 4.1 and 4.2, Tilson recommends that a Technical Broadband Plan be preceded by a Gap Analysis as called for in item 4.4. This will allow for much more targeted and cost-effective analysis.

Using data amassed in the assessment of existing infrastructure and speed test analyses, Tilson will develop a comprehensive but high-level plan for a prospective state broadband solution. We will identify and prioritize service territories by current service levels and magnitude of cost to serve. For each territory, we can if desired provide a high-level network design for various types of network as appropriate, such a middle-mile fiber, last mile fiber, or wireless networks. The design will be consistent with the basic requirements arrived at in the kickoff meetings. High-level designs will include proposed routes of major cables, major equipment locations, potential interconnection points with carrier or ISP networks, and a high level cost estimate.

- Service Territories. Tilson will divide the State into logical service areas based on our desktop analysis. These may be broken out by demographics, terrain, or other existing boundaries, such as counties or regions within the state.
- Routes for Backhaul and Distribution. Based on the service territory layout and other considerations, we will design a high-level route plan for a network backbone. This will enable the modular and flexible addition of varying areas of the state to the network, so that the State has the flexibility to construct distribution and last mile portions in a manner that fits with its budget and goals.

- Interconnection. The backhaul route will be designed to pass by and have the capability of interconnection with multiple points of presence or network meet-me facilities to ensure reliable internet access.
- Capacity and Expansion Strategies. A core tenet of the network design will be the capacity to serve substantially all residents and businesses in West Virginia today, with ample room for further growth.
- Providers. A plan for attracting and selecting provider(s) to be active on the network will be included. This will also depend on the business model selected for the network.
- Business and Technical Models. There are several potential business and technical models for a state broadband network. Tilson will describe up to three business models based on our analysis and make recommendations. Technical approaches will flow from the above items, as well as business models.
- Market Analysis. We will provide a discussion of the market for the proposed network.
- Cost Estimate. A high level cost estimate for the proposed network design will be provided. This will include materials and labor for construction. A discussion of the operating budget for each of the proposed business models will also be included.
- Funding Resources. We will identify common funding resources that the State may wish to pursue. This will also include a discussion of funding resources available under the different business models discussed.

Should the State desire, Tilson can further assist by crafting a strategy for pursuing CAF funding. We have significant experience in this with Pennsylvania and New York State as clients. Tilson will write a proposed set of broadband program rules that the State can use to demonstrate its intention to comply with FCC requirements that would permit issuance of a waiver releasing CAF funds for allocation by West Virginia. In addition, we will recommend a strategy that also allows the state to address non-CAF areas that it may wish to target, and that can serve as a fall-back plan should the FCC not grant a CAF waiver. The strategy will include broadband goals, policy recommendations, recommended funding levels, staffing/organizational recommendations for implementations, and any recommendations for how to leverage state assets analyzed.

In addition to policy matters, Tilson has great hands-on experience with broadband networks, both fiber and wireless based. We are a fiber and cellular construction contractor licensed in several states, including West Virginia (license no. WV052094).

Relevant experience includes:

- Maine Fiber Company
- MassBroadband 123
- MaineCom Services
- Joint Economic Development Office (Topeka/Shawnee County, Kansas)
- New Shoreham, Rhode Island
- Somerset County, ME

## 1.2.4 Broadband Gap Analysis (§ 4.4.4 in RFP)

A gap analysis is a common feature of Tilson's broadband consulting engagements. Analysis conducted as part of items 4.1 and 4.2 will provide a firm foundation for describing the present state. In one of the most comprehensive examples, Tilson performed designed and implemented a community engagement plan as part of developing a broadband plan for the City of Cambridge, MA. There, Tilson conducted a comprehensive inventory of existing broadband services in the City of Cambridge and proposed three alternatives for FTTP encompassing different levels of capital commitment and connectivity. First, Tilson developed and implemented a community engagement plan to seek input from residents and businesses from all areas of the City. Next, Tilson identified the service gap to define desired broadband service levels and determine underserved areas, then quantify their level of service compared with other parts of the City. Third, Tilson worked with the City and stakeholders to develop a range of alternatives for improving access. Finally, recognizing the community's desire for and the suitability to its needs of a fiber-based solution, Tilson proposed three discrete fiber network buildout plans suiting different capital commitment levels and service improvement goals. For each, Tilson provided a high-level network design and cost estimate. Tilson also advised the City on the tradeoffs and implications associated with different business and financing models for a municipal-scale network.

We propose the following in West Virginia:

- An articulation of the services generally available in the state, including cable, DSL, satellite, and fixed wireless. The goal here is to identify providers and service plans that significant portions of the population currently have access to, not to provide an exhaustive inventory of current service providers.
- We would then work with the Council's stakeholders to develop and articulate a description of future needs and requirements for broadband services and meaningful use. Depending on the amount of time that the Council wishes to devote to this task, we can work directly with Council members and staff in a single brief intensive session, or implement a multi-session discussion with various stakeholder groups. We can also simply adopt a set of future requirements if these have already been defined by the Council.
- A definition of the service gap. This will not only include a discussion of where services meeting the FCC's broadband standard are available, but can also include considerations such as affordability and equity, competition, and support for small business or enterprises.

Relevant project experience includes:

- City of Cambridge, MA
- Southeastern Colorado Counties
- Middlebury, VT
- Commonwealth of Pennsylvania

## 1.2.5 Collaborate with State and Local Government (§ 4.4.5 in RFP)

Tilson has extensive experience collaborating with state, regional and municipal governments around the United States. This includes designing and implementation state broadband programs in New York and Pennsylvania and working with municipalities around the country to promote broadband adoption and infrastructure development. Tilson's principal consultant on the project, Chris Campbell, is a seasoned senior telecommunications expert at the state level who has advised state policy makers and crafted legislation, regulatory reforms, and administrative policy. Tilson works with clients to help them understand what their policy options are, and which options are most impactful,

either positively or negatively. Our experience working with both government clients and private network owners and operators provides us deep insight into the industry and how decisions are made and helps us understand how the objectives of public policy interact with the development and operation of broadband infrastructure and services.

All of Tilson's project experience outlined in this document is relevant to this section.

## 1.2.6 Review State Laws and Policies (§ 4.4.6 in RFP)

The Tilson consulting team includes members with deep experience in crafting state broadband policy. Chris Campbell served for a decade and a half in various telecommunications policy roles in Vermont, including the Director for Telecommunications at the Vermont Department of Public Service, Director of Network Infrastructure in the Vermont Agency of Administration, and the Executive Director of the Vermont Telecommunications Authority. In these roles, he crafted regulatory reforms, wrote and shepherded proposed legislation, and advised State Commissioners and the Governor on public policy related to telecommunications. Among his policy successes were reform of state pole attachment rules to improve access for broadband and wireless companies to this critical infrastructure, clarifying the ability of broadband providers to highway rights-of-way, and the negotiation with major telephone and cable companies for major increases in broadband services. Chris is currently advising the Commonwealth of Pennsylvania on state policies and programs to facilitate broadband access, including access to state buildings, land, and rights of way.

Tim Schneider, Tilson's General Counsel, served as Maine Public Advocate, where he drafted proposed legislation, created legislative strategy, and built coalitions to successfully enact multiple laws promoting expansion of broadband access in Maine. This included support for community broadband planning, stabilizing funding for the Maine School and Library Network, and reforms to pole attachment rules.

Tilson's consulting engagements at the local and federal level have also exposed it to a range of dig once policies. We have worked with municipalities that have long-established Dig Once policies, advised on the creation of new policies, and crafted an overview of Dig Once policies for the National Telecommunications and Information Administration.

## 1.2.7 Develop and Present Marketing Strategies (§ 4.4.7 in RFP)

We have extensive experience working with long-haul and middle mile networks. Tilson's relevant experience includes its work for the Maine Fiber Company "Three Ring Binder" and MaineCom Services.

As part of the engagement, Tilson can examine West Virginia and the neighboring geographies for opportunities to identify potentially attractive long-haul routes that may also overlap with areas identified in the gap analysis. We would consider factors such as possible routes that provide low-latency routes and redundant connection between major and regional internet hubs. We will also advise the Council about strategies to encourage the "off ramps" that bring benefit to West Virginia, not merely relegate it to an area passed through.

## 1.2.8 Develop and Present Communications Strategies (§ 4.4.8 in RFP)

Tilson proposes to subcontract part of this scope item to Camoin Associates. Broadly speaking, we propose four components for a digital inclusion strategy in West Virginia:

1. Affordable Services. Devise methods for providing affordable internet access to low-income residents, or identify affordable options that currently exist.
2. Affordable Equipment. Identify ways that low-income residents can get access to computers or other broadband-capable devices.
3. Training. Tilson will identify suitable locations within the State to provide training on computers and broadband, and suggest potential course topics.
4. Publicly-Accessible Equipment. Tilson will suggest venues and ways to improve public access to computers for residents who cannot otherwise afford their own.

### *1.2.8.1 Proposed Communications Strategy Approach*

As the first step in formulating a successful communications strategy, Tilson and Camoin will work with the Council to define the target audience and intended central message or messages that need to be conveyed. In this case, the target audience may be the ultimate "customer", namely the businesses or individuals in question, or it may be the intermediary service providers, such as workforce development and economic development agencies, who will then convey the messages to the customers. The messages to be conveyed will depend on the audience and the desired outcomes of the campaign, but would be focused on the utilization of broadband for economic development purposes. We will then define the most appropriate marketing channels and strategy to be employed, with input from the Council, and will then either (1) produce the collateral materials, or (2) provide clear direction to the Council for how the Council could procure those materials, as appropriate. Finally, we will issue a memo with appropriate guidance as to how the Council should proceed with the final content, message and distribution channels.

### *1.2.8.2 Previous Camoin Project: Washington County, NY Tourism Economic Impact Study and Strategic Plan*

Washington County, NY is located between New York's Capital region to the west and Vermont to the east. The county is dotted with unique tourism offerings and events that occur year-round, which are enjoyed by residents and visitors alike. The County engaged Camoin Associates to first conduct an economic impact study of the overall tourism industry and with the findings complete an action plan matrix with tasks to thoughtfully support local tourism businesses.

It was apparent from initial data collection that second homeowners make up over 50% of tourism spending in the county and therefore Camoin worked with the county to create and distribute a second home owner survey to the county's nearly 2,250 second homes.

On top of quantitative analysis, Camoin facilitated two community meetings, one in the northern and southern part of the county, that brought together local businesses, Chambers of Commerce, and interested community members. **The meeting was an opportunity for Camoin to hear directly from businesses, as well as roll out our "Digital Directories" document, which guides businesses as to where and how to build their online presence. Shortly after the meeting, some businesses had already taken to the internet to upload their information with the intention of passing along the handout to other business partners to build a stronger digital network.**

It was clear from speaking with local businesses that more deliberate efforts to coordinate and cross-promote events and venues could improve revenue generated at businesses and the overall level of spending within Washington County. The County will issue a RFP in the summer of 2017 in search of a team that can support and eventually grow the region's tourism economy.

Project Highlights

- Economic impact study
- Second home owner survey and analysis
- Local business community engagement

## 1.2.9 Assistance with Broadband Infrastructure Projects (§ 4.4.9 in RFP)

Tilson has been involved in various aspects of grant funding, working either for the grantor or grantee. This includes:

- Maine Fiber Company
- MassBroadband 123
- City of Sanford, Maine
- City of Ellsworth, ME. Similar to Sanford, Tilson designed and constructed a municipal fiber backbone, for which the City successfully received funding from the Northern Borders Regional Commission (NBRC). NBRC is a regional commission like the Appalachian Regional Commission.
- FirstNetME. Tilson manages the National Telecommunications and Information Administration awarded, State and Local Implementation Grant Program-funded FirstNetME project (FirstNetME) under the guidance of the ConnectME Authority in the State of Maine. FirstNetME is the statewide program to prepare Maine for the design, deployment and operation of the Nationwide Public Safety Broadband Network (NPSBN). Tilson performs both project management and technical execution functions. These include reporting, ensuring compliance with grant requirements, needs assessments, stakeholder engagement, and research of legal and policy issues affecting the project.

In addition, Tilson's Chris Campbell has some further specific experience in his role prior to joining Tilson:

- As part of the Economic Stimulus and Recovery Office in the Vermont Agency of Administration, Chris helped entities in Vermont win more than $200 Million in grants for Broadband and Smart Grid projects from the U.S. Departments of Commerce, Agriculture, and Energy.
- At the Vermont Telecommunications Authority, Chris oversaw the successful implementation of more than $40 Million in federal BTOP grant funding, and obtained additional grant funding for telecommunications projects from the EDA and NBRC.

## 1.2.10 Develop State Oversight Capabilities and Project Management (§ 4.4.10-11 in RFP)

Tilson has significant experience working with state governments to develop state capabilities and provide reporting. We will design and assist with the implementation of methods and programs to aid State staff in oversight, monitoring and reporting of broadband infrastructure projects as coordinated with the Council. We will also develop and produce all written forms, documentation project management, data management and tracking tools necessary to accurately and completely collect, compile, manage, and analyze data for effective record keeping and compilation in the Council's annual report, as coordinated with the Council.

Relevant projects include:

- New York Broadband Program Office/Empire State Development
- Commonwealth of Pennsylvania
- State of Vermont. Prior to joining Tilson, Chris Campbell oversaw the state broadband grant program for the State of Vermont, where he and his team monitored and reported on awarded projects.
- Maine State Library. Tilson provided regular, comprehensive reporting to the Maine State Library in our execution of a $1.36 million grant from the federal Broadband Technology Opportunities Program to procure and configure over 500 computers, teleconferencing systems, and other technology in 107 libraries across the state.

## 1.2.11 Periodic Reporting (§ 4.4.12 in RFP)

Tilson will produce reports as directed under this scope. We have almost 10 years of experience working with government-funded projects and complying with their reporting requirements. Examples include:

- FirstNetME. Part of Tilson's scope on this NTIA-funded project is periodic reporting to comply with grant requirements. We are intimately familiar with the complexity of federal grant reporting and can assure proper handling of this process.
- Sanford, ME. Tilson is the project manager for the Economic Development Administration-funded SanfordNet municipal broadband project and provides all reporting mandated by the EDA to comply with its grant provisions.
- MassBroadband 123. Tilson served as owner's engineer and project manager for the $91 million, Department of Commerce, National Telecommunications and Information Administration funded MassBroadband123 project, a 1,300-mile fiber optic network build out to over 900 public safety and other state facilities including E911 centers, state police barracks, and fire/rescue locations. Our responsibilities included strategic planning, route design, business modeling, cost estimation, test and acceptance procedure design, intergovernmental coordination between Department of Transportation, public safety agencies, and industry, and project and construction management services in this engagement. This has included developing a comprehensive construction cost estimate for the design build requirements and managing over 20,000 Verizon, Western Mass Electric Company, National Grid, Unitil, and municipal light district-owned utility poles in licensing and make ready. Tilson network engineers developed next generation interoperability and design standards for Dense Wavelength Division Multiplexing (DWDM), routing, voice, and switching facilities.

## 1.2.12 Update of 2014 Broadband Strategic Plan (§ 4.4.13 in RFP)

Tilson has prepared strategic broadband plans for multiple municipal and county clients across the United States, in addition to the work already outlined for New York and Pennsylvania:

- MassBroadband 123. Tilson has also provided consulting and analysis for MTC's planning of its last mile initiatives, including a 2012 study of fiber and wireless last mile broadband options, and a 2016 evaluation of responses to MTC's cable line extension RFQ.
- Vermont. Tilson advised the Vermont Telecommunications Authority on dark fiber lease rates.
- Rhode Island. The Rhode Island Office of Digital Excellence retained Tilson to evaluate broadband availability and provide recommendations on two underserved islands in the state, Aquidneck and Block Islands.

Before becoming Director of the Vermont Telecommunications Authority, Chris Campbell was the state's Telecommunications Planner. As such, he was the primary author of the Vermont Telcommunications Plan, a comprehensive planning document to guide telecommunications policy across the state government.

# 2. Attachment B - Mandatory Specification Checklist

The following mandatory requirements must be met by the Vendor as a part of the submitted proposal. Failure on the part of the Vendor to meet any of the mandatory specifications shall result in the disqualification of the proposal. The terms "must", "will", "shall", "minimum", "maximum", or "is/are required" identify a mandatory item or factor. Decisions regarding compliance with any mandatory requirements shall be at the sole discretion of the Purchasing Division.

**5.1** Federal funds may be associated with any contract awarded under this RFP. The selected firm will be required to comply with Title VI of the Civil Rights Act of 1964, Executive Order 11246, Section 109 of the Housing and Urban Development Act of 1974, Section 3 of the Housing and Urban Development Act of 1968, Conflict of Interest Statement and Access to Records provisions and all other requirements as related to HUD-funded projects. Minority and Women-owned Business Enterprises shall have the maximum opportunity to participate in the performance of this work.

**Vendor Response: Tilson will comply with the above listed requirements**

**5.2** Ordering and Billing Process: Vendor must provide a single blended rate for all work performed under this contract. The hourly rate must include any travel costs.

1. The Council will develop a scope of work upon execution of a specific Project Goal and deliverable.
2. The Vendor will provide an estimate of hours for completion.
3. Upon reaching agreement on the scope, the Council will execute a delivery order to authorize the work. Vendor is not permitted to exceed the estimated number of hours without express authorization from the Council.
4. The Vendor will provide an itemized bill based upon hours actually worked; not an estimate.
5. The Council will review and processes payment based on the hourly rate, hours worked and deliverables specified inthe Agreement.

**Vendor Response: Tilson will comply with the above listed requirements**

**5.3** All materials, maps, reports and data generated as a result of any agreement shall remain the property of the Broadband Council.

**Vendor Response: Tilson will comply with the above listed requirements**

By signing below, I certify that I have reviewed this Request for Proposal in its entirety; understand the requirements, terms and conditions, and other information contained herein; that I am submitting this proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that, to the best of my knowledge, the bidder has properly registered with any State agency that may require registration .

Tilson Technology Management, Inc.

*(Company)*

Jay Ford, Director of Government and Institutional Consulting

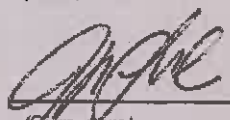
*(Representative Name, Title)*

(207) 358-7403

*(Contact Phone/Fax Number)*

2/27/18

*(Date)*



*(Signature)*

# We look forward to working with you.

**COMPANY DATA AND CONTACT**


**COMPANY NAME :**
TILSON TECHNOLOGY MANAGEMENT, INC.

**COMPANY ADDRESS**
16 MIDDLE ST.
PORTLAND, ME 04101
UNITED STATES

**CONTACTS :**
E: JFORD@TILSONTECH.COM
P: 207.358.7403
F: 207.772.3427


## Enabling great organizations to innovate and deliver

WWW.TILSONTECH.COM

**ADDENDUM ACKNOWLEDGEMENT FORM**
**SOLICITATION NO.: COM1800000001**

**Instructions:** Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

**Acknowledgment:** I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

**Addendum Numbers Received:**
(Check the box next to each addendum received)

| | | | |
|---|---|---|---|
| [X ] | Addendum No. 1 | [ ] | Addendum No. 6 |
| [ ] | Addendum No. 2 | [ ] | Addendum No. 7 |
| [ ] | Addendum No. 3 | [ ] | Addendum No. 8 |
| [ ] | Addendum No. 4 | [ ] | Addendum No. 9 |
| [ ] | Addendum No. 5 | [ ] | Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Tilson Technology Management, Inc.
Company

Authorized Signature

2/27/18
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.