The Eastern Transportation Coalition

Fiber/Broadband Information Exchange

Held April 22-23, 2025

Linthicum, Maryland

March 2026

Executive Summary

The Eastern Transportation Coalition (TETC) is dedicated to tackling emerging transportation challenges related to technology and policy by fostering collaboration, advancing research, and sharing best practices among its members. During a TETC Executive Board meeting, the procurement, deployment, and ongoing maintenance of fiber optic networks for transportation applications emerged as significant priorities for member agencies. In response, TETC organized a two-day peer exchange event, bringing together State DOT Transportation Systems Management and Operations (TSMO) managers and fiber and communication leads to discuss the planning and execution of major fiber optic projects. The event provided a platform for sharing insights into how different State DOTs have approached these complex initiatives.

Throughout the program, roundtable discussions centered on identifying and prioritizing the needs for fiber communications along interstate corridors, as well as addressing contract considerations and operational strategies. Panel sessions highlighted best practices for sustaining fiber programs over the long term and emphasized the importance of clear communication and strong partnerships. Public-private partnerships were recognized as particularly valuable, offering opportunities to leverage external expertise and resources. Participants also underscored the importance of establishing a solid baseline of information to understand where the industry was and what partners might offer through Request for Information (RFI) processes. This was noted as an important foundational step in defining a framework for fiber programs.

Although the event focused on fiber optic networks, many attendees noted that the broader goal is to ensure reliable data transmission across all broadband technologies—whether fiber, wireless, or copper. Additional lessons included the need to account for permitting timelines in construction planning and the strategic recommendation that State DOTs should concentrate on building robust backbone infrastructure, leaving middle-mile and last-mile connectivity to be addressed by others at a later stage. These insights collectively reinforced the value of collaboration, adaptability, and long-term planning in advancing transportation technology initiatives.

Introduction

Fiber programs within the State Departments of Transportation (DOTs) context generally refers to organized efforts to design, deploy, and maintain a fiber optic network for communication and data transmission within the state's highway right-of-way, often along interstate corridors. The programs in some states involve public-private partnerships where telecommunications companies or other entities are granted access to install and operate fiber optic cables in exchange for providing capacity or other benefits to the DOT. These programs help the DOTs modernize transportation infrastructure, support intelligent transportation systems, expand broadband access, and create value for both the state and private sector by leveraging shared resources and reducing overall deployment costs.

The procurement, implementation, and maintenance of fiber networks for transportation-specific applications have been identified as a key area of interest for TETC member agencies. TETC hosted this information exchange for DOT staff to discuss and explore the various planning stages involved in major fiber optic deployments and examined how different State DOTs have approached these efforts.

The Information Exchange was attended by 32 TSMO professionals and DOT staff. A copy of the various slide decks displayed over the day and a half event are included as Appendix A.

The Program – Day 1

Day 1 started with a welcome from **Trish Hendren, Executive Director of TETC** who shared that the motivation for the peer exchange originated from a TETC Coalition Board event where several executives discussed their different approaches to deployment and management of fiber. During that event, a request was made that TETC facilitate the exchange of information about fiber / broadband practices. The increasing attention to connect all communities by "lighting up the interstate" has put additional demands on transportation agencies to be part of solution, if not the lead.

Participants introduced themselves—the group included DOT TSMO leaders and communications specialists. The agenda for the day began with a look at how fiber deployments are planned as part of traditional DOT planning processes. The group then discussed corridor prioritization, resource sharing, and collaboration. After that, the conversation moved to how to value and use fiber resources once they are operational. The day ended with roundtable discussions on contract mechanisms and asset management concepts.

The Planning Stages of Fiber Deployments

Mike Floberg, former Director of Innovative Technology for Kansas DOT (KDOT), joined the group as a national expert and provided an overview of the demographics of Kansas to set the stage on several characteristics in the state that influenced its fiber program. Kansas has a mature fiber program with a nearly three-decade history. In the beginning early efforts required awareness building and education since the agency was rooted in building traditional highway infrastructure, not communication networks. There were also learning curves associated with partnering with the private sector to craft the program. The build out of the backbone was led by the Intelligent Transportation Systems (ITS) Group within KDOT and this group was located in the Planning Bureau.

Ultimately, the initiative supported KDOT's ITS program, connected remote KDOT offices and helped other state government functions. More recently the fiber network in Kansas has benefited from National Telecommunications and Information Administration (NTIA) grants to further build out its network.

> "YOU CAN NOT BUILD OUT FIBER WITHOUT PARTNERING"
>
> – MIKE FLOBERG, KDOT (Ret.)

Mike also detailed Kansas' approach and focus on building out the backbone/ long-haul aspects of the network and how the middle mile and last mile were often still challenging. Kansas has focused on implementing the fiber backbone and has included a good deal of middle mile links. They have not provided "last mile" connections as they understand that the Federal Communications Commission (FCC) gets involved when that last mile connection is made.

Eric Bathras, Chief Technology Officer for the Maryland Department of Information Technology (DoIT), then spoke about Maryland's planning stages for their fiber deployment program.

As Maryland began their program, they started with the Business Case for the fiber resource that first recognized it would not be a one and done project; it was a much larger strategy to continually build out the network. He made the point that DOTs are generally the largest landowner in a state and as such have a good bargaining position when talking with telecommunication providers.

Maryland's deployment plan defined four layers, and they refer to the plan as Goldilocks Builds. They assess their programs for what the layers cost and where they can find early wins. The four layers are:

- Layer 1 – Transportation Variables (high priority DOT corridor, ITS devices, key long-haul or middle mile)
- Layer 2 – Vertical Assets (resource sharing, revenue generation, public safety, coverage gaps)
- Layer 3 Government Institutions (corridor facilitates middle or last mile connectivity)

- Layer 4 – Community Need (corridor facilitates last mile connectively to the un- or underserved

Approach to Fiber Deployment from a DOT Perspective

Mike Floberg noted the need for right-of-way (ROW) management and in Kansas they followed their established utility accommodation policy (Microsoft Word - UAP 2007.doc) and permitting processes. Construction projects follow the established processes for utility locates and he cautioned that when railroads were involved that generally added time and effort.

Kansas has established processes for documenting where their fiber deployments are. They have asset mapping and documentation requirements where GIS coordinates are required, electronic permit processes are followed, and as-built plans are developed. Kansas is currently working on a dig-once policy. Mike emphasized the value of having a map of resources and having that map at all meetings. It is important to know what the agency has and what the agency would want (as far as fiber additions). The map shown here is maintained by KDOT and shows where its fiber resources are in the state as well as project numbers associated with the construction of these resources.

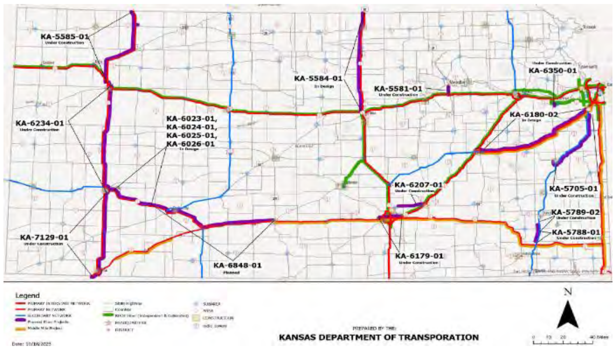


Figure 1 Fiber Location Map in Kansas

The KDOT fiber network provides redundancy for their 800 MHz radio system which assists in resiliency and emergency access.

Mike led a discussion highlighting several crucial lessons learned from fiber deployment initiatives, drawing particular attention to the value and management of the fiber assets. He stressed that, for any DOT considering a fiber build or partnership, it is essential to thoroughly assess the worth of existing and future infrastructure. For example, when a fiber route requires the DOT to bore underneath a river, the agency should maximize the number of conduits installed during initial construction. This approach is rooted in the reality that the labor and equipment costs associated with such projects far outweigh the material costs of the conduit itself. Once a conduit crossing is established, it becomes a highly valuable resource for future use, making it sensible to plan for long-term utility.

Another key lesson from Kansas's experience relates to procurement. Mike advised that agencies should source fiber from a "master fiber reel" whenever possible, aiming to minimize the number of splices required during deployment. Fewer splices in the backbone run reduce potential points of failure and maintenance challenges, supporting a more robust and reliable network. Maintenance in Kansas has become more difficult due to aging fiber; after two decades, the glass within the cables is breaking down and impacting reliability.

Mike also addressed the complexities of contract durations in large fiber partnerships. In Kansas, the DOT entered into a 30-year contract with a telecommunications company, a timeframe that, while providing stability, also introduces risk given the rapid pace of technological change. Mike suggested that contracts of this length should be designed with built-in flexibility, allowing for review and adjustment every five years to accommodate evolving technology, market conditions, and agency needs.

A notable cautionary tale emerged from Kansas's experience with conduit deployment. Years after construction, the DOT attempted to deploy fiber through previously installed, but unused, ducts—only to discover that the ducts had collapsed under the weight of backfill. This incident underscored the importance of including specific provisions in contracts requiring technology partners to repair collapsed conduits at their own expense. Such clauses help protect the DOT's long-term investment and ensure the viability of the infrastructure for future projects.

Mike's insights collectively emphasize the need for foresight, flexibility, and robust contract management in large-scale fiber deployments, ensuring that DOTs maximize the value of their assets while minimizing risk and operational headaches.

Ken Earnst, Virginia DOT, noted that fiber is only located in the limited access right-of-way (ROW) in Virginia. This seems unique to Virginia in that many other states allow fiber to be in any DOT owned ROW, not just the limited access ROW.

FIBER IS A RESOURCE

BROADBAND IS A RESOURCE, IT DOESN'T MATTER IF IT IS WIRELESS, FIBER, OR COPPER, IT IS A RESOURCE.

- ERIC BATHRAS, MARYLAND DOIT

Eric Bathras then presented Maryland's approach to designing and implementing its fiber deployments. He highlighted key design considerations for both aerial and underground installations, emphasizing the importance of standardization, permitting, and interconnection with existing fiber networks. Eric noted that Maryland is committed to designing its systems with future growth in mind throughout the planning and design phases. When discussing implementation, he organized the process into four main categories: construction, inspection, procurement, and operations.

Eric discussed the key design stages and considerations involved in DoIT fiber optic communication projects. For aerial designs, teams evaluate factors such as the number of poles per mile, pole attachment agreements, budgeting and scheduling, and pole ownership. In contrast, underground communications require an assessment of the terrain, selection of appropriate installation methods, and careful planning of handhole locations. Eric also highlighted the relevant standards governing naming conventions, conduit and handhole use, fiber and splice case management, splicing and testing procedures, master fiber reels, and permitting requirements. When planning interconnections, it is essential to consider splice points, slack loop placement, handhole positioning, and coordination with carriers or partner tie-ins.

Similarly, Maryland follows a structured process when evaluating project installations. During the construction phase, the focus is on master fiber reel installation, restoration, aerial installation approaches, budget and schedule management, as well as integrating a tracker, dashboard, and post-installation punch list. For project procurement, Maryland reviews overall strategy, material and labor needs, contract vehicles, and future maintenance commitments. The installation phase inspections involve reviewing as-builds, updating fiber asset inventories, assigning inspectors and certified traffic control personnel, and recording any field changes. In the operations phase, priorities include transitioning to the Network Operations Center (NOC), maintaining an up-to-date fiber asset inventory, managing relocations, registering with Miss Utility, locating fiber, ensuring emergency restoration capabilities, and defining maintenance windows.

How to Prioritize Fiber Needs with Corridors

Jennifer Portanova , State TSMO Engineer North Carolina DOT (NCDOT), led a session focused on how to prioritize fiber needs within transportation corridors. She began by outlining the current state of North Carolina's fiber program, noting that, up to now, fiber installation has been conducted in a piecemeal fashion without a unified statewide strategy. As a result, the system has suffered from inconsistent maintenance and a lack of standardization. Jennifer explained that the NCDOT is now working to address these challenges by developing a comprehensive communications plan. This plan aims to establish a cohesive approach for both major and minor roads, using standardized designs and layouts. Additionally, the DOT is prioritizing network redundancy and is actively defining clear priorities to guide the future of its broadband program. Jennifer then led a discussion asking how other states have reached out to the industry to find more information on what their needs were.

> ### Lessons Learned
>
> "ONE OF THE BIGGEST LESSONS FROM OUR FIRST BROADBAND PROJECT WAS THAT WE NEED TO BE MORE STRATEGIC WITH OUR FIBER DEPLOYMENTS. SO NOW, WE'RE DEVELOPING A STATEWIDE ITS FIBER PLAN TO IDENTIFY OUR CURRENT AND FUTURE NEEDS WHILE ALSO REACHING OUT TO POTENTIAL INDUSTRY PARTNERS TO SEE WHERE OUR GOALS ALIGN AND INDENTIRY OPPORTUNITIES FOR FUTURE PARNTERSIPS."
>
> – JENNIFER PORTANOVA, NCDOT

Resource Sharing and Agreements; Regional Collaboration for Cross-Border/Multi-Jurisdictional Sharing

Jeremy Dilmore, Emerging Technologies Manager Florida DOT (FDOT), provided a virtual presentation on resource sharing and agreements. He began his presentation by explaining the extensive partnering that exists in Florida DOT's District 5 region. He attributes the success to twenty plus years of collaborating on building and maintaining their fiber optic network and sharing of the resource (hardware, network, IT support, and corridor management). Partners include FDOT, Central Florida Expressway (CFX), MetroPlan Orlando, City of Orlando, Orange County, and Seminole County.

This collaboration is more than just sharing the fiber optic network, it includes dark fiber, bandwidth, access to CCTV cameras, IT personnel, and access to data (such as travel times, safety data, and volumes). Jeremy noted how the partnership really benefits with the shared expenses of construction, for instance that construction of a trench is five times the cost of the fiber so if resources are pooled to cut the trench, then all can benefit with getting more fiber strands in the construction.

In structuring agreements with these partners, the DOT opted to go with minimal terms such as "we agree to share fiber/data", "we hold each other harmless", and "we will meet regularly". The partners also are committed to a number of unwritten rules such as minimum fiber size, dark fiber if available is provided, and FDOT is the keeper of documentation. FDOT provides the fiber records on a public facing website (FDOT Central Florida Smart Roads) and noted their use of OSP Insight and then moved to ITSFM to come into compliance – which they are pleased with.

Use & Valuation of Fiber

Eric Bathras talked about Maryland's approach and considerations for regional collaboration in the use and valuation of their fiber network. Maryland categorizes the needs for collaboration in four segments: connecting buildings, streets, communities, and systems. For each segment there are models of collaboration with DoIT, local, and private entities that range from totally separate systems to fully shared systems. Eric talked about Maryland's approach to governance, prioritization, funding, revenue streams and closing the broadband divide.

When considering agreements, he commented that licensing agreements work best in that they don't grant ownership of the land. When an entity is considering a 30-year timeline they should be sure to include escalation elements to acknowledge the growth of the resource, both in its value and in the cost of upkeep and maintenance. In Maryland, he noted, they update their rates on an ad-hoc basis. The last time they escalated was in 2023, and Eric noted how the updates can rise and fall based on the demand of the resource.

DOIT needs DOT because the Maryland Legislators mandated that DOIT must provide internet/broadband address to all Marylanders. The only way to accomplish this is to work with DOT because the DOT has the ROW to build a fiber network for (on behalf) of DOIT.

COLLABORATION

IF YOU WANT TO GO FAST – GO IT ALONE;
IF YOU WANT TO GO FAR – GO TOGETHER.

- ERIC BATHRAS, MARYLAND DOIT

Matthew Dryer, Statewide RSA Program Manager for the Maryland Department of Information Technology then added information on Maryland's use and valuation of fiber. Matt provided some history on how Maryland structured their Resource Sharing Law (R SL) and the growth of that program's authority over the years. Types of Resource Sharing Agreements (RSA) can be small cells, fiber optic cabling, and tower sites. In Maryland, DoIT is the overall oversight agency to review, value, and approve information technology proposals. Matt's presentation stepped through the methods Maryland uses for determining value of IT resources.

Contract Mechanisms for Fiber Contracts/Contractors

Mike Floberg presented the many different methods and approaches used for infrastructure projects, depending on the specific location and the organizations involved. For example, KDOT has worked with a variety of partners such as fiber companies, local governments, the Kansas Turnpike Authority (KTA), and Wichita Electric Company in building out the fiber network. It's essential for any organization to carefully review its Utility Accommodation Policy before starting any project, as KDOT learned some tough lessons while building out a fiber network in Wichita. That project faced several challenges, including the need for permits to cross a river and coordination for five railroad crossings. There was a designated 7-foot utility corridor for placing conduit, but the contractor chose not to use it, which ended up causing significant problems and extra costs for KDOT.

The Wichita fiber project was originally expected to take just one year, but it ended up lasting five years due to various delays, most notably the extensive approval process required by the railroads and waterway permits. Despite these setbacks, the project also had its successes, especially the strong partnership that developed while building out the K-254 corridor. The main takeaway from KDOT's experience is the importance of thoroughly understanding and following utility accommodation policies to avoid costly mistakes and delays.

A more recent success story in Kansas was the passage of the IKE highway bill, a ten-year program that provides $10 million per year for broadband expansion, and an additional total program cost of $85M to provide to the State Broadband Office for broadband to the premise with a 50% construction match requirement. This program has truly opened doors to new possibilities and made it much easier to move forward with important broadband initiatives across the state.

VDOT noted that they allow "laterals" and all of their agreements go through the AG's office.

Tracking Fiber Assets and Usage/Dark Fiber

Russell Allen, Innovations and Emerging Technologies Lead for AtkinsRéalis made a presentation on fiber management and tracking the fiber assets. In organizing an agency's fiber resource it is very helpful to have a GIS that records all the fibers and who owns what. Key to this is knowing what fiber the agency has, where it is, and what it is used for. He then presented a case study on using a GIS-based fiber optic management system for organizing and cataloging the system and having visibility to this valuable resource. GDOT noted they use Iteris' Clear Asset

The group then discussed how helpful a TETC resource could be that contained a matrix of information across member states. This way member agencies have a quick resource of who is doing what and who a first contact might be. The attendees discussed the following items would be good to have on a fiber program resource matrix:

- Number of miles of lit fiber
- Number of miles of dark fiber
- State OT or DOT IT?
- Policy in place?
- Standards in place?
- Agreements/MOUs? With who?
- Number of employees supporting fiber program
- Is the agency participating in 811 (utility locate/ call before you dig)
- Status of supporting legislation
- Is the agency sharing resources?
- Ever consider a MESH network?

The Program – Day 2

Day 2 of the meeting built upon the lively and productive conversations that began on the first day. **Sheryl Bradley, TSMO Program Director TETC**, welcomed everyone back and briefly recapped the key highlights from the previous day. The agenda for Day Two featured three focused group discussions. The first session explored best practices for completing fiber implementations, with particular attention to the handoff process and ongoing maintenance, including how to manage resources in cases of damage, replacement, or routine preventative activities. The second session explored broadband deployment best practices, covering the planning and construction phases as well as strategies for collaborating with third-party vendors. The third session encouraged participants to consider the advantages and challenges of wired versus wireless connectivity solutions. The day concluded with a general discussion, allowing attendees to share their insights and brainstorm actionable next steps for moving forward.

Fiber Completion – Handoff and Maintaining Fiber (Replacement, Preventative Cycles, Damage) (Group Discussion)

Eric Bathras facilitated a conversation about completing fiber install projects and handing them off for operations. In Maryland they consider four core areas for their program:

- Fiber Asset Inventory – knowing where the fiber is and keeping records to support it.
- Operations and Maintenance – processes for reporting and repairing the broadband resource.
- Performance – capturing data to report on the performance of the resource.

- Capacity – delivering the expected speeds and integrating fiber and wireless systems.

Eric spoke about accepting the implementation from the contractor and that the system must be completed, tested, and then accepted. He provided a Maryland example of how empty conduit can get plugged up if not capped properly during construction. He cautioned that when an agency goes to use the conduit, say in two or more years, the agency may find that the conduit is damaged and the opportunity to fix it has passed. His emphasis was to make sure the contractors “do it right the first time”.

For maintaining the fiber network, Maryland’s maintenance group has an average of 13,000 maintenance tickets for “fiber locates” in its ROW each year. Eric recommends paying the contractor by ticket rather than by mile. Maryland has a dashboard to track tickets – what is trending, number of tickets cleared, and who is at fault for a fiber cut (bad info on the locate or contractor not checking first). He explained that in Maryland they categorize three ticket types:

- Standard – either desktop cleared no conflict (40% of the time) or field visit cleared (60% of the time).
- After-hour tickets
- Emergency locate tickets

Maryland budgets for two hits/strikes per year and they estimate that the resources needed to respond to a fiber hit has a cost of $25k each to the agency. He advised to always be aware of the recurring costs for pole placements, locating fiber, and relocating poles.

All in all, Maryland has benefited from their fiber program and owning the fiber network is beneficial. They have estimated that it is 16 times cheaper (less expensive) for DOIT to own the fiber and connect to MDOT buildings versus leasing services. Maryland estimates that it saves over $90m/year for the state by owning the network.

Best Practices in Fiber/Broadband Coordination with Planning, Construction, Third Party Vendors (Group Discussion)

ON PARTNERING

“IT’S NOT WHAT YOU SAY, IT’S HOW YOU SAY IT” – MIKE FLOBERG

Mike Floberg then led a discussion on best practices in fiber and broadband coordination with planning, construction, third party vendors. He advocated that the key is good communication with partners. He shared the story that AT&T was first in line to complain when KDOT started their fiber program. Once AT&T met with the KDOT team and understood what the state was doing, they were satisfied and didn’t raise any concerns. The key was good and open communications – tell them what the fiber could be used for and how KDOT would manage the resource. KDOT’s agreement with their telecom partner (DTI) only allowed KDOT and the State to use the fiber for state governmental purposes and intelligent transportation systems (ITS) and that it would not sell or compete with telecom service providers.

Kansas has one statewide network – therefore the Kansas DOT, DOJ, education, corrections, etc. are all on the same network. It was noted that this approach offers tremendous savings in resource allocations versus having multiple systems. And the result is that it is good for the citizens of the state when these types of value-added partnerships come together.

Another win for Kansas was that it didn't have an internet connection site and had to connect to the internet via Denver, Oklahoma City, or Kansas City prior to their partnership getting established. Kansas also has regeneration stations every 30 – 50 miles along the interstate routes.

Deciding On Connectivity-Wired vs Wireless

Jeremy Dilmore talked about how Florida went about deciding on when connectivity concerns might push a solution towards wired or wireless solutions. There were seven basic considerations: costs, bandwidth, spectrum analysis, FCC restrictions, privacy, distances, and line of sight. He relayed how at times the best solution might be to go with a cellular or point to point solution, but cellular considerations would include the recurring monthly costs.

When asked a question about how FDOT dealt with railroad crossings Jeremy noted that they would bore under railroads when possible or might go wireless with a point-to-point solution when line of sight was available. He cautioned that FDOT ran into challenge when a 15' tall train came through and they lost line of sight; designers will need to check for this.

In summary, wireless versus wired comes to assessing each on a case-by-case basis and location by location. He stated that having a solid backbone fiber is key to success.

Key Takeaways

The following key takeaways capture the most significant lessons, strategies, and recommendations discussed during the Eastern Transportation Coalition's Fiber/Broadband Information Exchange. The takeaways are intended to inform coalition members as they move forward with initiatives to strengthen their networks and partnerships while ensuring long-term success of fiber communication programs.

- A comprehensive fiber map is essential for managing resources, planning expansions, and holding effective discussions about fiber network assets.
- Building strong relationships with state IT departments from the outset improves coordination and policy development for fiber infrastructure programs.

- Early and frequent meetings with partners—including internal agency teams, local governments, and private sector collaborators—ensure that project needs are thoroughly understood before decisions are made.
- Agencies must proactively quantify and communicate the business case for fiber optic investments, demonstrating value through data and financial analysis.
- Fiber is a valuable, long-term asset for transportation agencies, delivering cost savings and improved capabilities over alternatives like leasing services.
- Sourcing fiber from a master reel minimizes splices, reduces maintenance needs, and increases the reliability of backbone network segments.
- Agencies should pursue grant opportunities to help offset the substantial capital costs of fiber deployment and expansion projects.
- Contract structures should balance long-term stability (such as 30-year agreements) with the flexibility to periodically review and update terms in response to technological and market changes.
- Memorandums of Understanding (MOUs)—formal “handshake” agreements—are widely used and highly beneficial for structuring resource sharing and partnership arrangements.

Next Steps

To foster ongoing collaboration following the workshop, the next steps include establishing an online list serve to facilitate communication among participants and to develop a matrix of fiber program resources of coalition members. Additionally, developing a shared repository has the potential to support efforts for distributing additional resources such as sample lease agreements and memorandums of understanding between partners. Participants also identified a strong interest in exchanging information on resource-sharing laws and best practices, as well as the criteria employed in selecting vendor partners for fiber optic communications projects. TETC support in advancing these resources for members will help strengthen fiber programs for coalition members and ensure continued progress in addressing common challenges across fiber communication initiatives.

Appendix A – Agenda

Appendix B – Attendees

Appendix C – Attendee Handout

Appendix D – Slide Deck (Day 1)

Appendix E – Slide Deck (Day 2)

The Eastern Transportation Coalition

Fiber Workshop

April 22-23, 2025

Maritime Conference Center
692 Maritime Blvd
Linthicum Heights, MD 21090

DAY 1		
Time	**Topic**	**Speaker**
6:30am – 8:00am	Breakfast (Onsite Cafeteria)	
8:30am - 9:00am	Welcome/Opening Remarks Introductions	Trish Hendren, TETC Sheryl Bradley, TETC
9:00am – 9:45am	The Planning Stages of Fiber Deployments (Presentation, Q&A)	Mike Floberg, Kansas DOT (Retired) Eric Bathras, Maryland Division of IT
9:45am - 10:00am	Break (Beverages & Snacks Provided)	
10:00am – 10:45am	Approach to Fiber Deployment from a DOT Perspective (Presentation, Q&A)	Eric Bathras, Maryland Division of IT Mike Floberg, Kansas DOT (Retired)
10:45am - 11:30am	How to Prioritize Fiber Needs with Corridors (Presentation & Roundtable Discussion)	Jennifer Portanova, North Carolina DOT
11:30am – 12:30pm	Lunch (Onsite Cafeteria)	
12:30pm – 1:30pm	Resource Sharing and Agreements; Regional Collaboration for Cross-Border/Multi-Jurisdictional Sharing (Presentation & questions/discussion)	Jeremy Dilmore, Florida DOT Eric Bathras, Maryland Division of IT
1:30pm – 2:15pm	Use & Valuation of Fiber (Presentation & questions/discussion)	Matt Dryer, Maryland Division of IT
2:15pm – 2:30pm	Break (Beverages & Snacks Provided)	
2:30pm – 3:15pm	Contract Mechanisms for Fiber Contracts/Contractors (Group Discussion)	Mike Floberg, Kansas DOT (Retired)
3:15pm – 4:00pm	Tracking Fiber Assets and Usage/Dark Fiber (Presentation and Group Discussion)	Russell Allen, AtkinsRealis

4:00pm – 4:45pm	Day 1 Wrap-Up/Group Discussion	Sheryl Bradley, TETC
5:15pm – 6:30pm	Networking Dinner (Onsite Cafeteria)	
6:30pm-8:00pm	Networking - Optional (Hotel Lobby)	
DAY 2		
6:30am – 8:00am	Breakfast (Onsite Cafeteria)	
8:30am – 8:45am	Day 2 Welcome	Sheryl Bradley, TETC
8:45am – 9:30am	Fiber Completion – Handoff and Maintaining Fiber (Replacement, Preventative Cycles, Damage) (Group Discussion)	Eric Bathras, Maryland Division of IT
9:30am – 10:15am	Best Practices in Fiber/Broadband Coordination with Planning, Construction, Third Party Vendors (Group Discussion)	Mike Floberg, Kansas DOT (Retired)
10:15am – 10:30am	Break (Beverages & Snacks Provided)	
10:30am – 11:15am	Deciding On Connectivity -Wired vs Wireless (Presentation & Group Discussion)	Jeremy Dilmore, Florida DOT
11:15am – 12:00pm	Day 2 Wrap-Up/Group Discussion	Nicole Forest, TETC
12:00pm – 1:00pm	Optional Lunch (Onsite Cafeteria)	

APPENDIX B

Fiber Workshop - Attendees
4/22-4/23/25

Anthony Colangelo	CTDOT	Transportation Supervising Engineer
Rabih Barakat	CTDOT	Division Chief Facilities & Transit
Rich Launder	CTDOT	Transportation Engineer 3
Skye Guo	DDOT	ITS Specialist
Clark Browder	DDOT	ITS Maintenance Technician
Kerry Yost	DelDOT	State TSMO Engineer
Jeremy Dilmore	FDOT	Emerging Tech Manager
Ben Lempke	GDOT	Major Projects Program Manager
David Miranda	GDOT	Assistant State ITS Engineer
Mike Floberg	KDOT (Retired) - Speaker	Retired
Zach Neihof	KYTC	TSMO Program Lead
Matt Dryer	Maryland Dept of Information Technology	Statewide RSA Program Manager
Tony Wade	MassDOT	Director of Statewide Communications and Electrical Systems
Eric Bathras	MD Dept of Information Technology	Chief Technology Officer
Willy Gayle	MDOT SHA	Assistant Division Chief
Raj Sharma	MDOT-SHA	Section Chief
Jennifer Portanova	NCDOT	State TSMO Engineer
Andrew Skuce	NCDOT	ITS Development and Design Engineer
Ethan Conrad	NHDOT	ITS Program Specialist
Robert McMullen	NHDOT	Traffic Signal Supervisor
Hirenkumar Patel	NJDOT	Principal Engineer - Electrical
Padmaja Sampat	NJDOT	Contract Administrator
Tyler Uhler	PennDOT	Civil Engineer
Joe Burns	PennDOT	Senior Traffic Control Specialist
Khuzaima Mahdi	TDOT	State ITS Engineer
Lee Smith	TDOT	Program & Technical Advisor
Ken Earnest	VDOT	Assistant Division Administrator
Jorg Huckabee-Mayfield	Virginia Department of Transportation (VDOT)	Assistant Director, Office of Land Use/ Broadband Coordinator
Jay Williams	Volusia County	Director of Transportation
Russell Allen	Atkins Reallis	Consultant
Erin Flanigan	ARA	Consultant
Sheryl Bradley	TETC	TSMO Program Director
Nicole Forest	TETC	TSMO Program Associate
Trish Hendren	TETC	Executive Director

THE EASTERN TRANSPORTATION COALITION
CONNECTING FOR SOLUTIONS

Fiber/Broadband Information Exchange
April 22-23, 2025

Session 1: Planning A Fiber/Broadband Deployment

Speakers: Mike Floberg/Eric Bathras

1. What is the target area and its current broadband coverage?

Understand geographic scope, existing infrastructure, underserved areas, and population density.

2. What are the bandwidth and performance requirements (upload/download speeds)?

Determine whether you're targeting residential, commercial, or enterprise users and their future needs.

3. What type of deployment architecture is appropriate (FTTH, FTTN, FTTP, etc.)?

Choose the right design based on cost, scalability, and user demand.

4. What is the estimated cost of deployment (CAPEX/OPEX)?

Include trenching, permits, equipment, labor, and ongoing maintenance costs.

5. What funding sources or subsidies are available (e.g., government grants)?

Investigate federal/state programs like BEAD, RDOF, or local incentives.

6. What are the regulatory and permitting requirements?

Understand the local, state, and federal approvals needed before construction.

7. Who owns the poles, ducts, and rights-of-way, and can they be accessed?

Access to infrastructure like utility poles or conduits is often a critical factor.

8. What technology and vendors will be used (fiber type, GPON/XGS-PON, etc.)?

Select based on cost, performance, and compatibility with future upgrades.

9. How will the network be operated and maintained (in-house vs. outsourced)?

Plan for network monitoring, repairs, customer support, and SLAs.

10. What is the projected return on investment (ROI) and subscriber adoption rate?

Build financial models and assess market demand to ensure long-term sustainability.

Session 2: Considerations for Fiber/Broadband Deployments from a DOT Perspective

Speakers: Mike Floberg/Eric Bathras

1. Right-of-Way (ROW) Management

Ensure broadband deployment plans align with existing and future transportation ROW usage. Coordinate access, minimize disruption, and preserve public assets.

2. Permitting Processes and Timelines

Establish clear, streamlined permitting procedures for fiber installation, including boring, trenching, and pole attachment within transportation corridors.

3. Utility and Infrastructure Coordination

Coordinate with utility owners, railroads, municipalities, and other agencies to avoid conflicts with existing or planned transportation and utility projects.

4. Safety and Traffic Control Plans

Require approved traffic control plans (TCPs) to ensure worker and public safety during construction activities in or near roadways.

5. Pavement Preservation and Trench Restoration

Set standards for pavement cutting, trenching, and restoration to preserve roadway integrity and prevent future maintenance issues.

6. Dig Once Policies

Promote "dig once" practices to allow for multi-use conduit installations and minimize future excavation in transportation corridors.

7. Asset Mapping and Documentation

Require accurate mapping and digital documentation (e.g., GIS data) of all installed fiber and related infrastructure within DOT jurisdiction.

8. Environmental and Cultural Compliance

Ensure that deployment complies with environmental regulations, such as NEPA, and avoids impacts to protected lands, wetlands, or culturally sensitive areas.

9. Emergency Access and Resilience

Consider how fiber infrastructure can support intelligent transportation systems (ITS), emergency response, and resilient communications during disasters.

10. Long-Term Maintenance and Access Agreements

Establish terms for ongoing maintenance, future upgrades, and access to infrastructure without interfering with DOT operations or planned projects.

Session 3: Prioritizing Broadband Across Corridors

Speaker: Jennifer Portanova

1. Define Corridor Objectives

Ask: *What are the main goals of the corridor?*

- Transportation: Support intelligent transportation systems (ITS), traffic signals, connected vehicle infrastructure.
- Broadband: Expand last-mile or middle-mile access for underserved areas.
- Economic development: Connect business parks, schools, hospitals, etc.

2. Conduct an Asset and Gap Assessment

Map what's already there and identify what's missing.

- Inventory existing fiber/conduit (public and private)
- Map roadway classification, land use, and key facilities
- Identify broadband deserts or low-capacity segments

3. Evaluate Stakeholder and Multi-Agency Needs

Coordinate with:

- State DOTs, counties, cities
- ISPs, utilities, and telecoms
- Schools, public safety, transit agencies

This helps align timelines, funding, and avoid redundant construction.

4. Use a Scoring or Tiering Framework

Develop a prioritization matrix based on criteria like:

Criteria	Weight	Description
Existing fiber gaps	High	Prioritize areas without infrastructure
Planned construction	High	Bundle with road projects to lower costs
ITS need	Medium	Support traffic management or sensors
Community impact	High	Benefits schools, hospitals, underserved
Cost-effectiveness	Medium	Leverage trench sharing or dig-once
Partner interest	Medium	Cost-share opportunities with ISPs/utilities

5. Align with Transportation Project Phasing

Leverage existing or planned projects like:

- Road widening
- Bridge replacements
- Safety upgrades
- Repaving or utility upgrades

Fiber can be bundled at lower cost when trenching or construction is already happening.

6. Build a Phased Deployment Plan

Organize deployment into:

- Short-term (0–2 years): Quick wins, bundle with active projects
- Mid-term (2–5 years): Tie to planned construction and broadband expansion
- Long-term (5+ years): Strategic backhaul, economic development, ITS corridors

7. Secure Funding and Partnerships

Pursue:

- Federal/state grants (BEAD, NTIA, IIJA, etc.)

- Public-private partnerships
- Local funding and utility cost-sharing

8. Ensure Equity and Resiliency

Prioritize areas that:

- Lack broadband competition or coverage
- Serve rural, tribal, or disadvantaged communities
- Enhance resiliency in emergencies (redundant fiber routes)

Session 4: Considerations for Resource Sharing of Fiber/Broadband

Speakers: Jeremy Dilmore/Eric Bathras

1. Types of Resources to Share

- Conduit: Install extra conduit during trenching ("dig once") for future use or leasing.
- Fiber Strands: Allocate dark fiber strands to other agencies or private providers.
- Poles and Towers: Allow co-location on existing vertical infrastructure.
- Right-of-Way Access: Share access to highway corridors or utility easements.
- Facilities: Co-locate equipment in huts, cabinets, or central offices.

2. Legal & Policy Considerations

- Ownership: Clearly define who owns what—fiber, conduit, poles, ROW, etc.
- Leasing vs. IRU: Decide whether resources are leased short-term or long-term via Indefeasible Right of Use (IRU) agreements.
- Regulatory Compliance: Ensure compliance with local, state, and federal laws (e.g., FCC rules, utility commission regulations).
- Permits & Easements: Confirm all rights-of-way and permits allow for shared use.

3. Governance & Partnership Structure

- Public-Private Partnerships (P3s): Structure agreements that balance public benefit and private ROI.
- Interagency Agreements: Standardize MOUs for sharing across government departments (e.g., DOT, schools, emergency services).
- Service-Level Agreements (SLAs): Define maintenance, uptime, and responsibilities for shared assets.

4. Financial Considerations

- Cost Allocation: Agree on how capital and O&M costs are split among parties.
- Revenue Sharing: If a party profits from leasing fiber, decide how revenue is distributed.
- Grant Compliance: Ensure any grant-funded infrastructure adheres to rules about revenue, use, or commercial leasing.

5. Technical & Operational Coordination

- Fiber Design & Capacity Planning: Plan for future demand—include spare strands or conduits.
- Network Management: Define who controls monitoring, maintenance, and repairs.
- Interconnection Points: Ensure standardization of access points and interfaces.

6. Timing & Construction Coordination

- Dig Once Coordination: Align timelines for trenching, conduit/fiber installation, and roadway projects.
- Third-Party Access: Allow future partners to access shared assets without disturbing existing services.

7. Data & Mapping

- Asset Inventory: Maintain GIS-based records of shared assets and ownership.
- Transparency: Ensure all parties have access to data about available resources and usage.

8. Risk & Liability

- Damage & Outages: Clarify liability in case of physical damage or service interruptions.
- Insurance & Indemnity: Protect parties from shared risk exposure.

Session 5: Use and Valuation of Fiber

Speaker: Matt Dryer

1. Use Cases for Fiber

Understanding how fiber will be used helps shape its value:

- Dark Fiber Leasing: Unlit fiber leased to ISPs, utilities, and enterprises.
- Backhaul: Transport data for mobile carriers, small ISPs, or public Wi-Fi.
- Middle-Mile Infrastructure: Connects core networks to local networks.
- Institutional Use: Government, schools, hospitals, ITS/transportation, and emergency services.
- Public Access/Broadband Expansion: Enable last-mile providers in underserved areas.

2. Valuation Factors

Valuing fiber is not one-size-fits-all. Common valuation factors include:

Factor	Impact on Value
Location	Urban fiber is more valuable due to demand and density
Strand Count	More strands = higher value and flexibility
Condition/Age	Newer, unused fiber (or known specs) is more desirable
Route Uniqueness	Redundant or diverse paths add high strategic value
Capacity Availability	Available strands or conduit space increase value
Permitting/ROW Status	Fiber with clean ROW access or long-term agreements is more valuable
Market Demand	Competitive ISP markets drive up leasing rates
Fiber Type	Single-mode is common, but specialized fiber (ribbon, armored) may command a premium

3. Common Valuation Methods

- Cost-Based: Original cost of construction + depreciation. Often used for public accounting.
- Market-Based: Compare to rates charged by other fiber owners in similar areas (e.g., $/strand-mile/year).
- Income-Based: Project revenue from leasing or using fiber over time.

Example: Dark fiber lease rates can range from $100 to $2,000+ per strand-mile/year, depending on market conditions and infrastructure.

4. Legal & Regulatory Considerations

- Ownership Clarity: Who owns the fiber, conduit, poles, ROW?
- IRUs (Indefeasible Rights of Use): Long-term (10–30 year) leases often used in dark fiber deals.
- Public Use Restrictions: Publicly funded fiber may be restricted in how it can be commercialized (e.g., E-rate, BEAD grant conditions).
- Tax Implications: Valuation affects asset reporting, depreciation, and possible taxation.

5. Operational & Strategic Considerations

- Spare Capacity: Reserve strands for future public use or redundancy.
- Network Management: Who maintains, monitors, and repairs the fiber?
- Resiliency Value: Redundant fiber paths are critical for emergency and disaster response.

6. Depreciation and Asset Lifespan

- Fiber lifespan is often modeled at 20–30 years.
- However, physical fiber can last longer if not damaged or technically obsolete.
- Accounting depreciation may reduce book value while market value stays high (especially in high-demand areas).

7. Strategic Control & Negotiation

- Control > Cash: Sometimes retaining control of fiber (e.g. for ITS or broadband leverage) is more valuable than monetizing it.
- Avoid Overcommitment: Don’t lease all strands—leave room for growth, public interest, or resale.
- Non-Monetary Value: Consider the value of fiber for enabling economic development, digital equity, or strategic partnerships.

Session 6: Contract Mechanisms for Fiber Deployment

Speaker: Mike Floberg

1. Design-Bid-Build (DBB)

Traditional public sector model.

- Process: Owner designs → bids out → contractor builds.
- Use case: When the agency wants full control and oversight.
- Pros: Competitive pricing, well-understood process.
- Cons: Longer timeline, less flexibility for innovation.

2. Design-Build (DB)

Contractor handles both design and construction.

- Process: One contract, fewer handoffs.
- Use case: Accelerated timelines, large-scale or complex builds.
- Pros: Streamlined delivery, reduced change orders.
- Cons: Less owner control over design decisions.

3. Public-Private Partnership (P3 or PPP)

Long-term agreements to share cost, risk, and benefit.

- Models: Build-Operate-Transfer (BOT), Design-Build-Finance-Operate (DBFO), etc.
- Use case: Large projects needing private capital or expertise.
- Pros: Risk-sharing, private innovation, off-balance-sheet financing.
- Cons: Complex negotiations, long-term commitments.

4. Indefeasible Right of Use (IRU)

Long-term lease (typically 10–30 years) for fiber strands or conduit.

- Use case: When an entity wants to use dark fiber without owning it.
- Pros: Exclusive use, known costs, asset-like control.
- Cons: High upfront fee; limited flexibility during term.

5. Master Services Agreement (MSA)

Framework agreement with add-on work orders or task orders.

- Use case: Ongoing fiber work across a city, state, or region.
- Pros: Flexibility, speed of execution, consistent terms.
- Cons: Requires good vendor relationships and program management.

6. Utility Franchise or Pole Attachment Agreements

Deals for use of utility poles, conduits, or other vertical assets.

- Use case: Needed when fiber traverses power or telecom infrastructure.
- Pros: Leverages existing assets; avoids trenching.
- Cons: Regulatory complexity; limited space on poles.

7. Leasing Agreements

Simple rental of conduit, fiber strands, or facilities.

- Types:
    - Dark fiber lease (short or mid-term)
    - Conduit lease
    - Colocation lease (e.g., cabinet, hut space)
- Use case: For ISPs, municipalities, or anchor institutions needing access.
- Pros: Lower cost of entry, no build-out needed.
- Cons: Limited control, renewals can be expensive.

8. Interagency Agreements / Memoranda of Understanding (MOUs)

Used between government entities.

- Use case: Sharing fiber assets or coordinating deployment.
- Pros: Avoids procurement issues; encourages collaboration.
- Cons: May lack enforceability or detailed terms.

9. Build-to-Suit Agreements

One party builds infrastructure tailored to another's specs.

- Use case: Enterprise networks, ISP expansion, smart city backbones.
- Pros: Tailored solution; risk transfer to builder.
- Cons: May cost more than self-deployment.

10. Concession Agreements

Private partner builds/operates infrastructure and earns revenue under a license.

- Use case: Municipal broadband or open-access networks.
- Pros: Public benefits without upfront public capital.
- Cons: Must regulate performance and pricing.

Want to Choose the Right Model?

Speaker: Mike Floberg (continued)

It depends on your goals:

Goal	Best Contract Types
Build & own	DBB, DB, MSA
Lease/use	IRU, lease agreements
Share costs	P3, MOUs
Speed/flexibility	Design-Build, Build-to-Suit
Minimize risk	P3, Concession
Enable ISP access	IRU, Conduit lease, Open access MSA

Session 7: Tracking Fiber Assets and Dark Fiber

Speaker: Russell Allen

1. Visibility is Everything

You can't manage what you can't see. Accurate tracking of fiber routes, strand counts, splice points, and usage is essential for operational efficiency, especially as networks expand and age.

2. GIS-Based Mapping Enables Smarter Planning

Modern fiber tracking uses GIS platforms to visualize fiber paths, cross-connects, and available dark fiber. This helps with network planning, project coordination, and rapid response to issues.

3. Supports Smarter Capital Investment

Knowing what fiber you already have—and where there's available dark fiber—can reduce overbuilding, save capital, and allow you to leverage existing assets before starting new construction.

4. Unlocks Revenue from Unused Fiber

Accurate inventory enables you to lease dark fiber, either directly or through Indefeasible Rights of Use (IRUs), generating revenue or supporting community broadband efforts.

5. Simplifies Maintenance and Troubleshooting

Technicians need to know which strands are in use, by whom, and where splices or faults are. A well-managed system reduces downtime and truck rolls.

6. Facilitates Partnerships and Asset Sharing

Fiber tracking supports inter-agency and public-private collaboration, helping entities share infrastructure fairly and transparently, especially along DOT corridors or utility routes.

7. Critical for Compliance and Auditing

Grant-funded or public fiber (like BEAD, ARPA, or CAF projects) often requires documentation, reporting, and compliance tracking—all made easier with a centralized asset system.

8. Improves Resiliency and Redundancy Planning

Tracking fiber paths allows you to identify diverse routes and avoid single points of failure, which is key for emergency communications, transportation, and enterprise continuity.

9. Enables "Dig Once" and Cost-Sharing Opportunities

When fiber routes are tracked alongside road projects or utility work, agencies can coordinate builds, save money, and minimize disruption to roads and communities.

10. Turns Fiber into a Strategic Asset

Fiber isn't just infrastructure, it's a long-term asset that enables smart cities, broadband equity, traffic management, and digital services. Tracking it properly ensures you get full value.

Session 8: Hand-off and Maintenance of Fiber

Speaker: Eric Bathras

1. The Handoff Isn't Just a Final Step—It's a Transition to Lifelong Ownership

It marks the shift from building fiber to owning, operating, and maintaining it for decades. Proper documentation, training, and systems must be provided to support that.

2. Complete As-Built Documentation is Non-Negotiable

Contractors must deliver detailed as-builts, including strand maps, splice diagrams, test results (OTDR, power readings), and GIS files. This documentation becomes the foundation for operations.

3. Maintenance Roles and Responsibilities Must Be Clearly Defined

Who handles fiber breaks, monitoring, preventive maintenance, and support? Whether it's in-house or contracted, roles need to be spelled out in service-level agreements (SLAs).

4. Fiber Management Systems Must Be Set Up Before Handoff

Systems like GIS, asset tracking software, or NMS (Network Management System) need to be ready so the operational team can manage assets from day one.

5. Preventive Maintenance Plans Protect Long-Term Reliability

Schedule regular inspections, slack loop checks, cabinet/hut maintenance, and power supply testing to avoid reactive, costly repairs down the road.

6. Emergency Response Protocols Must Be in Place

Have a documented response plan for outages or fiber cuts, including escalation procedures, repair timelines, and communication workflows.

7. Spare Materials and Access Agreements Should Be Secured

Ensure there's inventory of spare fiber, connectors, cabinets, and access rights to manholes, handholes, or poles for future repairs or upgrades.

8. Handoff is a Critical Coordination Point with ISPs or Partners

If leasing fiber or working with a third-party ISP, make sure handover includes demarcation points, access protocols, and strand-level documentation.

9. Post-Construction Audit and Acceptance Testing Ensure Quality

Before acceptance, require thorough testing (OTDR, light loss, continuity) and conduct an audit to validate the fiber was built to spec and is ready for service.

10. Good Maintenance Extends Asset Life and Enables Future Growth

Well-maintained fiber can last 30+ years. A proactive operations plan ensures the network is reliable, scalable, and supports future technology like 5G or smart infrastructure.

Session 10: Best Practices in Coordinating with Planning, Construction, and 3rd Party Vendors

Speaker: Mike Floberg

1. Early Stakeholder Alignment

Engage planners, engineers, local authorities, and vendors early to clarify expectations, timelines, and scopes.

2. Detailed Project Planning

Develop a phased project plan with clear milestones, responsibilities, and contingency buffers for delays or design changes.

3. Regular Coordination Meetings

Hold weekly or bi-weekly status meetings with all parties (including 3rd parties) to identify issues early and maintain alignment.

4. Centralized Documentation

Use a shared platform (like SharePoint, Basecamp, or Procore) for access to design files, permits, BOMs, and change logs.

5. Permitting & Utility Coordination

Work closely with municipalities and utility companies to secure ROWs, locate existing utilities, and prevent conflicts during trenching or aerial installations.

6. Clear Scope Definitions

Define responsibilities clearly among in-house teams and third-party vendors (e.g., who handles splicing vs testing vs permitting).

7. Change Management Protocols

Have a structured process for handling scope changes, including formal approvals, timeline adjustments, and budget tracking.

8. Real-Time Issue Tracking

Implement a live tracker for field issues and resolutions (using tools like Jira, Monday.com, or Smartsheet) to avoid communication lags.

9. Vendor Qualification & Onboarding

Pre-qualify vendors based on experience, references, and safety record. Provide standardized onboarding materials and SOPs.

10. Field QA/QC Checks

Conduct routine site audits and quality checks to ensure third-party work meets specs before moving to the next phase.

Session 11: Deciding on Connectivity – Wired or Wireless

Speaker: Jeremy Dilmore

Bandwidth & Speed Requirements

- Wired (Fiber/DSL/Cable): Typically supports higher consistent speeds, especially for gigabit applications.
- Wireless (Fixed Wireless/5G): Speed can vary with signal strength and user load.

2. Deployment Cost

- Wired: High up-front cost due to trenching, permits, materials, and labor.
- Wireless: Lower initial cost, especially in difficult terrain or remote areas.

3. Scalability & Future-Proofing

- Wired: Fiber especially is scalable and has decades of lifespan potential.
- Wireless: Can be upgraded with new tech (e.g., moving from 4G to 5G), but limited by spectrum and backhaul.

4. Geography & Terrain

- Wired: Challenging in rocky, mountainous, or urban congested areas.
- Wireless: Ideal for hard-to-reach or sparsely populated regions.

5. Latency

- Wired: Lower latency, better for real-time applications like gaming, VoIP, or telemedicine.
- Wireless: Higher latency due to radio propagation and processing delays.

6. Reliability & Uptime

- Wired: More stable under normal conditions, but vulnerable to physical cuts.
- Wireless: Weather, obstructions, or interference can impact service.

7. Installation Time

- Wired: Longer lead times (permits, digging, splicing).
- Wireless: Faster deployment (install towers, configure radios).

8. Maintenance Complexity

- Wired: Requires physical access for repairs (e.g., fiber splicing).
- Wireless: Remote diagnostics possible, but more sensitive to environmental changes.

9. Customer Density

- Wired: Cost-effective in dense areas with many users per mile.
- Wireless: Better suited for low-density, rural deployments.

10. Regulatory & Spectrum Considerations

- Wired: Subject to ROW (Right-of-Way) and local construction rules.
- Wireless: Depends on spectrum availability (licensed vs unlicensed), which may limit capacity.

APPENDIX D

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Fiber/Broadband Information Exchange – Day 1

April 22-23, 2025

Welcome

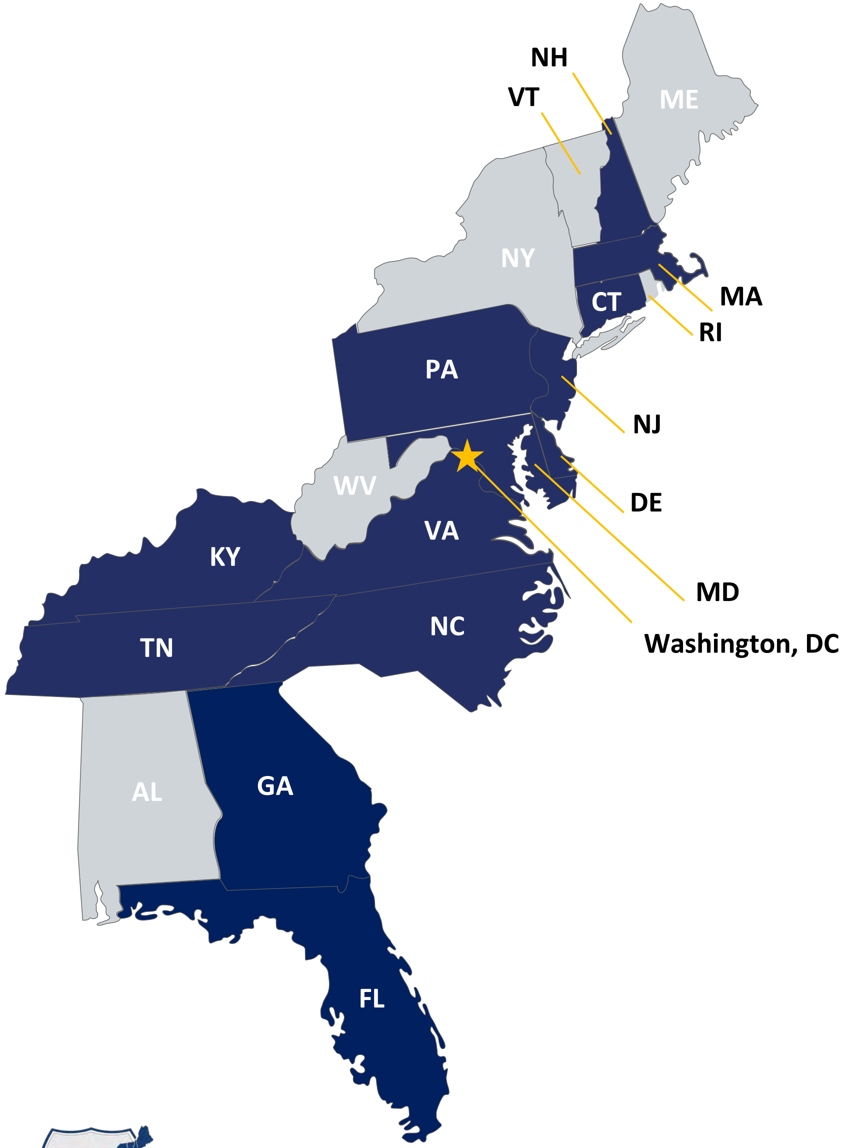
Trish Hendren
Executive Director
The Eastern Transportation Coalition

Welcome

Sheryl Bradley
TSMO Program Director
The Eastern Transportation Coalition

Nicole Forest
TSMO Program Associate
The Eastern Transportation Coalition

Welcome to the Meeting Participants



Agencies			
Connecticut DOT	Georgia DOT	Massachusetts DOT	Pennsylvania DOT
Delaware DOT	Kentucky Transportation Cabinet	New Hampshire DOT	Tennessee DOT
District DOT	Maryland DOT-SHA	New Jersey DOT	Virginia DOT
Florida DOT	Maryland DoIT	North Carolina DOT	Volusia County, FL

The Planning Stages of Fiber Deployment

Mike Floberg
Director of Innovative Technologies (Ret)
Kansas DOT

AGENDA

- Introduction
- Kansas Demographics
- Kansas’ Current Deployment Plan

KANSAS DEMOGRAPHICS

- Size of Kansas – Approx. 400 miles x 200 miles
- State Population - 2.97 Million People
- Number of Counties – 105
- Most Populated County – Johnson County – 622,237 (1313.8/sq.mi.)
- Least Populated County – Greeley County – 1,181 (1.5/sq.mi.)
- 67 of the 105 Counties have less than 10,000 people
- The 5 most populated counties – 1.614 million people

KANSAS DEMOGRAPHICS

- Kansas Roadway Miles – 138,975 miles
- State Highway Miles – 10,294 miles
- City/County Miles – 128,441 miles (Approx. 98,000 miles unpaved)
- Kansas Turnpike Authority – 240 miles

PLANNING FOR FIBER DEPLOYMENTS

- Cons
  - Highways versus Fiber
  - Lack of Knowledge/Understanding
  - Operating Budgets
- Pros
  - Intelligent Transportation Systems
  - Remote KDOT Offices
  - Help out other State agencies
  - Connected Vehicles
  - COVID

ONE-TIME OPPORTUNITY:
WIN-WIN-WIN WITH FEDERAL NTIA GRANT

Partnerships stretch public dollars further, meaning taxpayers get more services with less investment. Using state of Kansas resources helps our taxpayer dollars go as far as possible.

Kansas Office of Broadband Development

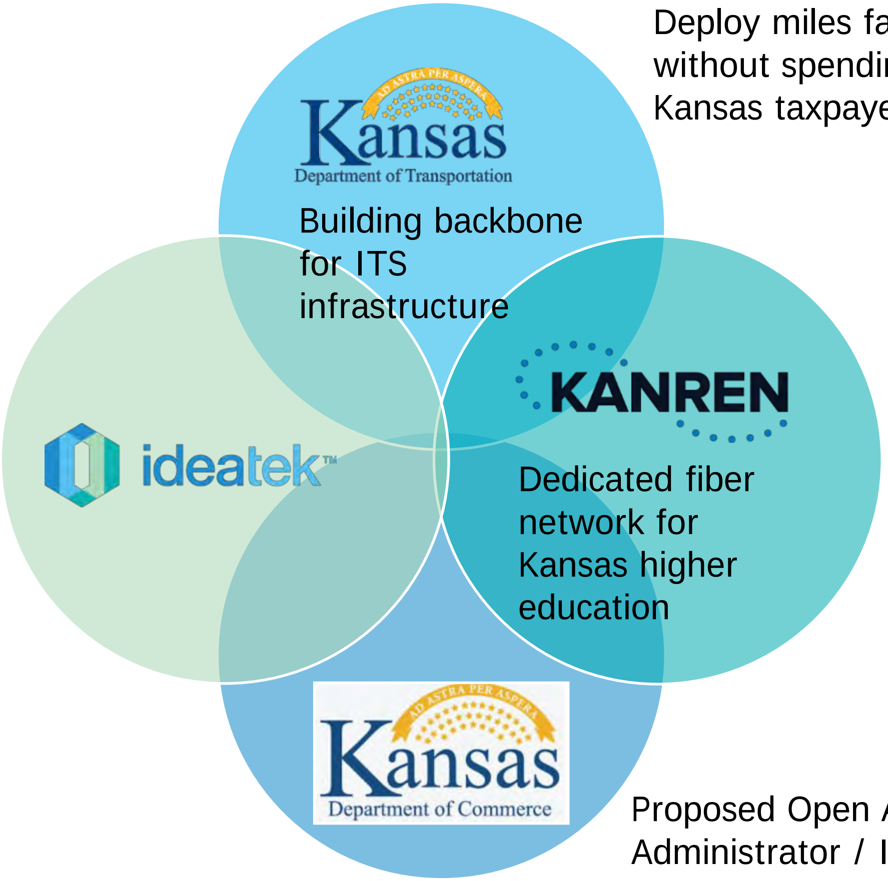
U.S. Department of Commerce
National Telecommunications and Information Administration (NTIA)

$1 Billion Broadband Infrastructure Program

A partnership of two or more entities can apply for funding under the Middle Mile Grants Program as an eligible entity.

Deploy miles faster without spending more Kansas taxpayer money

Fulfill grant requirements for "underserved/ rural" and state partnership with broadband provider



Inter-agency collaboration improves chances of winning grant

Proposed Open Access Administrator / IXC Partner

INTERNET “MILES”

MIDDLE MILE VS LAST MILE

Middle Mile Networks are like a highway system. It is composed of high-capacity fiber lines carrying huge amounts of data at very high speeds – connecting communities along the way.

BACKBONE/LONG HAUL

The greater internet. Big pipes that transmit data between large servers located around the world.

MIDDLE MILE

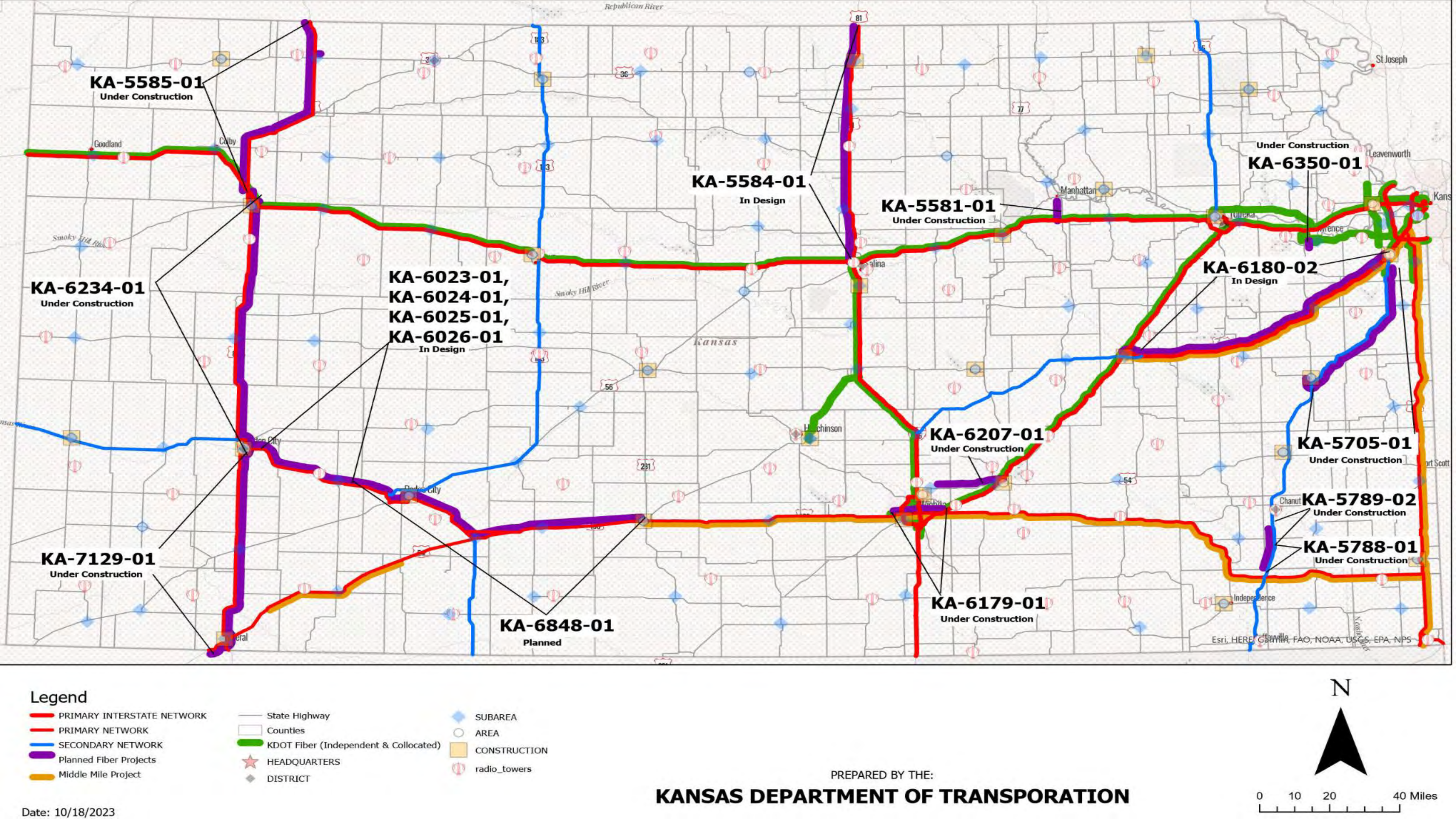
Crucial stage of data transportation between the backbone network and the last-mile connection to homes/businesses. Can serve parts of one or multiple states.

CONNECTS: Urban centers, universities, anchor institutions.

LAST MILE

Final leg of the connection between the service provider and the customer - residential homes and businesses.

CONNECTS: Community residential areas, small businesses.



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Salina
Hutchinson
Dodge City
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KANSAS DEPARTMENT OF TRANSPORATION
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QUESTIONS?

THANK YOU!!

MIKE FLOBERG, P.E.

MFLOBERG23@GMAIL.COM

The Planning Stages of Fiber Deployment

Eric Bathras
Chief Technology Officer
Maryland Department of Information Technology

Planning Stages of Fiber Deployment

Session 1

Planning ~~a~~ [to] Build

BUSINESS CASE

- Move Away from the Concept of a Build
- Funding Strategy
- Site Analysis
- Cost Benefit Recovery
- Goldilocks Corridors - Dig "Smart"
- Prioritize Quick Wins
- Modernizing Service Delivery

DESIGN

- Aerial
- Poles per Mile
- Pole Attachment Agreements
- Make Ready
- Type of Underground Install
- Terrain & Install Environment
- Standardize on Materials
- Fiber and Handhole System
- Interconnection Points

IMPLEMENT

- Procurement Strategy
- Materials Purchasing Decision
- Permits
- Inspection
- Network Implementation
- As-build to GIS Transition
- Miss Utility Registration
- Fiber Locating
- Emergency Response

Funding Strategy

Site Analysis

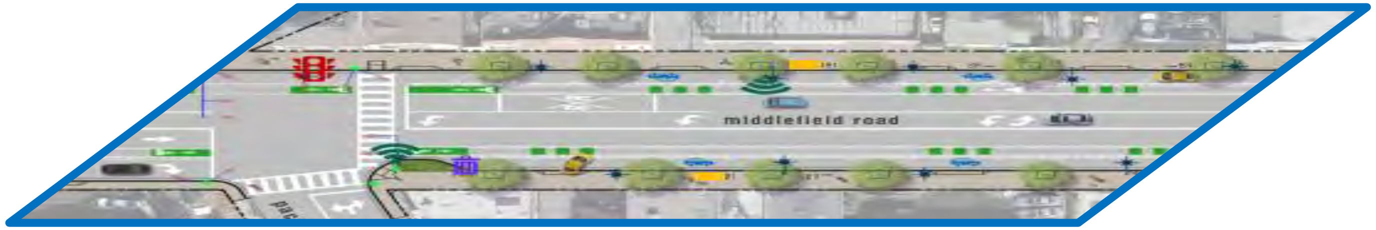
LATA and County	TOTAL CAIs	CAIs (Fiber Deployed)	CAIs (Ready to Light)	Total UG Miles	Total Aerial Miles	Total Miles	Miles Engineering Awarded (POs Issued)	Miles Submitted for Permits	Miles Construction Awarded (POs issued)	Miles UG Constructed (Conduit)	Miles UG Constructed (Fiber Pulled)	Miles Aerial Make Ready	Miles Aerial Constructed (Fiber Attached)	TOTAL Miles Construction Completed
Northern LATA	**16**	0	0	6.7	12.3	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Anne Arundel County	2	0	0	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Baltimore County	1	0	0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Carroll County	2	0	0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cecil County	2	0	0	0.0	8.8	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Harford County	1	0	0	0.0	3.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Howard County	8	0	0	5.6	0.0	5.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Washington LATA	**12**	0	0	14.3	0.0	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Charles County	4	0	0	8.8	0.0	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Montgomery County	2	0	0	0.8	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prince George's County	5	0	0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
St Mary's County	1	0	0	4.2	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Eastern LATA	**18**	0	0	27.7	0.0	27.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Caroline County	2	0	0	3.2	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dorchester County	2	0	0	2.5	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Queen Anne's County	2	0	0	4.6	0.0	4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Somerset County	2	0	0	2.3	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Talbot County	4	0	0	7.9	0.0	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wicomico County	3	0	0	0.9	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Worcester County	3	0	0	6.3	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Western LATA	**19**	0	0	22.4	14.4	36.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Washington County	3	0	0	4.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Frederick County	6	0	0	11.5	4.1	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Allegany County	5	0	0	3.5	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Garrett County	5	0	0	3.4	10.3	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DOIT Total	**65**	0	0	71.1	26.7	97.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Site	Site Street Address	City	Cour	Fiber distance (ft)	Estimated Fiber Cos	Carrier	Current Circuit BW (Mbps)	Current Circuit Monthly Co	Est. ROI (years)
AA049	7931 Brock Bridge Rd	Jessup	AA	2906	$ 130,770	Verizon	300	$ 1,300	8.4
AA052	910 Stewart Ave	Glen Burnie	AA	0	$ -	Verizon	3	$ 340	0.0
AA081	160 Harry S Truman Pkwy	Annapolis	AA	0	$ -	Verizon	3	$ 418	0.0
AA108	2525 Riva Rd	Annapolis	AA	0	$ -	Verizon	10	$ 480	0.0
AA300	10102 Junction Dr	Annapolis Junctio	AA	587	$ 29,350	Verizon	1.5	$ 179	13.7
AA311	1700 Margaret Ave	Annapolis	AA	1566	$ 70,470	Verizon	50	$ 690	8.5
AA314	1919 Lincoln D	Annaplis	AA	503	$ 25,150	Verizon	3	$ 424	4.9
AA324	416 Chinquapin Round Rd	Annapolis	AA	49	$ 2,450	Verizon	30	$ 550	0.4
AA325	49 Old Solomons Island Rd	Annapolis	AA	1006	$ 45,270	Verizon	60	$ 590	6.4
AA328	60 West St	Annapolis	AA	414	$ 20,700	Verizon	100	$ 800	2.2
AA333	94 Franklin St	Annapolis	AA	288	$ 14,400	Verizon	50	$ 590	2.0
AA346	1 Orchard Rd	Glen Burnie	AA	326	$ 16,300	Verizon	50	$ 590	2.3
AA349	150-H Blades Ln	Glen Burnie	AA	1765	$ 79,425	Verizon	3	$ 340	19.5
AA352	6701 Baymeadows Dr	Glen Burnie	AA	134	$ 6,700	Verizon	10	$ 480	1.2
AA353	6740 Baymeadow Dr	Glen Burnie	AA	0	$ -	Verizon	1.5	$ 170	0.0
AA357	721 E Ordnance Rd	Glen Burnie	AA	2161	$ 97,245	Verizon	3	$ 340	23.8
AA364	1734 Arlington Ave	Arbutus	AA	512	$ 25,600	Verizon	1.5	$ 158	13.5
AA365	1352 Charwood Ct	Hanover	AA	4501	$ 202,545	Verizon	1.5	$ 167	101.1
AA375	7463 New Ridge Rd	Hanover	AA	2503	$ 112,635	Verizon	100	$ 720	13.0
AA383	8037 Brock Bridge Rd	Jessup	AA	3514	$ 158,130	Verizon	4.5	$ 510	25.8
AA384	375 Red Clay Rd	Laurel	AA	3450	$ 155,250	Verizon	1000	$ 1,875	6.9
AA387	613 Global Way	Linthicum	AA	213	$ 10,650	Verizon	10	$ 480	1.8
AA389	839 Elkridge Landing	Linthicum	AA	1088	$ 48,960	Verizon	50	$ 590	6.9
AA390	849 International Dr	Linthicum	AA	861	$ 43,050	CrownCastl	500	$ 500	7.2
AA391	901 Elkridge Landing Rd	Linthicum	AA	388	$ 19,400	Verizon	100	$ 500	3.2
AA393	991 Corporate Blvd	Linthicum	AA	249	$ 12,450	Verizon	100	$ 690	1.5
AA394	259 Najoles Rd	Millersville	AA	3666	$ 164,970	Verizon	10	$ 480	28.6
AA406	7364 Baltimore Annapolis Blvd	Glen Burnie	AA	1539	$ 69,255	Verizon	200	$ 1,075	5.4
AA410	1523 Signature Dr		AA	1797	$ 80,865	Comcast	600	$ 500	13.5
AL008	13300 Winchester Rd SW	Cumberland	AL	0	$ -	Verizon	10	$ 465	0.0
AL010	12101 New George Creek	Frostburg	AL	0	$ -	Verizon	3	$ 670	0.0
AL037	10100 Country Club Rd	Cumberland	AL	5534	$ 249,030	Verizon	200	$ 775	26.8
AL046	1251 Vocke Rd	LaVale	AL	0	$ -	Verizon	3	$ 640	0.0
AL306	12407 Naves Cross Rd NE	Cumberland	AL	3109	$ 139,905	Verizon	10	$ 465	25.1
AL315	30B N Mechanic St	Cumberland	AL	60	$ 3,000	Verizon	50	$ 553	0.5
AL317	59 Prospect Sq	Cumberland	AL	78	$ 3,900	Verizon	20	$ 365	0.9
AL318	10700 15 Mile Creek Rd	Flintstone	AL	1042	$ 46,890	Verizon	1000	$ 1,025	3.8
AL319	11701 Mountain Rd	Flintstone	AL	8156	$ 367,020	Verizon	3	$ 544	56.2
AL321	12500 Pleasant Valley Rd	Flintstone	AL	2054	$ 92,430	Verizon	10	$ 465	16.6
AL326	28700 Headquarters Dr NE	North East	AL	2525	$ 113,625	Verizon	3	$ 544	17.4
AL330	160 South Water St	Frostburg	AL	1675	$ 75,375	Verizon	200	$ 475	13.2
AL334	National Freeway	Frostburg	AL	304	$ 15,200	Verizon	4.5	$ 582	2.2
AL337	164 Freedom Ln	Lonaconing	AL	17647	$ 794,115	Verizon	1000	$ 1,025	64.6
AL341	1 Frederick St	Cumberland	AL	282	$ 14,100	Verizon	60	$ 365	3.2
AL342	1 James Day Dr	Cumberland	AL	3314	$ 149,130	Verizon	30	$ 580	21.4
BC053	300 E Madison St	Baltimore	BC	0	$ -	Verizon	40	$ 605	0.0
BC075	201 Oldham St	Baltimore	BC	1797	$ 80,865	Verizon	1.5	$ 149	45.2
BC119	700 E Patapsco Ave	Baltimore	BC	0	$ -	Verizon	50	$ 480	0.0
BC308	100 S Charles St	Baltimore	BC	317	$ 15,850	Verizon	1.5	$ 272	4.9
BC313	1010 Park Ave	Baltimore	BC	114	$ 5,700	Verizon	20	$ 533	0.9
BC315	1040 Park Ave	Baltimore	BC	911	$ 45,550	Verizon	10	$ 480	7.9

Goldilocks Builds

Layer 1 — **Transportation Variables**

High Priority DOT Corridor, ITS Devices, Key Long-Haul or Middle Mile

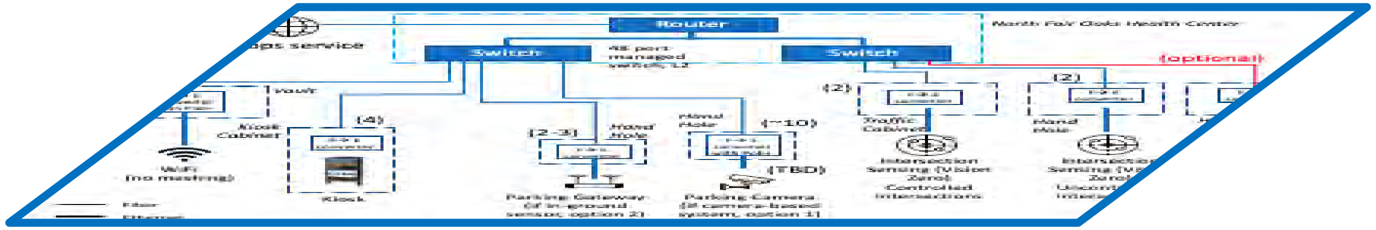


Layer 2 — **Vertical Assets**

Resource Sharing, Revenue Generation, Public Safety, Coverage Gaps

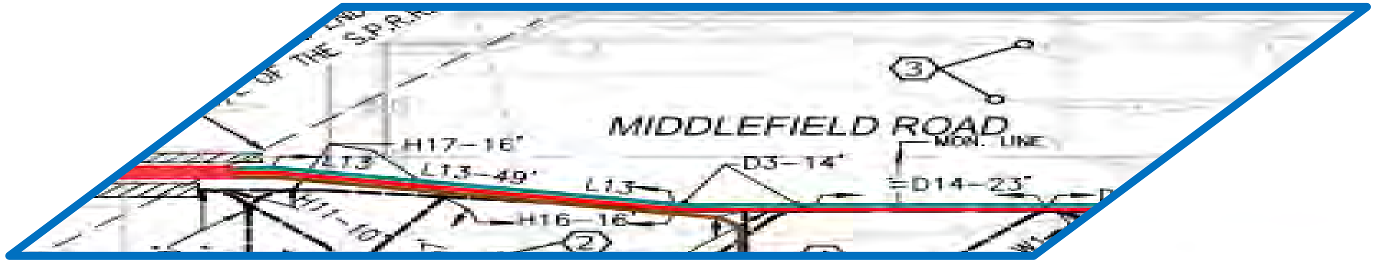
Layer 3 — **Government Institutions**

Corridor Facilitates Middle or Last Mile Connectivity to CAIs



Layer 4 — **Community Needs**

Corridor Facilitates Last Mile Connectivity to the Un(der)served.



Quick Wins

Build Investment Period	Capital Costs	Annual Return	Macro CBR (Years)	Total Sites	% Sites
<1 year builds	$114,950	$443,310	0.26	83	22%
<2 year builds	$501,020	$703,980	0.71	116	31%
<3 year builds	$940,050	$884,766	1.06	139	37%
<5 year builds	$1,608,205	$1,052,568	1.53	162	43%
<7 year builds	$2,755,450	$1,236,624	2.23	182	49%
<10 year builds	$5,035,150	$1,517,076	3.32	215	58%
<20 year builds	$8,792,495	$1,773,000	4.96	257	69%
>20 year builds	$68,514,740	$2,489,178	27.53	373	100%

ROI Period	# Sites	% of Sites	Macro Savings / Year
ROI < 1 year	12	23%	$76,242
ROI < 2 years	7	13%	$120,708
ROI < 3 years	3	6%	$152,418
ROI < 5 years	3	6%	$180,246
ROI < 7 years	3	6%	$201,066
ROI < 10 years	8	15%	$284,928
ROI < 20 years	6	12%	$327,432
ROI > 20 years	10	19%	$369,204


BREAK
TIME

Approach to Fiber Deployment

Eric Bathras
Chief Technology Officer
Maryland Department of Information Technology

Approach to Fiber Deployment

Session 2

BUSINESS CASE

- Move Away from the Concept of a Build
- Funding Strategy
- Site Analysis
- Cost Benefit Recovery
- Goldilocks Corridors – Dig "Smart"
- Prioritize Quick Wins
- Modernizing Service Delivery

DESIGN

- Aerial
- Underground
- Terrain & Install Environment
- Standardize
- Permitting
- Design for Growth
- Interconnection Points

IMPLEMENT

- Procurement Strategy
- Materials Purchasing Decision
- Restoration
- Inspection
- Network Implementation
- As-build to GIS Transition
- Miss Utility Registration
- Fiber Locating
- Emergency Response

Aerial

- Poles per Mile
- Pole Attachment Agreements
- Make Ready (Budget & Schedule)
- Pole Ownership

Underground

- Terrain (urban, suburban & rural)
- Type of Installation Method
- Handhole Locations

Standards

- Naming Conventions
- Conduit, Handholes, Fiber & Splice Cases
- Splicing & Testing
- Master Fiber Reels
- Permitting

Interconnection

- Splice Points
- Slack Loops
- Handhole Locations
- Carrier or RSA Partner Tie-ins

BUSINESS CASE

- Move Away from the Concept of a Build
- Funding Strategy
- Site Analysis
- Cost Benefit Recovery
- Goldilocks Corridors – Dig "Smart"
- Prioritize Quick Wins
- Modernizing Service Delivery

DESIGN

- Aerial
- Underground
- Terrain & Install Environment
- Standardize
- Permitting
- Design for Growth
- Interconnection Points

IMPLEMENT

- Procurement Strategy
- Materials Purchasing Decision
- Restoration
- Inspection
- Network Implementation
- As-build to GIS Transition
- Miss Utility Registration
- Fiber Locating
- Emergency Response

Construction

- Master Fiber Reel Installation
- Restoration
- Aerial (Make Ready & Strand/Fiber)
- Make Ready (Budget & Schedule)
- Tracker & Dashboard
- Post-Install Punchlist

Inspection

- As-builds
- Entry into Fiber Asset Inventory
- Inspector(s)
- Certified Traffic Control Personnel
- Field Changes

Procurement

- Strategy
- Materials
- Labor
- Contract Vehicle
- Maintenance

Operations

- Transition to NOC
- Fiber Asset Inventory
- Relocations
- Miss Utility Registration
- Fiber Locating
- Emergency Restoration
- Maintenance Windows

Approach to Fiber Deployment from a DOT Perspective

Mike Floberg
Director of Innovative Technologies (Ret)
Kansas DOT

APPROACH TO FIBER DEPLOYMENT A DOT PERSPECTIVE

- R/W Management
  - Follow KDOT Utility Accommodation Policy

- Permitting Process
  - Electronic Permit Application
  - Timeline

- Utility and Infrastructure Coordination
  - Railroads are the issue
  - Coordination with other utilities is done thru locating process

APPROACH TO FIBER DEPLOYMENT
A DOT PERSPECTIVE

- Asset Mapping and Documentation
  - GIS coordinates required
  - Electronic Permit Process
  - As-Builts

- Dig Once Policy
  - Currently creating a formal process

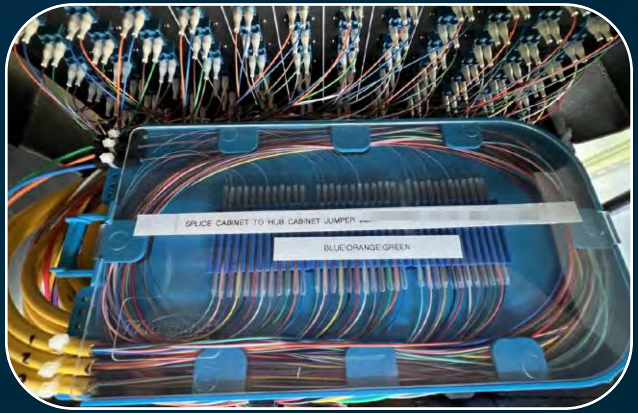
- Emergency Access and Resilliency
  - Fiber provides redundancy for statewide 800 MHz Radio

- Long Term Maintenance and Agreements
  - Contracted or added to agreement.

Prioritizing Fiber With Corridors

Jennifer Portanova
Statewide TSMO Engineer
North Carolina DOT

NORTH CAROLINA
Department of Transportation



NCDOT Fiber-Optic Communications Plan
Current Overview and Future Outlook

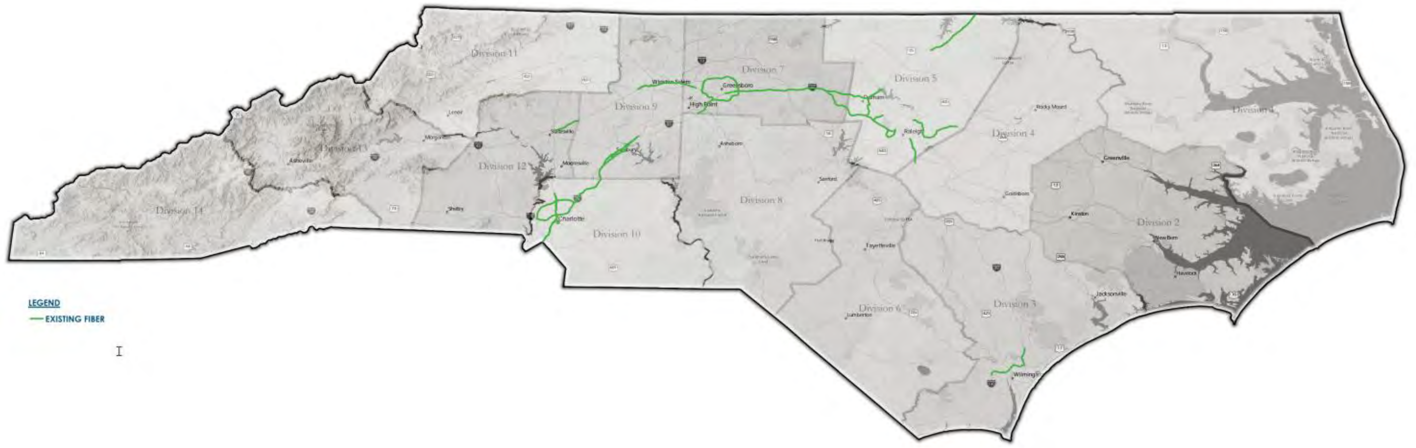
Jennifer Portanova, PE, CPM
State TSMO Engineer

April, 2025

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

Where We Were…

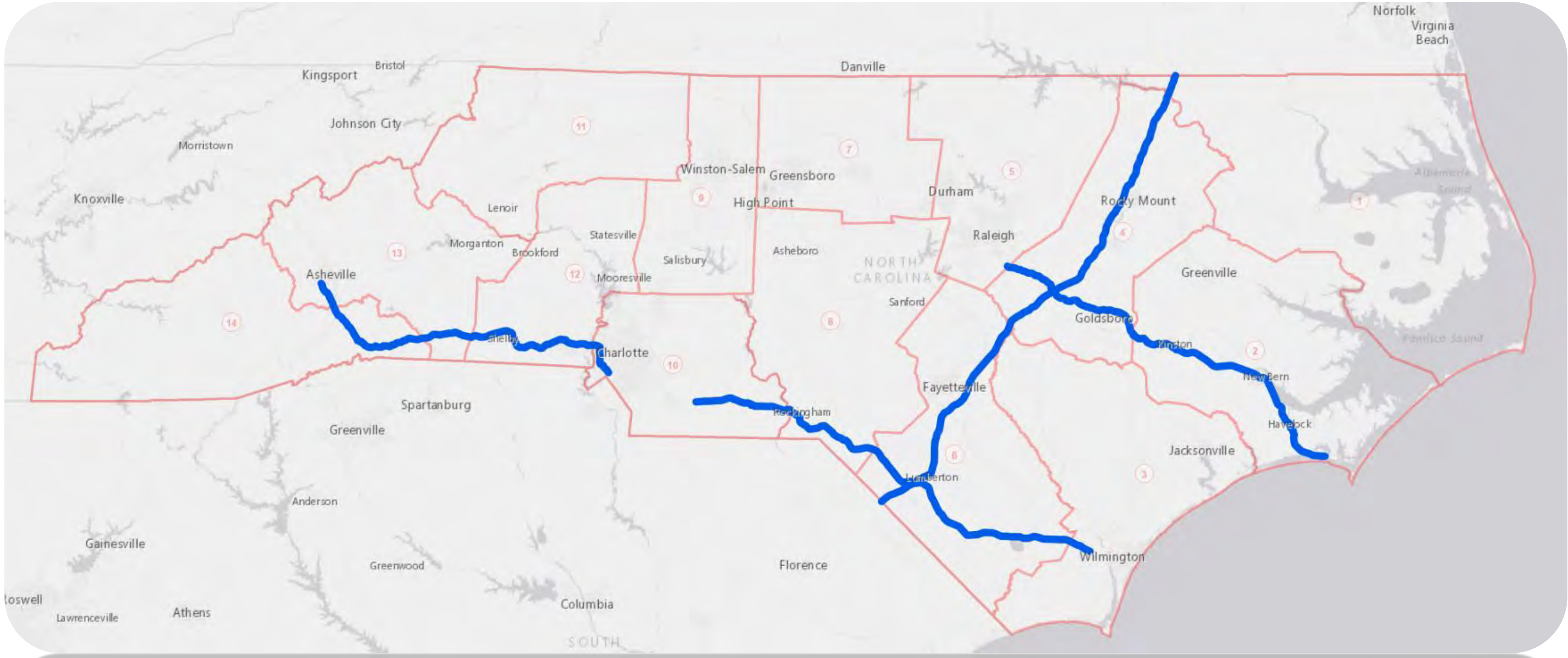
- No cohesive plan at the statewide level.
- Fiber installed piecemeal where we could get it on roadway projects.
- Poorly maintained or not maintained at all once installed.
- No consistent structure or layout to the network.
- Mix of fiber spliced differently for either analog or ethernet devices.



How the Plan Got Started

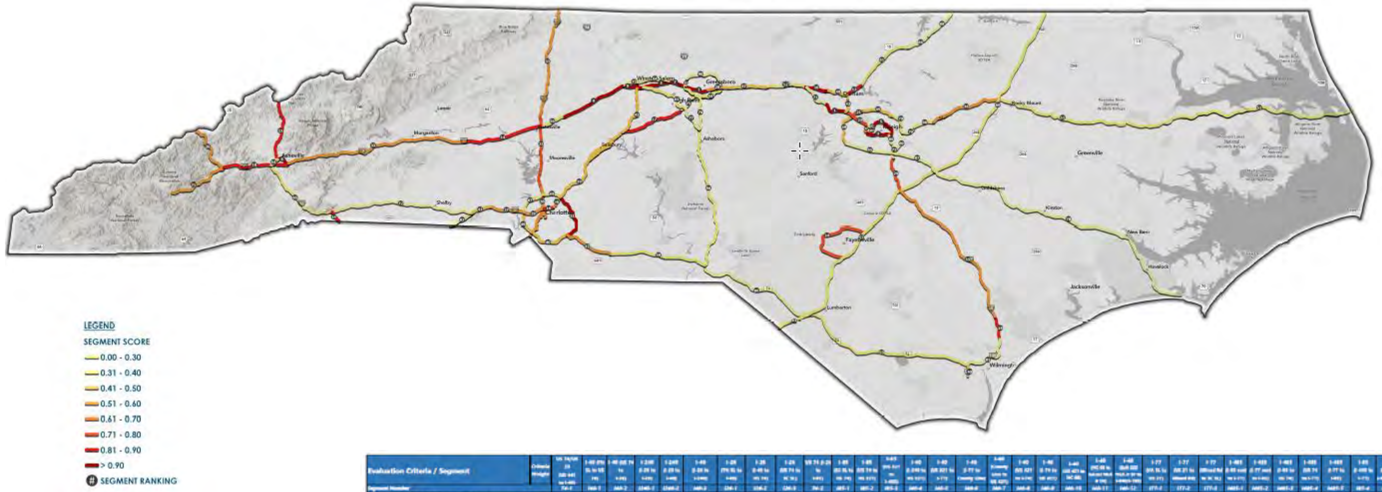
NCDOT's First Broadband Project

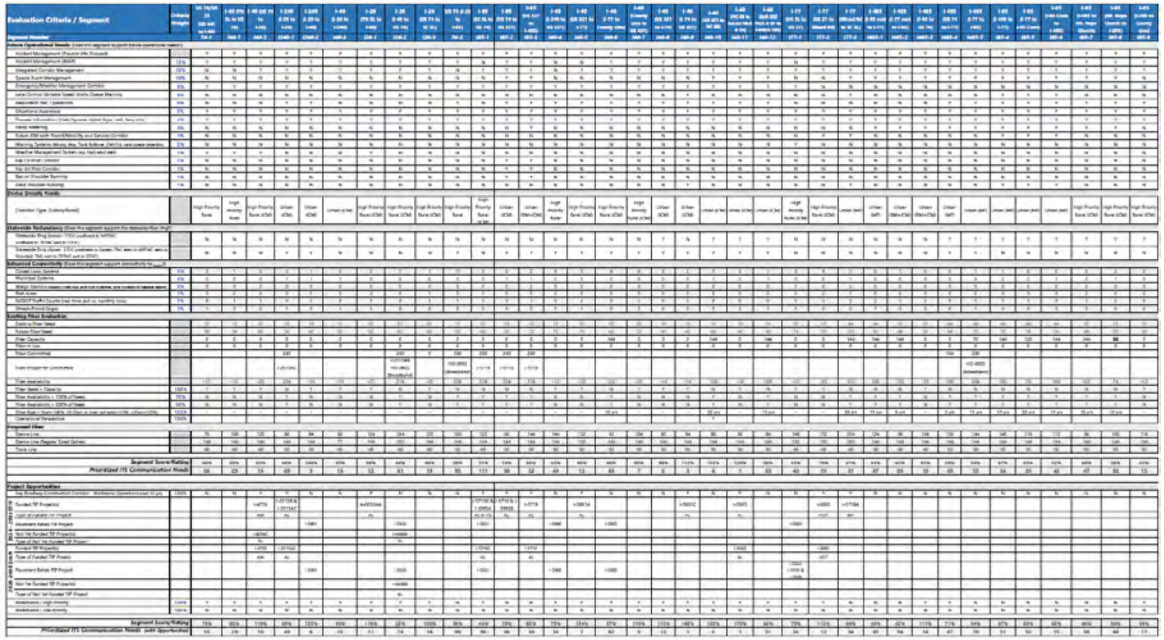
- Doubled the amount of ITS fiber in the state.
- Reliable connection to four of the five TMCs across the state.
- Performance based maintenance contract.
- Emphasized our need for a statewide comm plan for future ITS and Broadband projects.



Identifying and Prioritizing Our Needs

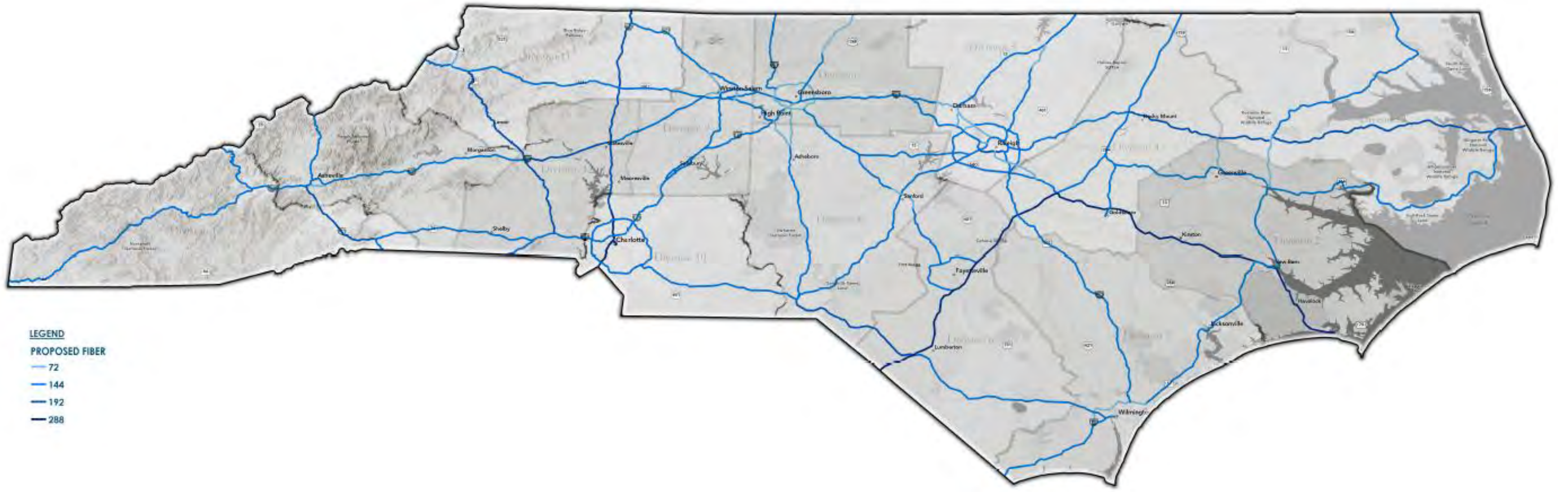
- Broke Interstates and major US routes into segments and categorized based on many criteria:
  - Existing fiber capacity and age.
  - Current and future operational needs.
  - Desired ITS device density.
  - Regional and statewide network impact and redundancy.
- Scored routes based on these criteria to prioritize our fiber needs.
- Private industry outreach to identify where our needs intersect theirs.





Where We Are Headed

- Cohesive plan for all major and minor routes statewide.
- Standardized and modern network design and layout.
- Multiple paths of network redundancy.
- Clear picture of route priority for planning future ITS and Broadband projects.



Contact Us

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@NCDOT NCDOT NCDOTcommunications View All Channels

Thank you!


LUNCH
TIME

Approach to Fiber Deployment

Jeremy Dilmore
Emerging Technologies Manager
Florida DOT

Resource Sharing and Agreements;

Regional Collaboration for Multi-Jurisdictional Sharing

Jeremy Dilmore, P.E.

Emerging Technologies Manager

Former D5 TSMO Program Engineer

ESTABLISHED PARTNERSHIP

- FDOT, Central Florida Expressway, MetroPlan Orlando, City of Orlando, Orange County, and Seminole County started
- Established 20+ years ago
- Foundation was fiber optic cable sharing
- Very mature coordination and collaboration
  - Regional Planning and Capability Maturity Modelling
  - Hardware/Network sharing
  - IT Support
  - ICM

AGENDA

- What Resources
- History
- Why do agencies participate
- Who Participates
  - Agreements
- How is this documented
- What steps were taken to make this happen

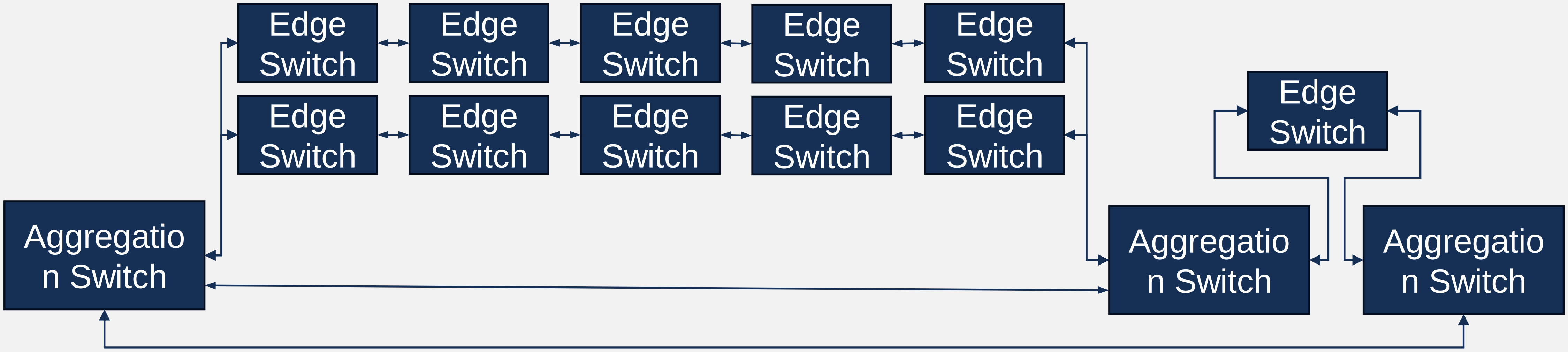
FDOT

WHAT RESOURCES

- Dark Fiber
- Communication Bandwidth
- Access to CCTV Cameras
- Access to Data
  - Travel Time
  - Safety Data
  - Volume Data
- IT Personnel to coordinate

BACKGROUND

- Started with fiber



- Today use no more than 24 strands for freeway or arterial networks
- Then used 12 strands and saved 12 for others

FDOT

BACKGROUND

- Transportation Purpose
- Fiber installed at times with Federal money
- Do not transport LEO traffic
- Do share camera feeds and data with LEOs via Local Agency TMC
- LEO do not have control; they see what we see

WHY AGENCIES PARTICIPATE

- Cost… Installation and Maintenance
- Fiber installation could be shared
  - Recognized cost structure
    - Trench costs 5x cost of fiber
    - More fiber strands cost very little. Shared resources benefited everyone
- One camera to install and maintain is half the cost of two cameras

WHO PARTICIPATES

- Counties and cities that maintain signals and FDOT
- Does not include 3 agencies out of 74 in the District
  - Never forced or used any political pressure
- All agreement coordination has been at the technical level
- Share with Transit and Expressway Authority*

EXPRESSWAY AUTHORITY

- FDOT provides TMC Operations for Central Florida Expressway
- CFX provides buffer tube for FDOT
- FDOT allocates white buffer tube as needed

- FDOT agreement provides access rights to CFX ROW
- Notification provided priority to comensing work
- Local Agencies are required to permit their work within the ROW

AGREEMENTS

- Agreement has minimal terms
  - We agree to share fiber/data
  - We hold each other harmless
  - We will meet regularly
- Unwritten rules
  - Minimum fiber size
  - Dark fiber if available is provided
  - FDOT keeper of documentation (ITSFM)

OTHER DOCUMENTATION

- Fiber records maintained in electronic files by FDOT
  - https://www.cflsmartroads.com/tools.html
- First documented OSP Insight
- Moved to ITSFM

PROCEDURE

- Need identified
- Email to FDOT
- FDOT gets agency with fiber maintenance responsibility, agency need
  - Verify min fiber need
  - Agree best route
  - Perform field verification
- Fiber assignment documented in system
- Work performed
- Fibers field verified
- **NOTE:** Time is spent on how versus should; act as a team to accomplish each other’s goals; documentation is centrally held

REGIONAL BOTTLENECKS

- Some areas become popular/congested
- Results in rearchitecting
- Examples:
  - I-4 and 528
  - 429 and SR 50

- Some require new fiber
  - CR 423

QUESTIONS

Jeremy Dilmore

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Happy to share any and all requested documents

The Planning Stages of Fiber Deployment

Eric Bathras
Chief Technology Officer
Maryland Department of Information Technology

Regional Collaboration

Session 4

CONNECTED BUILDING

- Un(der)served CAIs
- Towers
- PSAPs
- Research & Higher Education
- Public Safety
- DR Location
- Datacenters
- Campuses
- Corridors & Roadways
- Hospitals
- Parks
- Interconnection Points

CONNECTED STREET

- Lighting
- Automated Vehicles
- Cameras
- Messaging
- Air Quality
- Traffic Control
- Parking
- Kiosks
- Benches
- Digital Signage
- Waste Management
- Advanced ITS

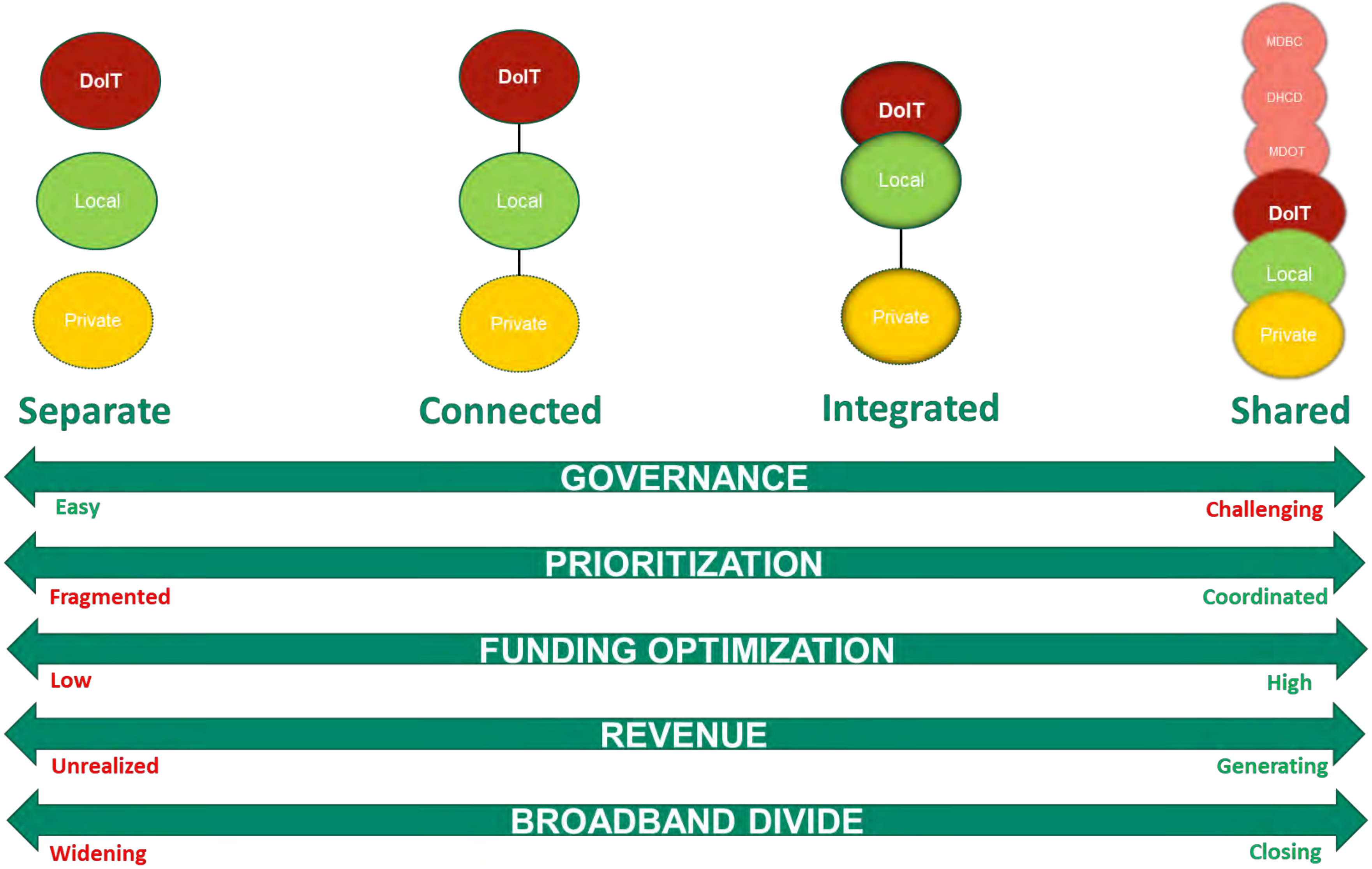
CONNECTED COMMUNITY

- Remote Working
- Connected Vehicles
- Remote Learning
- Health & Safety
- Digital Literacy
- Quality of Life
- Economic Development
- Job Training
- Workforce Development
- Mobility
- Digital Equity

CONNECTED SYSTEMS

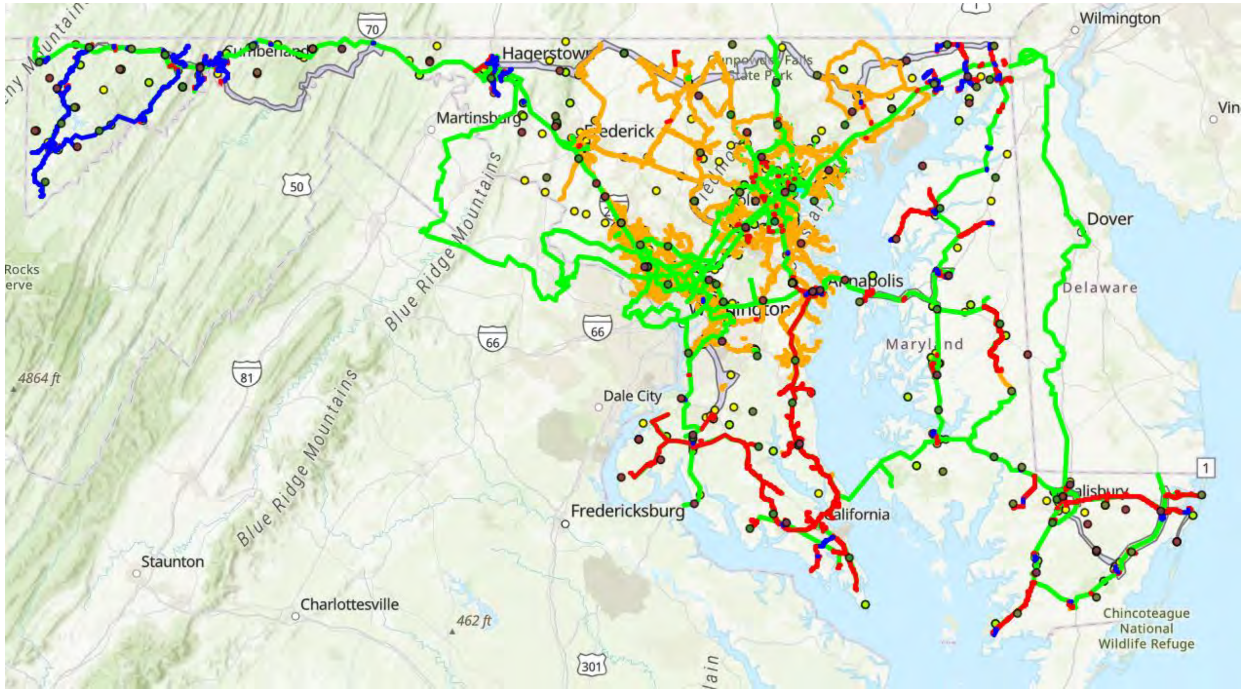
- Cloud & Datacenter
- Video Streaming
- Intelligent Transportation
- Operational Technology
- Shared Infrastructure
- Internet of Things
- Critical Infrastructure
- NextGen 911
- Utilities
- Interoperability
- Cellular and Wireless
- Public Safety

SHARED BROADBAND INFRASTRUCTURE MODEL



The Single View

- Existing & Future Fiber Routes
- Lit Buildings
- Towers
- Gap Analysis
- Datacenters
- Un(der)served Areas
- Layered Data
- Braid Funding



DIGITAL INFRASTRUCTURE GROUP (DIG)

ROI Period	# Sites	% of Sites	Macro Savings / Year
ROI < 1 year	12	23%	$76,242
ROI < 2 years	7	13%	$120,708
ROI < 3 years	3	6%	$152,418
ROI < 5 years	3	6%	$180,246
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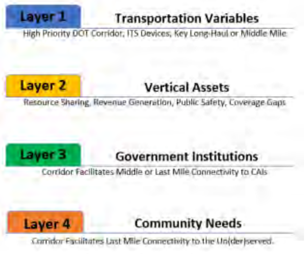
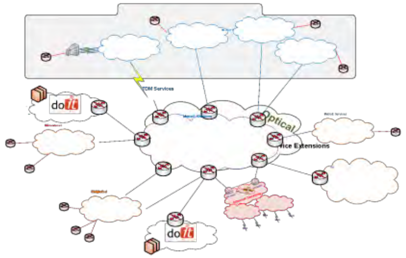
ROI > 20 years	10	19%	$369,204

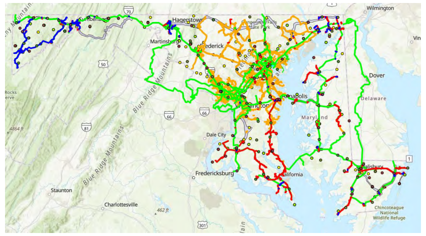
Budgetary Efficiency



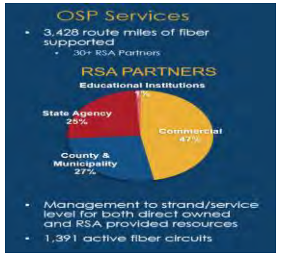
Goldilocks Corridors



Resiliency



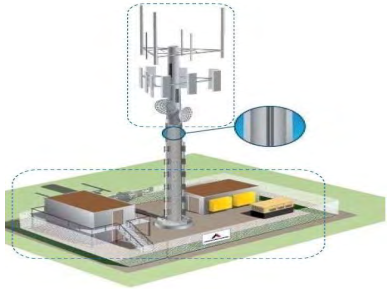
Single View



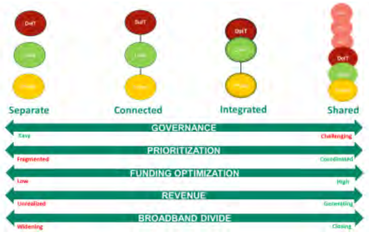
Coordination

Policy

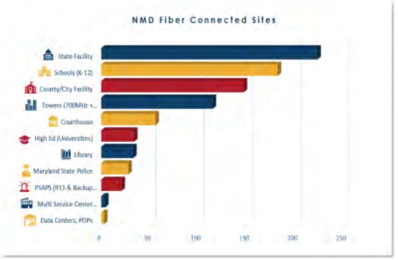
Awareness & Planning



RSA Revenue



Prioritization



Partnerships

Use & Valuation of Fiber

Matthew Dryer
Statewide RSA Program Manager
Maryland Department of Information Technology

Use and Valuation of Fiber

Presented by Matthew Dryer

Legal and Regulatory Considerations

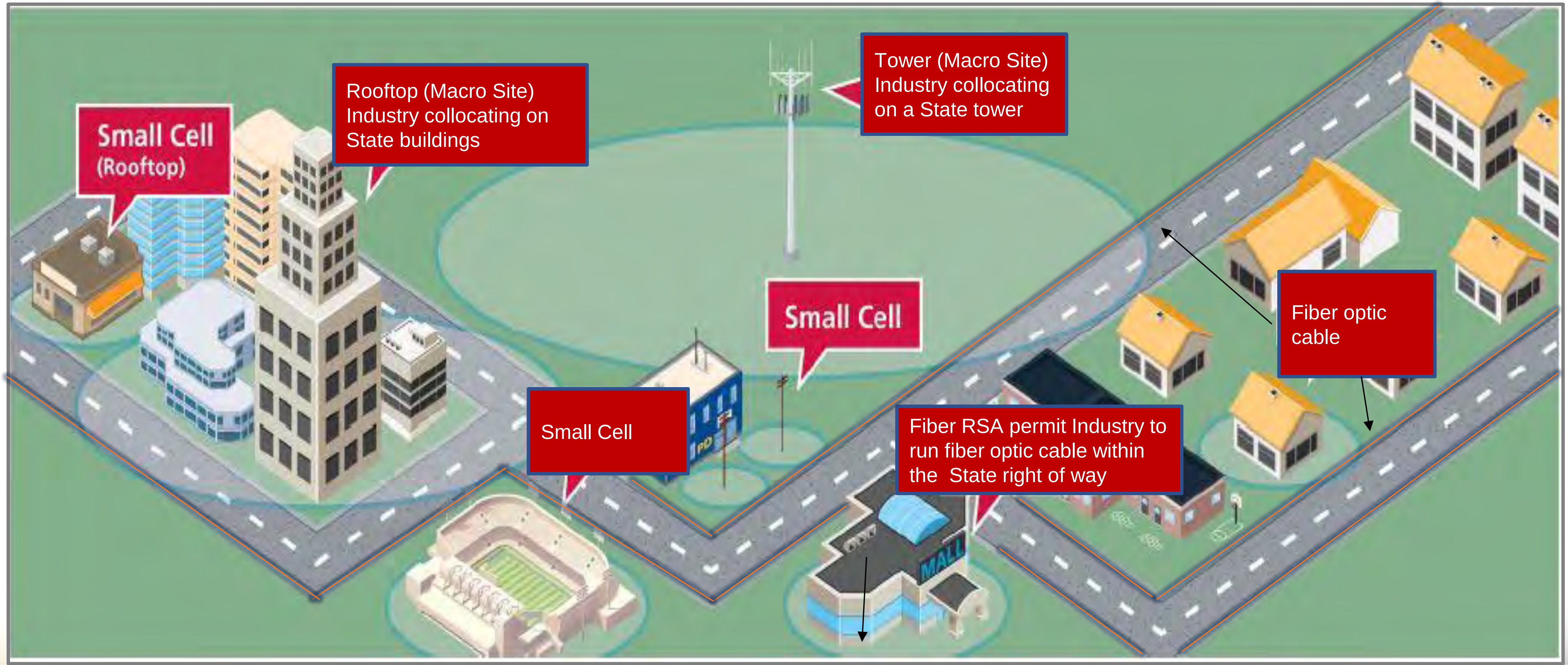
- 1996 Resource Sharing Law was established via Chapter 87, Laws of Maryland
  - Law allowed State Agencies to enter into non-exclusive agreements with private companies for use of State assets.
  - State Chief of Information Technology is given oversight
- 1999 Network Maryland established to provide internet to State Government
- 2008 RSA Law is recodified into Subtitle 3A of State Finance and Procurement Articles
- 2022 RSA Law is recodified into Subtitle 3.5 of State Finance and Procurement Articles

Statewide RSA Program Authority

- State Finance and Procurement §3.5 -404 (a)(1) Established Network Maryland

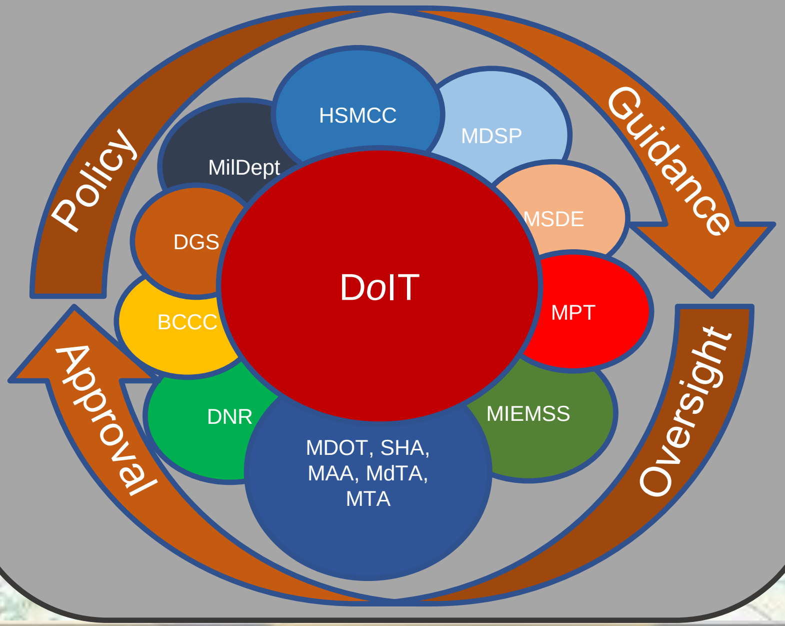
- State Finance and Procurement §3.5 -307 (c)(1) A unit of State government shall advise the Secretary of any information technology proposal involving:
  - Resource sharing
  - The exchange of goods or services
  - A gift, contribution, or grant of real or personal property
  - The sale, lease, exchange, or other disposition of communications facilities or communications frequencies

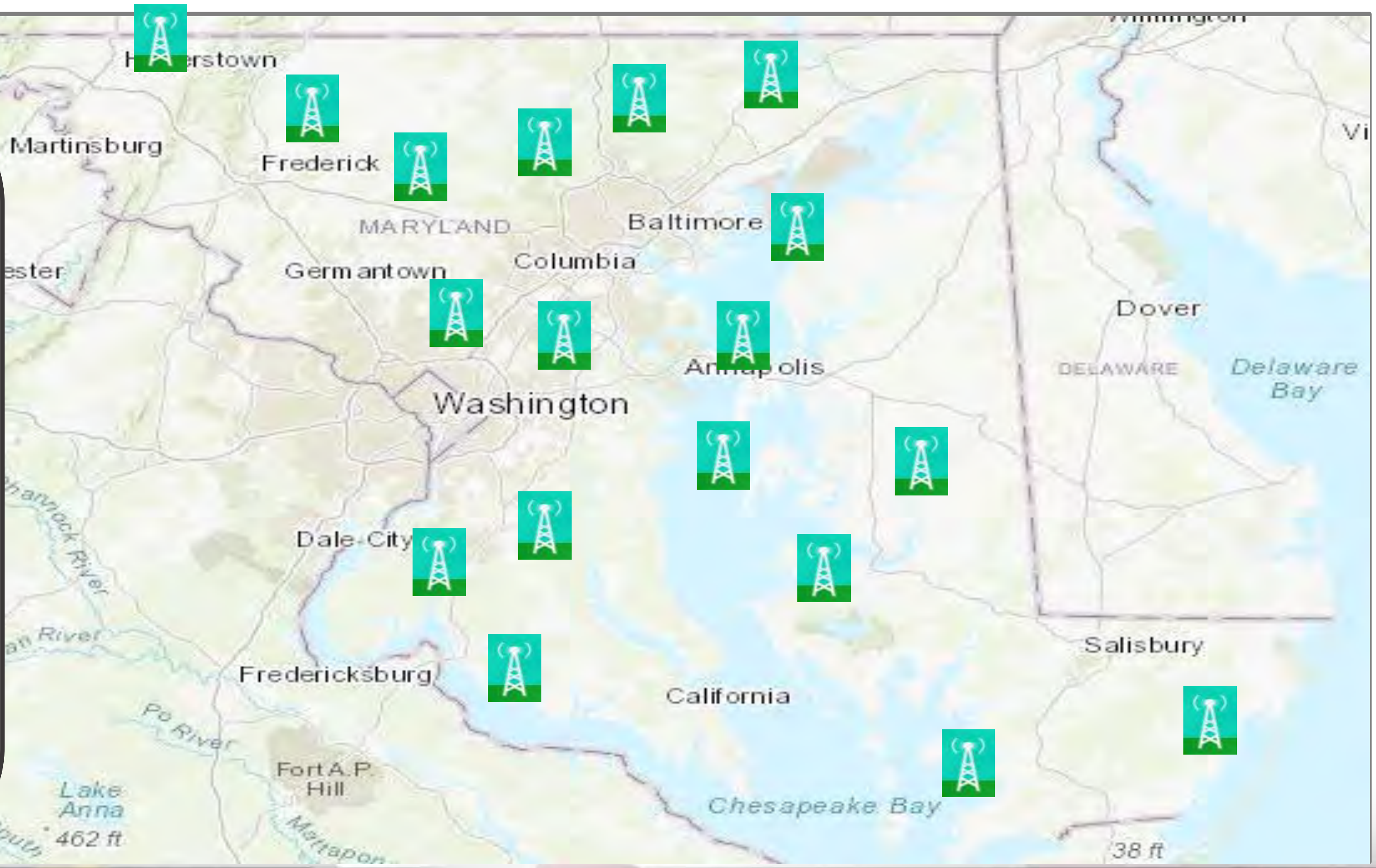
Common Types of RSAs



DoIT the Oversight Agency

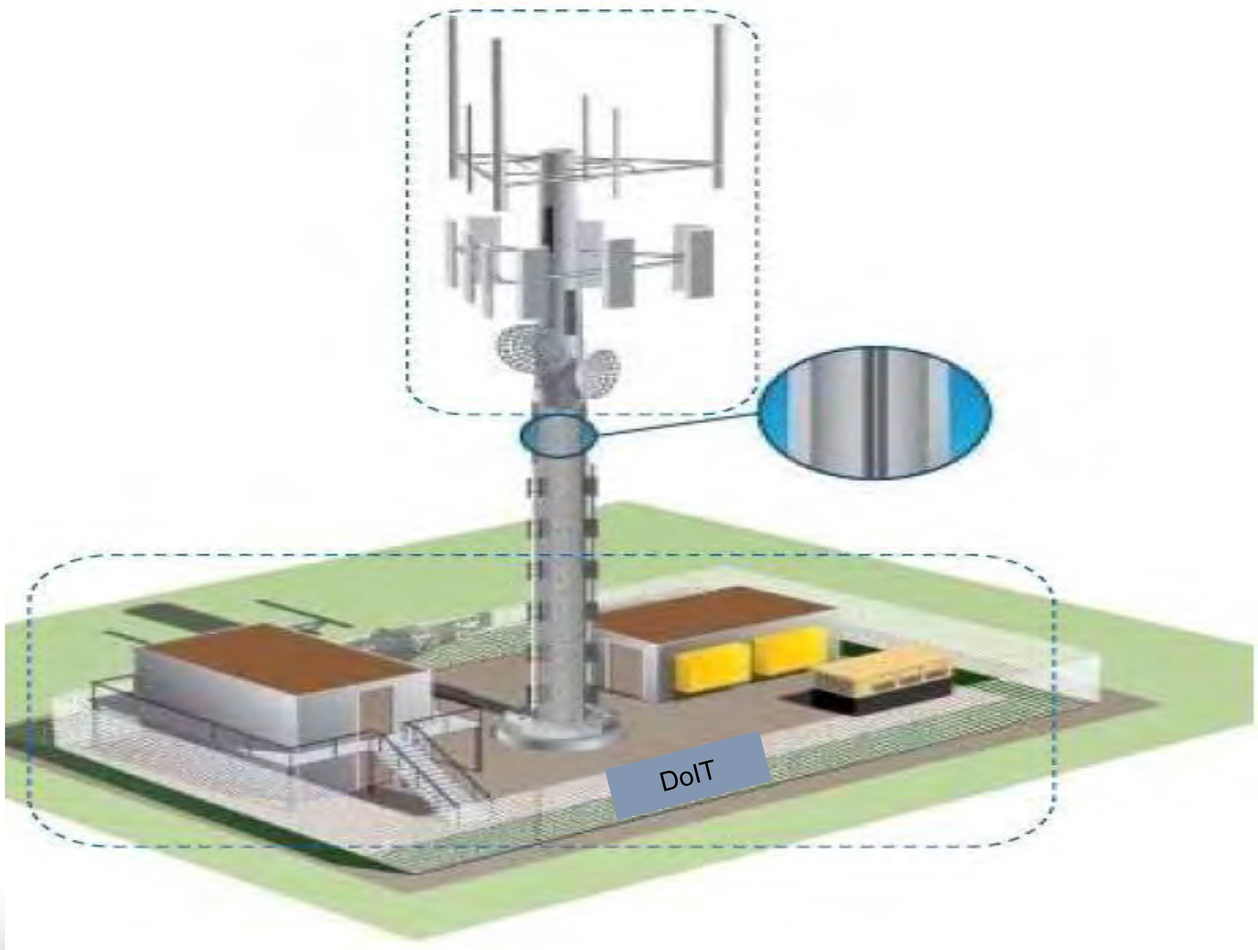
As the Oversight Agency, DoIT is responsible to review, value and approve all information technology proposals (SF&P) § 3.5-307 (c)





Program Compensation

- **The Resource Sharing Law (RSL), allows the State to receive monetary or like kind consideration**
- **DoIT has developed standardized rates for towers, small cells, fiber, land.**



Factors of Value

- The economic concept of value is not inherent in the commodity, good, or service to which it is ascribed. The relationships that create value are complex, and values change when the factors that influence value change. Typically, four interdependent economic factors create value:
  - 1. <u>Utility</u> - The ability of a product to satisfy a human want, need or desire.
  - 2. <u>Scarcity</u> - The present or anticipated supply of an item relative to the demand for it.
  - 3. <u>Desire</u> – The purchaser's wish for an item to satisfy human needs or wants beyond the essentials required to support life.
  - 4. <u>Effective Purchasing Power</u> – The ability of an individual or group to participate in a market to acquire goods or services.

Maryland Market Factors

- Maryland ranks 5th in the percentage of fiber coverage per State (Desire / Scarcity)
- National data usage trends are rising (Desire / Utility)
- More Americans are using smart phones, laptops, and teleworking (Desire / Utility)
- More industries rely on technology within their infrastructure (Desire / Utility)
- Technological advances are requiring faster data speeds (Desire / Utility)
- Expected 5G implementation (Utility)
- Highways and roads are the best telecommunications corridors (Utility / Scarcity)
- State rights of way are a finite resource (Scarcity)
- Federal / State / Private funding = ROI Incentives (EPP / Desire)

Methods for Determining Value

- (SF & P) § 3.5-307 (c)(2) – Requires the Secretary of DoIT to determine the value of the resource , services, and property to be obtained by the State.
- Common methods of determining the value of a resource and property include:
  - Across the Fence (ATF) (Easement Analogy) – Assumes the value of the IT corridor is similar to the adjacent property and applies the market value of adjoining property to the right of way.
  - Market Approach (Survey Method) – reviewing collected market data from similar transactions as a comparison to know what the market will bear.
  - Cost Approach (Cost Method) – Understanding the cost to construct.

Across the Fence (Easement Analogy)

- Across the Fence (ATF) (Easement Analogy)-
- This method of valuation is significantly more time intensive
- Less transparent
- More accurately represent the value of the fiber corridor being used
  - The formula is (Land value * Length * width * rate of return * Factor of recognized degree of alienation * use factor) =

Market Approach (Survey Method)

- Market Approach (Survey Method) –
- Reviewing market data from similar transactions as a comparison
- Once developed this method of valuation is faster to calculate
- More transparent
- Easily understood by private industry and State partners
- Can adjust for specific market factors
    - The formula is (Rate * (#Strands / 432 strands))*linear feet =

Market Approach (Survey Method)

- Market Approach (Survey Results)

Location or Agreement	Rate Average	Unit Measure	Average
USDOT Conduit Rates Average	$3.49	LF	$3.81
USDOT Fiber Cable Installation 24 to 96 count	$3.31	LF	
USDOT Fiber Cable Installation average 96 count	$3.50	LF	
National Survey	$4.42	LF	
Comcast at Deep Creek	$3.56	LF	
Quest at Chapel Point 48 count fiber	$4.27	LF	
Level 3 at Gunpowder 3 conduits less than 200 Strands	$3.50	LF	
Level 3 at Ft Frederick	$4.50	LF	
MASSDOT Average Rate per 216 strands	$5.61	LF	
Amtrak Northeast	$3.00	LF	
Bay Area Regional Transit	$4.00	LF	
Chicago Belt Line	$1.25	LF	
Ben Franklin Bridge	$8.00	LF	
Conrail	$2.29	LF	
CSX PA	$7.59	LF	
City Orlando	$2.00	LF	
Garden State Parkway NJ	$2.46	LF	
GTW Detroit	$4.69	LF	
GTW Detroit-Warren	$3.94	LF	
Mass Turnpike Authority	$1.96	LF	
SE PA Transit Authority	$2.50	LF	
US/Railroads Northeast	$4.00	LF	

DoIT Rates

Using State Property to Install Fiber or Conduit	Annual RATE
All Areas minus - Tunnels and Bridges	
Fiber Rate Calculation = (Rate X (# Strands/432)) X linear feet	$3.50
Empty Conduit = (# Conduits * Linear Feet * Rate)	$3.00
** Minimum default rate not less than	$0.50
All Tunnels and Bridges **PREMIUM**	
Fiber Rate Calculation = (Rate X (# Strands/432)) X linear feet	$5.75
Empty Conduit = (# Conduits * Linear Feet * Rate)	$5.00
** Minimum default rate not less than $0.50 LF	$0.50
Company Using State Owned "Dark Fiber"	
Per Linear Foot (1 to 5279 feet)	
Dark Fiber Rate = (# Strands X Linear Feet X Rate)	$0.03
Per Mile 1 +	
Dark Fiber Rate = (# Strands X # Miles X Rate)	$150.00
Annual Maintenance Cost Per Mile	$250.00
Distance 1 Mile = 5,280 feet	
Rent Escalation Rate	3.00%
Base RSA Term	10 Years
Renewal Option	(2-3) 10-year options

Discussion

- Question and Answer-

- Share how your organization does it-


BREAK
TIME

The Planning Stages of Fiber Deployment

Mike Floberg
Director of Innovative Technologies (Ret)
Kansas DOT

CONTRACTING METHODS

- Construction Contract
  - Bid and Let- DTI
  - Design, Bid and Let
- Include with Highway Construction Project
- Request for Proposal
- Partner with Fiber Company
  - Share trenching costs
- Partner with Local Units of Government
- Partner with Kansas Turnpike Authority

Tracking Fiber Assets & Usage/Dark Fiber

Russell Allen
Innovation & Emerging Technology Lead
AtkinsRealis

Tracking Fiber Assets and Dark Fiber

TETC Fiber Workshop

April 22, 2025

TOPICS

- Fiber Management
- Fiber Optic Management Systems and Their Uses
- Fiber and Infrastructure Sharing
- Q&A

FIBER MANAGEMENT – WHAT DO I HAVE, WHERE IS IT, AND WHAT IS IT USED FOR?

- Develop a Fiber Allocation Plan
  - Where do I have fiber and “can I see it”?
  - Am I the owner, or just a user?
  - How many strands do I have per corridor/section?
  - What if adjacent projects install different strand counts?
  - How do I maximize utilization?
  - Did I design redundancy (rings) into my network?
  - Do I have other potential stakeholders in the area?
  - Opportunity for partnering to “fill in gaps” or “dig once”?
  - What do I do with dark fiber?
  - Are there any revenue opportunities?

FIBER MANAGEMENT – WHAT DO I HAVE, WHERE IS IT, AND WHAT IS IT USED FOR?

- Fiber Allocation Plan – Buffer Assignments

BLUE	LOCAL / EDGE DEVICES (SIGNALS) - LAYER 2	TRUSTED
ORANGE	LOCAL / EDGE DEVICES (ITS) - LAYER 2	
GREEN	HUB TO HUB COMMS - LAYER 3	
BROWN	TMC TO TMC COOP/DR COMMS	
SLATE	THIRD PARTY FIELD DEVICES/NETWORKS	UNTRUSTED
WHITE	INTER-AGENCY CONNECTIVITY / DATA SHARING	
RED	PARTNER AGENCY CONNECTIVITY / DATA SHARING	
BLACK	EMERGENCY MANAGEMENT / ENTERPRISE BACKUP	
YELLOW	LAYER 1 HIGH-SPEED TRANSPORT / PASSTHROUGH	N/A
VIOLET	LOCAL AGENCY TO LOCAL AGENCY COMMS / PASSTHROUGH	
ROSE	BROADBAND / PASSTHROUGH(?)	
AQUA	SPARE - NOT ASSIGNED	

FIBER MANAGEMENT – WHAT DO I HAVE, WHERE IS IT, AND WHAT IS IT USED FOR?

- Fiber Allocation Plan – Strand Utilization

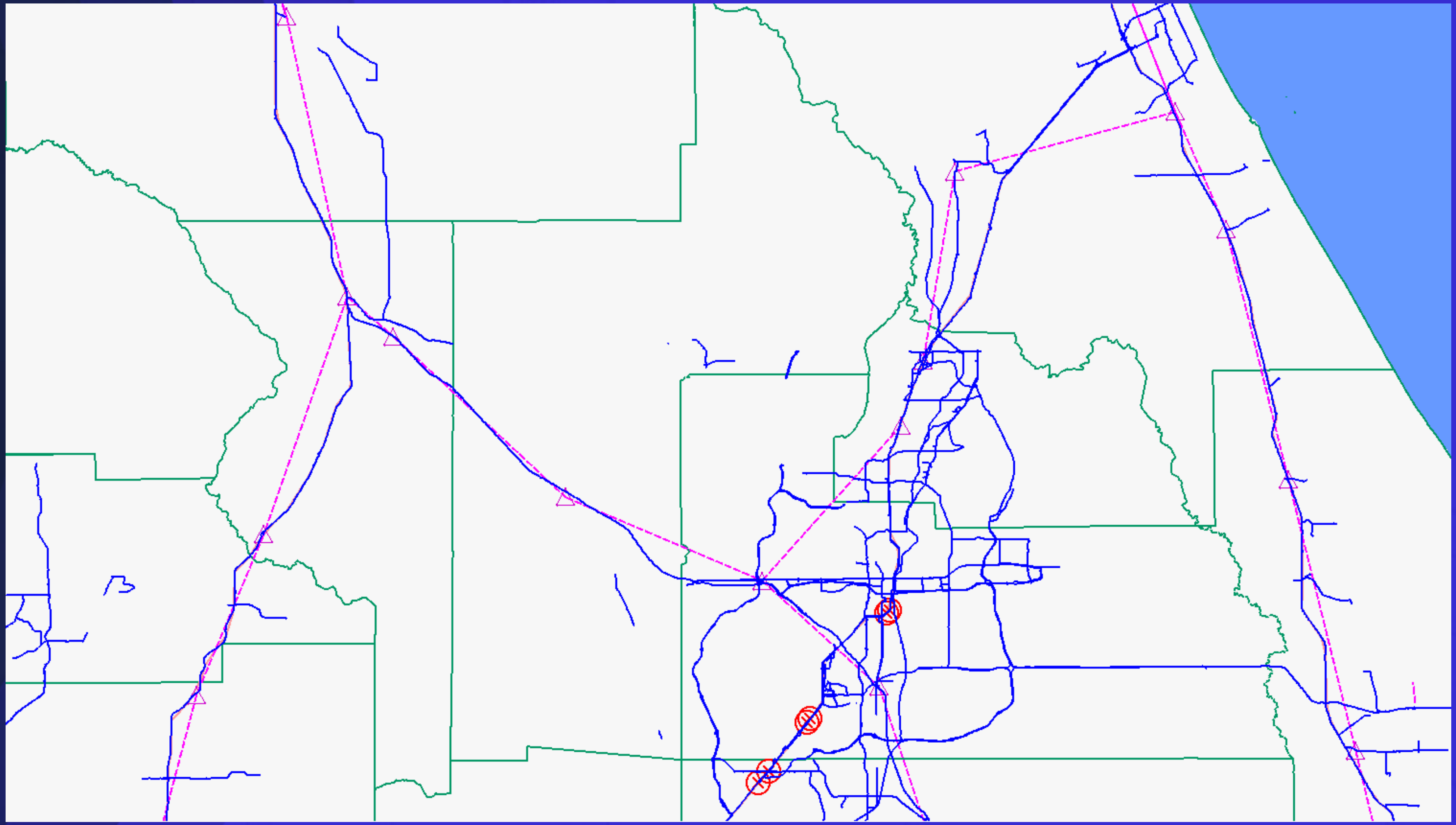
BLUE	LOCAL / EDGE DEVICES (SIGNALS) - LAYER 2	LOCAL SWITCH - SIGNAL CABINET 100
		LOCAL SWITCH - SIGNAL CABINET 105
		LOCAL SWITCH - SIGNAL CABINET 110
		LOCAL SWITCH - SIGNAL CABINET 115
		?
		?
ORANGE	LOCAL / EDGE DEVICES (ITS) - LAYER 2	L2 SWITCH - I-95 MM 102.5 NB TO 103.6 NB
		L2 SWITCH - I-95 MM 102.5 NB TO 103.6 NB
		L2 SWITCH - I-95 MM 102.5 NB TO HUB 6
		L2 SWITCH - I-95 MM 102.5 NB TO HUB 6

GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- GIS Tools help you accurately visualize your fiber assets
- There are a lot of Fiber Optic Management Systems out there to choose from. Some examples are:
  - 3-GIS | Live (*software-based*)
  - ArcFM (*software-based)*
  - Bentley OpenComms Designer (*software-based*)
  - FiberTrak (*software-based*)
  - IQGeo Network Manager^{TM} Telecom (*software-based*)
  - ITSFM (*software-based*)
  - NexusWorx (*software-based*)
  - Network Integrity Systems VANGUARD^{TM} (*hardware*)
  - Sintela ONYX^{TM} Sensing Unit (*hardware*)
  - VETRO FiberMap® (*SaaS*)
  - VIAVI Solutions (*hardware*)
- Some solutions offer full project lifecycle support including Planning, project schedules, BOM, Plant usage, work orders, etc.

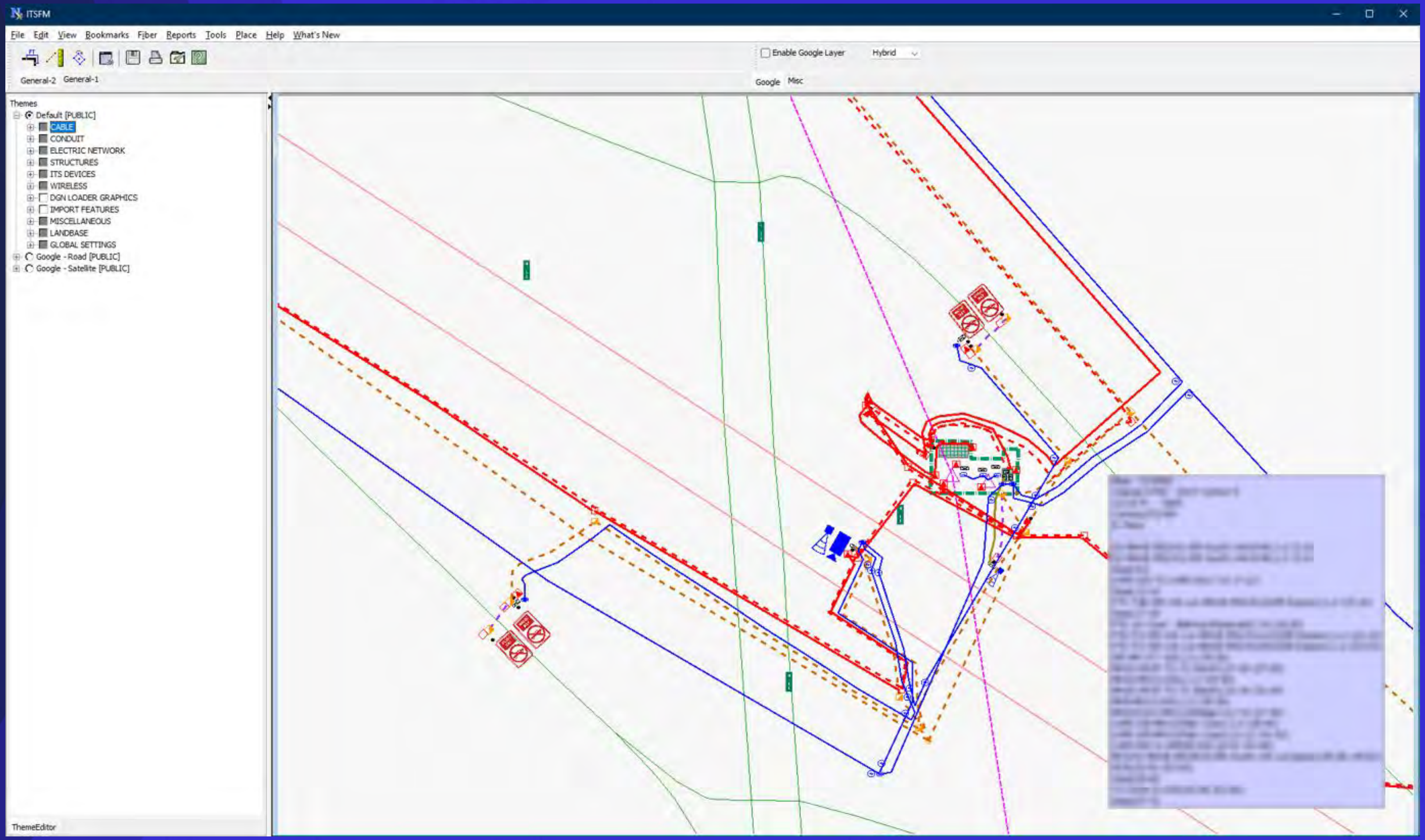
GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Visualization - Where Do I Have Fiber Assets?



GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Visualization – Where Do I Have Access to Fiber and What is it Used For?



GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Fiber Cable Details Report
  - Path Details
  - Connectivity Details
  - Termination Endpoints

Fiber Optic Cable Attribute Review

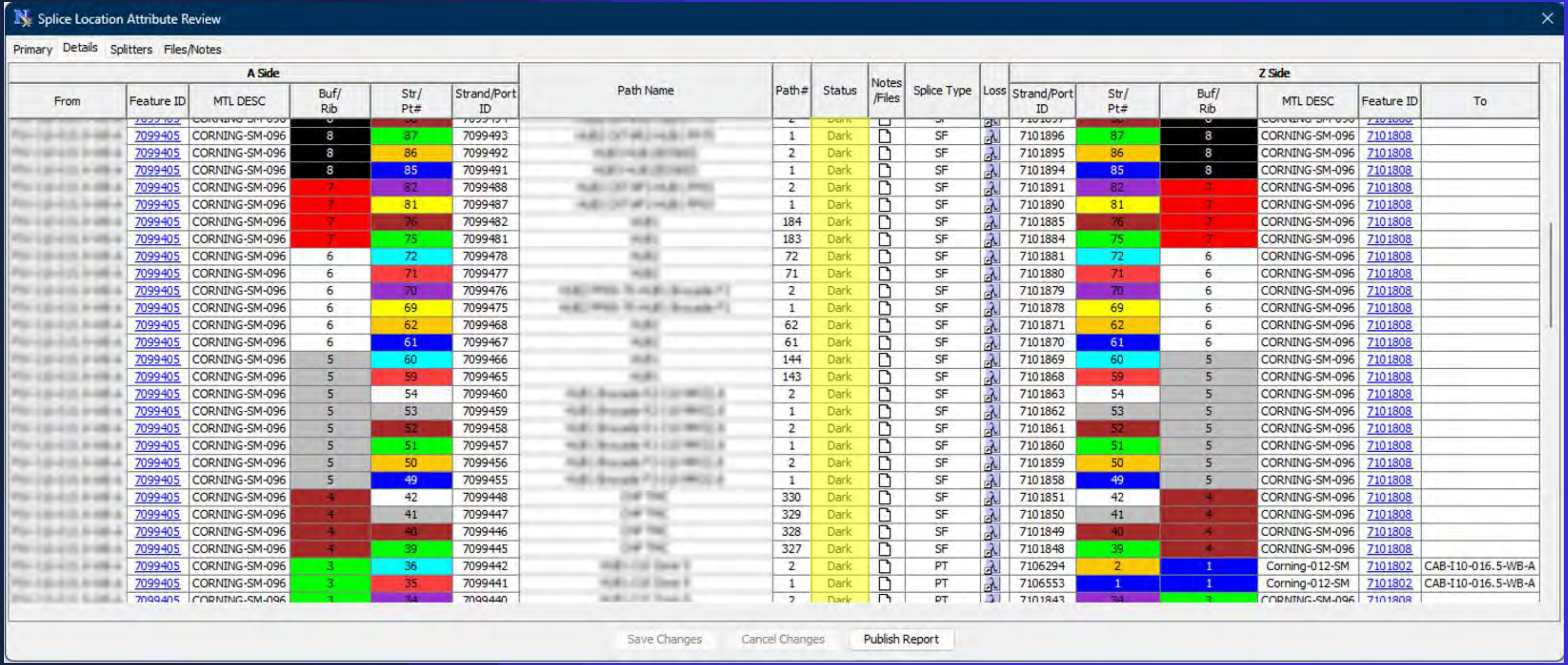
Primary | Strands | Circuits | Rate Summary | Status Summary | Files/Notes

Path Name	Path#	Customer	Circuit ID	Status	Notes /Files	Str	Buf/ Rib	Loss	Connectivity						Termination Loc	
									A Type	A ID	A#	Z Type	Z ID	Z#	A LOCATION	Z LOCATION
						1	1		Strand	29014342		Port	15029643	1	FiberDev, 7960319	FiberDev, 13531242
						2	1		Strand	29014352		Port	15029792	2	FiberDev, 7960319	FiberDev, 13531242
						3	1		Strand	29014564		Port	15029747	3	FiberDev, 7960319	FiberDev, 13531242
						4	1		Strand	29014552		Port	15029704	4	FiberDev, 7960319	FiberDev, 13531242
						5	1		Strand	29014530		Port	15029752	5	FiberDev, 7960319	FiberDev, 13531242
						6	1		Strand	29014341		Port	15029765	6	FiberDev, 7960319	FiberDev, 13531242
						7	1		Strand	29014348		Port	15029714	7	FiberDev, 7960319	FiberDev, 13617352
						8	1		Strand	29014350		Port	15029844	8	FiberDev, 7960319	FiberDev, 13617352
						9	1		Strand	29014545		Port	15029722	9	FiberDev, 7960319	FiberDev, 13531242
						10	1		Strand	29014561		Port	15029789	10	FiberDev, 7960319	FiberDev, 13531242
						11	1		Strand	29014567		Port	15029850	11	FiberDev, 7960319	FiberDev, 13617352
						12	1		Strand	29014543		Port	15029818	12	FiberDev, 7960319	FiberDev, 13617352
						13	2		Strand	29014525		Port	15029749	13	FiberDev, 7960319	SpliceCase, 7554392
						14	2		Strand	29014521		Port	15029708	14	FiberDev, 7960319	SpliceCase, 7554392
						15	2		Strand	29014346		Port	15029724	15	FiberDev, 7960319	SpliceCase, 7554392
						16	2		Strand	29014517		Port	15029808	16	FiberDev, 7960319	SpliceCase, 7554392
						17	2		Strand	29014553		Port	15029804	17	FiberDev, 7960319	SpliceCase, 7554392
						18	2		Strand	29014575		Port	15029742	18	FiberDev, 7960319	SpliceCase, 7554392
						19	2		Strand	29014510		Port	15029796	19	FiberDev, 7960319	SpliceCase, 7554392
						20	2		Strand	29014533		Port	15029781	20	FiberDev, 7960319	SpliceCase, 7554392
						21	2		Strand	29014565		Port	15029640	21	FiberDev, 7960319	SpliceCase, 7554392
						22	2		Strand	29014357		Port	15029649	22	FiberDev, 7960319	SpliceCase, 7554392
						23	2		Strand	29014554		Port	15029816	23	FiberDev, 7960319	SpliceCase, 7554392
						24	2		Strand	29014518		Port	15029810	24	FiberDev, 7960319	SpliceCase, 7554392
				Working		25	3		Strand	29014513		Port	15029791	25	FiberDev, 13530776	FiberDev, 11776490
				Working		26	3		Strand	29014547		Port	15029798	26	FiberDev, 13530776	FiberDev, 11776490
						27	3		Strand	29014541		Port	15029718	27	FiberDev, 7960319	SpliceCase, 11749037
						28	3		Strand	29014529		Port	15029734	28	FiberDev, 7960319	SpliceCase, 11749037
						29	3		Strand	29014511		Port	15029726	29	FiberDev, 7960319	SpliceCase, 11749037
						30	3		Strand	29014349		Port	15029760	30	FiberDev, 7960319	SpliceCase, 11749037
						31	3		Strand	29014548		Port	15029736	31	FiberDev, 7960319	SpliceCase, 7554392
						32	3		Strand	29014572		Port	15029794	32	FiberDev, 7960319	SpliceCase, 7554392
						33	3		Strand	29014537		Port	15029779	33	FiberDev, 7960319	SpliceCase, 7554392
						34	3		Strand	29014512		Port	15029787	34	FiberDev, 7960319	SpliceCase, 7554392
						35	3		Strand	29014535		Port	15029523	35	FiberDev, 7960319	SpliceCase, 7554392
						36	3		Strand	29014339		Port	15029773	36	FiberDev, 7960319	SpliceCase, 7554392
				Working		37	4		Strand	29014563		Port	15029767	37	FiberDev, 13530776	FiberDev, 11776490
				Working		38	4		Strand	29014522		Port	15029842	38	FiberDev, 13530776	FiberDev, 11776490
						39	4		Strand	29014343		Port	15029744	39	FiberDev, 7960319	FiberDev, 13531242
						40	4		Strand	29014534		Port	15029751	40	FiberDev, 7960319	FiberDev, 13531242

Save Changes | Cancel Changes | Publish Report

GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Dark Fiber Splicing Report



A Side												Z Side					
From	Feature ID	MTL DESC	Buf/ Rib	Str/ Pt#	Strand/Port ID	Path Name	Path#	Status	Notes /Files	Splice Type	Loss	Strand/Port ID	Str/ Pt#	Buf/ Rib	MTL DESC	Feature ID	To
[illegible]	7099405	CORNING-SM-096	8	87	7099493	[illegible]	1	Dark		SF		7101896	87	8	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	8	86	7099492	[illegible]	2	Dark		SF		7101895	86	8	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	8	85	7099491	[illegible]	1	Dark		SF		7101894	85	8	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	7	82	7099488	[illegible]	2	Dark		SF		7101891	82	7	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	7	81	7099487	[illegible]	1	Dark		SF		7101890	81	7	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	7	76	7099482	[illegible]	184	Dark		SF		7101885	76	7	CORNING-SM-096	7101808	
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[illegible]	7099405	CORNING-SM-096	6	70	7099476	[illegible]	2	Dark		SF		7101879	70	6	CORNING-SM-096	7101808	
[illegible]	7099405	CORNING-SM-096	6	69	7099475	[illegible]	1	Dark		SF		7101878	69	6	CORNING-SM-096	7101808	
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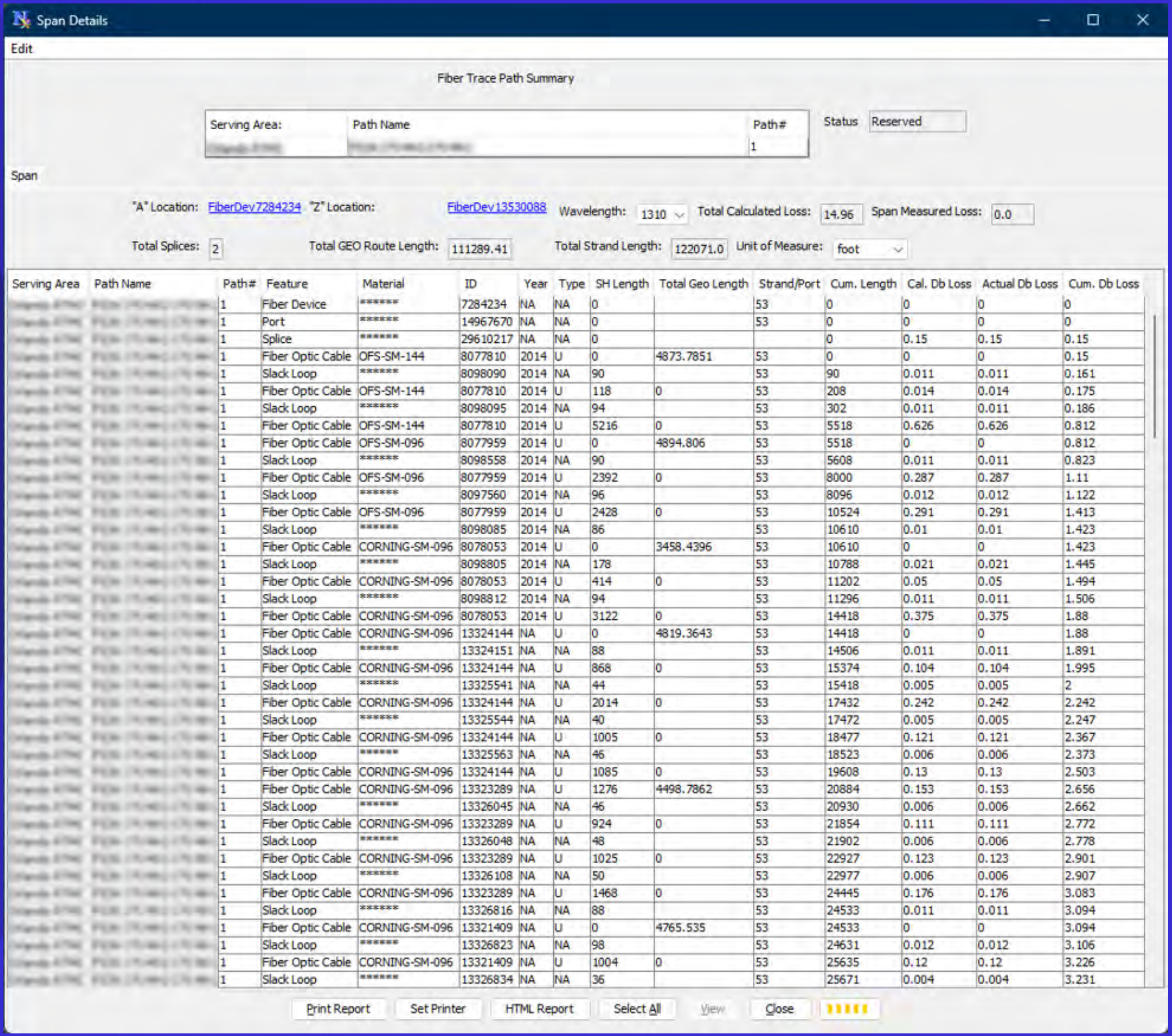
GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

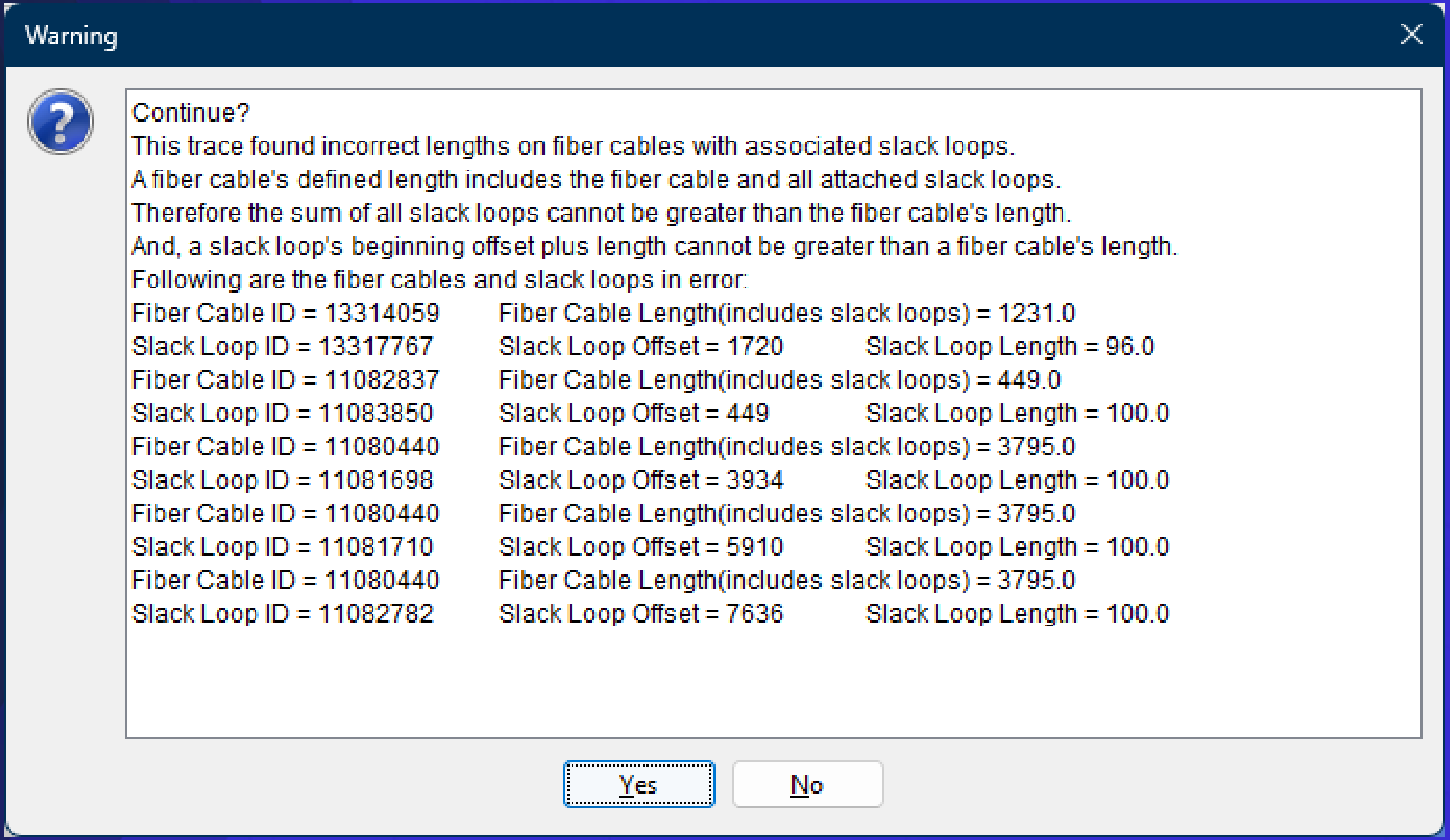
- Fiber Trace Capabilities



Serving Area	Path Name	Path#	Feature	Material	ID	Year	Type	SH Length	Total Geo Length	Strand/Port	Cum. Length	Cal. Db Loss	Actual Db Loss	Cum. Db Loss
[illegible]	[illegible]	1	Fiber Device	******	7284234	NA	NA	0		53	0	0	0	0
[illegible]	[illegible]	1	Port	******	14967670	NA	NA	0		53	0	0	0	0
[illegible]	[illegible]	1	Splice	******	29610217	NA	NA	0			0	0.15	0.15	0.15
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-144	8077810	2014	U	0	4873.7851	53	0	0	0	0.15
[illegible]	[illegible]	1	Slack Loop	******	8098090	2014	NA	90		53	90	0.011	0.011	0.161
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-144	8077810	2014	U	118	0	53	208	0.014	0.014	0.175
[illegible]	[illegible]	1	Slack Loop	******	8098095	2014	NA	94		53	302	0.011	0.011	0.186
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-144	8077810	2014	U	5216	0	53	5518	0.626	0.626	0.812
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-096	8077959	2014	U	0	4894.806	53	5518	0	0	0.812
[illegible]	[illegible]	1	Slack Loop	******	8098558	2014	NA	90		53	5608	0.011	0.011	0.823
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-096	8077959	2014	U	2392	0	53	8000	0.287	0.287	1.11
[illegible]	[illegible]	1	Slack Loop	******	8097560	2014	NA	96		53	8096	0.012	0.012	1.122
[illegible]	[illegible]	1	Fiber Optic Cable	OFS-SM-096	8077959	2014	U	2428	0	53	10524	0.291	0.291	1.413
[illegible]	[illegible]	1	Slack Loop	******	8098085	2014	NA	86		53	10610	0.01	0.01	1.423
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	8078053	2014	U	0	3458.4396	53	10610	0	0	1.423
[illegible]	[illegible]	1	Slack Loop	******	8098805	2014	NA	178		53	10788	0.021	0.021	1.445
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	8078053	2014	U	414	0	53	11202	0.05	0.05	1.494
[illegible]	[illegible]	1	Slack Loop	******	8098812	2014	NA	94		53	11296	0.011	0.011	1.506
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	8078053	2014	U	3122	0	53	14418	0.375	0.375	1.88
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13324144	NA	U	0	4819.3643	53	14418	0	0	1.88
[illegible]	[illegible]	1	Slack Loop	******	13324151	NA	NA	88		53	14506	0.011	0.011	1.891
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13324144	NA	U	868	0	53	15374	0.104	0.104	1.995
[illegible]	[illegible]	1	Slack Loop	******	13325541	NA	NA	44		53	15418	0.005	0.005	2
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13324144	NA	U	2014	0	53	17432	0.242	0.242	2.242
[illegible]	[illegible]	1	Slack Loop	******	13325544	NA	NA	40		53	17472	0.005	0.005	2.247
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13324144	NA	U	1005	0	53	18477	0.121	0.121	2.367
[illegible]	[illegible]	1	Slack Loop	******	13325563	NA	NA	46		53	18523	0.006	0.006	2.373
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13324144	NA	U	1085	0	53	19608	0.13	0.13	2.503
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13323289	NA	U	1276	4498.7862	53	20884	0.153	0.153	2.656
[illegible]	[illegible]	1	Slack Loop	******	13326045	NA	NA	46		53	20930	0.006	0.006	2.662
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13323289	NA	U	924	0	53	21854	0.111	0.111	2.772
[illegible]	[illegible]	1	Slack Loop	******	13326048	NA	NA	48		53	21902	0.006	0.006	2.778
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13323289	NA	U	1025	0	53	22927	0.123	0.123	2.901
[illegible]	[illegible]	1	Slack Loop	******	13326108	NA	NA	50		53	22977	0.006	0.006	2.907
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13323289	NA	U	1468	0	53	24445	0.176	0.176	3.083
[illegible]	[illegible]	1	Slack Loop	******	13326816	NA	NA	88		53	24533	0.011	0.011	3.094
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13321409	NA	U	0	4765.535	53	24533	0	0	3.094
[illegible]	[illegible]	1	Slack Loop	******	13326823	NA	NA	98		53	24631	0.012	0.012	3.106
[illegible]	[illegible]	1	Fiber Optic Cable	CORNING-SM-096	13321409	NA	U	1004	0	53	25635	0.12	0.12	3.226
[illegible]	[illegible]	1	Slack Loop	******	13326834	NA	NA	36		53	25671	0.004	0.004	3.231

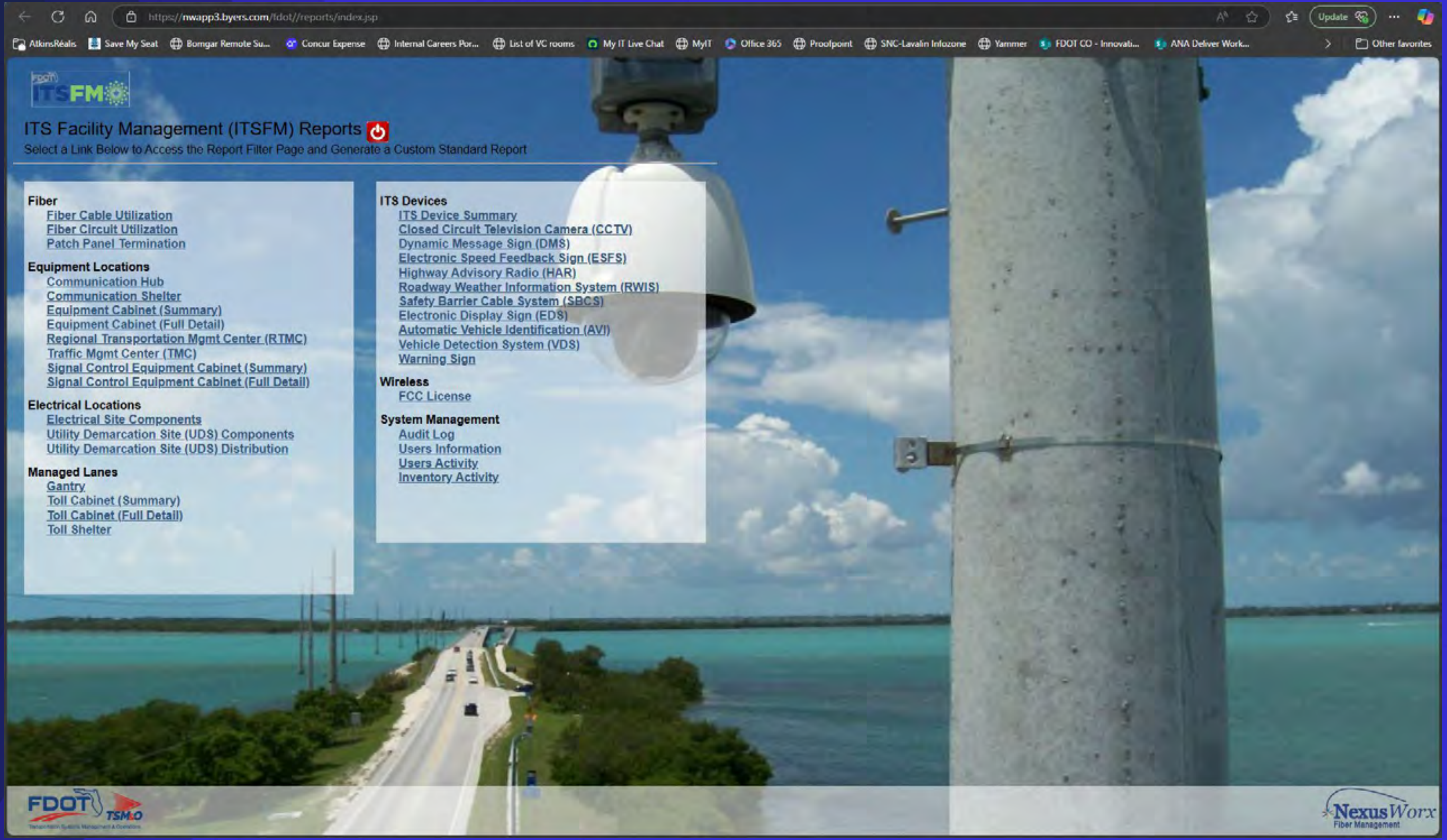
GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Garbage In, Garbage Out!



ASSET REPORTS

- Fiber Utilization Reports
- Hubs / Cabinets
- Electrical Sites
- Tolls
- Device Inventory and Details
- Site Docs
- User Reports
- Audits



ASSET REPORTS

- Device Inventory
  - Device IDs
  - Type
  - Install Date
  - Location
  - Make/Model
  - Serial Number
  - More…

Device Id	ITS Device Type	Installation Date	Latitude	Longitude	Manufacturer	Model	Serial Number
7072747	Vehicle Detection System	6/26/2017	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072748	Vehicle Detection System	12/3/2018	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072996	Closed Circuit Television	3/19/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072749	Vehicle Detection System	6/3/2016	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072750	Vehicle Detection System	8/18/2016	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072997	Closed Circuit Television	3/19/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072751	Vehicle Detection System	2/10/2021	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072752	Vehicle Detection System	4/14/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
13170480	Vehicle Detection System	1/1/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS Sx-300-SSP	[illegible]
13169134	Closed Circuit Television	1/1/2019	[illegible]	[illegible]	GovComm	GC-IMPO-FIZDE	[illegible]
13170478	Vehicle Detection System	1/1/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS Sx-300-SSP	[illegible]
13170479	Vehicle Detection System	1/1/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS Sx-300-SSP	[illegible]
7072753	Vehicle Detection System	4/14/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072998	Closed Circuit Television	8/13/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
13170477	Vehicle Detection System	1/1/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS Sx-300-SSP	[illegible]
13169135	Closed Circuit Television	1/1/2019	[illegible]	[illegible]	GovComm	GC-IMPO-FIZDE	[illegible]
7072754	Vehicle Detection System	4/14/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
13307701	Wireless Access Point	1/1/2019	[illegible]	[illegible]	CivicSmart	SENS-SX-GATEWAY	[illegible]
13307700	Wireless Access Point	1/1/2019	[illegible]	[illegible]	CivicSmart	SENS-SX-GATEWAY	[illegible]
13169136	Closed Circuit Television	1/1/2019	[illegible]	[illegible]	GovComm	GC-IMPO-FIZDE	[illegible]
7072755	Vehicle Detection System	4/14/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072999	Closed Circuit Television	1/21/2020	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072756	Vehicle Detection System	7/7/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072757	Vehicle Detection System	6/12/2018	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072758	Vehicle Detection System	4/13/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7073000	Closed Circuit Television	8/13/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072759	Vehicle Detection System	4/13/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072760	Vehicle Detection System	7/5/2017	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072761	Vehicle Detection System	5/6/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072762	Vehicle Detection System	10/13/2016	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7073001	Closed Circuit Television	9/14/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072763	Vehicle Detection System	8/2/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072764	Vehicle Detection System	7/11/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7073002	Closed Circuit Television	10/16/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072765	Vehicle Detection System	7/10/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7072766	Vehicle Detection System	12/31/2019	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7073003	Closed Circuit Television	9/16/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072768	Vehicle Detection System	7/27/2020	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]
7073005	Closed Circuit Television	3/21/2019	[illegible]	[illegible]	Cohu	HD 4220-1000	[illegible]
7072767	Vehicle Detection System	7/25/2016	[illegible]	[illegible]	Image Sensing Systems	RTMS G4	[illegible]

GIS-BASED FIBER OPTIC MANAGEMENT SYSTEMS

- Considerations for selection
  - Do I want a web-based solution?
  - Will it effect my firewall rules?
  - Is training included in the purchase?
  - Is an API available to integrate with my network hardware for real-time monitoring?
  - Is a mobile format available?
  - Can the system be accessed offline?
  - Can I run reports?
  - Manual input vs automated capabilities
  - Do I want built-in real-time monitoring and fault detection with high-positional accuracy?
  - Am I mainly monitoring trunk lines vs drops?
  - Do I want to track full details of assets?
  - Do you want to create maintenance tickets?
  - Can I export as-built records to aid in future design, damage mitigation, etc?

BENEFITS OF A FIBER OPTIC MANAGEMENT SYSTEM

- Knowing What You Have
- Knowing What It's Used For
- Supports Better Planning
  - Redundancy and Resiliency
  - Future Build-out
  - Fiber and Cost Sharing
- Supports Maintenance and Troubleshooting
- Tracking of Unused Fiber Assets
- Reporting and Documentation Capabilities to Support Compliance for Potential Funding Opportunities (Grants)

FIBER AND INFRASTRUCTURE SHARING

- Common Questions (and Recap from Fiber Allocation Plan)
  - Am I the owner, or just a user?
  - Do I have other potential stakeholders in the area?
  - Opportunity for partnering to “fill in gaps” or “dig once”?
  - What do I do with dark fiber?
  - Am I allowed to share fiber with Private Sector/Broadband providers?
  - Are there any revenue opportunities?

QUESTIONS?

Interested in more information?

Russell Allen, PE

Innovation & Emerging Technology Lead

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Day 1 Wrap-Up

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

THANK YOU

APPENDIX E

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

Fiber/Broadband Information Exchange - Day 2

April 22-23, 2025

Welcome

Sheryl Bradley
TSMO Program Director
The Eastern Transportation Coalition

Nicole Forest
TSMO Program Associate
The Eastern Transportation Coalition

Fiber Completion – Hand-off & Maintenance

Eric Bathras
Chief Technology Officer
Maryland Department of Information Technology

tetcoalition.org

Fiber Completion

Session 8

Fiber Asset Inventory

- Transition from As-builds
- Data Repository
- Maintain Accuracy
- Fiber Locating
- Interconnections
- Resource Share

Performance

- Fiber delivery is16x Less Expensive to Deliver
- 90% Less Outages on State Owned Fiber
- Revenue or In-Kind Value
- +30 Year Life Span
- Modernizing Service Delivery

Operations & Maintenance

- Fiber Locating
- Relocation
- Recurring Fees
- Reporting
- Emergency Restoration Contractor
- In-source VS Out-source

Capacity

- Delivering 100G Core & Distribution
- Delivering 10G to CAIs
- Blend in Wireless
- Datacenter & Peering Fabric

Eric Bathras

Chief Technology Officer, Infrastructure

Maryland Department of Information Technology (DoIT)

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(667) 644-8490 (M)

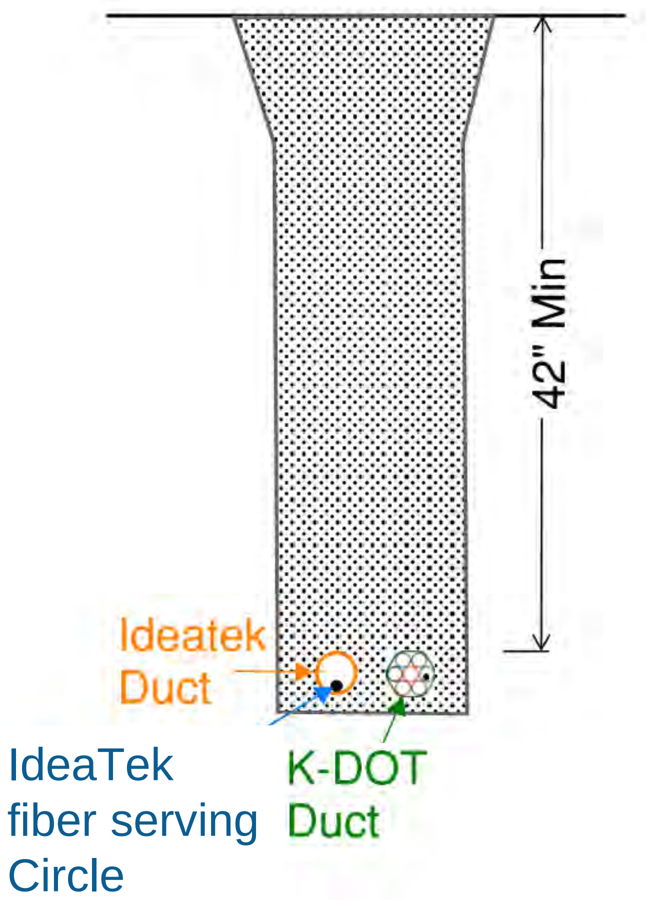
Best Practices in Fiber/Broadband Coordination with Planning, Construction, & 3rd Party Vendors

Mike Floberg
Director of Innovative Technologies (Ret)
Kansas DOT

FIBER/BROADBAND COORDINATION

- Partnered with City of Topeka for fiber
- Partnered with Indian Nations for fiber
- Partnered with Kansas Turnpike Authority for fiber and bandwidth

EXAMPLE:
SHARED TRENCH



ONE-TIME OPPORTUNITY:
WIN-WIN-WIN WITH FEDERAL NTIA GRANT

Partnerships stretch public dollars further, meaning taxpayers get more services with less investment. Using state of Kansas resources helps our taxpayer dollars go as far as possible.

Kansas Office of Broadband Development

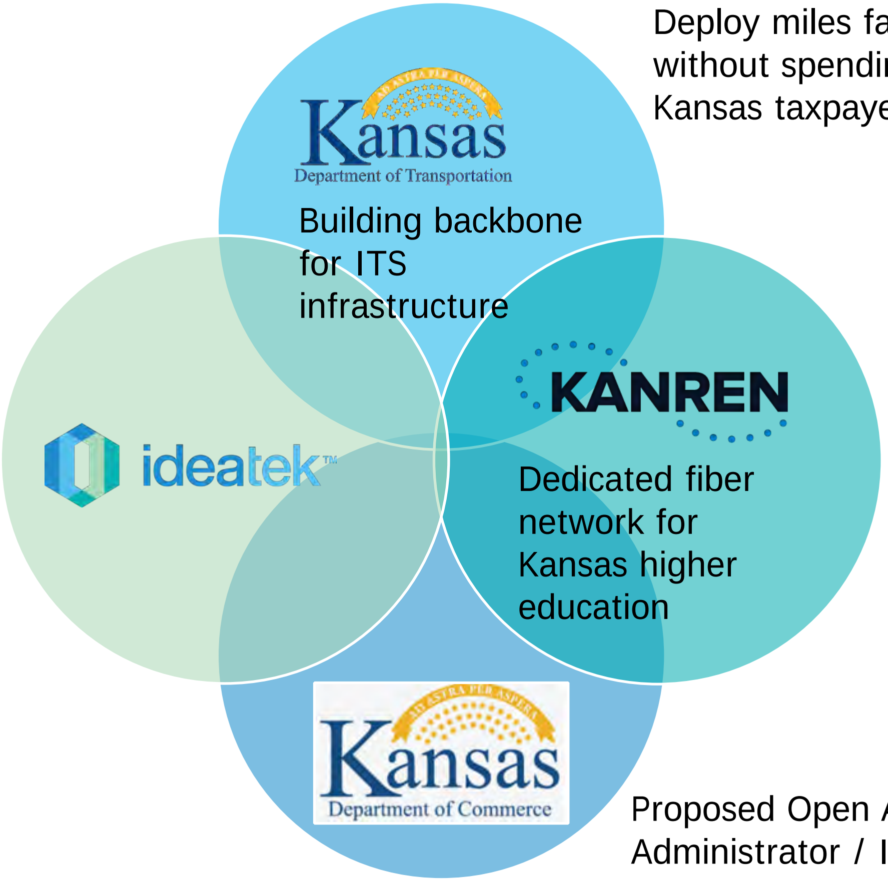
U.S. Department of Commerce
National Telecommunications and Information Administration (NTIA)

$1 Billion Broadband Infrastructure Program

A partnership of two or more entities can apply for funding under the Middle Mile Grants Program as an eligible entity.

Deploy miles faster without spending more Kansas taxpayer money

Fulfill grant requirements for "underserved/ rural" and state partnership with broadband provider



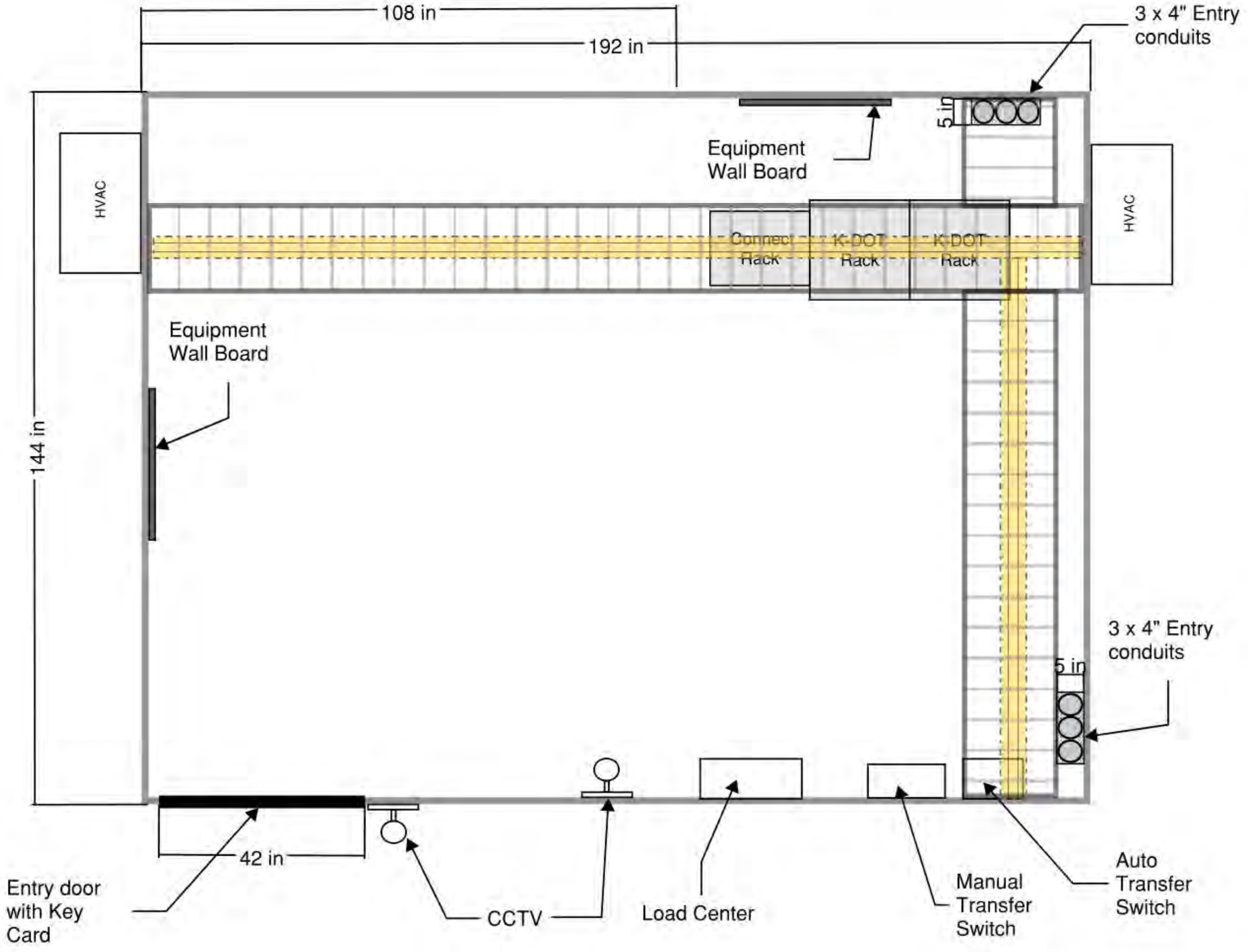
Inter-agency collaboration improves chances of winning grant

Proposed Open Access Administrator / IXC Partner

ideatek

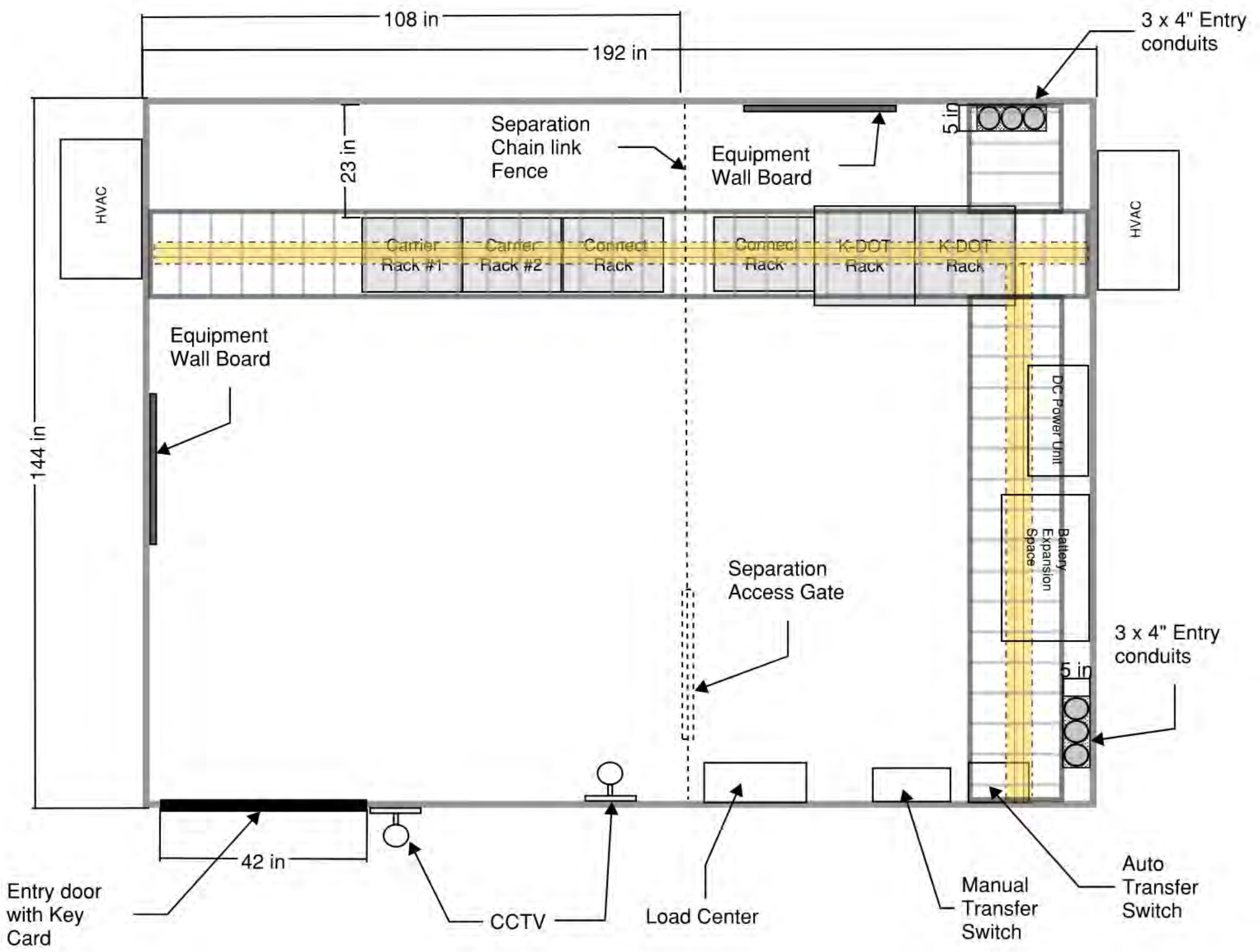
Phase 1

- Includes only what is necessary for K-DOT provisioning
- Used RFP Specs to determine
- Generator and Building upsized in order to create space for expansion



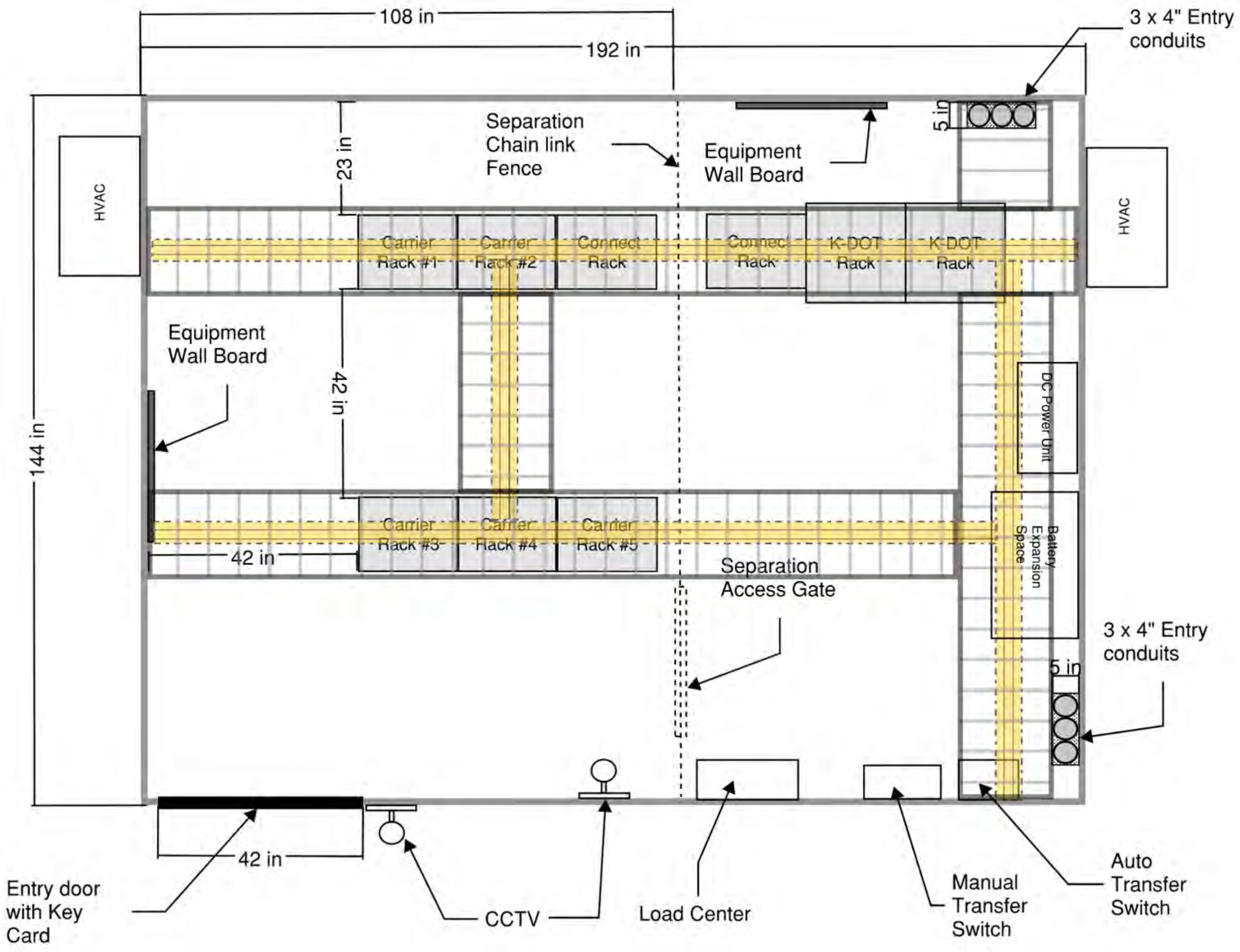
Phase 2

- Adds Racks for 2 carriers
- Includes DC power Unit Installation and Batteries if required by carrier (Carriers cost?)
- Install Separation Gate to protect K-DOT Gear and power infrastructure



Phase 3

- Adds Racks for 3 additional carriers
- Adds More Cable management to accommodate new racks
- Consider adding a 3rd HVAC unit on the left wall to cool additional racks



Deciding on Connectivity – Wired vs Wireless

Jeremy Dilmore
Emerging Technologies Manager
Florida DOT

Wireless vs Wired

Jeremy Dilmore, P.E.

Emerging Technologies Manager

Former D5 TSMO Program Engineer

Florida Department of
TRANSPORTATION

FDOT

CONSIDERATIONS

- Cost
- Bandwith
- Spectrum Analysis
- FCC restrictions
- Privacy
- Distance
- Line of sight

Wired

- Cost – Most Expensive
- Bandwith – Most Bandwidth
  - Easiest to share
- Spectrum Analysis – Not needed
- FCC restrictions – No impact
- Privacy - Secure
- Distance – 100+ miles between regen
- Line of sight – No impact

WIRELESS POINT TO POINT

- Cost – Inexpensive for short distances
- Bandwith – Uneffected by other users
- Spectrum Analysis – Needed to avoid interference
- FCC restrictions – May be restricted based on location
- Privacy – Dependent on registered vs unregistered
- Distance – impacted by mounting height and antenna
- Line of sight – Requires clear line of sight

Cellular Point to Point

- Cost – Reoccuring monthly cost; impact different type budget
- Bandwith – Lowest; effected by other users
- Spectrum Analysis – Need look at reception for area
- FCC restrictions – uneffected
- Privacy – use of Access Point Name or Virtual Private Network
- Distance – not effected
- Line of sight – not required

EXAMPLE INSTALLATIONS

- Launch area install – Cape Canaveral
  - Point to Point
    - Needed coordination due to Space Force
    - Avoided saturation effects of cellular
    - Fiber was too expensive
- SR 40 – Ocala National Forest
  - Cellular
    - Distance too large for Point to Point
    - Cellular network stable
    - Fiber was too expensive

Cellular and Edge Processing

- Computer Vision and other tech requires stability
- Moving video is bandwidth intensive
- Moving processing to the edge for stability
  - Impacts costs
  - May offset benefits of cellular

QUESTIONS

Jeremy Dilmore

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Sanford, FL 32771

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Happy to share any and all requested documents

THE EASTERN TRANSPORTATION COALITION

CONNECTING FOR SOLUTIONS

THANK YOU