

**Date of Meeting:** December 3, 2019

**#19c**

**BOARD OF SUPERVISORS  
BUSINESS MEETING  
ACTION ITEM**

**SUBJECT:** **FINANCE/GOVERNMENT OPERATIONS AND  
ECONOMIC DEVELOPMENT COMMITTEE  
REPORT: FY 2021 Budget Development and Contract  
Award – Dark Fiber Wide Area Network Services**

**ELECTION DISTRICT:** Countywide

**CRITICAL ACTION DATE:** December 3, 2019

**STAFF CONTACTS:** Marilee Ciehoski, Information Technology  
Wendy Wickens, Information Technology  
Cheryl L. Middleton, Finance and Budget  
Erin McLellan, Finance and Budget

**PURPOSE:** To award a contract for dark fiber wide area network services.

**RECOMMENDATIONS:**

**Finance/Government Operations and Economic Development Committee (FGOEDC):** At the FGOEDC meeting on November 12, 2019, the FGOEDC recommended (4-0-1: Chairman Randall absent) to the Board of Supervisors (Board) that the Purchasing Agent be authorized to award a contract for dark fiber wide area network services, leveraging the Loudoun County Public Schools' (LCPS) contract, to Lumos Networks, Inc. (Lumos) for the period of December 1, 2019 through March 31, 2029, in the amount of \$15,500,000.

**Staff:** Staff concurs with the FGOEDC recommendation.

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**BACKGROUND:** At the June 21, 2018, Board Business Meeting, the Board unanimously adopted the County's Proposed Broadband Strategic Plan. This plan resulted from the Board's November 1, 2016, adopted Strategic Plan's focus area for Economic Development, which is to increase broadband and cellular access in western Loudoun County. The Broadband Plan further identified connectivity issues facing Loudoun County departments and residents in the near and long-term due to the lack of high-speed broadband services in western Loudoun County and outlines proposed next steps to mitigate those issues. The second goal within the plan was for the Department of Information Technology (DIT) to work with a vendor, such as Columbia Telecommunications Corporation (CTC), to identify potential areas of overlap between the current

LCPS' proposed fiber expansion project and County facilities and to identify opportunities for cooperative network infrastructure buildout. When completed, the CTC Broadband study was to identify potential opportunities to leverage the LCPS fiber investment to improve County facility broadband as well as identify opportunities for private investment expansion into unserved and underserved areas of Loudoun County.

At its July 18, 2019 Business Meeting, the Board was provided with an overview of the findings and recommendations for broadband included in the CTC Study completed in February 2019<sup>1</sup>. CTC reviewed LCPS' dark fiber wide area network service proposal and resulting contract, awarded to Lumos by the LCPS' Finance and Facilities Committee on February 26, 2019 for the period of March 29, 2019 through March 31, 2029, and possible opportunities for commercial, private investment in accordance with the Commonwealth's guidelines for local government funded broadband networks. Additionally, the LCPS contract includes an option to renew for one, ten year period, extending the term to March 31, 2039.

During the November 21, 2019, Board Business Meeting, the Board deferred (7-0-2: Buffington and Randall absent) action on this item to the December 3, 2019, Board Business Meeting.

The CTC study found that bringing broadband infrastructure parity to western Loudoun would require the construction of a robust wireline connection to every home and business. The analysis suggested that deploying a fiber-to-the-premises (FTTP) network in western Loudoun would cost up to \$130 million or more for capital costs alone, not including operating expenses. It is important to note that staff does not recommend the FTTP solution due to prohibitive cost and the fact that subscribership does not support such an effort.

The CTC study also found that the creation of a private Wide-Area-Network (PWAN), or middle-mile network to connect County facilities, would require the construction of roughly 140 route miles of fiber interconnecting 60 County facilities at a cost estimated at approximately \$16.1 million. Over the course of 20 years, should the County decide to own, operate, maintain, and manage the network, estimated network operations, maintenance, and financing would cost the equivalent of approximately \$2,290 per site, per month, or a total of \$1.65 million annually. It is important to note that staff does not recommend County ownership, maintenance, and management of the PWAN, or middle-mile network.

However, the construction of a PWAN would replace existing County Institutional Network (I-Net) fiber and private fiber infrastructure that is at the end of its useable life expectancy and will provide the County with a robust network to its other leased circuit facilities that would allow expansion for future network bandwidth requirements, while reducing connectivity costs. Therefore, at the July 18, 2019 Board Business meeting, staff recommended the County explore deploying middle-mile fiber to key County facilities whereby the County would serve as an anchor tenant on a private provider's network and commercial broadband expansion to western Loudoun would be the responsibility of the private partner with no additional costs or responsibilities extended to or expected from the County. In this scenario, the private fiber provider would own

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<sup>1</sup> [Columbia Telecommunication Corporation's Study Board Item](#)

the fiber and the County would pay recurring operational costs (lease costs) for the use, maintenance, and management of the fiber.

At that time, the recommendation and Board direction to staff was to work through the FY 2021 budget process to identify funding needs for the deployment of a PWAN and to work through the County procurement process to identify procurement options through either a cooperative agreement or Request for Proposal (RFP) for the deployment of a middle mile fiber network to key County facilities using a private third party entity that would own and operate the network.

DIT staff have worked closely with Lumos to identify potential cost efficiencies derived by utilizing the LCPS contract to coordinate construction to County facilities. Staff and Lumos developed a design to connect 110 facilities with dark fiber that would be constructed simultaneously with the LCPS build. Dark fiber requires that the County implement network switches to propagate the signal throughout the fiber path. Funding in the amount of \$930,000 for this undertaking is currently being considered in the development of the Proposed FY 2021 – FY 2026 Capital Improvement Program (Proposed CIP). The PWAN design (Attachment 1) includes nine fiber rings throughout the County with redundant connectivity to the County's data centers and direct fiber to replace the Comcast I-Net and private fiber mentioned above.

This design will extend the PWAN to all current County facilities except for those listed below, which are not covered by the Lumos contract awarded by LCPS. These sites will remain on Verizon leased circuits until funding is provided for this future RFP and subsequent construction costs are determined. Funding in the amount of \$4.8 million for this effort is also being considered in the development of the Proposed CIP. These funds will also allow the selected provider to offer broadband infrastructure connectivity to private carriers in those areas.

1. Bluemont Community Center
2. Philomont Community Center
3. Philomont Fire & Rescue
4. Loudoun Heights Fire & Rescue
5. Loudoun Heights Public Safety Radio Tower

The proposed design will allow the County to build a scalable, reliable, redundant, highly available network with more than double the current bandwidth at remote sites and the ability to increase bandwidth in the future without additional recurring costs. The fiber-based WAN will ensure that the County's network is capable of supporting the ever increasing usage demands and provide the following capabilities:

- prioritizing data network traffic,
- optimizing and improving network performance,
- network segregation for IT security,

- micro-segmentation for Internet of Things (IoT)<sup>2</sup> devices,
- automatically quarantining devices that do not meet pre-identified security parameters, and
- recognizing loss of connectivity and moving traffic to functioning circuits with minimal impact.

In addition to providing fiber to the County facilities for Government use, Lumos will offer broadband infrastructure connectivity by making middle mile fiber available to private carriers to extend broadband to underserved areas in the west. This scenario would be accomplished by the installation of excess fiber (as part of the build out of the PWAN) in western Loudoun County, to allow Lumos to extend fiber to private providers such as Wireless Internet Service Providers and cable carriers. Lumos would be responsible for attracting and contracting with potential Internet Service Providers willing to lease fiber access for the expansion of broadband to rural residences and businesses.

The intent of this item is to award a contract for the County's anticipated connectivity requirements in the estimated amount of \$15,500,000 utilizing and co-termed with the LCPS contract. This includes \$1,683,540 per year for monthly recurring charges (Attachment 2). The total estimated amount also includes connectivity for four additional sites/facilities per year to allow for County growth. It should be noted that staff is anticipating approximately three months of overlap in services between the existing providers and Lumos to account for testing and transition, which is resulting in additional costs during the first year of the contract.

**ISSUES:** Alternative to this proposal, the County would need to upgrade the Verizon leased circuits in order to implement necessary security, performance, and quality improvements, similar to the technical capabilities of the Lumos solution but with less than half of the bandwidth. This is estimated to cost at least \$2,460,000 annually and does not include the cost for replacing the Comcast I-Net and private fiber that is at the end of its useable life expectancy. Over the life of the Lumos contract, staff estimates the County will save approximately \$16,000,000 (Attachment 2) by implementing the PWAN through Lumos.

Even though actual services to County facilities will not begin until January 1, 2021, the contract needs to be awarded effective December 1, 2019 in order for Lumos to coordinate construction to County facilities simultaneously with the LCPS fiber build, which are currently in process. If the County cannot award the contract at this time, Lumos will not be able to include the County's fiber requirements which will greatly impact the County's cost for this initiative.

At the November 21, 2019 Board meeting, the Board deferred the contract award recommendation to the December 3, 2019 meeting as a result of concerns raised by Communications Commission leadership. These concerns were regarding the provision of services to telecommunications providers in an open and competitively priced manner. These concerns have been addressed in a letter provided by Lumos/Segra (Attachment 3).

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<sup>2</sup> The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction.

Commission leadership also requested that the County possibly, through its Economic Development Advisory Commission (EDAC) and Department of Economic Development, explore a separate partnership opportunity with Lumos/Segra under which the County would refer Internet Service Providers (ISPs), tower developers, and others seeking fiber infrastructure to Lumos/Segra in return for which Lumos/Segra would agree to terms consistent with those found in the attached letter. Staff would recommend that the Communications Commission pass a resolution requesting that the Board (at a future Business meeting) consider directing staff to explore the investigating of such a partnership

**FISCAL IMPACT:** The costs associated with these services will be offset by DIT's existing operating budget for services from Verizon (\$1,156,000 annually) and Comcast (\$6,000 annually) that will no longer be required. If the Board supports this proposal, an additional \$552,695 would be added to DIT's FY 2021 base budget until the complete transition to Lumos from Verizon. Funding for FY 2021 and beyond would be subject to the Board's adopted budget appropriations.

As mentioned above, over the life of the contract this will save the County approximately \$16,000,000.

**ALTERNATIVES:**

1. Authorize the Purchasing Agent to award a contract for dark fiber wide area network services, leveraging the Loudoun County Public Schools Contract, to Lumos Networks, Inc. for the period of December 1, 2019 through March 31, 2029 in the amount of \$15,500,000.
2. Do not recommend the contract award and direct staff how to proceed; however, staff does not recommend this option as the County would not receive the benefits of the simultaneous build pricing. Lumos has already begun its work under the LCPS contract and will no longer be able to accommodate the County's participation in this effort after the end of December 2019. Additionally, and as stated above, the County will not realize the \$16,000,000 savings by implementing PWAN through Lumos .

**DRAFT MOTIONS:**

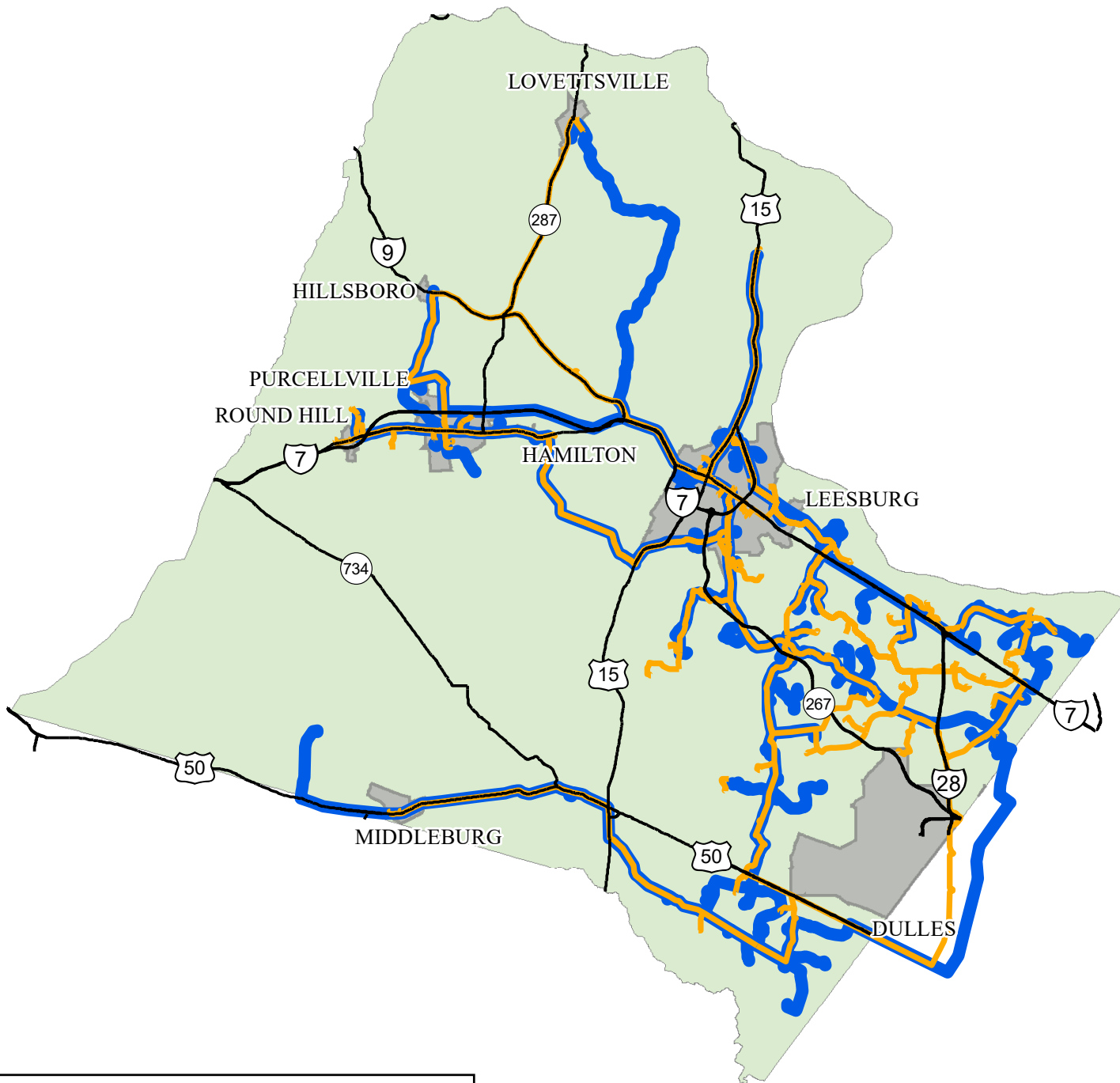
1. I move the recommendation of the Finance/Government Operations and Economic Development Committee that the Board of Supervisors authorize the Purchasing Agent to award a contract for dark fiber wide area network services, leveraging the Loudoun County Public Schools Contract, to Lumos Networks, Inc. for the period December 1, 2019 through March 31, 2029 in the amount of \$15,500,000.

OR

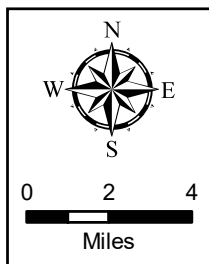
2. I move an alternate motion.

**ATTACHMENTS:**

1. Lumos Network Maps
2. Lumos Cost Analysis
3. Lumos Letter



— Loudoun County proposed dark fiber  
— LCPS planned dark fiber

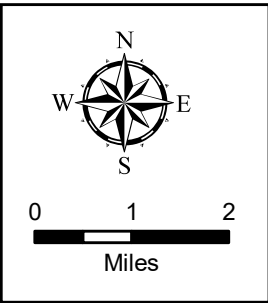
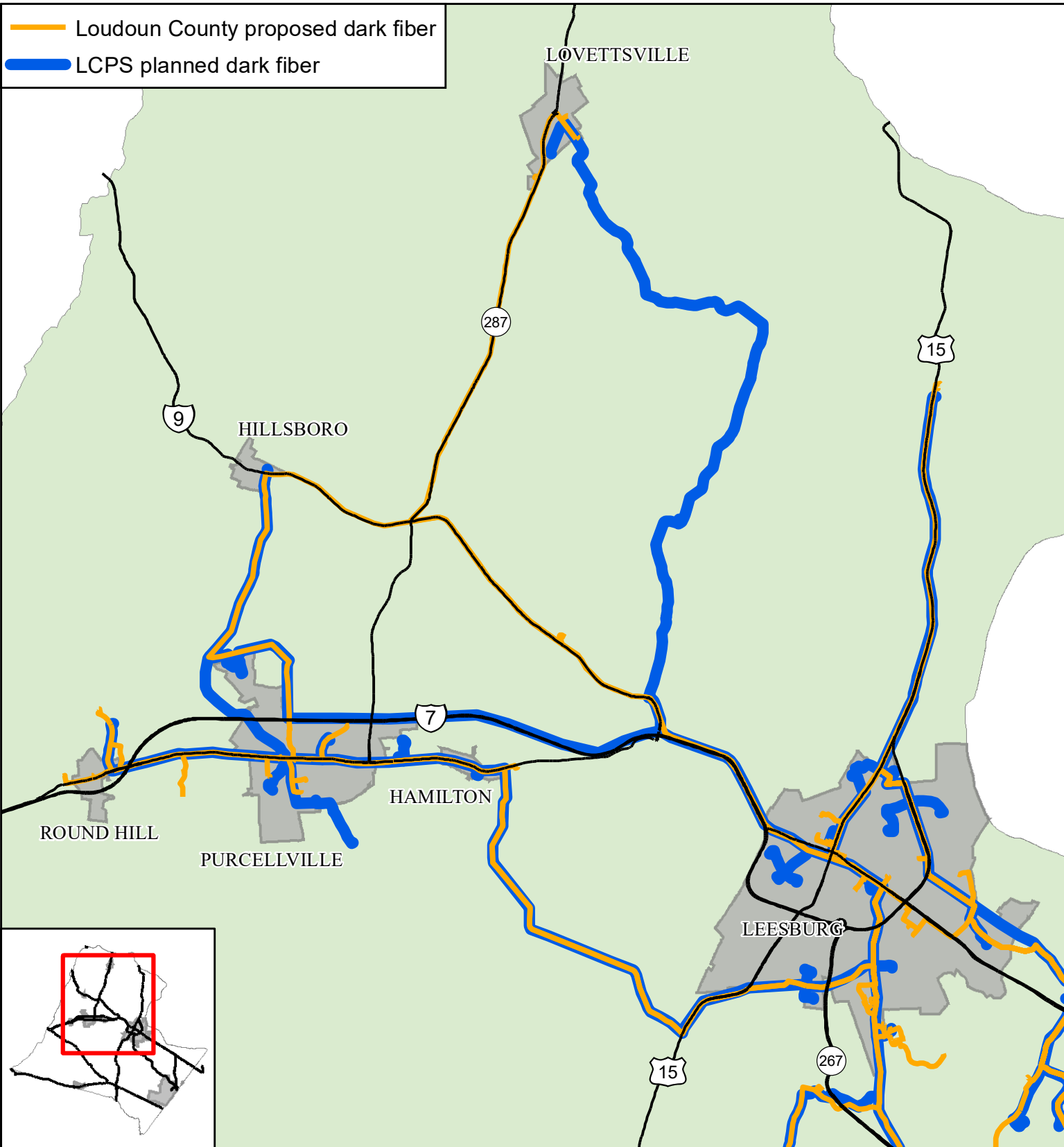


## Dark Fiber Wide Area Network Services

Map Number: 2019-384

Mapped Date: October 2019

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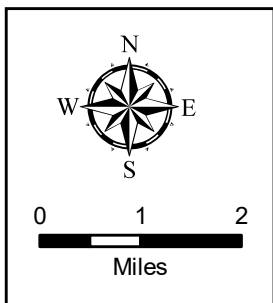
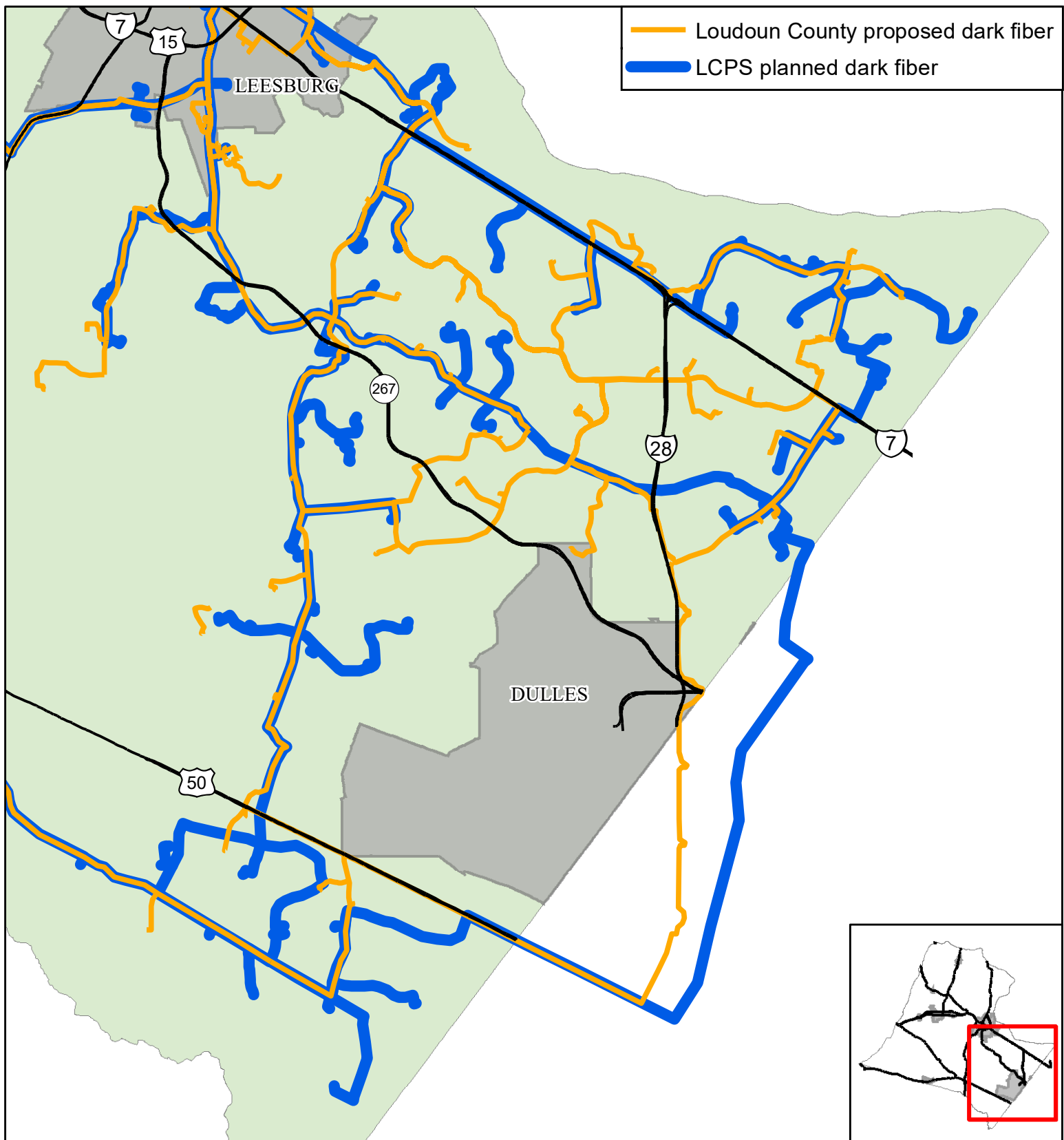
# Dark Fiber Wide Area Network Services (Western Loudoun)

Map Number: 2019-382

Mapped Date: October 2019

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## Dark Fiber Wide Area Network Services (Eastern Loudoun)

Map Number: 2019-383

Mapped Date: October 2019

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Connectivity Costs	Calendar Year									Lumos <sup>1</sup> Contract Total
	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Verizon TLS	\$286,085	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Comcast	\$6,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Lumos (TLS Replacement)	\$1,014,900	\$1,014,900	\$1,014,900	\$1,014,900	\$1,014,900	\$1,014,900	\$1,014,900	\$1,014,900	\$253,725	\$8,372,925
Lumos (iNet & Central Leesburg)	\$668,640	\$668,640	\$668,640	\$668,640	\$668,640	\$668,640	\$668,640	\$668,640	\$167,160	\$5,516,280
Lumos Growth <sup>2</sup>		\$47,760	\$95,520	\$143,280	\$191,040	\$238,800	\$286,560	\$334,320	\$254,720	\$1,592,000
<b>Total</b>	<b>\$1,975,625</b>	<b>\$1,731,300</b>	<b>\$1,779,060</b>	<b>\$1,826,820</b>	<b>\$1,874,580</b>	<b>\$1,922,340</b>	<b>\$1,970,100</b>	<b>\$2,017,860</b>	<b>\$675,605</b>	<b>\$15,481,205</b>
If the County decides not to implement the Lumos fiber, the Verizon leased circuits will need to be upgraded. The pricing below does not include the cost for replacing the iNet and other Central Leesburg fiber.										
Verizon TLS to EVPL <sup>3</sup>	\$2,460,000	\$2,460,000	\$3,050,400	\$3,050,400	\$3,444,000	\$3,936,000	\$4,428,000	\$4,428,000	\$4,428,000	\$31,684,800
Verizon Growth <sup>2</sup>		\$36,000	\$72,000	\$108,000	\$144,000	\$180,000	\$216,000	\$252,000	\$288,000	\$1,296,000
<b>Total</b>	<b>\$2,460,000</b>	<b>\$2,496,000</b>	<b>\$3,122,400</b>	<b>\$3,158,400</b>	<b>\$3,588,000</b>	<b>\$4,116,000</b>	<b>\$4,644,000</b>	<b>\$4,680,000</b>	<b>\$4,716,000</b>	<b>\$32,980,800</b>
<b>Cost Avoidance</b>	<b>\$776,460</b>	<b>\$728,700</b>	<b>\$1,271,340</b>	<b>\$1,223,580</b>	<b>\$1,569,420</b>	<b>\$2,013,660</b>	<b>\$2,457,900</b>	<b>\$2,410,140</b>	<b>\$3,752,395</b>	<b>\$16,203,595</b>

FY 2021 Impact	FY20	FY21 <sup>1</sup>	FY21 Increase
Verizon TLS	\$1,156,000	\$866,925	
Comcast	\$6,000	\$6,000	
Lumos (TLS Replacement) <sup>2</sup>	\$0	\$507,450	
Lumos (iNet & Central Leesburg)	\$0	\$334,320	
<b>Total</b>	<b>\$1,162,000</b>	<b>\$1,714,695</b>	<b>\$552,695</b>

<sup>1</sup> Contract start 1/1/2021 and end 3/31/2029 (aligned with LCPS contract term); 3 months of overlap in services for testing/disconnect lead time in first year

<sup>2</sup> Projecting 4 new sites per year starting in second year

<sup>3</sup> EVPL not available on VITA contract; 3 year quote provided for 100Mb at all sites; would need to upgrade Public Safety sites to 1G in ~3 years; projected to upgrade remaining sites in ~5 years; future pricing does not take contract increases into account

## Attachment 2



Lumos Networks (dba Segra) is honored that the Loudoun County Public Schools ("LCPS") chose us to provide fiber connectivity to 101 school sites, and other LCPS facilities throughout Loudoun County. Additionally, because of the LCPS contract award, we are excited that Loudoun County Government will be able to leverage the cooperative procurement opportunity with LCPS in order to extend fiber over 40 miles to Loudoun County Government facilities.

Segra is also excited about the opportunities that this platform in Loudoun County provides to serve the fiber needs of other potential customers. Indeed, an important customer segment for Segra is other telecommunications carriers. In this regard, we work continuously with wireless carriers who need fiber and backhaul services to their towers. We thus offer lit services and fiber to other carriers to facilitate their connections to their customers.

Prior to the LCPS project, Segra had offered service to some parts of Loudoun County, but for the most part, our core network was simply too far away for Segra to build fiber for new customers that would have ensured the provision of quality broadband services. Because of our partnership with Loudoun County Public Schools and Loudoun County Government, however, that situation has now changed in a decidedly positive manner. Accordingly, Segra looks forward to serving a whole range of customers – other telecom carriers, government, schools, businesses, colleges, hospitals, and others that can benefit from the provision of high speed, high quality broadband services. More importantly, Segra's intent is to provide its broadband services in an open and competitively priced manner.

Segra will build out extensive fiber routes in order to serve LCPS and Loudoun County at Segra's own cost. Segra is including additional capacity in those routes and commits to offer to all other potential customers in Loudoun, whether communications provider or not, services on fair, reasonable, consistent, and competitively-neutral terms and prices which will incorporate a portion of the savings attributable to the avoidance of incremental build costs due to the build costs funded by LCPS and Loudoun County as appropriate.

Sincerely,

A handwritten signature in black ink that reads "Steven Hamula". The signature is written in a cursive, flowing style.

Steven Hamula  
Associate General Counsel  
Lumos Networks Inc. dba Segra