



# Orange County Broadband

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VIRGINIA ASSOCIATION  
OF COUNTIES  
11.14.16



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“In a paper published in 1936, the British mathematician Alan Turing proved that a digital computer, which at the time existed only as a theoretical machine, could be programmed to perform the function of any other information-processing device. And that’s what we’re seeing today. The Internet, an immeasurably powerful computing system, is subsuming most of our other intellectual technologies. It’s becoming our map and our clock, our printing press and our typewriter, our calculator and our telephone, and our radio and TV.”

Nicholas Carr, “Is Google Making Us Stupid”, Atlantic Monthly July/August 2008



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“...employment and economic output...[are] strongly related to broadband deployment, particularly in certain service sectors, such as finance, education, and healthcare. Surprisingly, even manufacturing employment appears to be related to broadband penetration.”

Crandell, Lehr, and Litan, “The Effects of Broadband Deployment on Output and Employment: A Cross-sectional Analysis of U.S. Data”,  
Issues in Economic Policy (The Brookings Institute) July 2007



# Orange County Board of Supervisors

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## Strategic Priorities

# Orange County Board of Supervisors

## Two-Year Priorities

### FY2016-2017\_FY2017-2018

(adopted 4.26.16)



#### Vibrant Economic Development

1	Stand-up the Orange County Broadband Authority (OCBbA) and continue with development, implementation, and management of an “open access” fiber optics network and the <i>Rural Broadband Initiative</i> with the over-arching goal of making high-speed broadband available to all residents and businesses.
2	Initiate a process to collaborate on economic development with the Towns of Gordonsville and Orange.
3	Continue to develop, implement, and manage the Germanna-Wilderness Area Plan annual work program to include infrastructure planning (water, wastewater, transportation, and telecommunications), land use and development, economic development, and historical and cultural assets.

#### Effective, Reflective Government

4	Develop, implement, and manage strategies for the <i>Digital Citizen</i> - “Anytime, Anywhere, All Citizens” in the areas of Access, Transactions, Information, Engagement, and Security.
5	Enhance the overall fiscal planning and budgeting process for general government, Orange County Public Schools, Constitutional Officers, and outside agencies to align with the Board’s Financial Policies and Capital Projects financing strategies.
6	Make targeted technical corrections to specific ordinance language with respect to land use and development, and subdivisions.



# Common Barriers and Opportunities

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- The “death by distance----last mile” conundrum for under and unserved areas
- Not solved solely by private sector or public sector – a public/private solution is needed much like rural electrification in the early 20<sup>th</sup> century
- Goal is to reduce capital costs and start-up operating expenses for private sector to enter under and unserved markets
- Critical elements are use of publically owned or controlled vertical assets for wireless broadband; deployment of low cost, open-access fiber optics backhaul (the “middle mile”); and, leveraging local government capital expenditures for education and public safety.



# Capital Expenditure Leveraging for Broadband

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## Goals and Steps



# Capital Expenditure Leveraging for Broadband Goals

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The Orange County Board of Supervisors' overarching goals are:

- to **strategically integrate** telecommunications services and support facilities for education and public safety
- to **reduce** the capital expense barriers for private-sector broadband companies; and,
- to **provide** Orange County's residents and businesses **consumer choice** for **affordable, reliable** high-speed broadband.





# Step 1

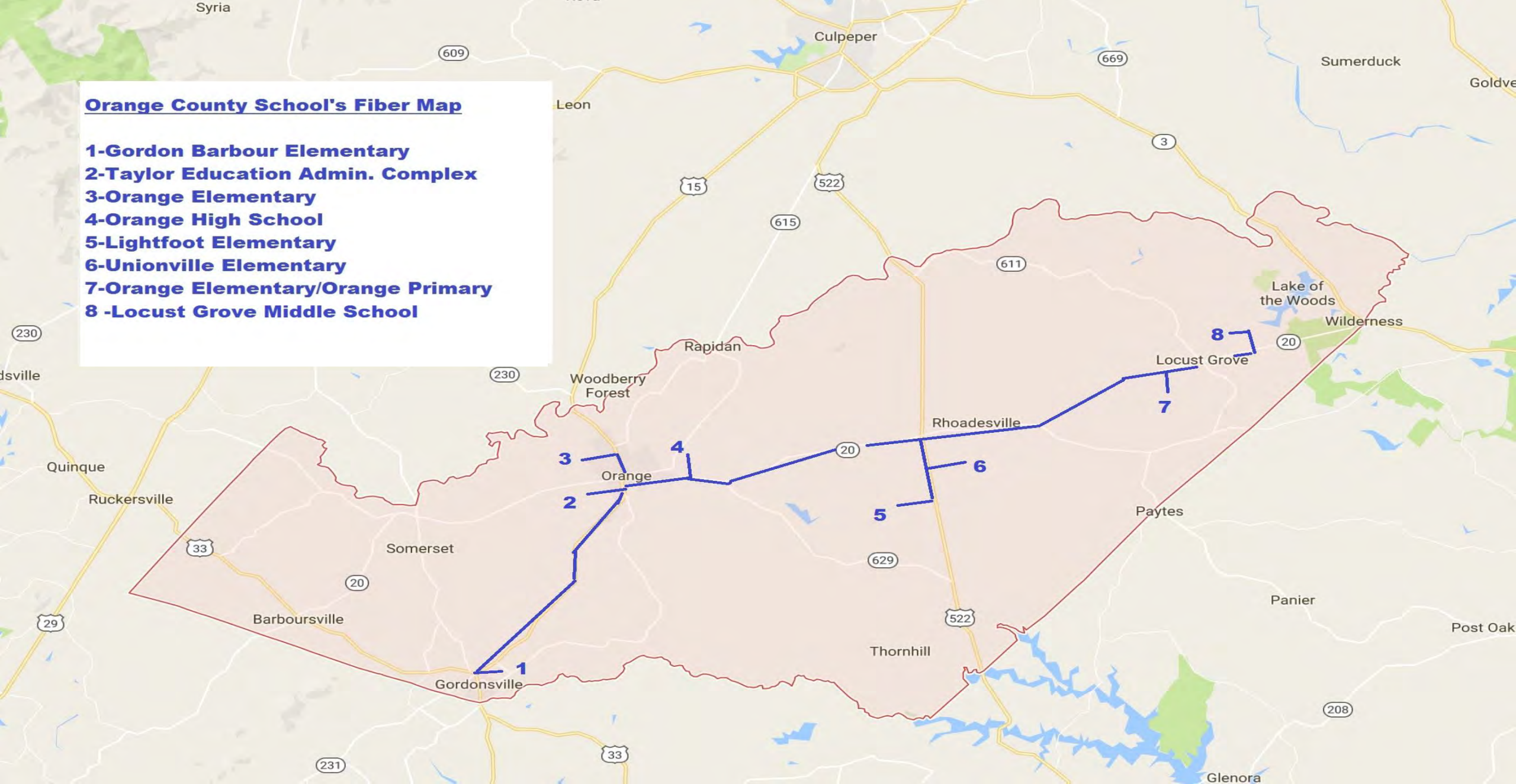
## Orange County Public Schools Fiber Optics Network Project

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- Why is fiber connectivity between facilities important?
- On-line testing (SOLs, WIDA, CoGAT, CSGAs, etc.); classroom instruction; administrative/instructional connectivity; and value\_”future proofing”
- A Wide-Area Network (WAN) will provide reliable and secure transmission of voice, video, and data using internet protocol-based applications
- Federal Communications Commission/Universal Service Access Corporation Grant Opportunity (*Second E-rate Modernization Order*) - awards to be made between 7/1/16 – 6/30/17
- Self-Provisioned Fiber: an eligible organization’s ability to self-construct and own their own high-speed networks independent of specific service providers subject to a Return-On-Investment analysis
- WAN project is eligible for self-provisioned fiber to connect 8 schools via a 33 mile network

### Orange County School's Fiber Map

- 1-Gordon Barbour Elementary**
- 2-Taylor Education Admin. Complex**
- 3-Orange Elementary**
- 4-Orange High School**
- 5-Lightfoot Elementary**
- 6-Unionville Elementary**
- 7-Orange Elementary/Orange Primary**
- 8 -Locust Grove Middle School**





# Orange County Public Schools WAN Funding Sources

- Selected Vendor: Computer Cabling & Telephone Services, Inc.

<b>Total Project Cost</b>	<b>\$1,365,825.90</b>
E Rate Funding (70%)	(\$956,078.13)
School Funding w/ VPSA Funds (10%)	(\$136,582.59)
Additional E Rate Funding (10%)	(\$136,582.59)
County Funding (10%)	(\$136,582.59)
County Funding (10%)	\$136,582.59*
County Reimbursement of School Funding w/ VPSA Funds (10%)	\$136,582.59*
<b>Total</b>	<b>\$273,171.18</b>

\* Committed funding



# Orange County Public Schools & General Government “Open Access” Fiber Optics Network Project

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- Cooperatively procured pricing (design specifications, easements, fiber strands, materials, and labor)
- Orange County will increase the strands of fiber in conjunction with the OCPS project for the “Open Access” fiber optics network and *Rural Broadband Initiative*
- Overall strand count for both OCPS and Orange County projects may increase (\*majority of strands will remain dark and will be “lit” based on demand during the next 30+ years)

Strand Count	School	County	Additional Cost	Total County Investment
288	84	204	\$404,179	\$677,350.18

# Capital Expenditure Leveraging for Broadband Step 2

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## Public Safety Communications Network and the Rural Broadband Initiative



# Capital Expenditure Leveraging for Broadband Step 2



## Public Safety Communications Network and Supporting Facilities

- 2015 Communications Needs Analysis
  - Network is functionally obsolete and nearing end of service life – “P25 Compliant”
  - No communication capability between LMR (land mobile radio) systems of Orange County Sheriff’s Office and Orange County Fire/EMS
  - 18% mobile “at hip” county-wide coverage for Orange County Sheriff’s Office
- E-911 Call Center (Public Safety Answering Point) equipment nearing end-of-service life and located in confined, basement location
- Emergency Operations Center co-located with E-911 Center

# Capital Expenditure Leveraging for Broadband Step 2

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## Public Safety Communications Network and Supporting Facilities (continued)

- Sheriff's Office has insufficient space to meet current and future requirements
- Fire/EMS Administration located in substandard space not owned by county
- Information Technology Department located in confined space not meeting industry practice for security

# Capital Expenditure Leveraging for Broadband Step 2



## 2016 Series Bond Financing Package (closing December, 2016)

- Public Safety Communications Network (Land Mobile Radio System and support equipment)
  - \$9,241,733 (estimate)
- Consolidated Public Safety Facility (co-location of Sherriff, E-911 Center, Emergency Operations Center, Fire/EMS Administration, and Information Technology Department)
  - \$16,515,043 (estimate)
- Rural Broadband Initiative (supplementing public safety communications network with additional towers and fiber optic laterals to serve all towers where possible for multiple users (public safety, fixed-wireless broadband providers, and cellular telephone providers))
  - \$1,200,000 (estimate)

**Total financing = \$26,956,776**



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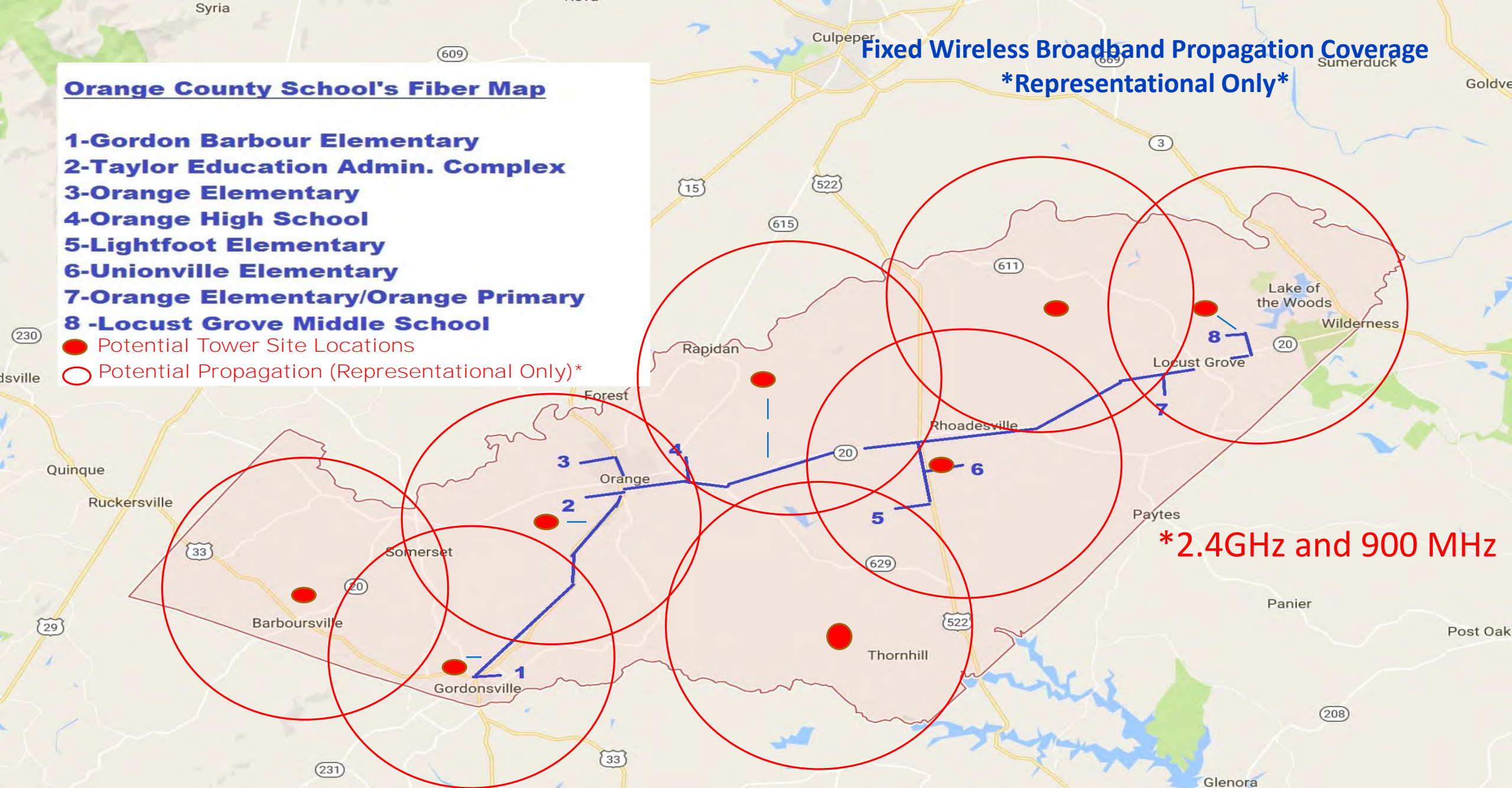
● Potential Tower Site Locations

○ Potential Propagation (Representational Only)\*

## Fixed Wireless Broadband Propagation Coverage

**\*Representational Only\***

**\*2.4GHz and 900 MHz**





# Broadband Business Model

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- Orange County Broadband Authority (OCBbA)
- Development of low cost, “middle mile” transport to Network Access Point
- Public-Private Education Facilities and Infrastructure Act of 2002



# Orange County Broadband Authority (OCBbA)

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- Organized under the *Virginia Wireless Service Authorities Act*, Chapter 54.1 of Title 15.2 of the Code of Virginia (modeled after Virginia Water and Waste Authorities Act)
- State Corporation Commission issued charter June, 2016
- Board of Supervisors serves as the Board of Directors for OCBbA – “fiduciary oversight”
- OCBbA will operate as *enterprise fund* able to charge fees for service, issue debt, and otherwise utilize business-like practices similar to local or regional water/wastewater authorities, airports, landfills, etc.
- “Open Access” Fiber Optics Network and *Rural Broadband Initiative* is transferred to OCBbA for implementation and operations management as needed
- Organizational meeting held on July 12, 2016



# Broadband Business Model

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Development of “Middle Mile” Transport  
and Intra-County Open Access Fiber Service



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TO ASHBURN VA

Verizon NAP of the  
Capital Region-Culpeper

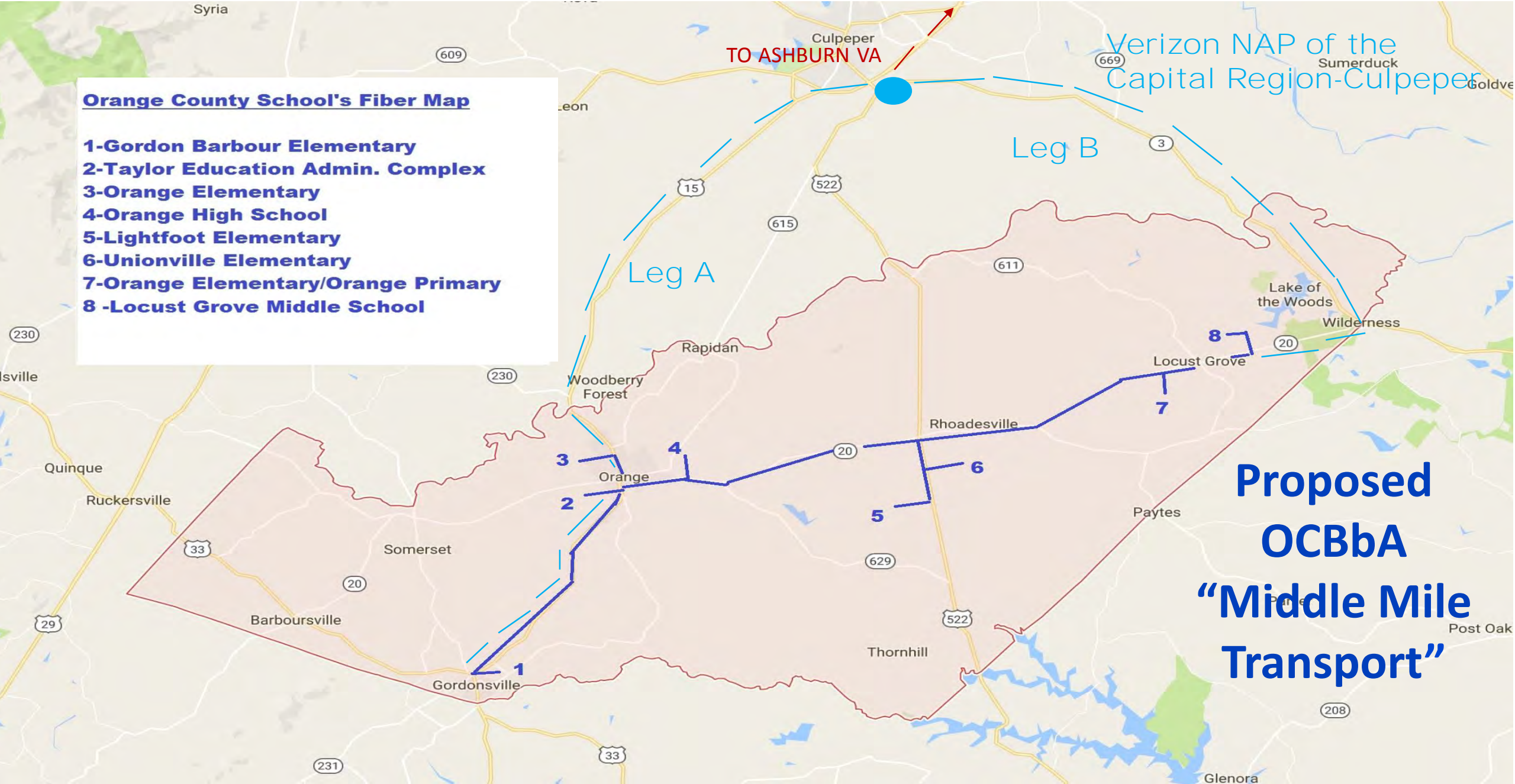
Leg A

**Proposed  
OCBbA  
“Middle Mile  
Transport”**



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# Potential Leg B of "Open Access" Fiber Network\*



Verizon NAP of the  
Capital Region-Culpeper

Leg B

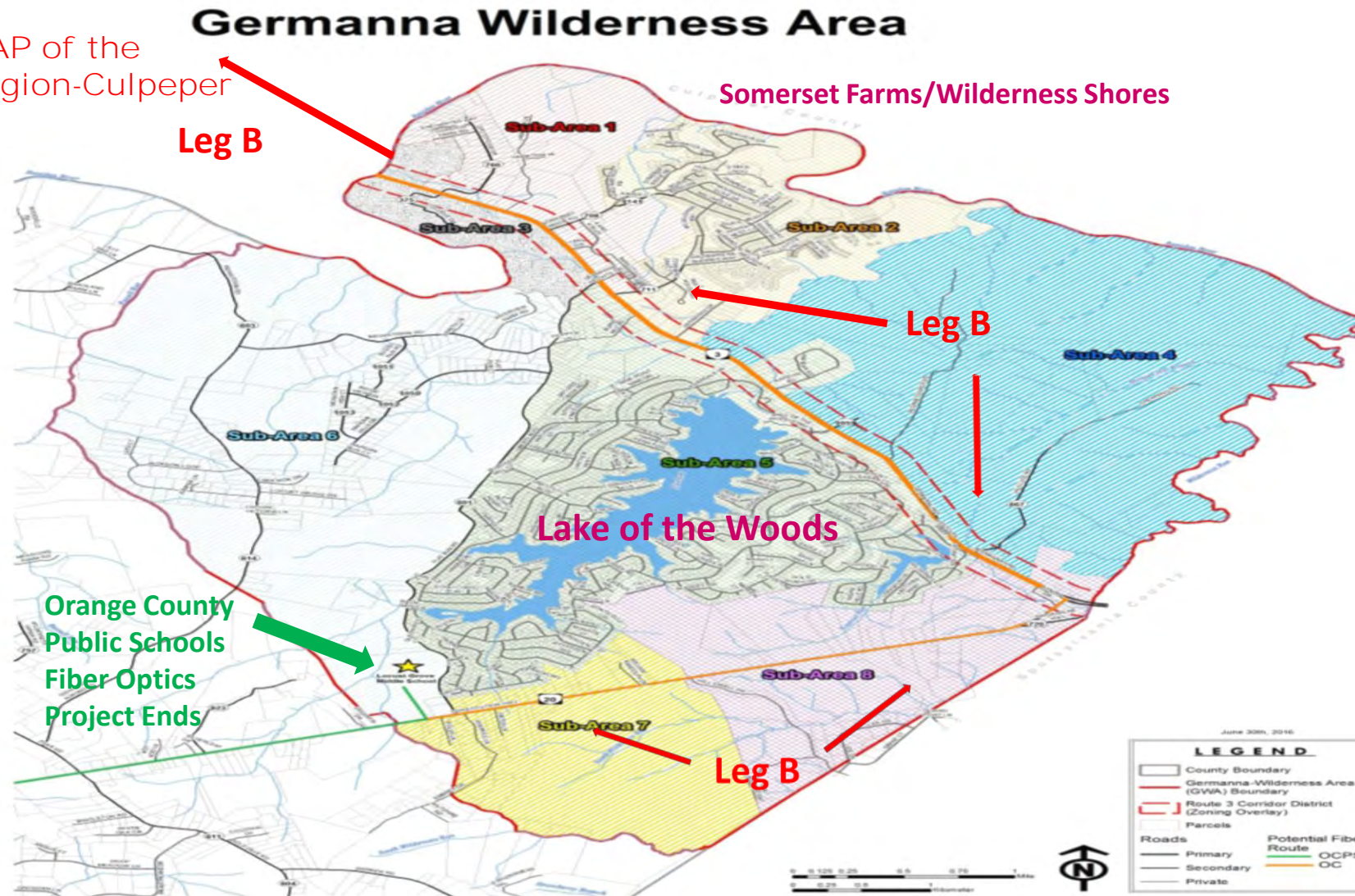
Somerset Farms/Wilderness Shores

Leg B

Lake of the Woods

Orange County  
Public Schools  
Fiber Optics  
Project Ends

Leg B



\*Potential OCBbA  
Project – Capital  
financing solely  
based on revenue  
potential and no  
future  
implementation date  
determined



# Broadband Business Model

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## Public-Private Education Facilities and Infrastructure Act of 2002

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### Fixed Wireless Broadband Service



## Public-Private Education Facilities and Infrastructure Act of 2002 (PPEA)

- General Assembly finding:

“...administer a fair, reliable, uniform and competitive project development and procurement process that encourages innovation, private sector investment and creates long term value for the Commonwealth...”

- Qualifying projects (Code of Virginia §56-575.1.):

- utility and telecommunications and other communications infrastructure
- any technology, equipment, or infrastructure designed to deploy wireless broadband services to schools, businesses, or residential areas;

Orange County Board of Supervisors

Orange County Broadband Authority



○ Professional Engineering Services:

- *Federal Engineering* undertaking network design, user assessment, cost estimations, procurement, and commissioning for public safety telecommunications network
- Broadband related tasks include fixed-wireless broadband propagation analysis; tower siting analysis and potential fiber optics network connection; assessment of suitable property available to OCBbA for tower locations; typical tower design; and, tower construction and fiber optics network connection cost estimates
- All design public safety and broadband tasks occurring concurrently

○ Broadband Consulting:

- Professional broadband consulting services awarded to *Blue Ridge Advisory Services Group, Inc.*
- Needs assessment, business plan, organizational performance plan, PPEA solicitation preparation and marketing, operational advisory services, etc.

○ Fiber Installation:

- Fiber optics network installation awarded through cooperative procurement with Orange County Public Schools to *Computer Cabling Telephone Services, Inc.*



“[change is realized by individuals] ...who take the next step; not those who theorize about the 200<sup>th</sup> step.”

President Theodore Roosevelt





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# Thank You

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