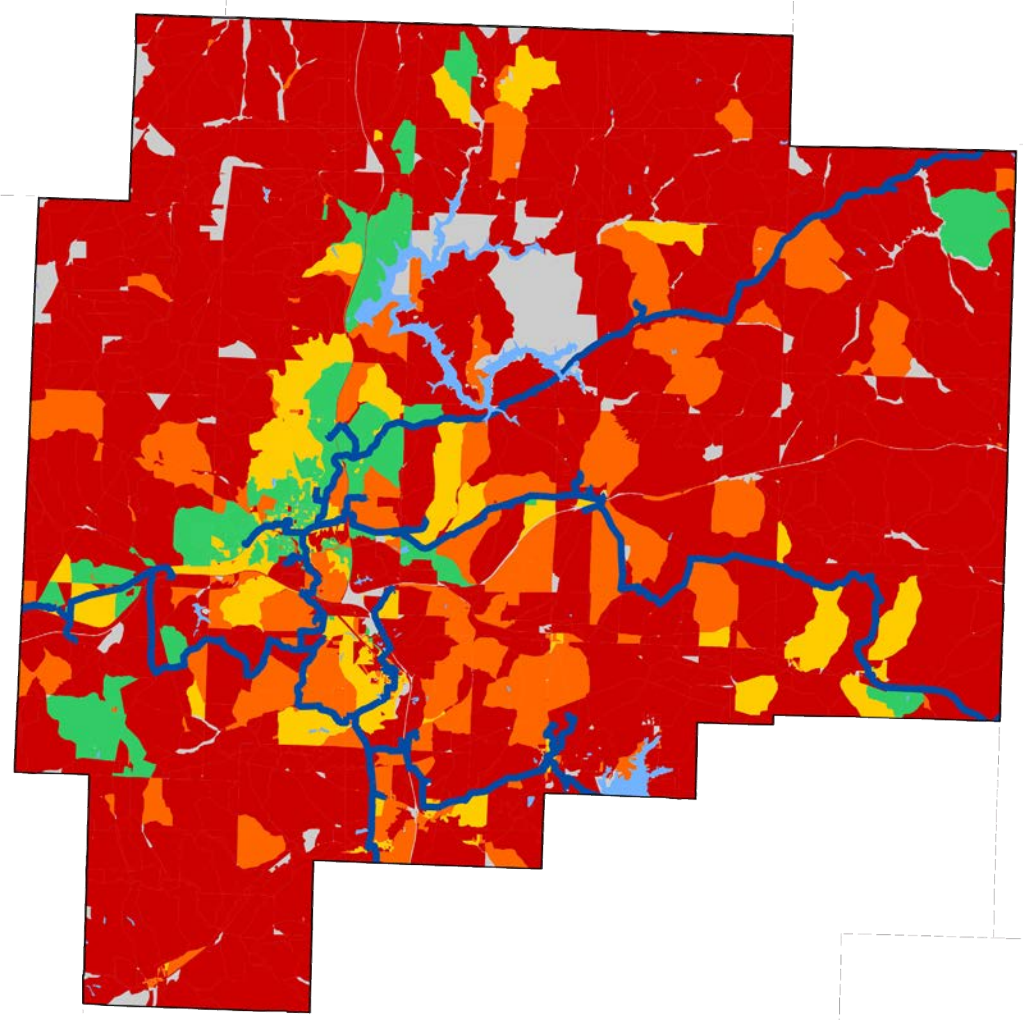
GUERNSEY COUNTY
broadband profile



52%
of households

10,984 households
DO NOT HAVE ACCESS TO MINIMUM 25/3 Mbps

7,598
= 36% of households below 10/1 Mbps

<10/1 Mbps | >=10/1 <25/3 Mbps | >=25/3 <50/10 Mbps | >= 50/10 Mbps | no data / unpopulated | Existing Open Middle-Mile

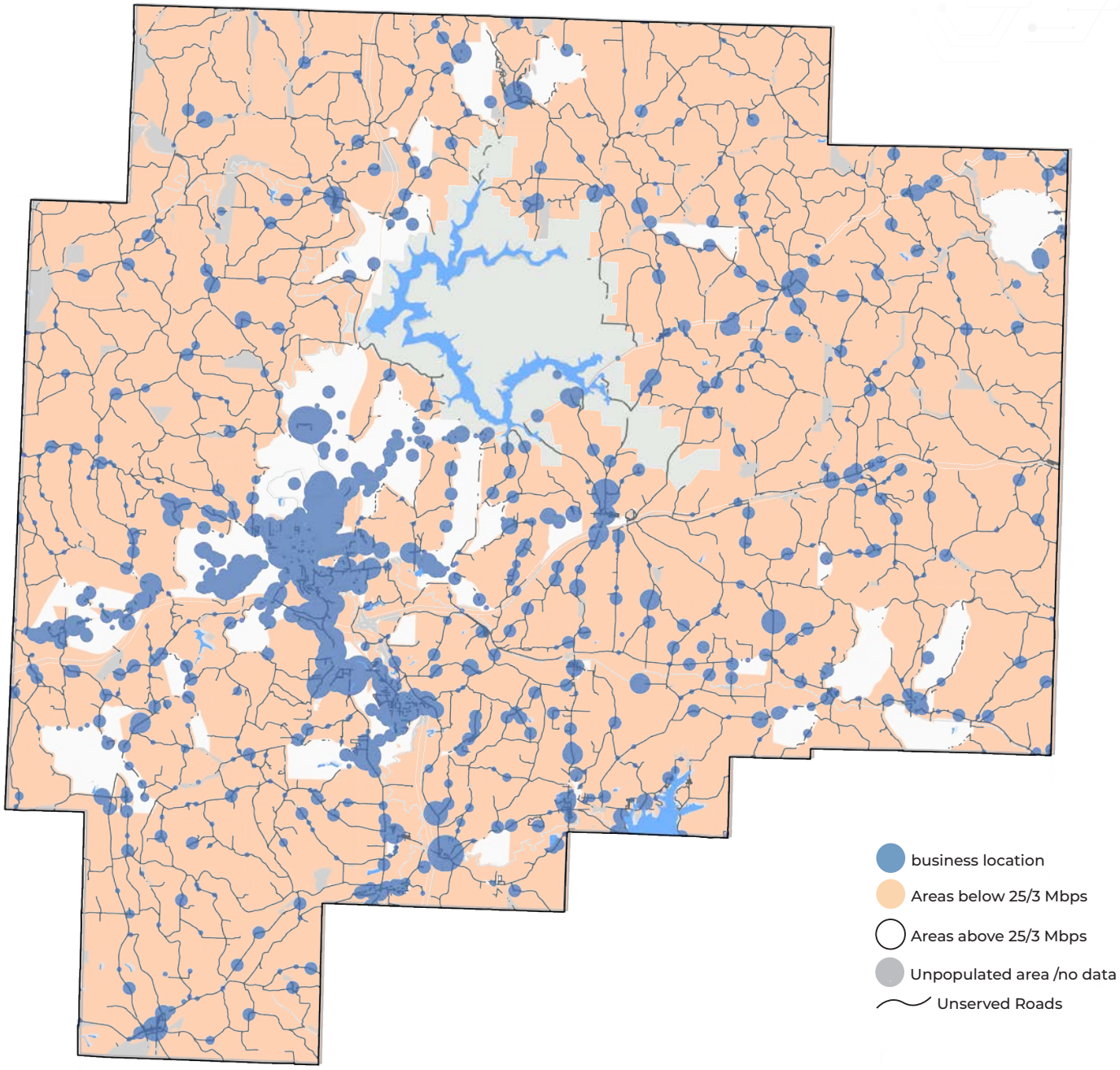
88% *of the populated area* ▶ ***443 miles² do not have access to 25/3 Mbps***

**Coverage ratings reflect multiple sources, including Ookla Speedtest Intelligence® data licensed by InnovateOhio for the months of February 2020 through August 2021. See "About the Mapping" (page 7) for detailed methodology*

Connecting Appalachia | Buckeye Hills Regional Council | OMEGA | Ohio Valley Regional Development Commission | Eastgate Regional Council of Governments | Ohio Southeast Economic Development | Buckeye Hills Foundation | Foundation for Appalachian Ohio | InnovateOhio | Ohio University Voinovich School of Leadership and Public Affairs | REID Consulting Group

BUSINESS OPPORTUNITY AREAS

below 25/3 Mbps

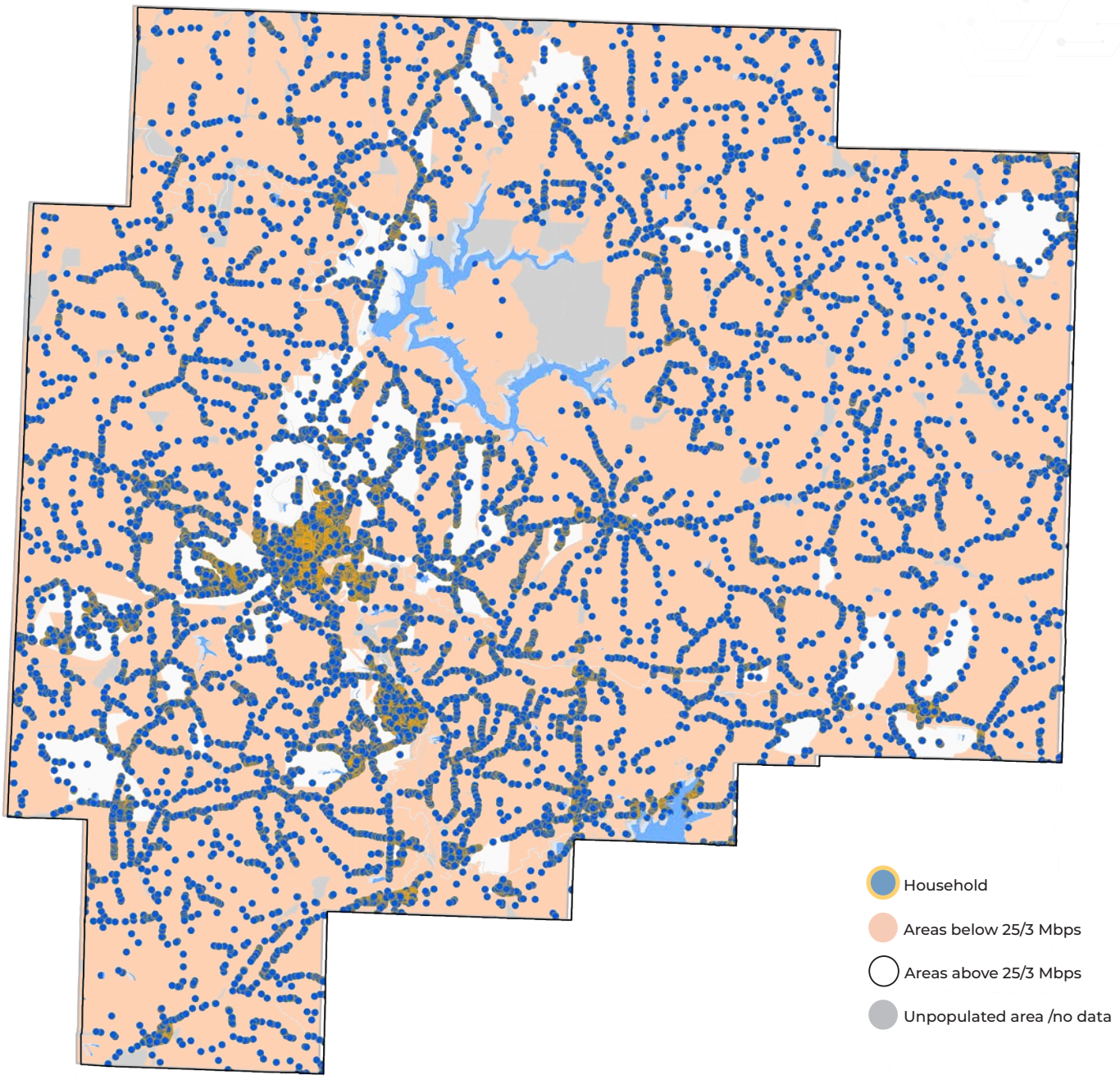


Business demand for broadband varies based on company size and economic sector. The greater the demand, the bigger the dot. The presence of a high-demand business or multiple businesses of any size will make that area significantly more attractive to a broadband provider.

**See "Business Broadband Opportunity Index" (page 8) for a detailed explanation of how dot size was determined*

RESIDENTIAL OPPORTUNITY AREAS

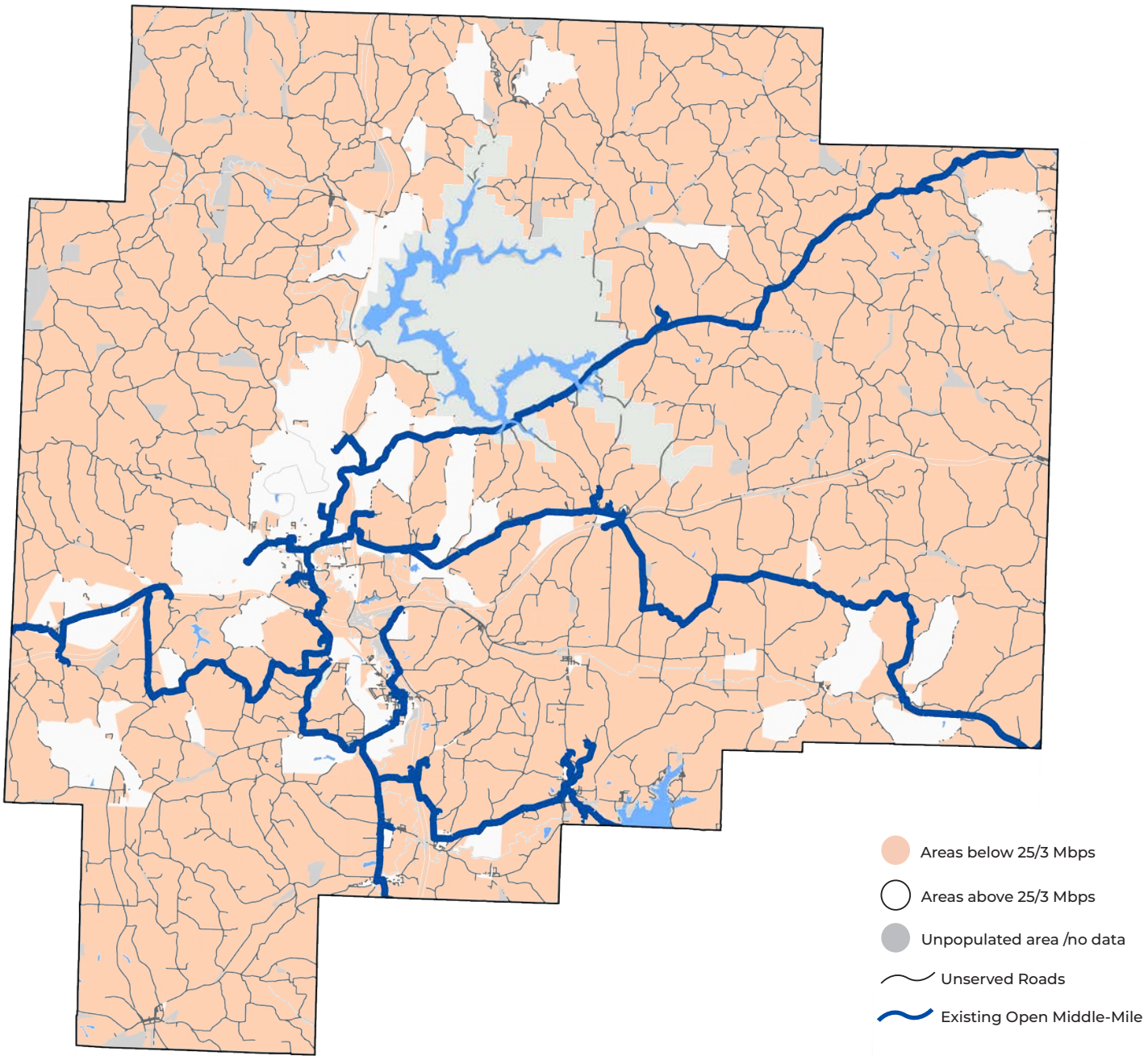
below 25/3 Mbps



21,043 ***households*** ▸ ***10,894 are below 25/3***

GUERNSEY COUNTY

unserved roads



975 miles *of unserved roads* = ***the amount of fiber needed to install fiber-to-the-home in areas below 25/3 Mbps***

GUERNSEY COUNTY
cost to close the gap

A FIBER NETWORK
for the next 40 years

BUDGET

$86.8 MILLION
Total County Cost

$18.7 MILLION
Projected internet provider investment

OUTCOME

10,894 ***Unserved households passed***
11.2 ***Households per fiber mile***

$1,720
Investment per household

FUNDING GAP

$68.1 MILLION

= $6,246
Gap per household

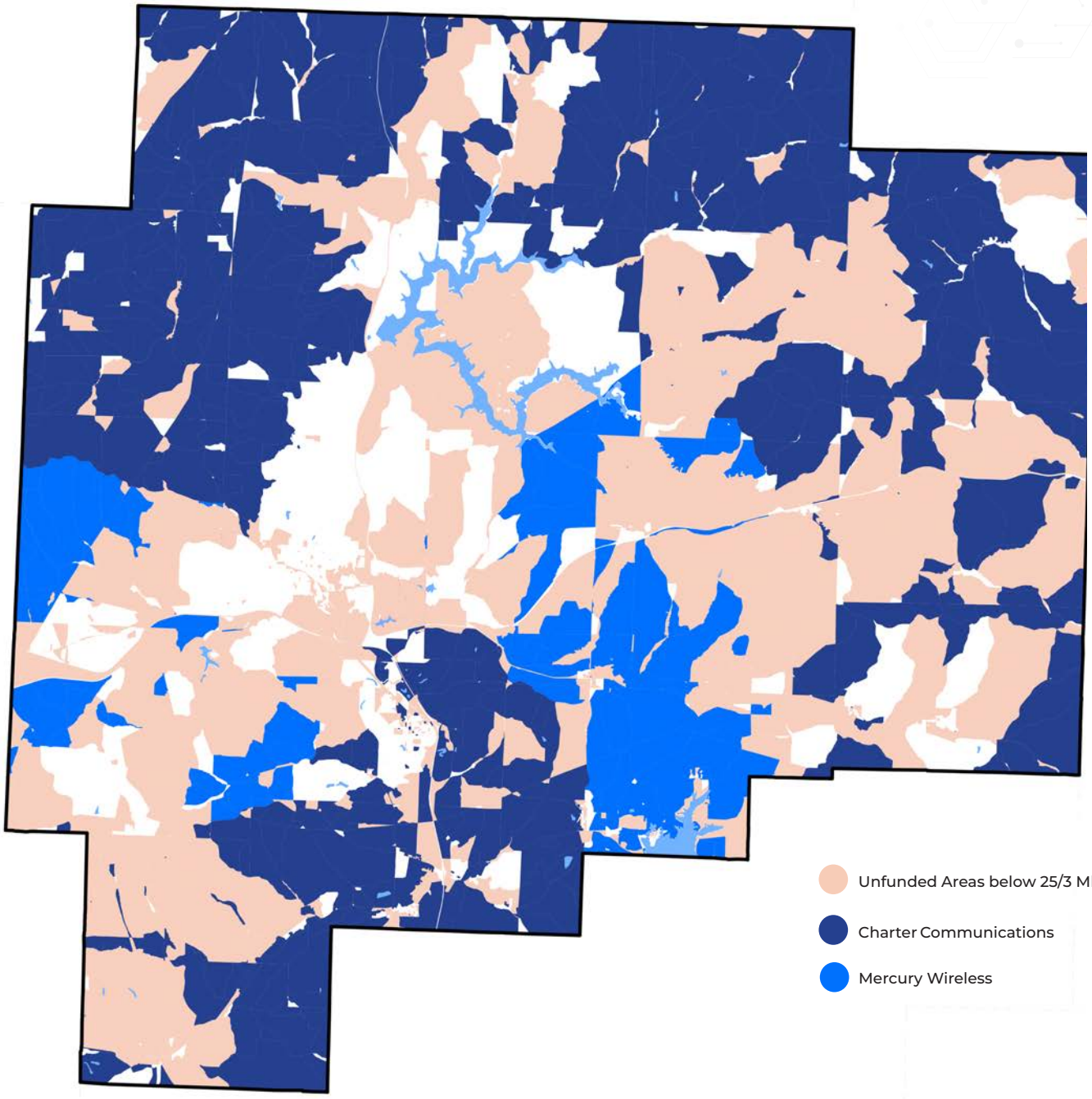
975 MILES OF FIBER

Cost estimates assume $41,000 per mile for utility pole make-ready, $40,000 per mile for high strand-count, aerial fiber.

**See "Estimating Costs and Distances" (page 9) to learn more about these calculations.*

TENTATIVE AWARDS

Rural Digital Opportunity Fund (RDOF)



The FCC's Rural Digital Opportunity Fund (RDOF) subsidizes internet providers to deploy broadband in unserved rural locations. In 2020, the FCC awarded a total of $170 million to 11 internet providers in the state of Ohio. The majority of this funding remains tied up in financial due diligence, so many other funding programs consider such awards tentative.

About the Mapping

This profile was created under contract by Reid Consulting Group, LLC. for Ohio Mid-Eastern Government Association (OMEGA). This map, collectively with county maps created for Buckeye Hills Regional Commission (BHRC) and Ohio Valley Regional Development Commission (OVRDC), is being provided to Connecting Appalachia. Connecting Appalachia is a consortium of local governments, regional economic development councils, and industry professionals working to increase economic opportunity for Appalachia by expanding access to quality, affordable broadband.

Broadband coverage maps are based on a rating system developed by Reid Consulting Group, LLC. Data sources include Ookla Speedtest Intelligence® data licensed by InnovateOhio for the months of February 2020 through August 2021, carrier filings of available speeds with the FCC (Form 477), carrier reports of actual broadband deployments to USAC (HUBB), RDOF Phase 1 eligibility, and population density.

Unserved and underserved ratings are color coded at the census block level:

<10/1 Mbps	Red: Less than 10/1 Mbps
>=10/1 <25/3 Mbps	Orange: At least 10/1 Mbps and less than 25/3 Mbps
>=25/3 <50/10 Mbps	Yellow: At least 25/3 Mbps and less than 100/20 Mbps
>= 50/10 Mbps	Green: Above 100/20 Mbps defined as served
no data / unpopulated	Gray: Areas with no data/ speedtests submitted- unpopulated

We conducted analysis of the raw Ookla® data for the months of February 2020 through August 2021, applying the following filters:

Filter
Include desktop, iOS, and Android app results*
Exclude results with GPS precision of greater than 200 meters**
Include only results from fixed broadband providers

**iOS and Android results were included only if the device was connected to wi-fi during the speed test.*

*** To protect consumer privacy, Ookla® limits location precision to +/-100 meters. As a result, a single location may include multiple households and many individual tests.*

Using the Ookla® results we rated each location based on the average of up/down speeds for all tests at that location. We then graded census blocks based on the median up/down speed of all locations within each block. Block-by-block ratings were further refined based on RDOF eligibility, past HUBB deployments, and Form 477 data. For blocks with no Ookla test results, extrapolated ratings were assigned where possible via comparative analysis of population density, Form 477 coverage, HUBB data, and RDOF Phase 1 awards. Areas that could not be assigned an extrapolated rating are shown in gray on the map.

Business Broadband Opportunity Index

Business demand for broadband varies based on company size and economic sector. The more employees at any given business location, the greater the demand will be for that location. Certain types of businesses also tend to consume more bandwidth regardless of size. For example, a medical clinic with 50 employees will need significantly more capacity than a construction contractor of similar size.

When planning for broadband expansion, it is important to consider the effect businesses have on overall need. The presence of a high-demand business or multiple businesses of any size in a particular area may make that area significantly more attractive to a broadband provider than the surrounding population density would predict.

The Business Broadband Opportunity Index helps planners visualize this economic impact by mapping the location of every business (as identified by Dun & Bradstreet) with a dot size proportional to that business' expected broadband demand. The larger the dot, the greater the demand. Calculations are as follows:

OPPORTUNITY INDEX = BUSINESS SIZE * INDEX MULTIPLIER

Business Size: Number of employees as reported in Dun & Bradstreet. If count is blank, assume 1 employee.

Index Multiplier: A number from 1-5 based on industry sector.

On the Map: The greater the demand, the bigger the dot. To aid with visualization, comparative rankings from 1 to 10 are also assigned.

Category	Multiplier
Healthcare	5
Education & Libraries	5
Telecom and IT	5
Banking and Finance	5
Professional Services	4
Publishers	4
Real Estate	3
Hospitality	3
Publishers	3
Non-Profit	3
Wholesalers	2
Dealers and Retail	2
Transportation	2
Childcare	2
Sports, Music & Arts	2
Religious and Fraternal	2
Manufacturing	2
Printing	2
Restaurants & Food	2
Farming	1
Hunting, Fishing	1
Energy	1
Raw Materials	1
Contractors	1
Textiles	1
Unclassified	1

Estimating costs and distances

Building a fiber network involves three basic expenses: preparing utility corridors to support fiber optic cables (make-ready), installing fiber along those corridors (cost-to-pass), and connecting individual homes and businesses to the new fiber (cost-to-serve).

ASPECT	LOW	EXPECTED	HIGH
Make-Ready*	$32,000	$41,000	$60,000
Cost-to-Pass**	$32,000	$40,000	$40,000
TOTAL per mile***	$64,000	$81,000	$100,000

** Some industry groups estimate make-ready as low as $5,000-10,000 per mile. Such estimates generally either assume the pole owners will make up the difference or that low-count drop cables are being deployed.*

*** Assumes high strand-count fiber network using strand-and-lash design.*

**** Cost-to-serve not included, assumed as ISP investment.*

The following assumptions have been made when estimating costs:

Aerial Installation: The high incidence of surface rock in Appalachia can make buried conduit prohibitively expensive, so costs in this report have been calculated based on attaching overhead fiber to existing electrical poles.

Make-Ready: As part of any broadband deployment, electric utilities must modify or replace at least some of their poles to accommodate increased cable weight, wind and ice loads, and limited clearance between power lines and communications cabling. These costs vary based on electric provider and the kind of cable being installed. A heavier cable may require more make-ready than a lighter one.

In this report, we assume a make-ready of $41,000 per mile to accommodate high strand-count cables that require strand-and-lash support. This figure also is approximately what it would cost to build an independent communications pole network as a last resort, should ISPs and local utilities be unable to reach an acceptable agreement.

Underground Alternative: Buried fiber can avoid utility pole attachment fees and associated make-ready, but such savings must be weighed against the total cost of going underground. Costs can vary widely based on burial depth, the presence or absence of other underground infrastructure, the need to bore beneath roads, how much rock is encountered, and whether conduit is used versus direct burial.

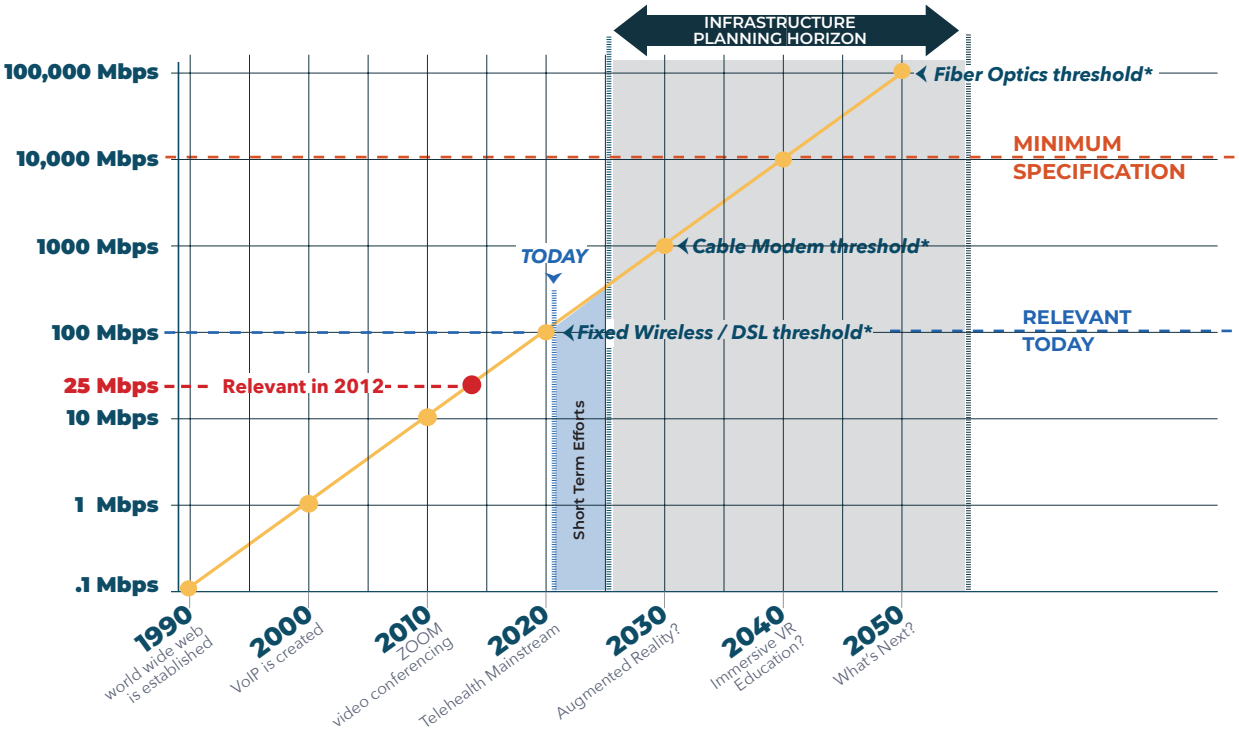
Given the prevalence of surface rock in Appalachia, it is estimated that burying fiber in conduit (the preferred approach for long term durability) would cost between $90,000 to $140,000 per mile in total.

THE METHODOLOGY
continued

Cost-to-Pass: Fiber optic comes in a wide range of styles, from lightweight household drop lines to high capacity cable sheaths that bundle hundreds of fiber strands together to carry massive amounts of data. Household drop fiber is inexpensive and puts less strain on utility poles, but it has limited capacity.

Broadband speeds have increased 10-fold every decade since 1990. To ensure that a fiber network built today remains useful 40 years from now, this report assumes the use of high strand-count cables. While a provider could deliver broadband that meets current state and federal speed requirements using only low strand-count household drop cable, such a network would offer little flexibility to expand services or increase speeds as demand rises.

Material and labor costs for high strand-count fiber are estimated at $40,000 per mile.



**Ceilings based on commercially deployed products*

Cost-to-Serve: Internet providers typically absorb the cost of running a drop cable from an individual home or business to the nearest utility pole. As such, the cost-to-serve is not included in budget estimates.

Distance and Total Cost: Last mile broadband infrastructure typically follows existing roads. Total project cost can be estimated by multiplying make-ready and cost-to-pass by the number of state, county, township and unincorporated road miles in unserved census blocks.

THE METHODOLOGY

calculating cost and investment

The budget is based on a fiber-to-the-home network with enough capacity to meet demand for the next 40 years. Expected investments and grant amounts will vary based on the area to be served, the population density, and the presence or absence of other services.

BUDGET

TOTAL COUNTY COST

Total county cost is the sum of make-ready ($41,000) and cost-to-pass ($40,000) multiplied by the number of unserved state, county, township, and unincorporated road miles.

Unserved Miles * (Make-Ready + Cost-to-Pass) + (Number of households * Network electronics)

Projected internet provider investment

The total an internet provider can spend to install fiber and still make a profit, estimated between $1000 and $2500 per household. As population density goes down, costs go up while expected investment remains the same.

Unserved households * Investment per household

FUNDING GAP

The funding gap is the difference between the total cost of the project and the available or anticipated private investment. For an internet service offering to be sustainable, grant or other public funding must be used to close this gap.

Investment - Total County Cost = Funding Gap

= *Gap per household*

The gap per household is calculated by dividing the funding gap by the total number of unserved households.

$$\frac{\textit{Funding Gap}}{\textit{Unserved Households}} = \textit{Gap per household}$$

THE METHODOLOGY
calculating the outcome

OUTCOME

The sum of E-911/LBRS addresses that fall within unserved census blocks. Census households were used instead of LBRS in Carroll, Clermont, Harrison, Highland, and Tuscarawas counties.

Unserved households passed

Total number of unserved households divided by the number of unserved state, county, township, and unincorporated road miles.

Households per fiber mile

The amount an internet provider can spend to install fiber and still make a profit, estimated between $1000 and $2500 per household. As population density goes down, cost goes up while expected investment remains the same.

Investment per household

THE RESULT

Fiber distance is based on the number of unserved state, county, township, and unincorporated road miles within the county.

MILES OF FIBER