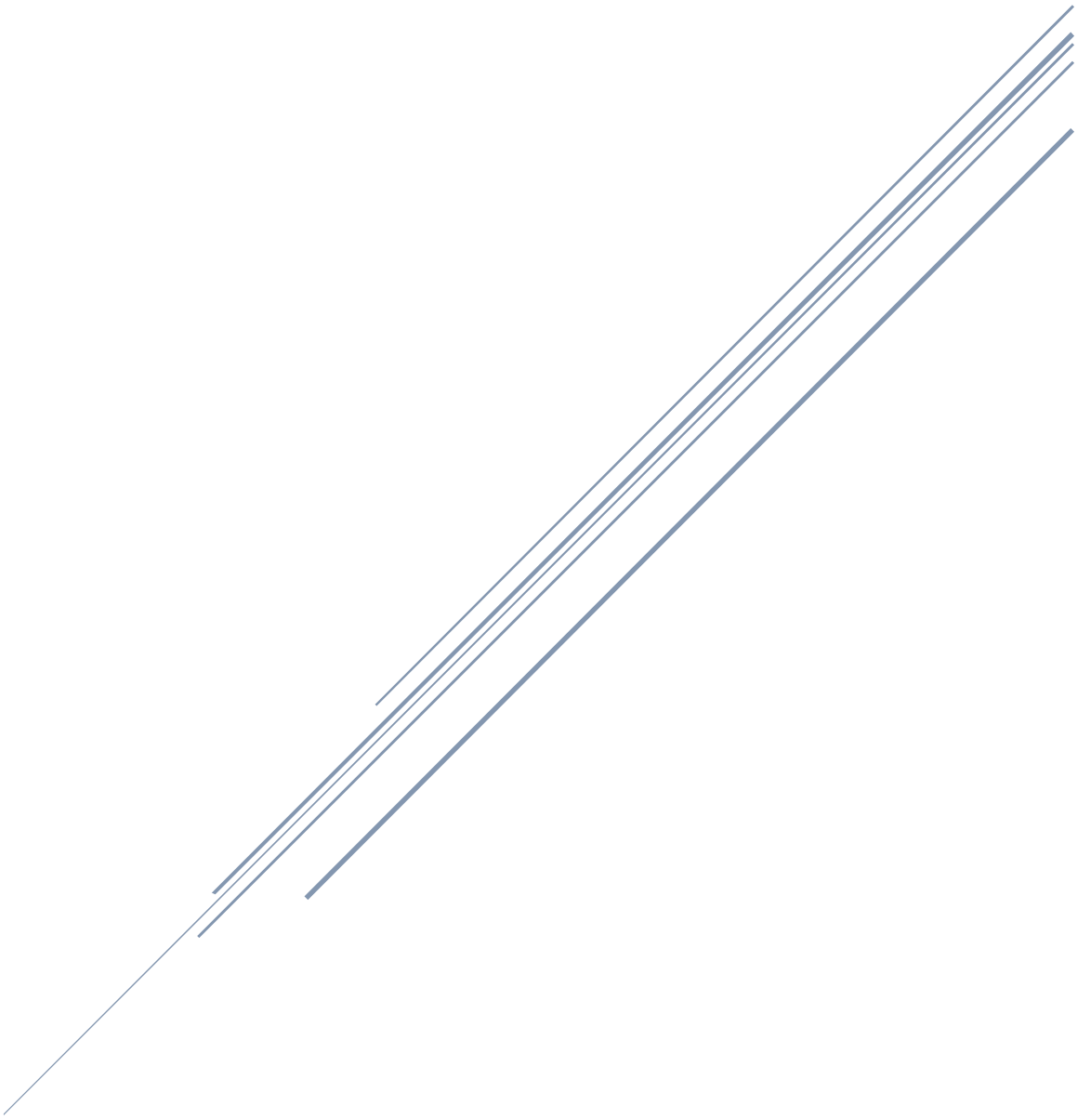


ST. MARY'S COUNTY, MARYLAND  
Broadband Assessment Report



Submitted by Dellicker Strategies, LLC with Lewis Strategic, LLC  
December 29, 2020

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## About the Assessment Team

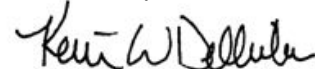
Dellicker Strategies is a regional provider of solutions and services in the fields of broadband infrastructure, cybersecurity, and technology management. Dellicker has been in business for 15 years helping schools, municipalities, hospitals, and companies use technology to improve their operations.

Since 2005, Dellicker has helped more than 2,000 organizations upgrade their broadband access in projects approaching \$300 million. The company pioneered the use of hybrid learning before it became a necessity during the pandemic and established one of the largest and most successful online learning platforms in the mid-Atlantic region. Dellicker also helps public organizations develop and implement cybersecurity programming to protect critical information. Visit us at [www.dellicker.com](http://www.dellicker.com).

For this project, Dellicker is partnering with Lewis Strategic for technical assistance and organizational expertise. This effort continues a five-year relationship between the two companies to bring faster and more affordable broadband access to underserved areas along the eastern seaboard.

Dellicker and Lewis are grateful for the opportunity to serve the people of St. Mary's County. We hope and trust that this report meets your expectations and provides valuable insights to county leaders and telecom providers for improving broadband pricing and infrastructure to households and employers.

Sincerely,



## Foreword

Because of COVID-19 impacts, household broadband is an essential service for work, education, and play. Because of market trends, employer broadband is a critical commodity for all kinds of public and private enterprises. Therefore, county governments across America are justified to explore creative solutions to improve broadband access to households and employers.

While St. Mary's County government has some highly effective county broadband initiatives that already have improved local access to high-speed service, we recommend several action-oriented strategies and tactics to propel the county's broadband offerings forward. Accordingly,

- This report provides recommendations to deliver affordable options to most of the employer organizations seeking ultra-high-capacity broadband upgrades, immediately.
- This report provides a recommendation that could accelerate the rollout of 5G wireless technologies in St. Mary's County with price-points and timeframes that are both reasonable and achievable, almost immediately.
- This report highlights several recommendations to improve the broadband infrastructure for existing providers and the new providers identified through the St. Mary's County Broadband Assessment Project Request for Proposals (RFP), which was issued last November.
- With the recent Federal Communications Commission (FCC) announcement identifying grants to provide broadband services to portions of St. Mary's County over the next ten years, we recommend the county use the findings and data within this report, as well as a cadence of future community broadband meetings, to speed and optimize the federal grant investments.
- This report identifies future strategies to improve the next countywide broadband RFP and boost broadband supply and demand.

Conclusion: St. Mary's County government has undertaken a strategic approach to county broadband infrastructure leveraging available grants and marketing the availability of these opportunities to households and employers. By undertaking the recommendations in this report, St. Mary's County leaders can immediately improve options for affordable, ultra-high capacity, high-speed broadband; 5G cellular service; expanded cable offerings; and advanced next steps for further improvements.

*BECAUSE OF COVID-19 IMPACTS,  
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AND PRIVATE ENTERPRISES.*

*THEREFORE, COUNTY GOVERNMENTS  
ACROSS AMERICA ARE JUSTIFIED TO  
EXPLORE CREATIVE SOLUTIONS TO  
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HOUSEHOLDS AND EMPLOYERS.*

## Introduction

This Broadband Assessment was authorized by the St. Mary's County Board of Commissioners to evaluate options for improving the regional broadband infrastructure. For the past 20 years, broadband has been important to the citizens and employers of St. Mary's County. Today, quality, and affordable broadband is even more critical, as students, employees and citizens must work and learn from home.

This report compiles publicly available information, government resources and background materials to establish a baseline of information about the regional broadband infrastructure. It adds results from the St. Mary's County Household Broadband Survey, which received almost 2,600 responses, and the Employer Broadband Survey, which included 99 local employers. It also incorporates results from last November's St. Mary's County Broadband Assessment RFP, which compiled pricing and availability data for 50 local employers and gathered information about the wholesale and retail infrastructure.

Combined, these sources provide a broad and current perspective on the strengths and weaknesses of the regional infrastructure and a roadmap for ways to leverage this information to make improvements. This analysis is written for a non-technical audience and the recommendations are designed to be practical and achievable. While this report identifies many challenges to the cost-effective rollout of ubiquitous, high-quality broadband, the report provides plenty of options for the St. Mary's County Board of Commissioners to consider, and high-quality information for broadband providers

### Telecom Economics in St. Mary's County

At its core, the main barrier to accessible broadband in St. Mary's County is rather simple: the return on investment is much lower in rural areas compared to more urban locations. This is as true for St. Mary's County, Maryland as it is for Potter County, Pennsylvania, or for that matter Teton County, Montana.

With few exceptions, the costs to deploy telecommunications infrastructure in urban and rural areas are comparable, but the number of potential buyers is vastly different. For example, stringing a mile-long, fiber-optic cable through a city central may provide access to hundreds, if not thousands, of potential

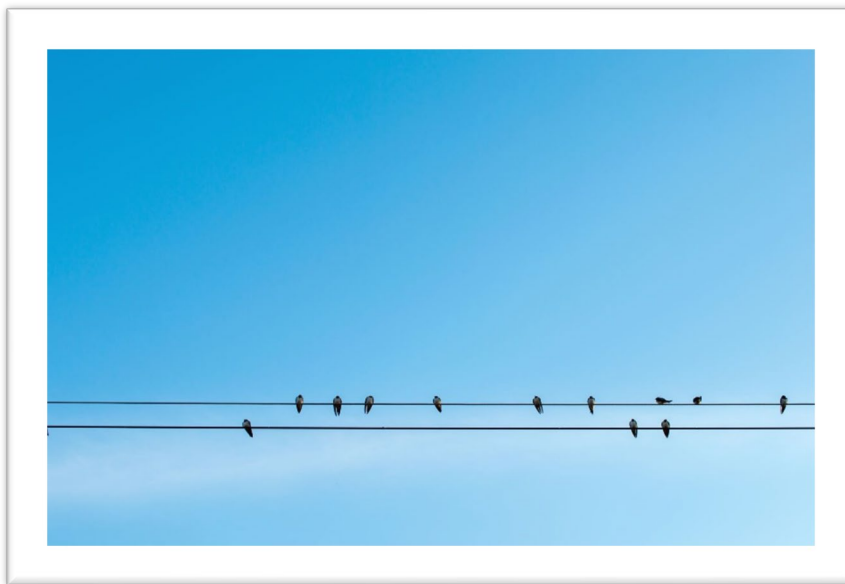


Figure 1: When Rural Telecom Serves More Birds than People...

customers. Running that same cable down a country lane might reach one or two households, or maybe none at all. It is no wonder why private telecom companies seek to deploy their capital in the most populous areas.

So, what can rural communities do? They have plenty of options, but most are inefficient, impractical, or ineffective. To solve the rural broadband problem, policymakers must focus on economic reality.

One approach is to boost supply. Policymakers can subsidize telecom providers to install new infrastructure where the business case is not otherwise justified. This approach can be effective, but it is not necessarily efficient, and it depends on the availability of public funds. Governments can try to compel providers to serve rural areas, but that is even less practical or desirable. New technologies or business models can increase supply, but that generally takes a very long time.

Another approach is to boost demand. The government can provide incentives for employers and households to buy more broadband through special credits. But this approach also requires public funds. And, while no policy maker is talking about forcing employers and households to buy more broadband, they are in fact being “forced” to buy more broadband as they grow more dependent on technology for work, school, and personal lives.

So, absent a windfall of massive funding, a kingly decree, or a miracle technology, there is no magic solution. However, by targeting both supply and demand with some funding, reasonable encouragement, and modest improvements, St. Mary’s County can implement efficient, practical, and effective policies and strategies that improve its broadband infrastructure. This report shows how.

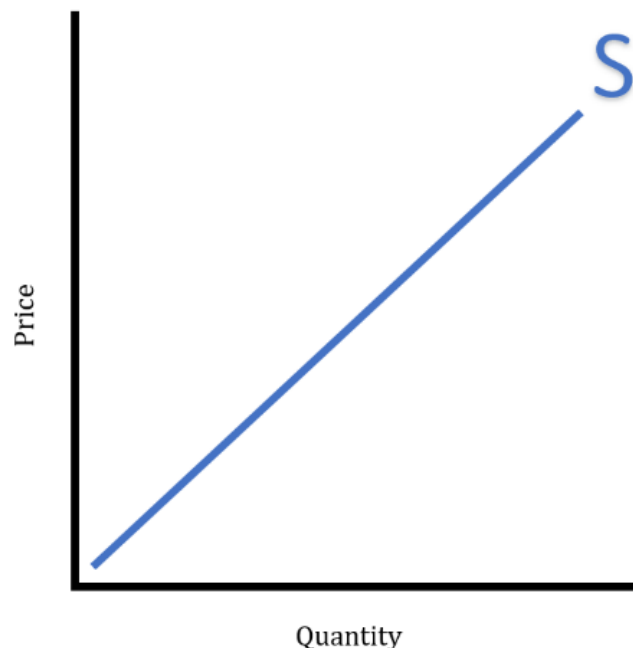
## Telecom Supply

For rural communities, telecom access has two primary components: availability and cost. Availability refers to the quantity and quality of broadband that can be purchased, while cost refers to the corresponding price for each offering. From the perspective of suppliers, the relationship between availability and cost is depicted as the rural telecom supply curve (See Figure 2). Understanding both components of the curve is essential for crafting broadband strategies that work.

## Competitive Environment

We have observed the best way to optimize broadband availability and cost is to foster a competitive free market, with several quality providers offering plenty of options. Unfortunately, this ideal is almost never the case with rural broadband. Since delivering quality broadband requires a significant investment and most consumers only buying one type of broadband service at a time, the barriers to entry are substantial. This harsh economic reality is the primary reason why rural incumbent providers get so entrenched in their communities. Once established, these providers rarely leave. As a direct result few competitors and their investors want to invest their limited resources into a rural market to compete against an incumbent provider.

Figure 2: Rural Telecom Supply Curve



With these economic realities in place, it may seem a hopeless endeavor to get more competition in a rural telecom market. Fortunately, changes in the technical, regulatory, and business environment have all vastly expanded the choices available to rural consumers everywhere, including in St. Mary's County. Increasingly, while a given provider may be entrenched in one aspect of the telecom industry, other providers are getting very good at delivering alternative solutions that increase competition, improve available choices, at reduced pricing. Additionally, there are targeted grant programs, like the Maryland Department of Housing and Community Development (DHCD) broadband expansion grants that are helping the situation. The following section evaluates key aspects of the competitive environment in St. Mary's County, exploring the supply of telephone, cable, cellular and wireless offerings that all contribute to the overall broadband infrastructure.

*ACCORDING TO THE ST. MARY'S HOUSEHOLD BROADBAND SURVEY, ONLY 55 LOCAL CITIZENS USE VERIZON'S DSL SERVICES, ABOUT TWO PERCENT OF SURVEY RESPONDENTS.*

### Local Telephone Company

For many years, the most notable telecom provider in St. Mary's County was Verizon, or as the company was previously known, Bell Atlantic. Bell Atlantic grew out of the national telecom giant AT&T, which was court-ordered to break itself into seven baby Bell companies in 1984. The Bell regime was heavily regulated and was required to provide telephone service to just about every address, no matter how rural. This deployment was financed by the federal Universal Service Fund, which essentially taxed urban customers so rural customers could receive service. A similar law applied to rural electrification, and updated versions of both policies still exist today.

Understanding the history of local telephone service explains three things that remain relevant to St. Mary's County today. First, the base infrastructure of serving offices and wires is well-established and at least partially controlled and maintained by Verizon. Second, Verizon still falls under a very different regulatory scheme than other telecom providers, alternately providing protections and limitations on how they operate. Third, this background at least partly explains why the Verizon telephone company continues to operate in a more bureaucratic, deliberate system that often seems to resemble an anachronistic public utility than a modern technology company.

Within this framework, Verizon offers a range of wireline broadband services to retail customers in St. Mary's County. Options include Digital Subscriber Line (DSL) and fiber-to-the-home (FTTH) services to household and small enterprise customers, plus various high-capacity data services to business customers. Whether Verizon markets these services to local customers is a different matter.

Presently Verizon offers Digital Subscriber Line (DSL) services in St. Mary's County. DSL technology uses modified voice telephony infrastructure to deliver basic broadband service to the residential and small business marketplace. DSL is relatively affordable (less than \$100 per month) and reasonably reliable, but it tends to be slow compared to other residential broadband options with all reported download speeds less than 100 Megabits per second (Mbps). That offering is barely enough for basic residential applications and not ideal for at-home work and learning. According to the St. Mary's Household Broadband Survey, only 55 local citizens use Verizon's DSL services, about two percent of survey respondents. Only one business reports using DSL service.

Verizon FiOS, the company's brand name for its FTTH offering, is a much more capable product, but FiOS requires the deployment of fiber optic cables to the end-user, something that telephone lines and DSL do not require. As a result, Verizon does not offer FiOS services everywhere it offers phone or DSL service, including most of St. Mary's County. Only 10 residents (less than one percent) say they receive Verizon FiOS. The limiting factor is not demand but supply; FiOS simply is not offered in most of St. Mary's County.

#### Cable Telecommunication Providers

St. Mary's County telecommunications landscape is dominated by the local cable company, Atlantic Broadband, formerly MetroCast. Atlantic Broadband is a subsidiary of Cogeco Communications, Inc. and has grown to become one of the top-ten largest cable telecommunications companies in the United States. The other cable company, Comcast Communications, Inc. serves a relatively small number of addresses in northern St. Mary's County.

Beginning more than fifty years ago, cable companies like Atlantic Broadband deployed cables, repeaters, and an army of service support personnel to provide a better television experience. For the past twenty years, those providers realized that the same infrastructure could be used to deliver Internet access, and cable providers emerged as the primary competition to the local phone companies in the residential marketplace.

Cable companies deal with several limiting factors when modifying their networks from television-focused to data. First, their operations were built to send lots of bandwidth into the home but very little out. That is why cable companies still struggle with asymmetric bandwidth and almost always offer more download bandwidth than upload bandwidth. Second, their services were delivered via copper cables, not fiber optic lines. When fiber became the standard, cable companies had to play catch up. Finally, cable infrastructure is not a dedicated technology solution, but a solution shared by users on the same cable line. Therefore, available bandwidth is reduced when usage is heavy; one child playing video games can potentially reduce the available bandwidth for the whole neighborhood. This reduced capability is also why cable companies advertise maximum speeds instead of guaranteed speeds.

In St. Mary's County, 72 percent of employers and 83 percent of households identify Atlantic Broadband as their Internet Service Provider (ISP). This large market share is why many citizens of St. Mary's County view Atlantic Broadband as a monopolistic service; the company dominates the market.

The most common type of Internet service offered by cable providers is cable modems. In fact, between Atlantic Broadband and Comcast, 84 percent of residential households get their primary Internet access from cable modems. (See Figure 3) Cable modems are relatively affordable and easy to install, making them very popular across St. Mary's County and nationwide.

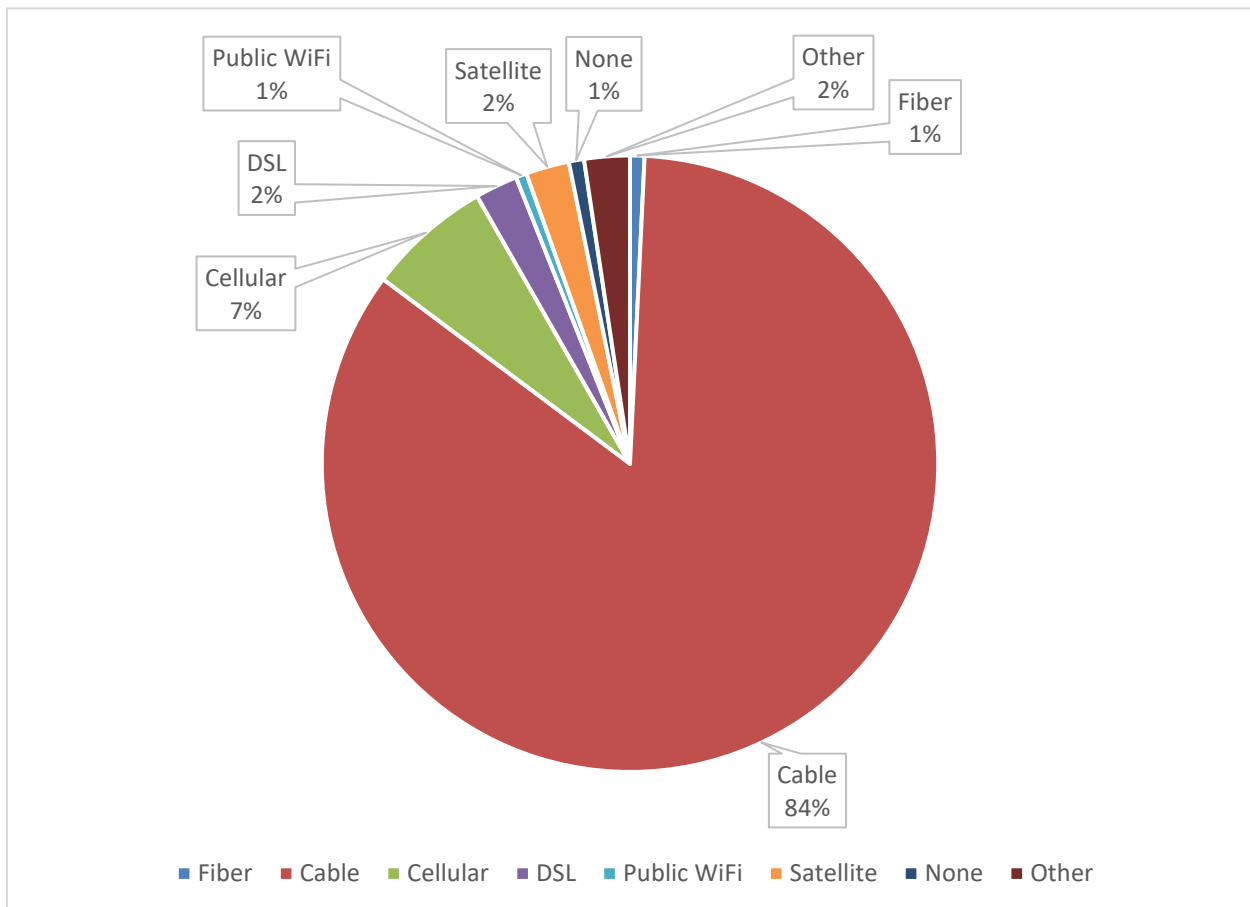
In St. Mary's County, Atlantic Broadband offers Internet access at speeds from 15 Mbps download/1 Mbps upload to 1,000 Mbps

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download/50 Mbps upload. Generally, prices range from a low of \$9.99 per month for the most basic services to \$100 per month or more for the highest bandwidth options. Those speeds and prices are comparable to those in other nearby markets without any appreciable premium.

Often, cable modem pricing is confusing. The companies offer discounts, specials and sales that result in different prices for the same services in the same neighborhood. Prices are typically bundled with other services like voice and television, making it difficult to isolate the Internet component. And since cable companies advertise maximum speeds that can be significantly different than actual speeds, it is not uncommon for cable customers to feel they are getting less than what they pay for. This cable phenomenon certainly is not unique to St. Mary's County.

Figure 3: Primary Type of Household Internet Connection: St. Mary's County



### Competitive Telecommunications Carriers

Thanks to the development of new business models, increased demand and deregulation, a new class of wireline providers has emerged to compete with local phone companies and cable companies. Whether they compete aggressively often depends on the size of the market and likelihood of winning data customers away from the incumbent providers.

There are different regulatory classes for these competitive wireline providers, but most are classified as Competitive Local Exchange Carriers (CLECs) or Competitive Access Providers (CAPS). Generally, CLECs use the wholesale infrastructure of other telecom companies, especially the local telephone and cable



companies, to deliver services to retail customers. CAPs are known for building and using their own infrastructure, or “facilities,” as it is called in the industry. However, the lines have blurred among these providers and it is difficult to classify all the possible combinations.

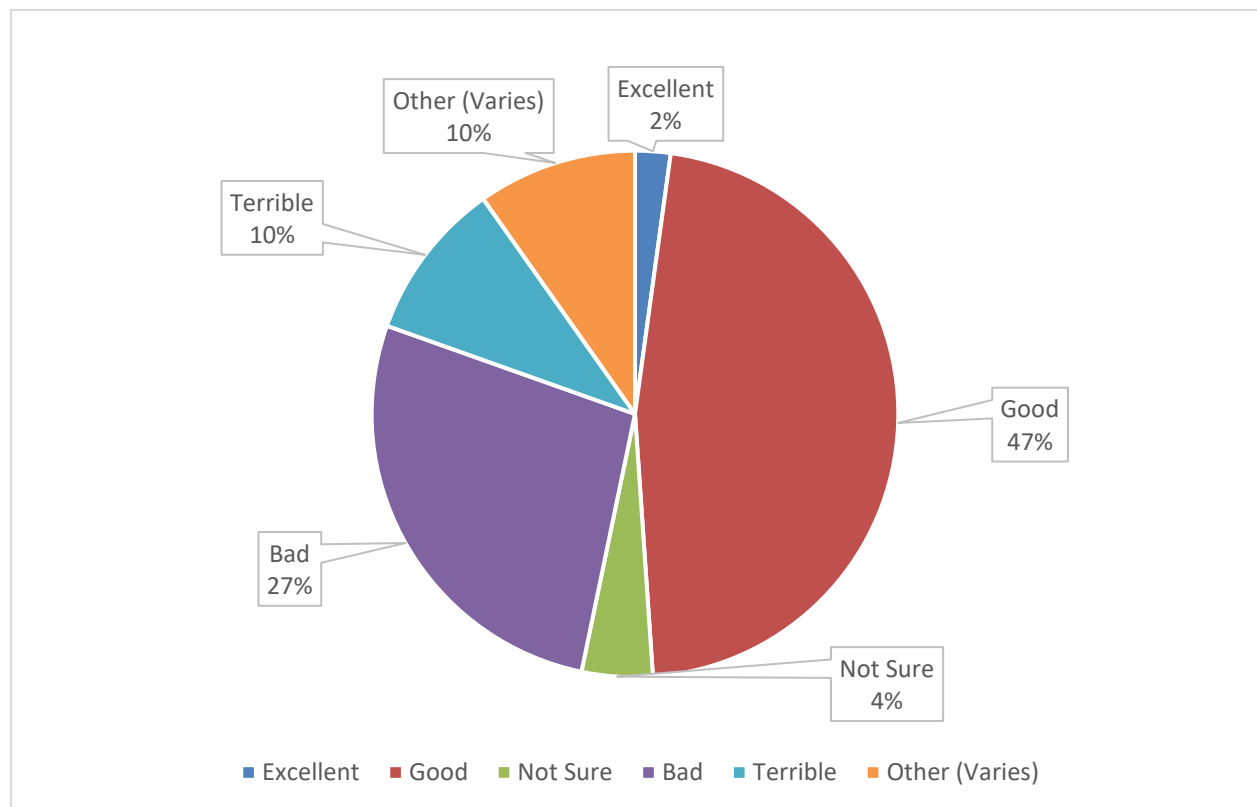
What St. Mary’s County needs to know: is there is a community of competitive wireline companies working elsewhere in Maryland and/or across the mid-Atlantic that is not engaged in St. Mary’s County that would invest there. While firms like Crown Castle, Shentel, Xtel Communications, Zito Media, Zayo Communications and many more can access the local infrastructure in St. Mary’s County, they do not appear active. For example, none of the organizations who responded to the Employer Broadband Survey said they purchase services from a CLEC or a CAP. This lack of competitive wireline companies was a missed opportunity that the November 2020 broadband RFP addresses, immediately.

### Cellular Service Providers

Not too long ago, cellular service was only for mobile voice. Today, it is the most pervasive form of broadband access. With almost every adult, teenager seemingly using a smartphone, anyone with a data plan or Wi Fi connection can now use the mobile infrastructure to send, receive, and share data.

In St. Mary’s County, the major carriers are using 4G cellular service as the standard for service. 4G simply stands for “fourth generation” cellular wireless technology. AT&T, Verizon and T-Mobile all offer services in St. Mary’s County, although coverage varies by location and by carrier. Coverage assessments by St. Mary’s citizens were mixed in the Household Broadband Survey, with 43 percent saying coverage is good or excellent, and 40 percent describing coverage as bad or terrible (see Figure 4). Employers offered a slightly more positive view of cellular coverage, with 49 percent offering a favorable opinion.

Figure 4: Household Sentiment about Cellular Coverage: St. Mary’s County



In many ways, 4G service is similar to cable modems: Both services tend to be asymmetrical (data speed and file transfer rate on your network are different in each direction, both cost about the same, and both are characterized by bundled pricing packages that may vary by time, place, and customer. While 4G speeds are not quite as fast as high-end cable modems, 4G cellular is comparable to more typical cable speeds. Of course, the biggest difference between landline broadband, and cellular phones is mobility- people can use their smartphones anywhere there is adequate cellular service.

*THE SAME ECONOMIC FACTORS THAT TEND TO LIMIT THE DEPLOYMENT OF OTHER TYPES OF TELECOM INFRASTRUCTURE IN RURAL AREAS ALSO APPLY TO 5G ROLLOUT. RURAL PLACES LIKE ST. MARY'S REMAIN AT THE END OF THE LINE.*

Right now, national carriers are rolling out the fifth generation (5G) cellular service, starting in big cities and populated suburbs. This promising technology boasts speeds up to ten times faster than current 4G levels. This increase in speed, places 5G on par with high-end cable modems and other premium residential services like Verizon FiOS, but with full mobile capabilities. In addition to being a game-changer for residential and small business Internet access, 5G will transform the so-called "Internet of things." Already, applications

providers and device makers are gearing up for 5G by incorporating their superfast speeds, and mobile convenience into all kinds of gadgets from home appliances to electric automobiles. As you have also seen, TV advertisements for 5G are proliferating on TV and internet programming.

5G works differently than 4G cellular networks, which depend on large towers connected by fiber optic cables to transmit and receive voice, video, and data. While 5G carriers still need those big towers, they also need a concentration of smaller 5G antennas that can be mounted on utility poles, rooftops, or other similar points to relay information back and forth.

Ideally, these 5G antennas are connected by fiber. So, even though it is billed as a mobile revolution, 5G requires massive amounts of new fiber optic cabling to work effectively. The fundamental need for fiber connections to 4G towers, and 5G antennas means the same economic factors that tend to limit the deployment of other types of telecom infrastructure in rural areas, also apply to 5G rollout. Accordingly, rural places like St. Mary's County remain at the end of the line.

In the various broadband surveys, we asked the citizens and employers of St. Mary's County to identify the most important cellphone "dead-cell-zones." These are the known places where cellular networks drop the most cellular calls, offer the weakest signals, or have no cellular service whatsoever. Results of the St. Mary's Employer Survey are shown in Figure 5. While this is an unscientific survey with locations, the graphic accurately depicts the most common 'dead-cell-zones' identified by county employers.

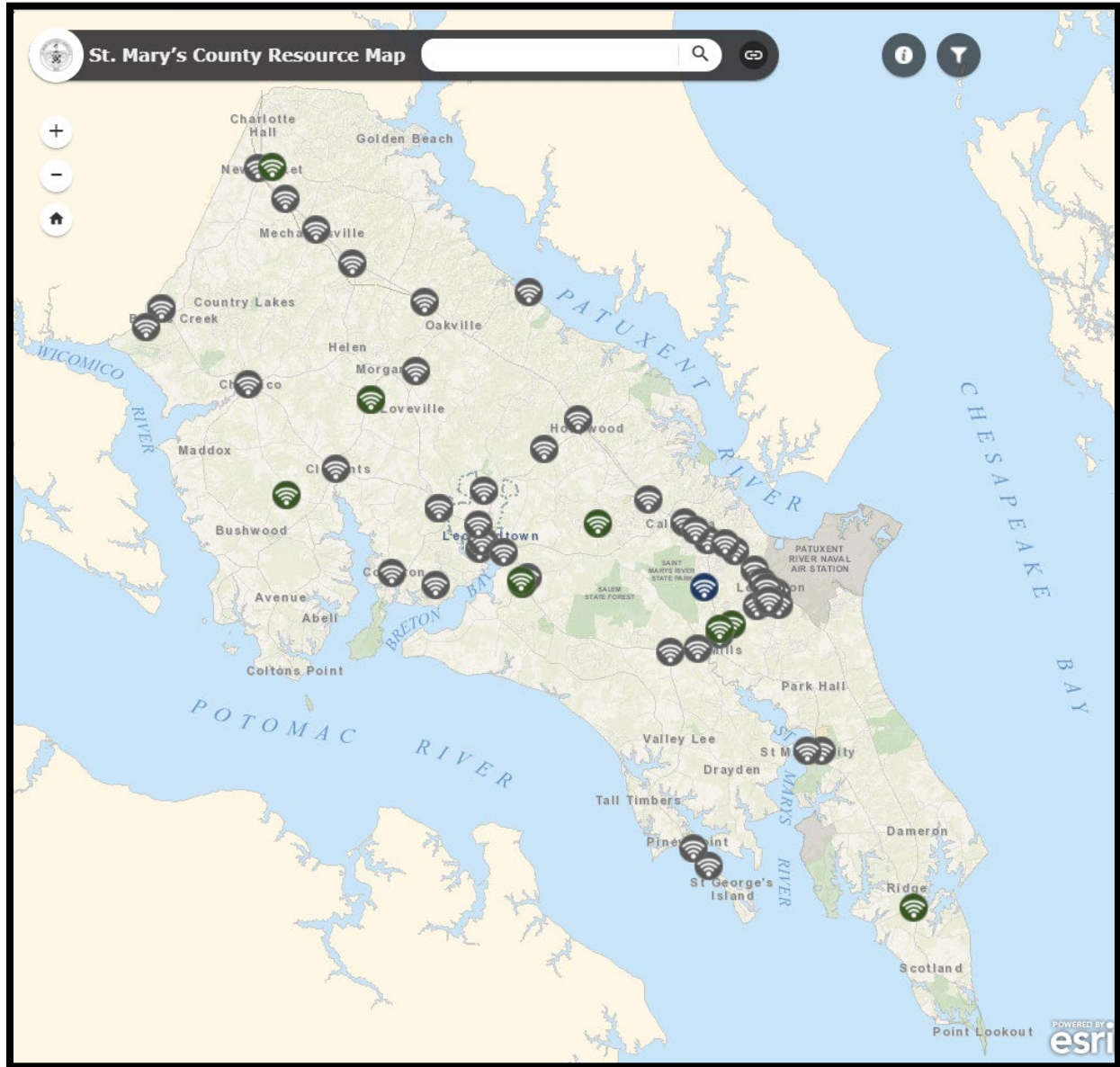
#### Other Wireless Providers

One of the more surprising results of the St. Mary's County Broadband Surveys is the moderately high number of citizens who rely on non-cellular wireless services to receive Internet access. In fact, more than 125 different households and employers use some kind of alternative wireless service to exchange data. Generally, there are three types of services employed in the residential and enterprise market: fixed wireless, public Wi Fi, and satellite broadband, with the latter being the most popular by far.



The St. Mary's County Board of Commissioners has been leading a coordinated effort to deploy public Wi Fi throughout the region. Figure 6 shows the locations of more than 50 local hotspots in parks, shopping centers, schools, libraries, and other public places. The county has plans to expand public Wi Fi to four additional parks during the next few months so citizens of St. Mary's County can better connect.

Figure 6: Public Wi Fi Hotspots in St. Mary's County: Source- St. Mary's County



Many Internet Service Providers (ISPs) have deployed such “hotspots” to allow their customers to conveniently connect when they are on the go. Generally, customers receive unique login codes or register their devices with the ISP, which allows secure access wherever there is a hotspot. Services are typically offered as a free add-on for residential or small business customers. Basically, instead of plugging a cable connection into a modem and accessing the Internet via a “household” wireless router, the ISP installs a more robust, “commercial” router that can handle many users simultaneously.



Recently, some ISPs have been offering public Wi Fi as a primary way for people to connect to the Internet, especially in places like apartment complexes or other densely populated areas. For example, when coronavirus hit, several cable companies in New Jersey offered public Wi Fi to help students and teachers connect from home through the district’s commercial Internet account. While this is not viable for open spaces and rural locations, it is very cost-effective for cities and small towns. With over 18 million hotspots nationwide, Comcast Xfinity is one of the largest providers of public Wi-Fi hotspots. In St. Mary’s County, 35 people said they use public Wi Fi for Internet access.

Satellite broadband is a potentially revolutionary technology that unfortunately has never quite lived up to expectations. The promise of satellite broadband is ubiquitous access with no wires at all. In theory, Internet access can be delivered by satellite broadband providers in a similar way that radio service is delivered by SiriusXM or television service is delivered by DirectTV. Users of these services know that the signal may be interrupted by foliage or bad weather, but for the most part, transmission is reliable.

In St. Mary’s County, five different commercial satellite providers, led by HughesNet, a market leader, deliver satellite Internet access to 80 residents and five employers. While satellite market share is only about three percent of households and five percent of employers, compared to most areas of the mid-Atlantic, these numbers are high. Such results suggest that resourceful people are seeking alternatives to more traditional means of Internet access, in St. Mary’s County.

The problem with satellite service is that its pricing and performance remain inferior to other broadband solutions. Residential satellite download speeds are mostly limited to 25 Mbps with upload speeds even slower, and costs are generally higher than comparable methods. Another problem that affects multiple applications is latency, which is the data processing lag that results from the broadband signal bouncing back and forth between space and earth. For unique situations when no other alternatives are available, like providing Internet access in Afghanistan to the United States military, satellite broadband is a tried-and-true method that works very well. But for most Americans seeking residential or commercial Internet access, satellite is usually a last resort. In 2021, the use of satellite broadband may be changing.

Famous Tesla entrepreneur, Elon Musk’s, is testing a new broadband satellite service called “Starlink” through his affiliated company SpaceX. The company has the ambitious goal of providing affordable Internet access at speeds up to 1,000 Mbps (1 Gigabit per second) worldwide. Already, SpaceX has launched almost 1,000 satellites to deliver broadband service and its download speeds are reportedly hitting 50-150 Mbps for a price of \$99/month with a \$499 installation fee.

Public reports indicate that coverage is intermittent during current beta testing, but the company says it plans to keep launching satellites until it can achieve ubiquitous coverage with low latency. In early December 2020, SpaceX was awarded almost \$1 billion in grant money from a recent FCC auction to provide satellite broadband service to more than 500,000 rural Americans. After decades of underperformance, it seems like satellite broadband finally is poised to become a breakthrough technology for rural customers and perhaps may challenge traditional means of Internet access.

*ELON MUSK’S SPACEX COMPANY IS TESTING A NEW BROADBAND SATELLITE SERVICE CALLED “STARLINK” WITH THE AMBITIOUS GOAL OF PROVIDING AFFORDABLE INTERNET ACCESS AT SPEEDS UP TO 1 GIGABIT PER SECOND (1 GBPS) WORLDWIDE.*

## Service Availability

This section provides additional information about broadband availability in St. Mary’s County by customer category. Specifically, it evaluates the supply of broadband in the wholesale and retail markets, with the latter including enterprise customers, small businesses, and residential customers.

Some of the most important information in this section comes from the St. Mary’s County Broadband Assessment Project Request for Proposals (RFP). Last November, the county sought proposals from regional telecommunications providers for 50 local employers who sought upgraded broadband services. The employers were included in the RFP based on their responses to the St. Mary’s County Employer Broadband Survey. For each location, the RFP sought to review different proposals for various broadband products and services. The RFP process generated real proposals from viable vendors with upgraded services ready for purchase right now.

Five providers responded, each offering a different perspective to the same problem: how to improve pricing and availability to regional employers. The respondents are shown in Table 1. The mix of different types of providers offering different types of services provides excellent insights into the opportunities and challenges that relate to service availability within St. Mary’s County.

Table 1: St. Mary’s County Broadband Assessment Project RFP Respondents

Provider	Description
<b>Atlantic Broadband</b>	Local cable telecommunications company
<b>Maryland Broadband Cooperative (MBC)</b>	Statewide non-profit fiber optic infrastructure provider
<b>Talkie Communications</b>	Local competitive telecom provider in Chestertown, MD
<b>Telecom Capital Group</b>	Regional cellular infrastructure company
<b>Xtel Communications</b>	Regional competitive telecom provider in New Jersey

## Wholesale Market

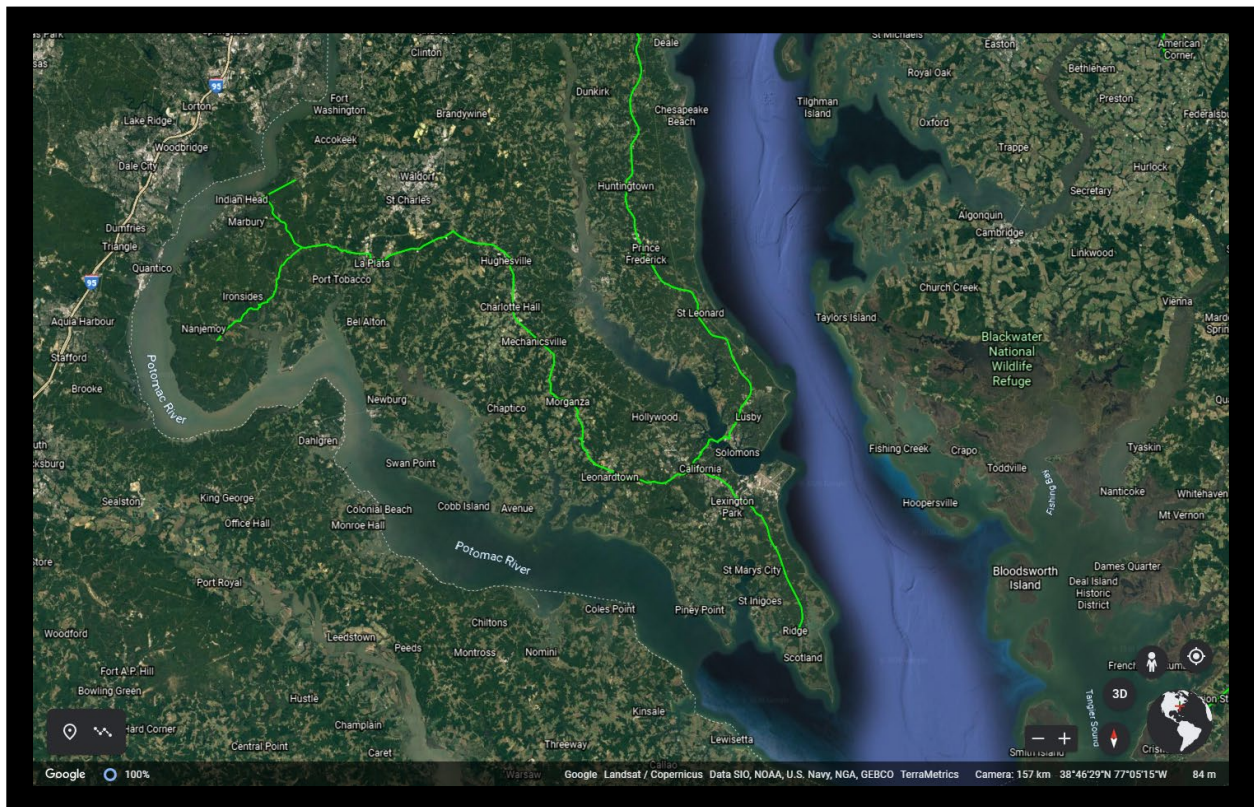
Many broadband feasibility studies focus on generating detailed maps showing the availability of wholesale fiber resources. That is not the purpose of this section. Often, such maps present a partial or misleading representation of available supply; they may show fiber that exists but is not available at an affordable price. Sometimes, they highlight gaps in coverage that are easily filled if a customer asks for service. The key question for St. Mary’s County is whether sufficient wholesale broadband fiber services are available to service retail customers.

Backhaul fiber, or “middle-mile” fiber as it is commonly called, is the backbone of the telecommunications infrastructure. Backhaul fiber consists of the fiber optic cabling, network equipment, utility poles, and other facilities that transport large amounts of data back and forth among switching centers and neighborhood hubs.

MBC specializes in middle mile fiber. The non-profit organization was launched in 2006 with a mission to bring expanded services to the State of Maryland, with a special emphasis on underserved communities. About ten years ago, the company received a substantial federal broadband grant, and MBC has been advocating for open access and better infrastructure ever since.

MBC has an extensive fiber backbone already available in St. Mary's County, as depicted by the map in Figure 7. Combined with additional fiber assets from its cooperative partner, MBC offers a substantial fiber run from north to south, right through the middle of St Mary's County. This MBC fiber is available to any service provider that needs it to deliver retail service to the business or residential population.

Figure 7: Maryland Broadband Cooperative Middle Mile Fiber in St. Mary's County



In St. Mary's County, the two providers with the most extensive middle-mile networks are Verizon and Atlantic Broadband. Years ago, both companies made significant fiber upgrades to their network, Verizon to support its voice business, and Atlantic (then Metrcast) to deliver video. Later, both companies built new fiber to modernize their wireline facilities and support a full range of applications.

Verizon and Atlantic Broadband still use their networks to support their own retail customers, but they also may sell their fiber wholesale to other telecommunications providers. Since Atlantic Broadband is a cable company, it has no regulatory obligation to make its facilities available to other providers. But Verizon, which operates under a different regulatory environment, must offer its facilities to other providers in certain cases, even if those providers are direct competitors. In St. Mary's County, this means that aspects of the underlying fiber infrastructure owned and operated by Atlantic Broadband and Verizon are available, at least in certain circumstances, to other telecom providers.

The recent results from the St. Mary's County Broadband Assessment Project Request for Proposals (RFP) prove that Verizon is proving this true. Xtel Communications, the CLEC from New Jersey, proposed Ethernet fiber services to more than half (27) of the listed employers at ultra-high capacity, high-speed broadband from 1 Gbps to 10 Gbps. Other employers that did not receive specific offerings are also serviceable, but Xtel said it needs more information to provide specifics. As above discussed, Xtel is using Verizon's fiber network to offer these high-speed services, which are as fast and stable as anything else in the marketplace. Notably, if Xtel can use Verizon's network, then other CLECS can (technically and legally) use it too.

*THE RECENT REQUEST FOR PROPOSALS PROVED THAT OTHER COMPETITIVE TELECOM PROVIDERS CAN EFFECTIVELY ACCESS THE EXISTING WHOLESALE INFRASTRUCTURE IN ST. MARY'S COUNTY WHEN A RETAIL CUSTOMER PRESENTS AN OPPORTUNITY.*

Besides, MBC, Atlantic Broadband and Verizon, there are other providers in St. Mary's County with various degrees of accessibility and offerings. It appears competitive access providers operate networks that connect cellular towers and transport mobile voice and data traffic to the carrier infrastructure. Plus, the Maryland Department of Information Technology (DoIT) provides fiber access to state agencies and other public organizations across the county, including the public schools. Finally, the Department of Defense has broadband fiber services connecting major military bases in the county.

Presently, middle mile fiber assets from these specialized providers are not necessarily available for wholesale purchase or retail delivery, but they nonetheless add to the overall fiber infrastructure. And sometimes, these specialized providers do engage in special relationships to solve important problems. For example, sometimes the DoIT network arranges for fiber swaps to accommodate compelling commercial projects.

Overall, there are multiple options for middle mile connectivity in St. Mary's County already. It is important to check with these resources before attempting to build new fiber on top of existing assets.

### Enterprise Services

Enterprise services are used by mid-to-large businesses, large employers, and organizations with high bandwidth needs. Often, such organizations have multiple locations that need to exchange large amounts of data on a regular basis. Examples of enterprise users are school districts, healthcare systems, county governments, big businesses, and other large non-profits.

Twenty years ago, most enterprise buyers purchased dedicated telecommunications circuits from local telephone companies (or CLECs) to receive their Internet access. These circuits were highly reliable, reasonably fast, and available just about anywhere. But they were also difficult to scale and rather expensive, especially in rural areas. Often, they cost more depending on how far away the customer was located from a major population center. Common bandwidth options for dedicated telecom circuits are T-1s (1.5 Mbps), DS3s (45 Mbps) and OC3s (155 Mbps). Today, very few enterprise users still use dedicated telecom circuits unless they have unique requirements, like military bases or state agencies.

Most enterprise buyers purchase Ethernet access. Ethernet is a technology that simplifies information exchange and drives down the cost of high-capacity services. In an office environment, employers use

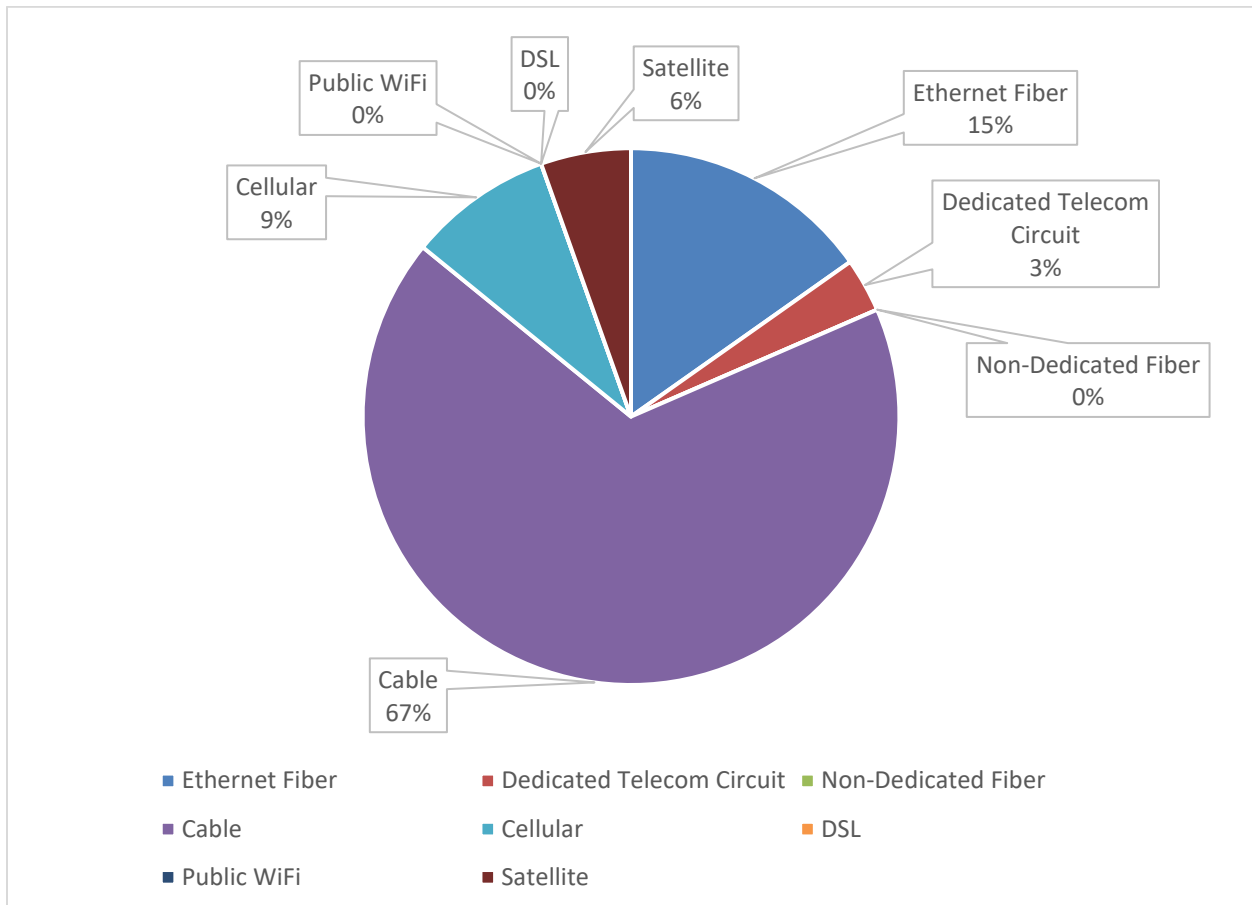


Ethernet cables to connect computers to a local area network. In a city, employers use Ethernet cables to connect separate building networks to a wide area network (or metropolitan area network) or Internet Point of Presence (PoP). Ethernet is usually sold in standard intervals like 100 Mbps, 1 Gbps and 10 Gbps, although many providers offer a range of bandwidth options.

Compared to dedicated telecom circuits, Ethernet is very affordable, but compared to residential connections like cable modems, it is much more expensive. Regardless, Ethernet connections are today's standard connection for most mid-to-large size organizations.

In the St. Mary's County Employer Broadband Survey, 15 percent of respondents said they use Ethernet as their primary Internet connection and three percent said they use dedicated telecom circuits (see Figure 8. Overall, about 18 percent of employers who completed the survey use an enterprise-class connection. Generally, dedicated telecom circuits and Ethernet circuits are widely available throughout St. Mary's County. Atlantic Broadband can service businesses in its franchise footprint, and other RFP respondents like Xtel can deliver a competitive choice to most locations.

Figure 8: Primary Internet Connection of St. Mary's County Employers



#### Small Business Access

Organizations that cannot afford Ethernet circuits or do not need enterprise access use various type of broadband services optimized for small businesses. Generally, these are the same technologies used in the residential market, often with better service support policies with additional features and benefits.

In St. Mary’s County, the most popular small business service is by far the cable modem, with almost all companies purchasing from Atlantic Broadband. In the RFP, Atlantic Broadband said it could provide small business cable modem services to all 50 employer locations. A few organizations also report using cellular connections and a handful use satellite. All the respondents reporting satellite connections implied that they were not able to get cable modems due to lack of availability.

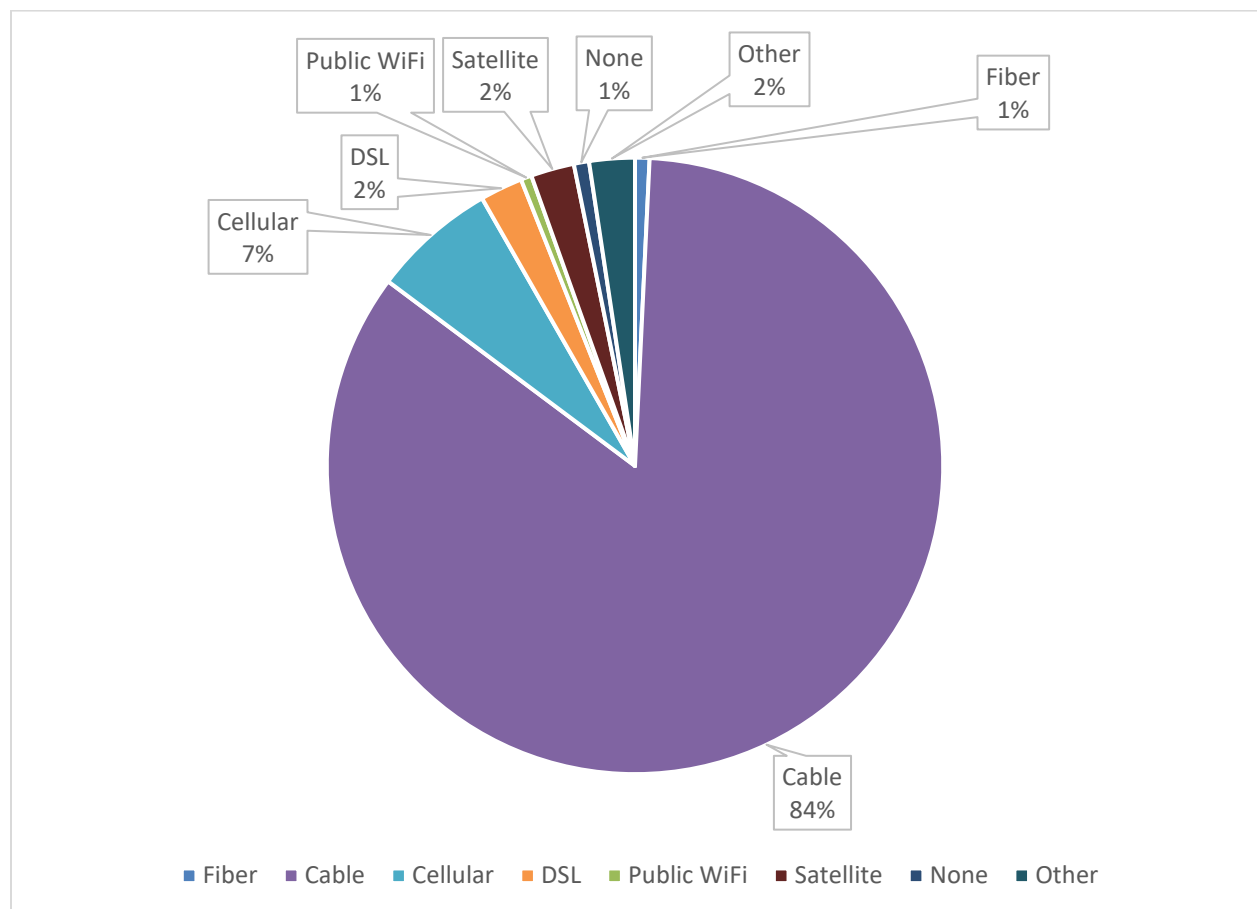
Notably, no small business owners said they use DSL or non-dedicated fiber (e.g., FiOS) for their primary Internet connection. DSL is probably not used because it is an inferior product to other wireline broadband solutions. FiOS is not used because it is not available. FiOS is an example of a product that is widely used by small businesses elsewhere, that is not offered to organizations in St. Mary’s County.

### Residential Access

The same availability issues affecting small businesses also apply to households across St. Mary’s County. But based on the survey comments, residents have more service complaints than businesses.

According to the survey results, most households in St. Mary’s County can access both cable broadband and cellular Internet services at their homes, and some can access one, or the other (see Figure 9). Among the 2,654 household respondents, 29 people (about 1 percent) said they do not have any Internet access at home, although at least a few of them seem to have mobile data plans.

Figure 9: Primary Internet Connection of St. Mary’s County Households



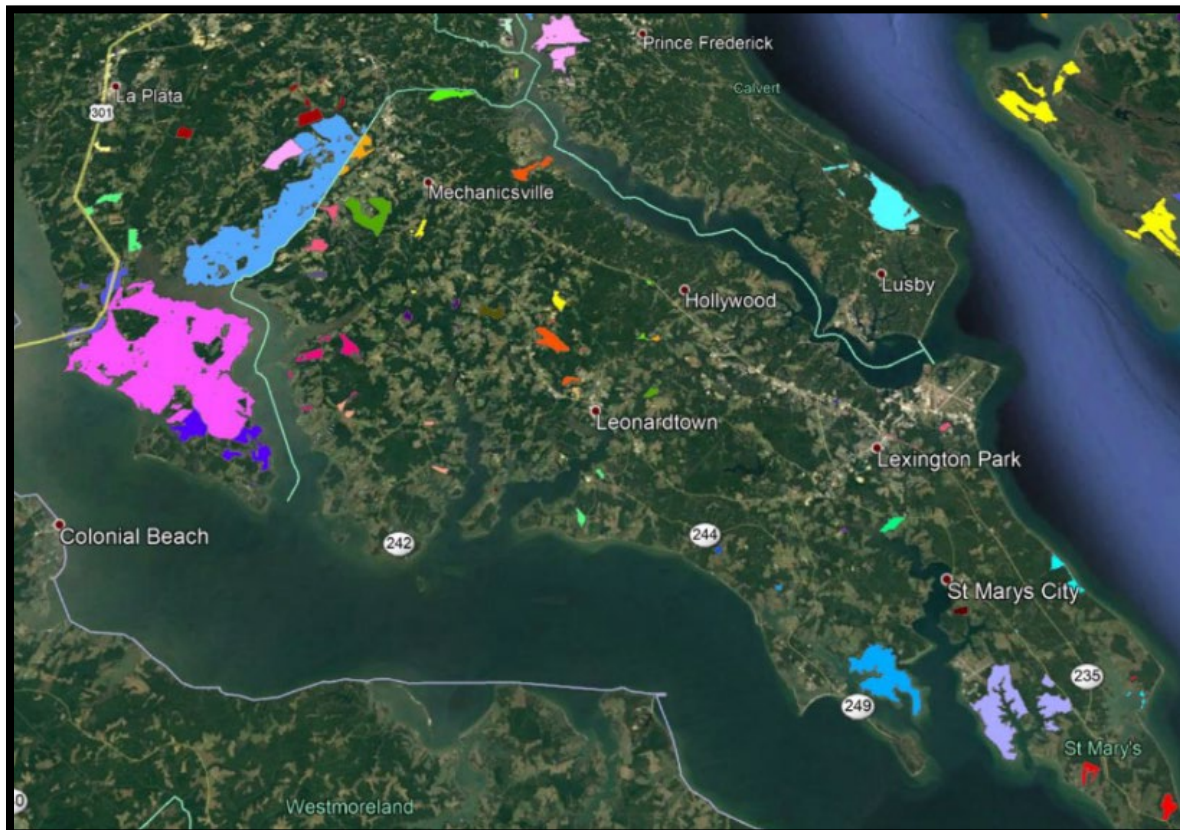
Among the satellite users (2 percent), many commented that cable services are not available where they live. It is less clear how many cellular users (7 percent) choose wireless because they prefer to “cut the cord,” and how many cellular users are forced to use wireless because no cable service is available.

Clearly, there are some residents in St. Mary’s County who want cable service but cannot receive it. It is likely less than one percent of the total population, but for those individuals, it is a big problem. The county knows where most of those residents live and the government is actively working on various solutions. Two novel ideas were proposed through our RFP process that might solve multiple problems.

The first is from Talkie Communications. Talkie is a Chesterton-based CAP that recently (December 2020) won the Rural Digital Opportunity Fund (RDOF) reverse auction from the FCC to build new broadband service to underserved areas of Maryland, including St. Mary’s County. Talkie received a commitment of \$57 million in federal grant money, of which \$851,000 is dedicated for St. Mary’s County. The program’s goal is to provide services to certain underserved areas identified by the FCC as lacking adequate broadband coverage, identified as the brightly colored locations in Figure 10 below (provided by Talkie).

According to terms of the FCC auction, Talkie must initiate service to those locations within established timeframes. So even if St. Mary’s County decides to do nothing further for broadband, Talkie has federal funds to provide services to various locations within the community. However, the county could engage Talkie to possibly accelerate or expand Talkie’s grant-related deployment plans, placing St. Mary’s County leadership closer to the front-line decision-makers to optimize positive impacts. Note that the FCC announcement selecting Talkie occurred just a few weeks ago, so due diligence is required.

Figure 10: Talkie Communications FCC Expansion Commitments: Source- Talkie Communications



The other intriguing option detailed in our RFP results is from Telecom Capital Group (TCG), a Prince Frederick company that deploys wireless infrastructure in southern Maryland. In their proposal, TCG lays out a framework for improving both household connectivity, and wireless coverage by developing up to 15 new “make-ready” sites for new cellphone towers in strategic locations throughout the county. These towers would help fill in the “dead-cell-zones” identified by citizens in the broadband surveys while delivering requisite infrastructure for 5G.

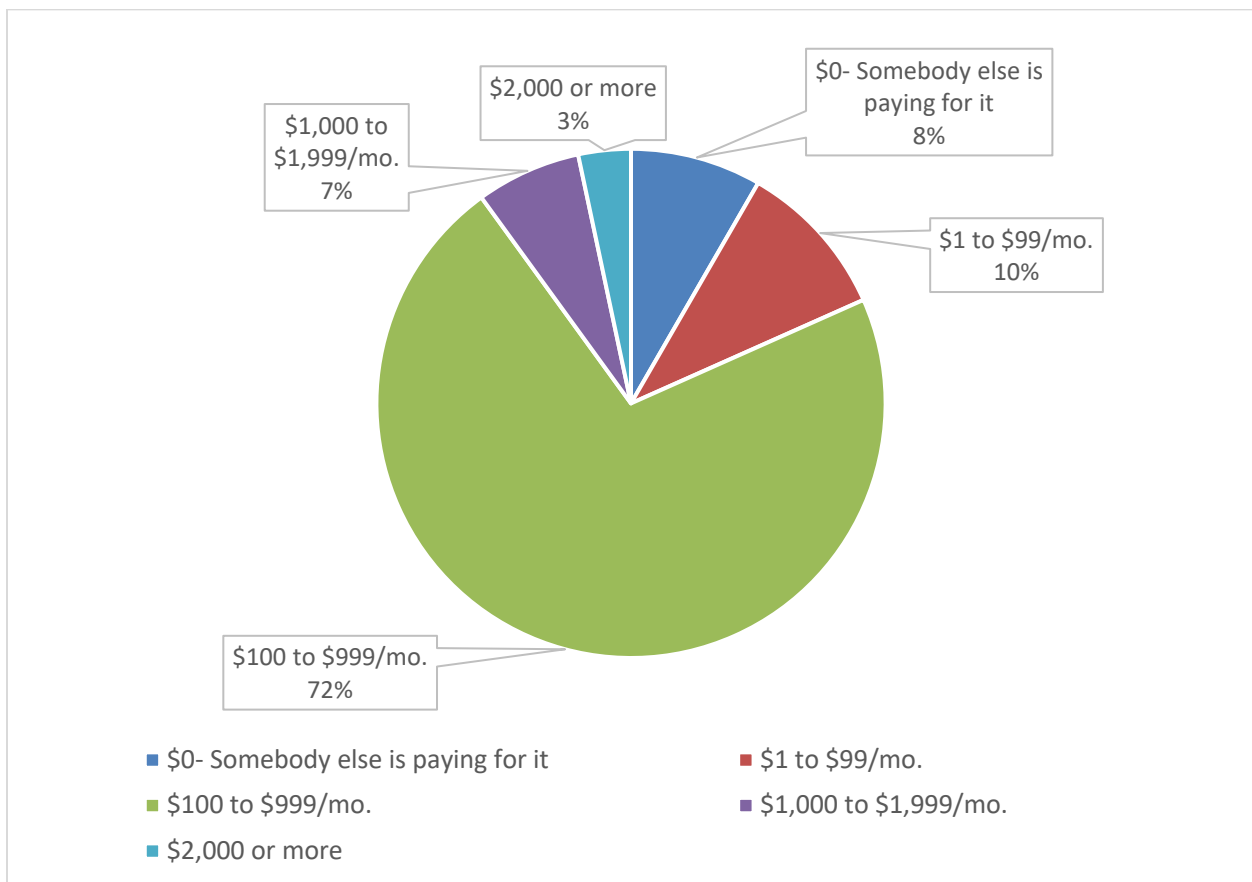
The TCG solution would push St. Mary’s County to the national forefront of 5G rollout, years ahead of the County’s projected timelines. With these make-ready sites, discounted rates, and active marketing, one or more national carriers could activate 5G service at these new tower locations sooner rather than later. The transformational benefits to St. Mary’s County would be first-in-nation rollout of 5G, fewer cellular coverage gaps, and more middle-mile fiber to the more remote sections of the county.

### Service Costs

When it comes to broadband costs, there can be a significant gap between perception and reality. This section briefly evaluates the price of telecom services in St. Mary’s County against regional benchmarks to determine whether employers and residents are getting a fair deal. Then, we compare that analysis to survey sentiment to explore the true nature of the county’s broadband cost issues.

According to our November 2020 Employer Broadband Survey most employers in St. Mary’s County (72 percent) pay between \$100 and \$999 a month (72 percent) for Internet service (see Figure 11).

Figure 11: Average Broadband Costs for Employers: St. Mary’s County, Maryland



The average reported price is \$762 per month with a low of \$71 and a high of \$16,000. The high amount is for a very large user of enterprise services receiving services to dozens of locations.

### Enterprise Pricing

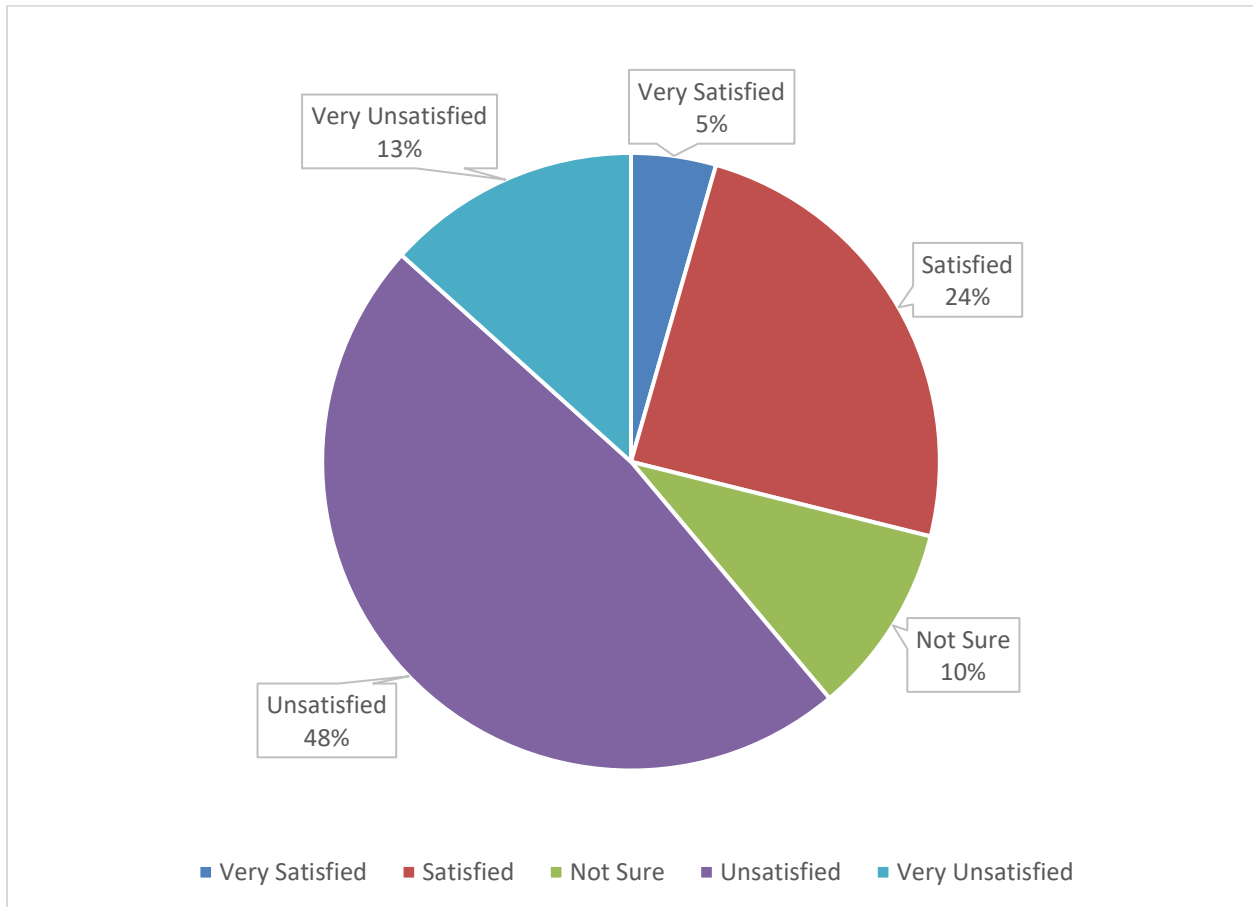
Our survey indicates, enterprise costs are in line with regional norms. The high amount of \$16,000 per month is for a very large user of enterprise services that provides services to dozens of locations. The RFP responses we received offer Ethernet Internet access at variable prices ranging from around \$1,300 per month for 1 Gbps, to \$5,700 per month for 10 Gbps. These prices are well within the range of industry standards, and at the low end of regional norms. Nothing out of the ordinary is showing up in the observed data about the costs of enterprise services in St. Mary's County.

### Small Business Pricing

The same seems to be true with small business access. The RFP shows new business class cable Internet ranging from about \$80 per month to just under \$300 per month for different terms and bandwidth amounts. These prices are consistent with reported prices in the Employer Broadband Survey for similar services and regional norms. These cable Internet prices are not the cheapest around, nor are they the most expensive. They are typical for the class of service and the region.

Although it seems that enterprise and small business pricing is standard in St. Mary's County, employers still report a high degree of dissatisfaction with the cost of their service (see Figure 12).

Figure 12: Broadband Price Satisfaction among Employers: St. Mary's County



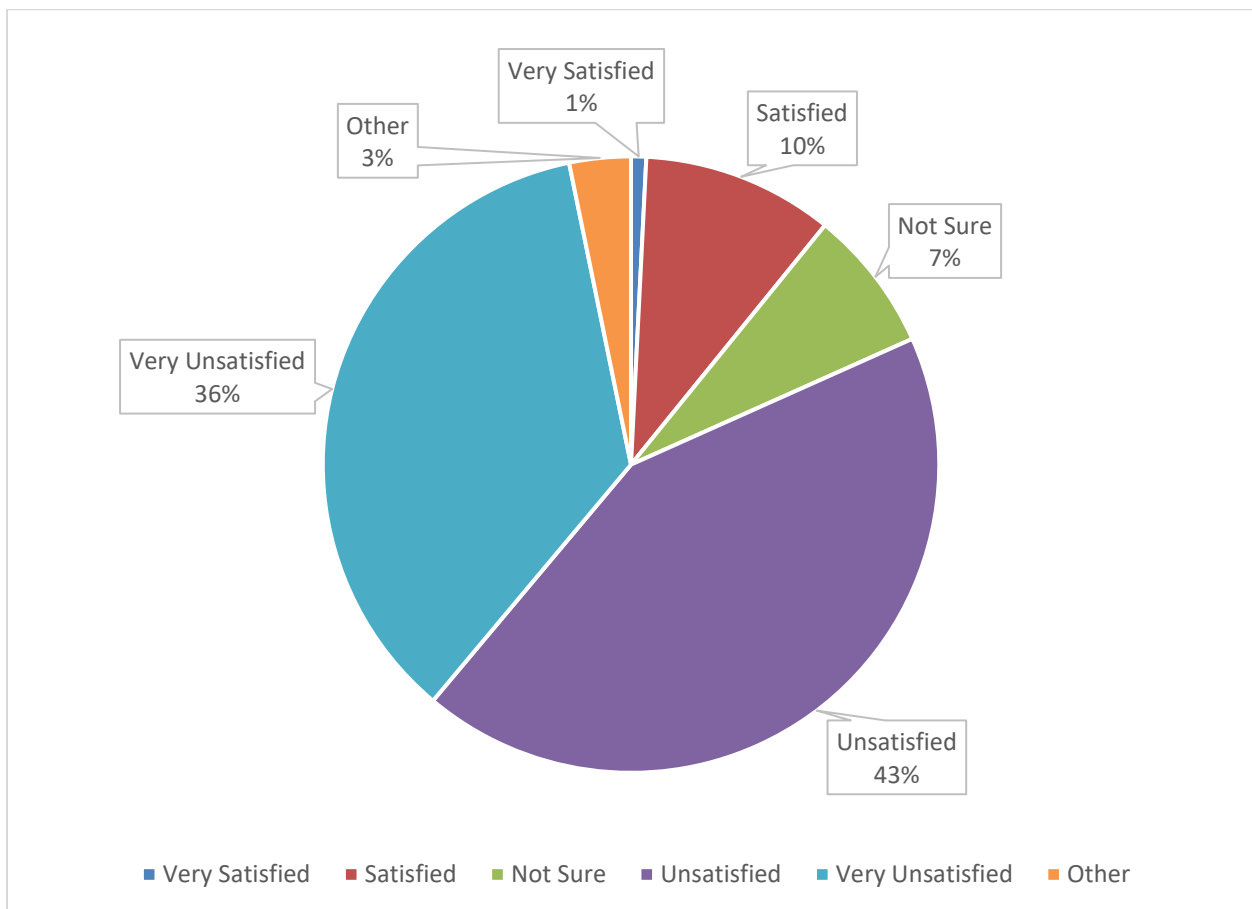
According to the Employer Broadband Survey, about 60 percent of employers say they are dissatisfied with the price they pay for broadband services, compared to only 29 percent who say they are satisfied.

### Residential Pricing

A similar but more intense dynamic appears in the analysis of residential pricing. Almost all household customers (94 percent) say they are paying less than \$200 per month for their broadband service, with an average reported price of \$93. That price-point is about right for cable modem pricing nationwide.

Yet, when asked whether they are satisfied with the price they are paying, almost 79 percent said they are dissatisfied with what they are paying, with 36 percent saying they are “very unsatisfied” with the price they pay (see Figure 13).

Figure 13: Broadband Price Satisfaction among Households: St. Mary’s County



There are several things that can explain the disconnect. First, most of the pricing complaints relate to cable modems. People are not complaining nearly as much about their cellular service or their Ethernet connections. The pricing complaint is an issue with cable.

One issue with cable pricing is people do not know what they are actually paying for internet services, because their Internet is bundled with television and voice.

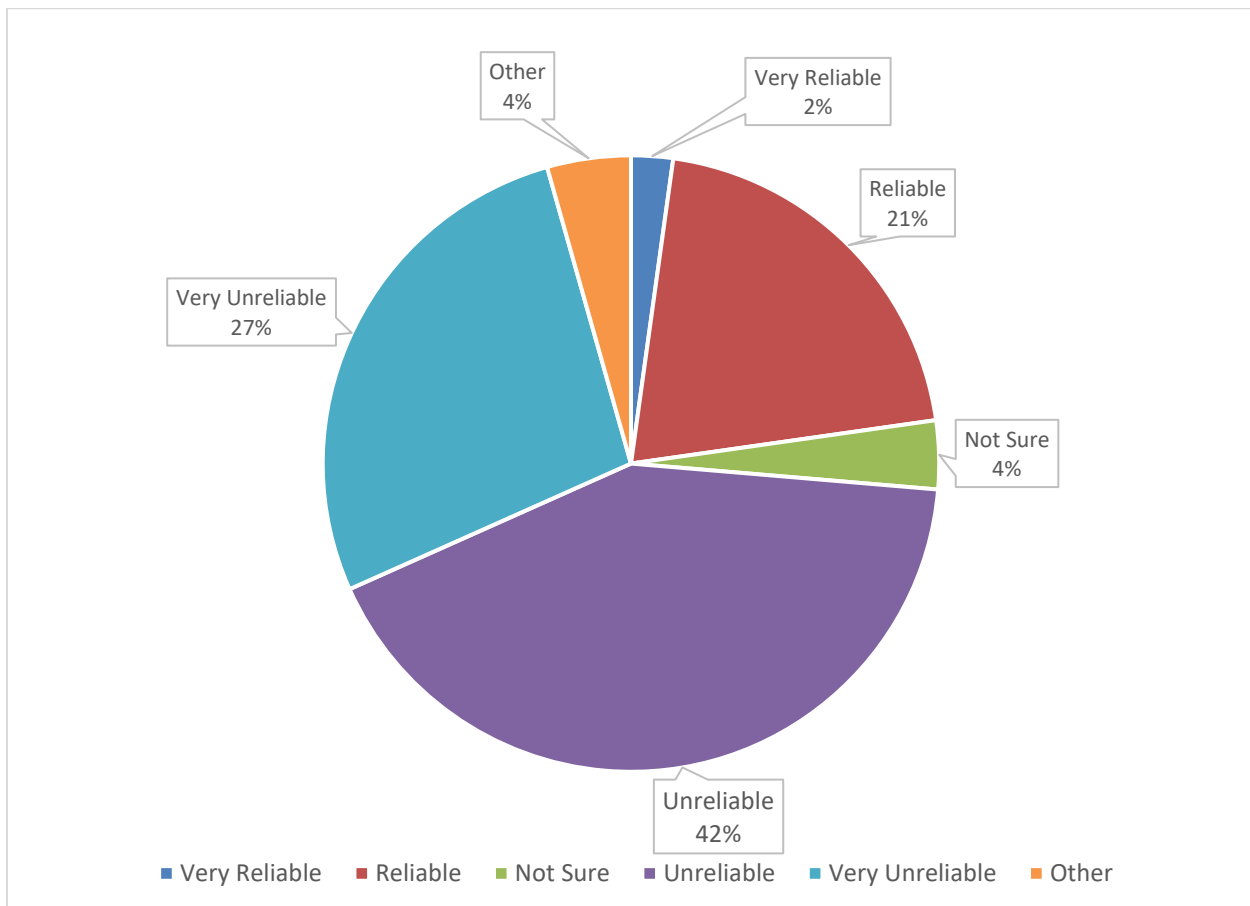
Another issue with cable pricing is cable companies advertise far more bandwidth than they deliver to users under normal circumstances. Cable companies are not necessarily misleading people; the fine

print always refers to “best effort” and “maximum speeds.” But savvy users are more frequently appreciating that cable companies continue to sell faster speeds than they deliver to customers.

This cable user-experience is expressed in profoundly bad reliability ratings. According to our Household Broadband Survey, 69 percent of respondents said their service was unreliable, and 70 percent said they were unsatisfied with the speed of their connection (see Figure 14).

Employers were a bit more forgiving, but 48 percent of respondents to the Employer Broadband survey still said that their service was unreliable. These employers also indicated their speeds were too slow. The majority of responding employers (51 percent) said they were dissatisfied with their connection bandwidth.

Figure 14: Broadband Reliability among Households: St. Mary’s County



These poor perceptions are likely exacerbated by the widespread notion that better options are not available in St. Mary’s County. Except for the resourceful few who buy satellite service, few people or employers have the time, resources, or the knowledge to shop around for alternative broadband solutions. Therefore, they believe the cable company is their only option, which makes them feel trapped.

One respondent wrote in the comments, “I had better Internet options in Afghanistan.” That experience may not be exactly true, but the sentiment is prevalent throughout these surveys. Real or perceived, too many people in St. Mary’s County believe they are getting ripped off by their broadband provider.



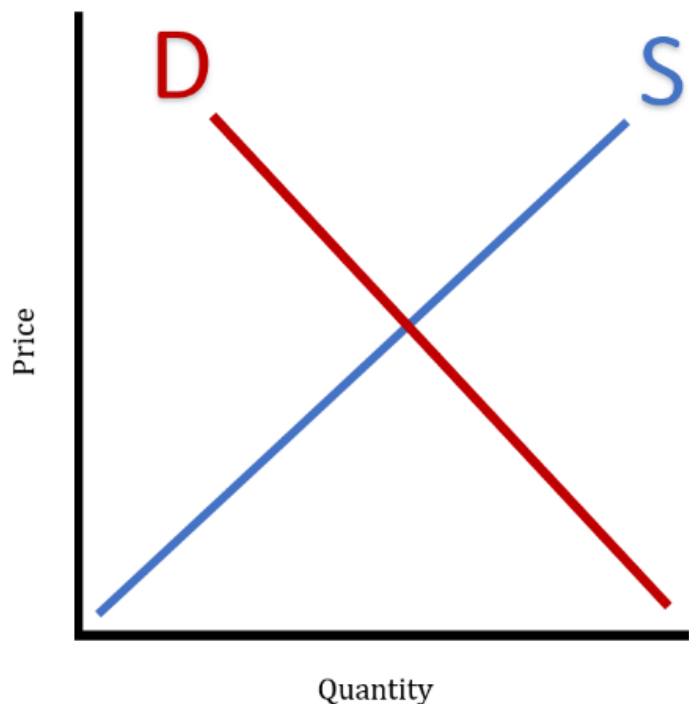
## Conclusions about Supply

- The competitive environment in St. Mary's County is adequate but can be improved:
  - The local phone company has extensive facilities but is disengaged from retail.
  - The two local cable companies are well-established and dominate the market.
  - Competitive telecom companies are poised to gain market share w/owned & shared assets.
  - Cellular service is mixed with decent coverage overall but with notable dead-cell-zones.
  - Other wireless providers, especially satellite, have a greater than typical share of market.
- County-wide service availability is near-ubiquitous, but the gaps are loudly noted:
  - The wholesale market has adequate fiber available to service existing requirements.
  - Enterprise services are available from multiple providers almost everywhere.
  - Small business access is okay with notable deficiencies in certain areas.
  - Residential coverage is better than people appreciate, but some places lack viable options.
- There is a broad divide between perception and reality when it comes to broadband pricing:
  - The cost for enterprise service is reasonable, and most big businesses agree.
  - The cost for small business access is reasonable, but most businesses disagree.
  - The cost for household broadband is reasonable, but residents strongly disagree.

## Telecom Demand

The supply of advanced telecommunications services in St. Mary's County is only half the equation. Policymakers must understand factors affecting demand to craft the most efficient solutions. This section of the assessment evaluates key aspects of telecom demand in St. Mary's County. This section looks at how different kinds of buyers approach their broadband services and looks for trends and anomalies. We also examine how different industries use broadband today and what they might require in the future. Finally, we look at some emerging dynamics like the impact of coronavirus, non-telecom barriers, and demographic factors that might be affecting the overall environment. This demand analysis helps determine the market equilibrium to identify which combinations of supply and demand can best deliver positive change.

Figure 15: Rural Telecom Supply and Demand Curve





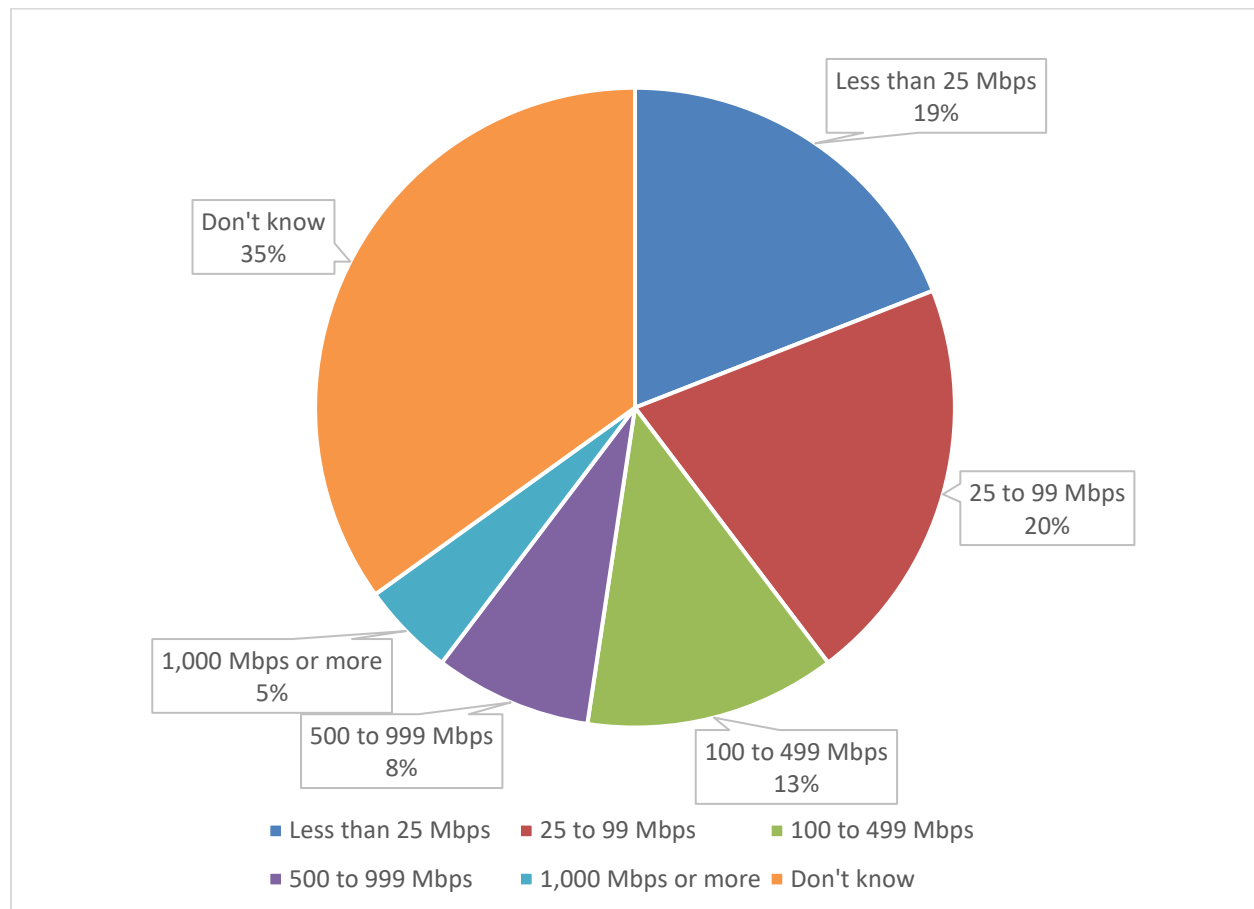
## Demand by Type of Buyer

From one place to another, the types of consumers driving the marketplace can vary considerably, and so do the behaviors of those consumers. For example, a community with a strong information technology base will probably have more enterprise demand than an industrial community. However, if the industrial hub generates a large population of highly skilled workers, they may be avid consumers of broadband for their personal use and drive high levels of personal demand. In St. Mary's County, the survey results combined with demographic comparisons provide an insightful look into how St. Mary's consumers are buying broadband, and what that means for the market.<sup>1</sup>

## Enterprise Demand

Simply put, in St. Mary's County, there are not that many big organizations to drive demand. Among Employer Broadband Survey respondents, the average number of local offices is two (the median is one), and the average number of employees is 81 (the median is 11). Since small organizations tend to need less bandwidth, it is no surprise that overall bandwidth demands are relatively low (See Figure 16). Among survey respondents, the average employer bandwidth was 366 Mbps with a median of 95 Mbps.

Figure 16: Estimated Employer Bandwidth Amounts: St. Mary's County



<sup>1</sup> Note that any reference in this section to demographic data comes from the most recently available data from United States Census "QuickFacts" worksheets about St. Mary's County and similar QuickFacts for Maryland and the United States. Access: <https://www.census.gov/quickfacts/fact/table/stmaryscountymaryland/HCN010212>

In addition, it is notable how many employers did not know the bandwidth of their primary connection (35 percent). For such an important commodity to almost all employers, broadband remains misunderstood and mysterious, even among many institutional users.

*FOR AN IMPORTANT COMMODITY TO ALMOST ALL EMPLOYERS, BROADBAND REMAINS MISUNDERSTOOD AND MYSTERIOUS EVEN AMONG MANY INSTITUTIONAL USERS.*

Among enterprise users, the school district, which has about 30 locations around the county, has the highest bandwidth compared to any other survey respondent. The Navy base, which did not complete the survey, probably consumes more. MedStar St. Mary's Hospital is another large consumer of bandwidth, as is the County government, and several big defense contractors. But that is about it for enterprise users of bandwidth in St. Mary's County.

Complicating matters, many of these enterprise users buy their bandwidth from non-local providers. For example, the Navy base undoubtedly uses a Department of Defense contract with the Defense Information Service Agency (DISA) and does not consider local vendors. The school district uses networkMaryland, the state's network for public agencies. And the big defense contractors likely have corporate contracts that connect their worldwide offices without considering local options. While there is nothing wrong with enterprise users buying bandwidth from non-local providers, when the largest users do not buy broadband locally, the pool of local aggregate demand is reduced.

As a result of these factors, in St. Mary's County, enterprise users are not a big factor in local broadband demand. Therefore, without convincing enterprise users to buy locally or adding new enterprise buyers to the mix, enterprise users are not likely to add to the pool of local aggregate demand going forward.

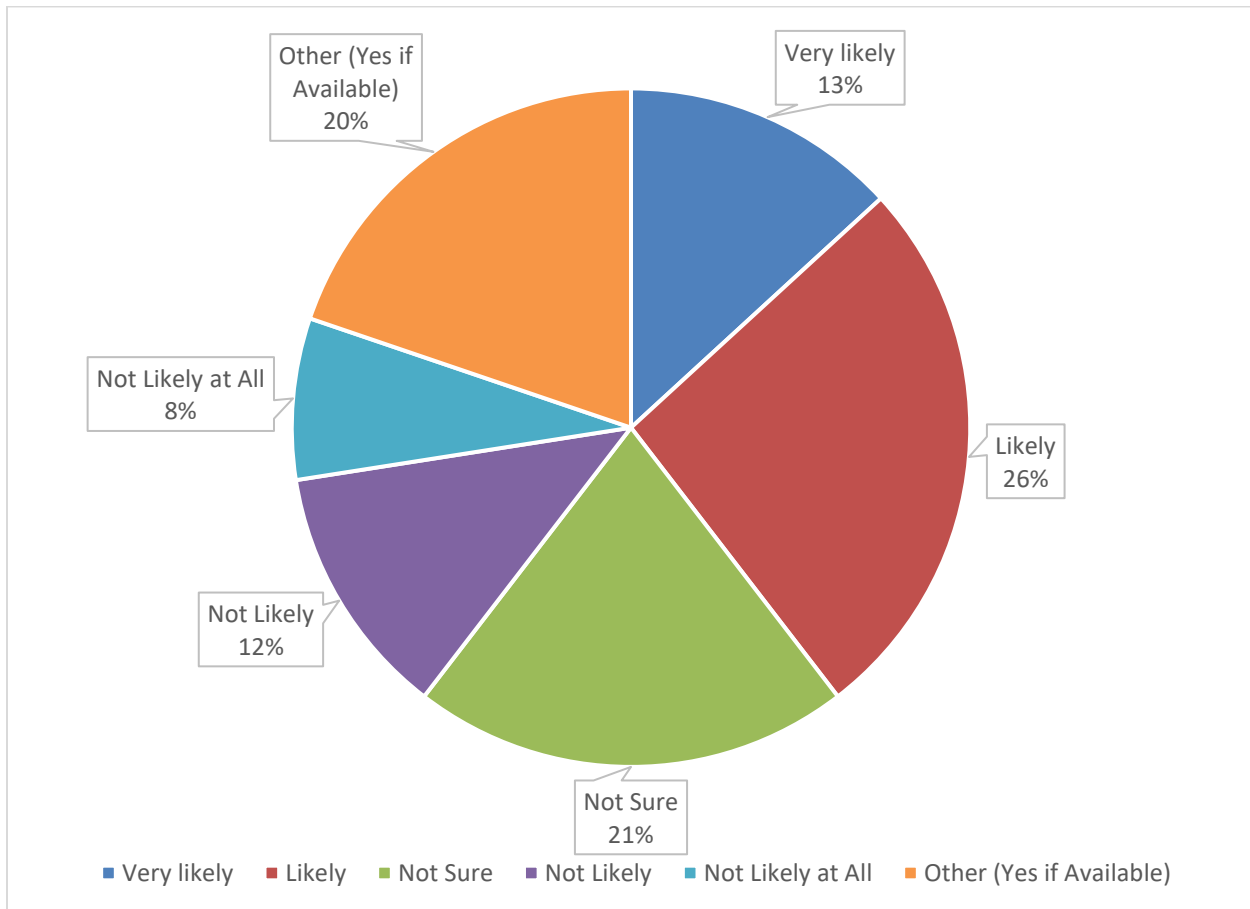
#### Small Business Demand

Among small organizations in St. Mary's County, demand for broadband seems typical. As previously noted, the overwhelming majority of small organizations (defined here as 100 or less employees) use cable modems for service (72 percent). Only ten small organizations (12 percent) report using Ethernet or dedicated telecom connections.

Generally, business cable modems do not move markets. Unless the quantity of buyers is very large, the aggregate demand is rarely enough to generate interest by suppliers to either make speculative investments or build-out targeted infrastructure. Adding ten more cable modem customers at \$100 a month to a supplier's revenue stream does not justify million-dollar investments. However, adding ten more Ethernet connections at \$1,300 per month can be transformational. In fact, aggregating just a few business class Ethernet or dedicated telecom circuits can drive infrastructure deployment in meaningful ways. The RFP demonstrated that high-capacity services are both available and affordable to businesses countywide. Therefore, it is significant to report, if more small organizations would purchase Ethernet services, the positive impacts in St. Mary's County could be significant.

Figure 17 shows the likelihood that St. Mary's County employers of all sizes will increase their bandwidth over the next two years. The responses are a mixed bag. More respondents say they will upgrade than not, but others are unsure. If more small businesses decided to upgrade their connections, especially to business class services like Ethernet access, more providers might be willing to invest in the county infrastructure.

Figure 17: Likelihood of Upgrade (Next Two Years): St. Mary's Employers



### Residential Demand

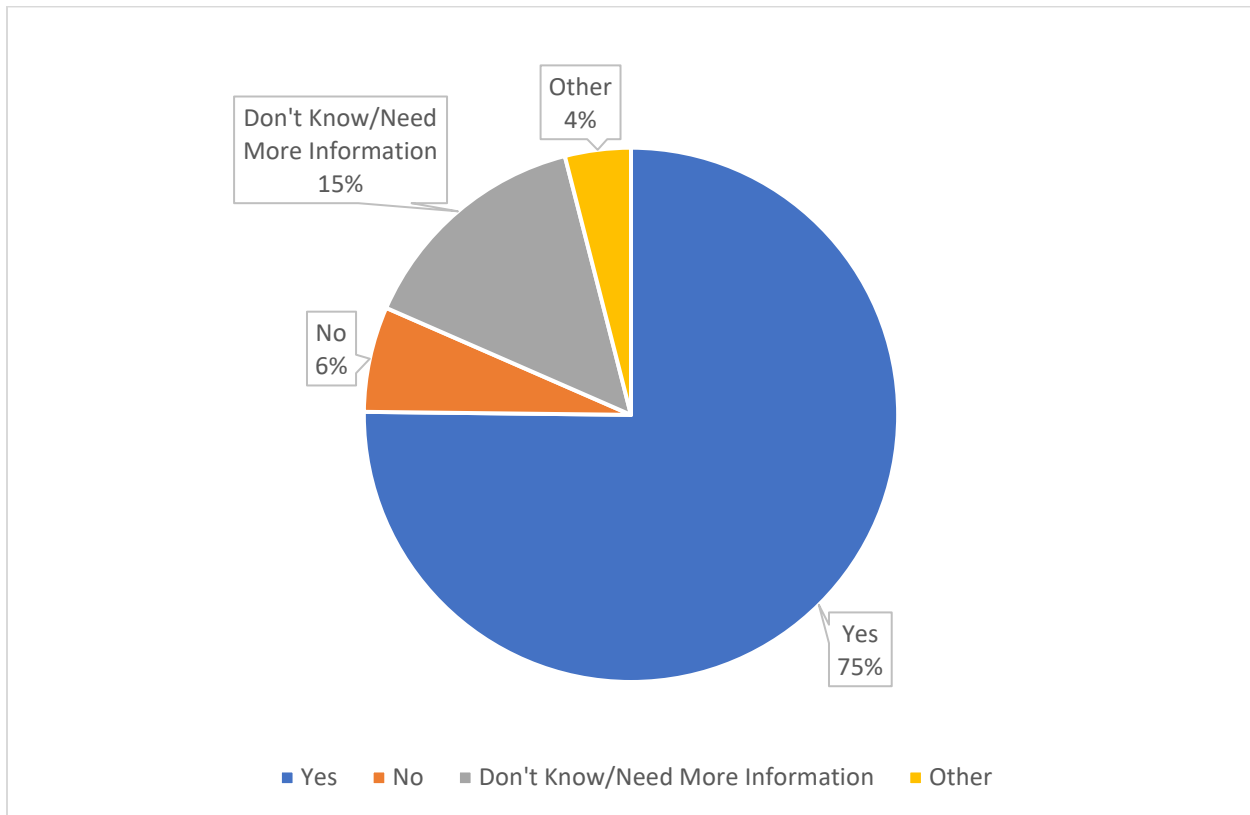
In St. Mary's County, it seems clear that residential demand is driving the market. With 40,000 households and a median income 40 percent higher than the rest of the nation, St. Mary's County presents a good investment for residential broadband services. But this finding comes with limitations.

If all 40,000 households buy cable modems for \$100 a month, that generates \$48 million a year- a big sum of money. But if 4,000 businesses buy Ethernet service for \$1,300 a month, that generates \$62 million a year- more money for much less work. This is why providers are so focused on deploying to places where: a) there are lots of household customers in a densely populated area; or b) a good base of businesses buying and consuming large amounts of bandwidth. St. Mary's County has neither.

That said, the citizens of St. Mary's County seem receptive to finding creative solutions to their broadband problems. For example, in the Household Broadband Survey, respondents identified 3,745 dead-cell-zones that could use better service. They expressed overwhelming interest in getting involved with a community-wide effort to get 5G wireless coverage sooner (See Figure 18).

Indeed, the simple fact that 2,653 people responded to the Household Broadband Survey is remarkable. If each one of those people represents a household, that means seven percent of St. Mary's County population is represented by these survey results. By any standard, this response is a high level of engagement.

Figure 18: Household interest in a Community-Wide 5G Acceleration Effort: St. Mary's County



### Industry Dynamics

Generally, the size of an operation provides a good indication of the bandwidth requirements- to wit, the larger the entity, the more bandwidth it needs. This result is driven by the math. To deliver reasonable broadband across the enterprise, organizations need to divide their total available bandwidth by the number of users, to determine a reasonable amount for simultaneous consumption. On average, respondents to the Employer Survey consume 17.8 Mbps per employee.

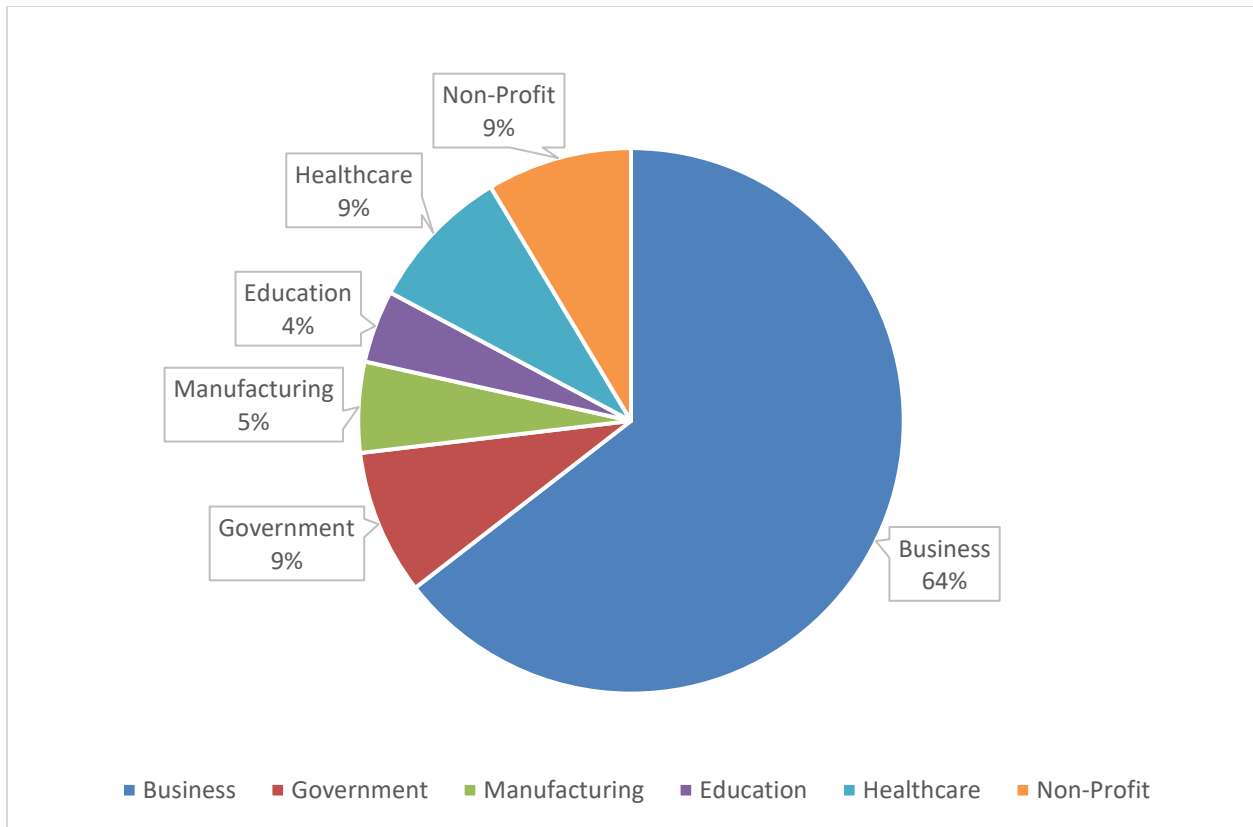
Bandwidth demands do vary significantly by industry, and some industries need more broadband than others. In fact, bandwidth is driven by applications, or apps as they are commonly called. Different industries use different apps, and different apps require different amounts of bandwidth. This is important for broadband demand, because changing the quantity and type of apps can change aggregate demand. This section looks at the differences in broadband demand among the most important types of industries in St. Mary's County.

### Government

With its proximity to state and national government centers, the government sector is important to St. Mary's County. Locally, there is a good mix of local, state, and federal government organizations, and they tend to have relatively high bandwidth requirements, due to their size. However, in St. Mary's County, government organizations seem to be using less bandwidth than expected. Among survey respondents, government employees use 14.8 Mbps of bandwidth per employee, slightly less than the average of other survey respondents. While government users are very important to the broadband marketplace, perhaps they could be investing more in their own broadband networks. If local and

county governments purchased more broadband, they would simultaneously better serve their employees and constituents while also driving-up, the County's overall aggregate demand.

Figure 19: Respondents to the St. Mary's Employer Broadband Survey, by Type of Industry



### Education

In most communities, the education sector is among the biggest users of broadband service. Teaching and learning are inherently information intensive, and schools and universities have been using digital tools for years. The coronavirus outbreak has only accelerated the push to online instruction, which is now standard practice in K-12 and higher education.

Within this project, a challenge for demand-aggregation is all the K-12 demand is locked into a contract with the state network. In nearby states like New Jersey and Pennsylvania, local school districts combined their purchasing power in regional groups, conducted competitive procurements, and awarded in bulk to the most cost-effective providers. Often, they coordinated with other regional users to create an even bigger pool of purchasing power. This helped local providers build local infrastructure to help the entire community.

In St. Mary's County, the schools are all connected to networkMaryland, so they cannot participate in local aggregation efforts. This fact may provide a good deal for the schools, but it removes 30 locations and a high bandwidth enterprise user from the pool of local demand. Since networkMaryland is almost exclusively devoted to serving public organizations, this arrangement does very little to help private enterprise users access better broadband in St. Mary's County. If local schools added their locations and bandwidth needs to a countywide RFP for broadband, the positive impacts could be significant.

## Healthcare

Only a few healthcare providers responded to the Employer Survey, but the results capture the largest institutions in the County: the hospital and the nursing home. According to the survey, the major facilities connect with Ethernet fiber and the smaller offices and clinics mostly use cable modems. At least one local doctor's office connects with satellite broadband, which indicates lack of accessibility.

It seems counterintuitive, but healthcare organizations are often underinvested in broadband access. This fact seems to be a national trend not limited to St. Mary's County. In fact, despite the high-tech equipment, electronic records, and bandwidth-intensive applications such as imaging and telemedicine required for modern medicine, many healthcare organizations are downright old-fashioned with it comes to I.T. networking and broadband consumption.

Because enterprise broadband used to be so expensive, there seems to be an industry-wide propensity to conserve bandwidth instead of consuming it. With broadband solutions now abundant, accessible, and affordable, implementing new systems that maximize cloud computing and information exchange could make the entire industry more effective and efficient. While nothing in the survey suggests a specific problem in St. Mary's County, healthcare organizations in general could have a big impact on regional broadband demand if they ever decided to collectively upgrade.

## Business Demand

Almost 70 percent of respondents to the St. Mary's County Employer Broadband Survey represent the business community, with about five percent classifying themselves as manufacturing. In St. Mary's County, businesses tend to be small, which drives down their aggregate bandwidth need for broadband. But these employers also tend to use more bandwidth per employee than other types of organizations, consuming 25 percent more than the county average.

If more businesses can migrate from cable modems to higher quality business services, like Ethernet services, then more telecom providers might be interested in targeting the local market and making new investments. Perhaps the most important thing that an employer can do to improve its own broadband service while also increasing countywide demand is to consider purchasing one of the Ethernet Internet offerings presented in the St. Mary's County Broadband Assessment RFP.

## Not-for-Profit

Eight different non-profit organizations responded to the Employer Broadband Survey. Most are very small, several are volunteer-oriented, and a few operate from private residences. But they all need broadband to accomplish their missions. As is typical of many non-profits nationwide, those in St. Mary's County have low levels of bandwidth and affordable connections. This fact is probably out of budgetary necessity, not because of poor broadband options. While non-profit organizations are not significant drivers of broadband demand, they are important consumers, nonetheless.

*PERHAPS THE MOST  
IMPORTANT THING THAT A  
PRIVATE BUSINESS CAN DO TO  
IMPROVE ITS OWN  
BROADBAND SERVICE AND  
INCREASE COUNTYWIDE  
DEMAND IS TO CONSIDER THE  
ETHERNET INTERNET  
OFFERINGS PRESENTED IN THE  
ST. MARY'S COUNTY  
BROADBAND ASSESSMENT RFP.*

## Residential Dynamics

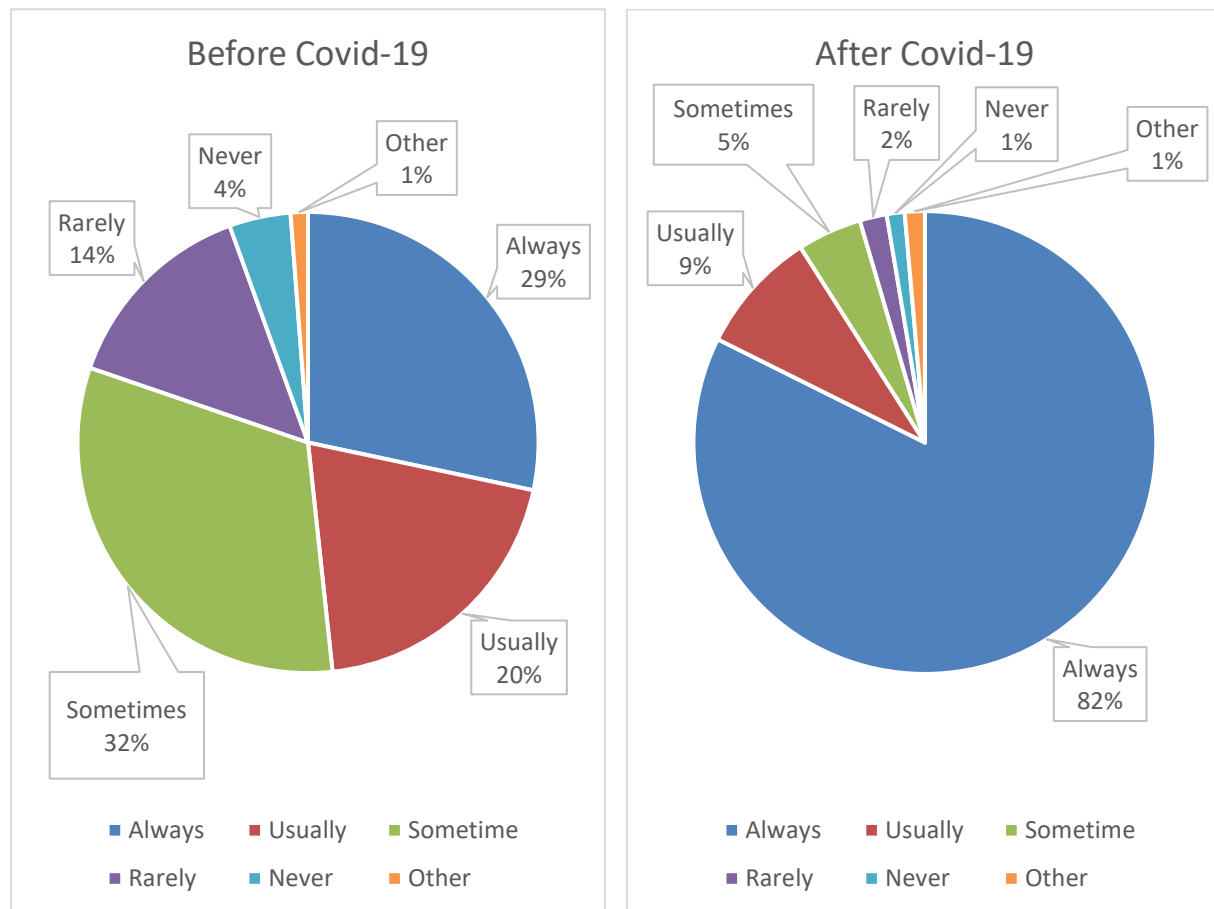
Industrial demand for broadband service is mostly influenced by the size of the organizations, the type of organization and the applications used at work. Household demand is primarily influenced by the number of household connections. The previous analysis of residential demand already acknowledged the 40,000 households that comprise the residential broadband market. This section examines two other factors that contribute to residential demand; to wit, lifestyle issues and demographic factors, plus the non-telecom barriers to increased broadband adoption.

## Lifestyle Issues

A multitude of lifestyle issues affect residential broadband demand. Some people like to play video games; others do not. Some people are social networking maniacs; other users are not involved at all. Some people love to binge watch streaming videos; other users would rather watch basic television. While these factors are important in determining whether somebody wants a fast broadband connection, these factors have one thing in common: they are preferences that do not change quickly.

However, from time to time, lifestyle factors can change quickly, as the entire world has experienced with the outbreak of coronavirus. Almost at once, people all over the country were forced to work, learn, and play from home, instead of office, school, or entertainment venue. Figure 20 depicts just how substantial and rapid the shift to homebound work and learning has been.

Figure 20: Work & Learn at Home: Before & After Covid-19: Household Broadband Survey



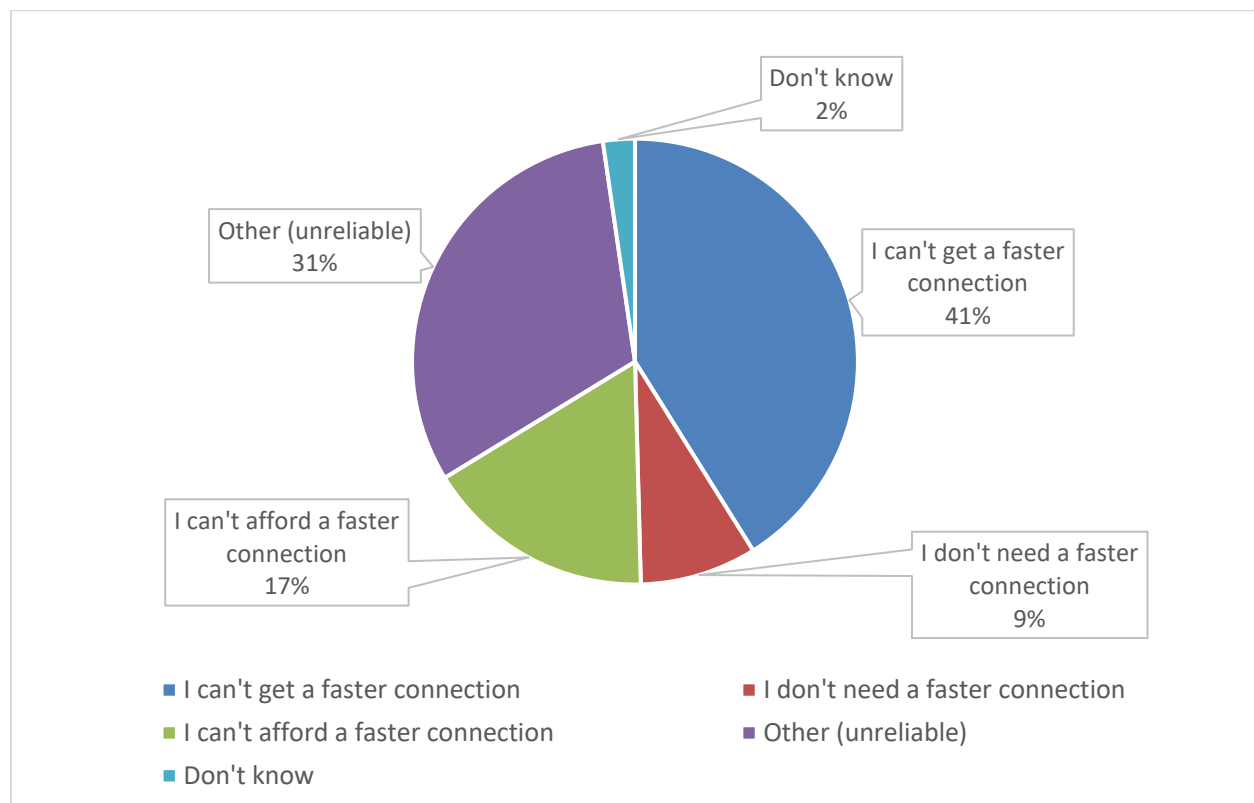
Prior to coronavirus, 29 percent of Household Survey respondents said they always work or learn from home. Instantly after the virus hit, that number skyrocketed to 82 percent. If this adjustment is representative of the larger population, about 30,000 more residents of St. Mary's County are learning and working from home today compared to March 2020. That level of change is a staggering number, about 31 percent of the county's population.

In St. Mary's County and the rest of the nation, the infrastructure was not built to handle that level of demand; but it is a testament to the flexibility, resiliency, and competency of the local providers that their networks functioned so well with that many new users and applications. Nor was the existing broadband infrastructure and its services designed as a mission-critical, essential service from the household for work, school, and play. With this lightning-fast change, it is no wonder that residents feel trapped, providers consider themselves under fire, and policymakers seek new solutions.

### Demographic Factors

Social scientists like to study how broadband demand is affected by demographics like age, income, race, education, and a multitude of other factors that impact rates of adoption. These factors can have a significant impact on whether people upgrade their broadband now, or just wait for the future. Figure 21 suggests that the factors affecting St. Mary's County are more than just demographic.

Figure 21: Barriers to Upgrading Broadband Service: St. Mary's County Households



By examining St. Mary's County Census data, we can determine that compared to the rest of the nation, St. Mary's County residents are slightly younger, significantly wealthier, a little more diverse, with about the same level of educational attainment. These factors suggest that St. Mary's County should have an above average demand for broadband services, which the survey results confirm is probably true.



Despite these favorable demographics in St. Mary’s County that tend to spur broadband demand, Figure 21 shows that many households report significant barriers to actually purchasing more bandwidth.

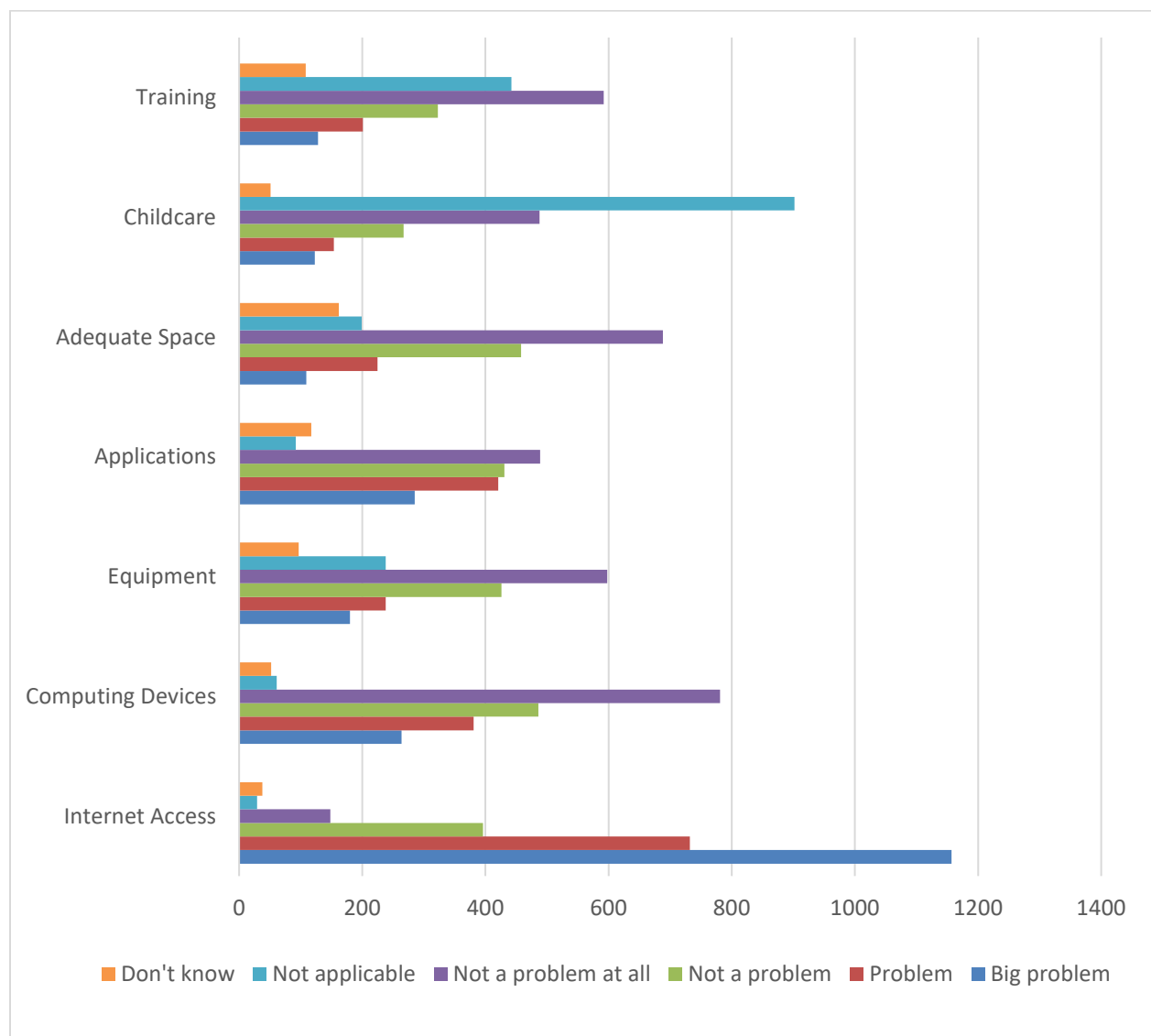
Forty-one percent of respondents said they cannot get a faster connection and 31 percent said their service is too unreliable to upgrade. Only 17 percent said they could not afford a faster connection, and still fewer (9 percent) said they do not need one. These responses are evidence of a bona fide economic shortage. In St. Mary’s County demand is outstripping supply and the market is not being satisfied.

### Non-Telecom Barriers

If policymakers are still unconvinced that inferior broadband access is impacting life in St. Mary’s County, consider Figure 22. The survey question asked household respondents to indicate the most important barriers to effective work and learning at home in a post-coronavirus environment.

Broadband was overwhelmingly the biggest barrier, with 71 percent identifying it as a problem, which results was more than the next three choices, combined (computing devices, equipment, and apps).

Figure 22: Barriers to Effective Work & Learning at Home: St. Mary’s Household Broadband Survey



## Conclusions about Demand

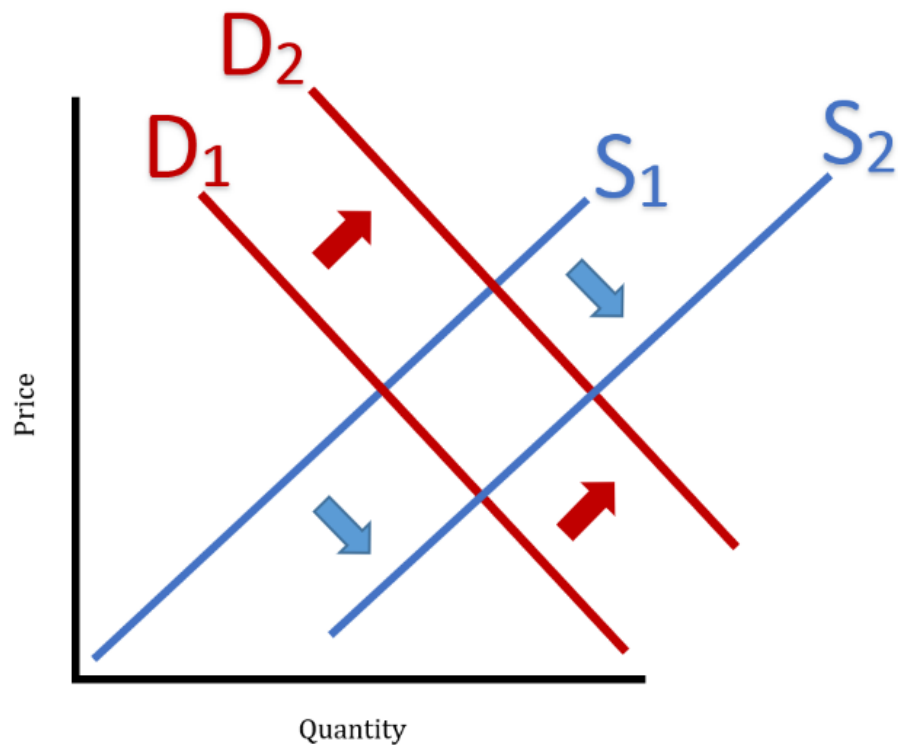
- The demand for broadband can be stimulated by policy changes at all levels:
  - Enterprise demand is non-local and does not impact local demand or infrastructures.
  - Small business demand can be improved through purchasing of upgraded services.
  - Residential demand can be encouraged with organized efforts to improve access.
- Some sectors of the economy are not doing their part to address the local broadband problem:
  - Government and healthcare users are underinvested in broadband access.
  - Education users do not use their considerable purchasing power to help local users.
  - Healthcare users are not optimizing high-speed telecommunications services.
  - Business demand is strong but limited by the relatively small size of most local companies.
  - Non-profit organizations are just buying what they can afford.
- Unusual dynamics are upending demand and presenting unique challenges and opportunities:
  - The move to at-home work and learning has been extremely disruptive for many residents.
  - Demographics are less important than attitudes for trends in broadband demand.
  - For thousands of St. Mary's households, broadband is now a critical, essential service.

## Recommendations

This assessment contains a large amount of information and analysis about the supply and demand of broadband services for St. Mary's County. Based on what is known, these recommendations are designed to be practical and achievable within a reasonable time. The technical concept we propose is to simultaneously boost the level of supply (from S1 to S2) and demand (from D1 to D2) to generate more broadband access at the same or better price for all different kinds of

service (Refer to Figure 23). Put simply, we want to help participating organizations and households buy more broadband, at the same or a reduced price than they are presently paying.

Figure 23: Increasing the Level of Broadband Supply & Demand



## Top Ten Action Items

1. **Distribute RFP results to local employers.** Right now, St. Mary's County employers can purchase affordable ultra-high-speed access from Xtel Communications with no new infrastructure required. And Atlantic Broadband offered gigabit cable modems for all 50 employers in the RFP. The County should make sure employers know their options at speeds from 100 Mbps to 10 Gbps.
2. **Extend residential and small business cabling initiatives.** St. Mary's County should keep using DHCD grants and other supplemental funding sources to expand the existing cable plant to new neighborhoods and households. We believe the county should consider using a competitive process to collect the best proposals before selecting providers for funding, if practical.
3. **Evaluate the cellular tower make-ready proposal from TCG.** The proposal appears sound, its financials are reasonable, and its solutions are creative. Due diligence is warranted to determine whether this proposal can accelerate 5G and remediate cellular coverage gaps as described.
4. **Assist Talkie Fiber with its deployment.** County leadership should meet with Talkie Fiber to optimize the impact of the FCC grant, accelerate deployment, and find ways to leverage the results.
5. **Help municipalities and non-profits improve their connectivity.** The county should continue sharing its considerable broadband deployment and applications experience with other local government and non-profit organizations to spur regional demand and improve public services.
6. **Approach enterprise users about local telecom aggregation.** Most of the large consumers of broadband in St. Mary's County seem locked-up in long-term contracts with non-local providers. Getting these organizations to work together in a competitive broadband procurement might improve their own access while helping the rest of the county too.
7. **Seek additional Covid-19 discounts from local telecom providers.** While local providers should be commended for offering special programs to facilitate at-home work and learning, cable providers in other markets deliver better models, pricing, and services. County leaders should meet with the local cable provider to discuss options for improving temporary Covid-19 related programming.
8. **Expand the County work/learn from home relief initiative.** St. Mary's County has already delivered a strong policy response to households that cannot get reasonable broadband for work and learning. These programs can be improved and expanded based on the new information in this report to meet the most urgent needs of households and employers.
9. **Keep engaging the community.** With almost 3,000 responses to the household and employer surveys, St. Mary's County has widespread awareness and engagement with stakeholders. We encourage the County to continue its outreach to share ideas and solutions and optimize the broadband initiatives the county supports.
10. **Keep marketing your broadband programs.** St. Mary's County is already doing more than most counties to improve its broadband access. If the county implements a few of these recommendations, it will have a model policy. St. Mary's County should continue telling its constituents what it is doing.