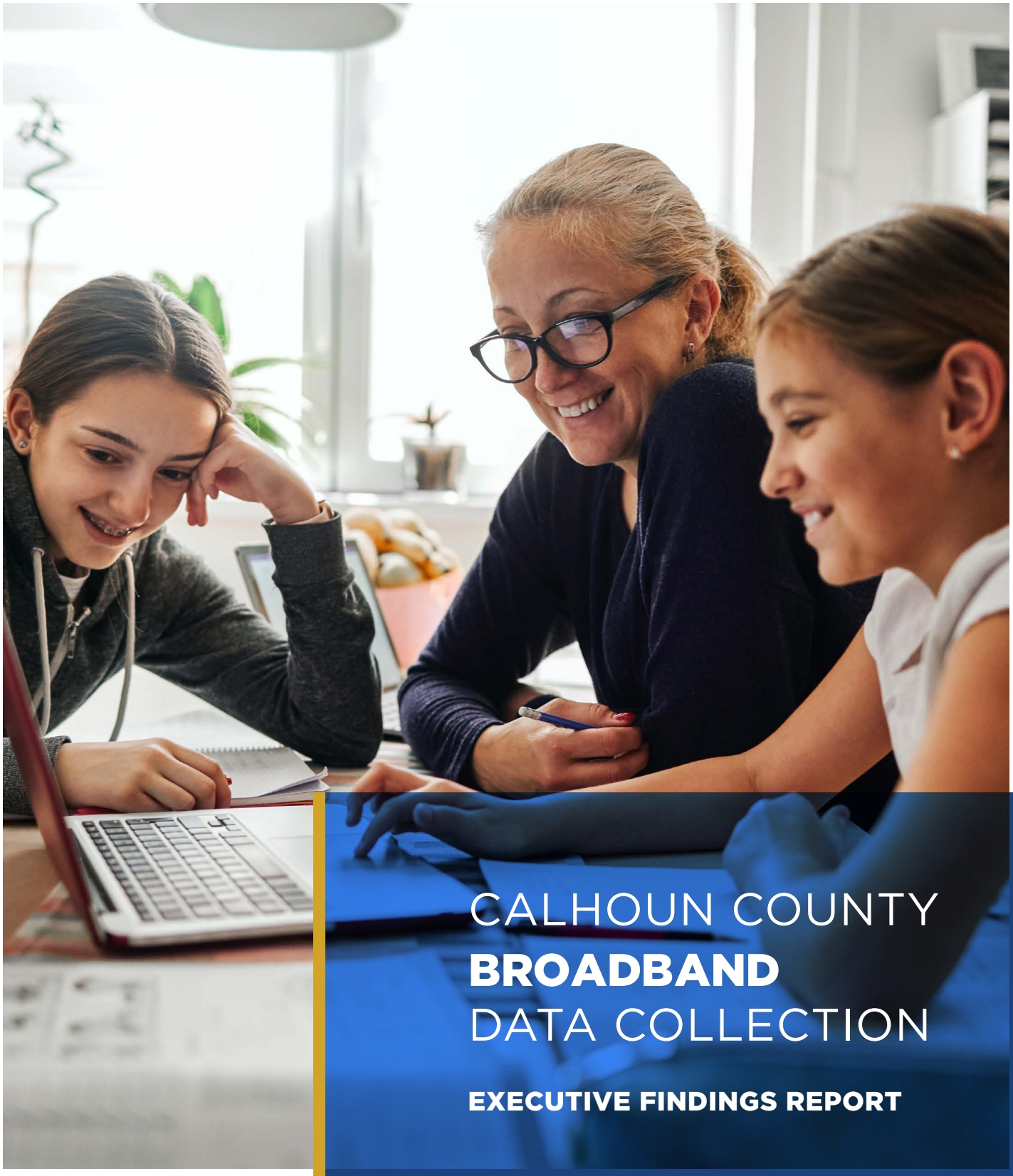
February, 2022



CALHOUN COUNTY **BROADBAND** DATA COLLECTION

EXECUTIVE FINDINGS REPORT

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THE MICHIGAN MOONSHOT™

Introduction

The genesis of Calhoun County's dynamic broadband modernization efforts began in 2020 at the Willard Library in Battle Creek. When community spaces suddenly shuttered as a result of COVID-19, many people relying on public broadband access throughout Calhoun County were left without service. Notably, the Willard Library closure illuminated that large numbers of families and individuals depended on public libraries for routine access. This problem became a catalyst for a grassroots-led initiative to enhance broadband access across Calhoun County.

Inconsistent service, access gaps, and unaffordable subscription fees impact economic prosperity and quality of life in Calhoun County, and throughout its cities, villages, and townships. These challenges were only exacerbated by the 2020 pandemic. As a result, a call to action for broadband modernization quickly gained grassroots momentum. Stakeholders from healthcare, Children and students up to age 18 education, higher education, public libraries, the private sector, and more raised an initial $40,000 to begin an exploratory broadband expansion initiative in the region. In May of 2021, 15 citizens and community leaders from all sectors of industry and public life--including a Michigan House Representative--formalized a broadband task force, choosing the umbrella of Calhoun County to unite their efforts.

Calhoun County's Broadband Task Force identified their first step toward broadband modernization was to quantify residents' experiences with broadband and the ways in which access, or lack of access, impacts quality of life. Calhoun County requested that Merit Network perform a citizen-driven survey and speed test mapping effort to grasp the scale of the County's broadband gap. The survey assesses access and adoption of digital technology within the county. At the end of the survey, respondents contributed speed test data to a countywide database to help Calhoun County measure broadband coverage (or lack thereof) across the county.

In addition to quantitative assessment and mapping, Calhoun County seeks to:

1. Understand the depth and breadth of underservice and the variability of speed and access across the county, focusing on digital redlining in urban areas
2. Understand how the local economy is harmed by inconsistent access in rural areas
3. Obtain insights regarding Internet connectivity potential for the county's children and students up to age 18 population
4. Ensure seniors and disabled citizens are able to participate in civic life, have access to healthcare and other necessary services, and that at-risk populations can leverage the Internet for human health and longevity
5. Achieve a goal of universal service across Calhoun County student population.

What Is Broadband?

Broadband is a very fast Internet connection. To understand the importance of broadband Internet access, consider this analogy from the transportation system: If a road has one lane and heavy traffic, it will take a long time for drivers and passengers to reach their destinations. If the same road had multiple open lanes, the same group of cars could reach their destinations in a shorter period of time. To continue the analogy, "broadband" refers to high-speed Internet "lanes" or connections that provide someone the capability to upload and download data efficiently. Broadband connections have wide bandwidth and can handle "heavy traffic", older or connections such as dial up cannot.

Why Broadband?

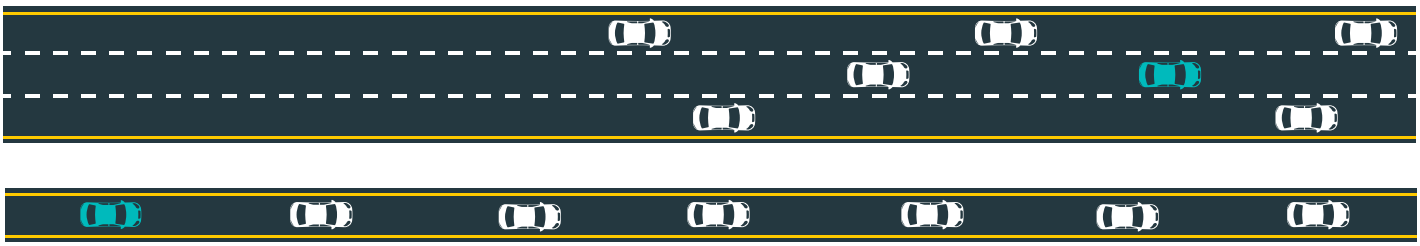
Broadband access allows high-quality teleconferencing, video and audio streaming, e-gaming, e-commerce, and large file transfers to function smoothly. Broadband connections also enable new technologies like smart-home devices like thermostats with automatic room temperature control, home security cameras, health monitoring devices, and televisions and speakers with built-in streaming entertainment.

As mentioned earlier, current federal standards define a broadband connection as 25 megabits per second for download and 3 megabits per second for upload. Technology to deliver this connection can include cable, DSL, fiber, wireless, and more.

Broadband Mapping

Funding eligibility for all state and federal grant programs rely upon broadband penetration data. The primary existing source of this data is the Federal Communications Commission (FCC) Form 477. Form 477 data is self-reported by service providers, aggregated to the census block level, and is the basis for mapping broadband coverage in the United States. This data is unreliable and lacks the granularity needed for accurate coverage inferences (Mack et al., 2019, p.6). Initial results from community speedests throughout Michigan signify greater connectivity issues than identified by the FCC. The magnitude of the problem is much higher than suggested by federal data; in other Michigan counties, as many as 64% of households do not have access to fixed broadband at the FCC threshold of 25 Mbps download and 3 Mbps upload. (Merit Network, 2020).

Figure 1. Cars Along a Road



Impacts of Broadband on a Community

The presence of fiber-based broadband can be associated with a positive effect on property values in a neighborhood (Molnar et al., 2015, p.12).

Broadband access is associated with increased agricultural yields (LoPiccalo, 2020, p. 24).

Middle and high school students with high-speed Internet access at home have more digital skills, higher grades, and perform better on standardized tests, such as the SAT. Regardless of socioeconomic status, students who cannot access the Internet from home or are dependent on a cell phone for Internet access do worse in school and are less likely to attend college or university (Hampton et al., 2020, p. 48).

Internet connectivity, particularly access to broadband, plays an increasingly important role in both healthcare and public health (Bauerly et al., 2019, p. 39).

There is evidence that access to state of the art Internet like optical fiber and employment growth are related (Lapointe, 2015, p.25).

Survey Design and Methodology

Calhoun County partnered with Merit Network's Michigan Moonshot team to develop and deploy a survey for 23 communities. Survey participants were recruited through printed postcards, newspaper advertisements, fliers and community partner outreach efforts.

Residents with Internet access at their properties were instructed to complete a survey and Internet connection speed measurement online. Residents without Internet connectivity were asked to complete a mobile-optimized web survey through their cellular phone.

Text message surveys were available via SMS, and printed surveys were available upon request. All survey materials, including the informational websites, were available in English and Spanish languages.

After the data were cleaned, 2,240 surveys were eligible for analysis. From this total number, 1,287 surveys indicated they had some form of Internet service in their home. There were 953 surveys completed by residents who self-reported that they had no Internet in their home.* Residents were asked to complete a speed test after entering their survey, and 697 households with Internet access completed a speed test, with 590 households answering did not complete a speed test. Ookla data totaling an additional 805 additional speed test measurement tiles were incorporated to augment speed test analysis, totaling 1,502 speed test measurements overall. When accounting for both served and unserved respondents are 2,455 total data points included in the project metrics. The overall response rate for the survey is about 4.2% of all households in Calhoun County. When accounting for additional data points and survey responses the project margin of error is 2%.

Survey Results

The Battle Creek area and Southwestern portions of the county have the highest broadband service density. However, all communities within Calhoun County contain areas that lack access. As household distances from the Southwest and Battle Creek areas increase, broadband service decreases. FCC Form 477 broadband penetration data indicates that only around 4% of surveyed communities do not have Internet service. **The proportion of households in Calhoun County that do not have Internet access is much higher: 39% of households in this study report having no access at all.**** The majority of unconnected residents in Calhoun County do not have service because they simply do not have availability at their address. An absence of service availability impacts 73% of unconnected homes in the survey. The price of Internet service is another key barrier for unconnected residents; 23% of unserved households replied service costs are prohibitively expensive.

The FCC defines broadband speed as Internet service at a minimum of 25 Mbps download and 3 Mbps upload. In households without children, 24% total experience Internet access at broadband speeds. In households with children, a slightly lower proportion--22% total–have access to broadband speeds. Survey results indicate that **55% of households overall do not** have access to fixed broadband at the FCC threshold of 25 Mbps download and 3 Mbps upload.

In contrast to the FCC's definitions of broadband, industry experts and members of the US Congress and US Senate assert that broadband should be classified at speeds above 100 Mbps download and 20 Mbps upload. Current FCC data in Calhoun County suggest 68% of residents have access at the 100 Mbps/20 Mbps speed. Contrasting federal reporting, **only 9% of respondent households throughout the County** have broadband Internet at speeds above 100 Mbps/20 Mbps. **The citizens of Calhoun County indicate that underservice in their communities is much higher than reported by Federal data**.

Satisfaction with broadband options is another factor impacting adoption and 37% of residents are satisfied with options for competitive choice at their homes. Around 24% of residents had neutral feelings, and 40% of residents are dissatisfied with their provider choices.

Footnote for Speeds

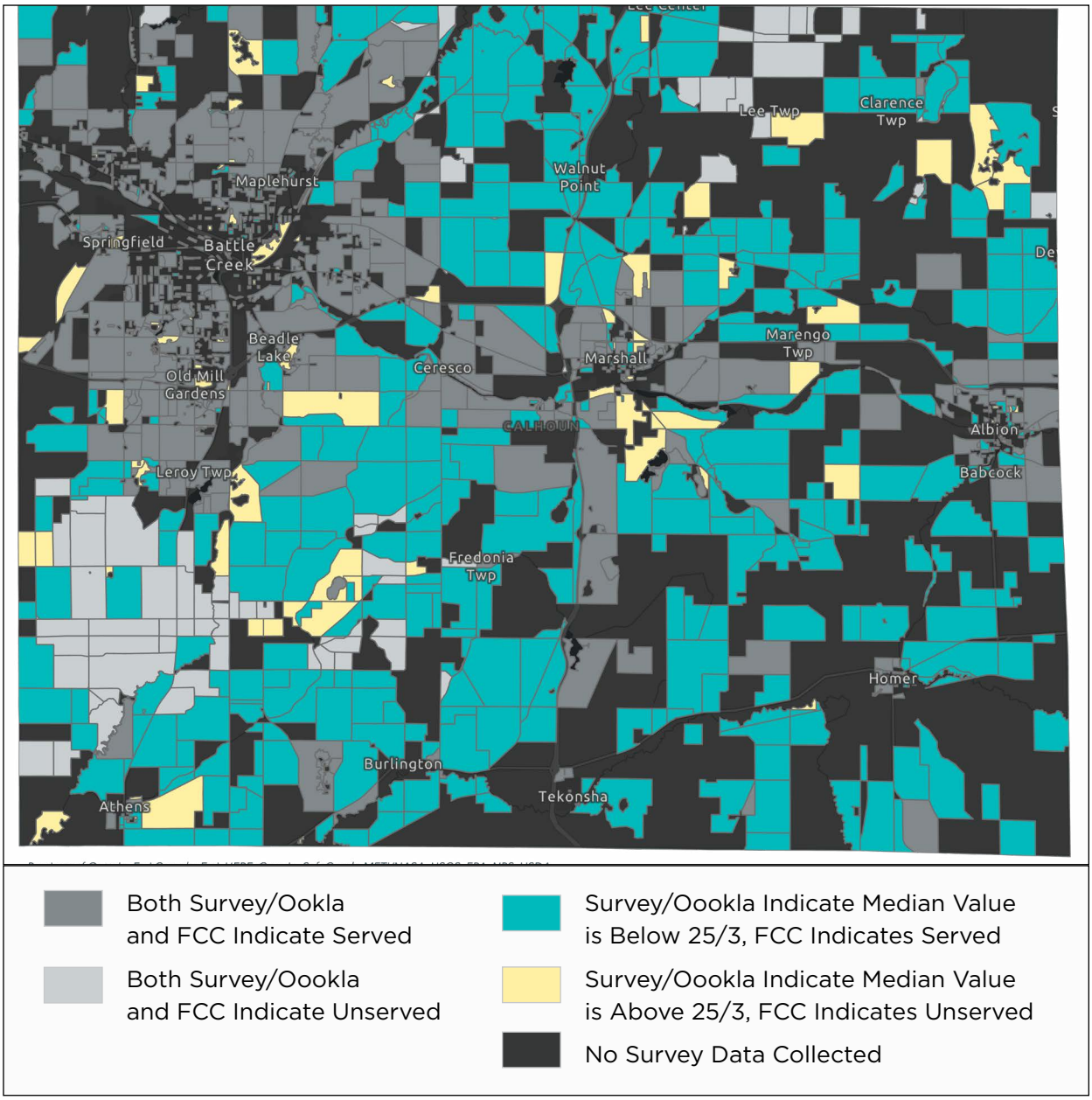
**We received 1,123 total speed test results. Speed test results that seemed to originate from 1) cellular or satellite Internet connections and 2) from connections originating from an ISP not serving Calhoun County or connections over a Virtual Private Network (VPN) were excluded. As a result, a total of 213 survey-based speed test results were omitted from our data analysis. Only responses from within the county were included in the analysis. After data cleanup, 910 speed test measurements were viable. 215 were households responding multiple times. The highest recorded speed from an address was used in the calculations. Additionally, 428 households took the served survey but did not take a speed test. These responses were used in the sentiment analysis only.*

***Individual household speed test results can vary depending upon time of day and network traffic. All figures and calculations in this report reflect the highest measured speed from a household.*

Broadband Density Per Census Block

FCC Compared to Survey Results

Map is based on the survey results (and not a census of all the households in the area).



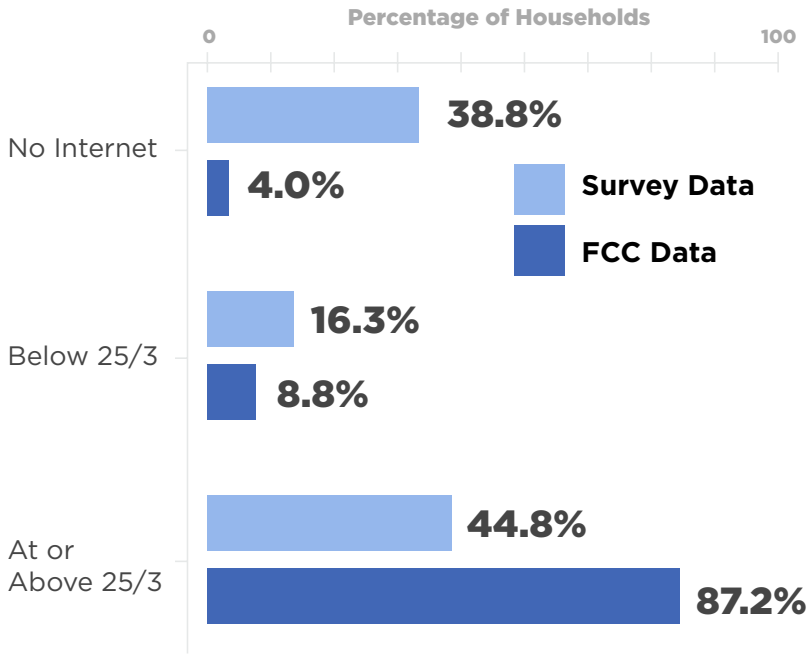
The map reflects the share of respondents who indicated having broadband. Using these numbers as indicators of the share of all households (including those who did not respond) that have broadband must take margins of errors into consideration, which depend on the total number of responses and the total households in an area. At the county level, the margin of error is in the 2% range. For individual municipalities, the margin of error is in the 5%-20% range. Response rates at the level of some census blocks were low and therefore imply higher margins of error.

Availability by the Numbers

Survey speed data as well as FCC data on the maximum advertised upload and download speeds per census block were each bucketed into one of the following categories: 1) No Internet, 2) Below 25/3 Mbps, or 3) At or Above 25/3 Mbps. Each survey result was then directly compared to the FCC census block the survey point falls within. The differences between coverage reported by the FCC and data from this survey are drastic.

This study suggests that within our sample of survey responses:

- 42% fewer homes than indicated by Federal sources have access to broadband Internet speeds
- 7% more homes than indicated by Federal sources have some connectivity at speeds lower than broadband
- 35% more homes than indicated by Federal sources have no Internet connectivity whatsoever

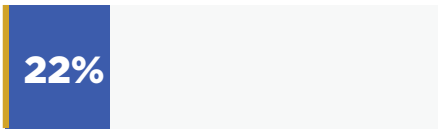


Satisfaction with Home Internet Provider Options:

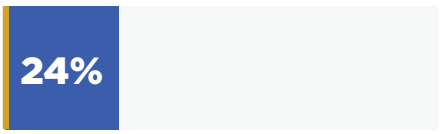
Satisfied 37% **Neutral 24%** **Dissatisfied 40%**

Only 37% of residents were satisfied with the Internet service provider options at their homes.

Broadband in Households with Children and Students up to age 18 Students:



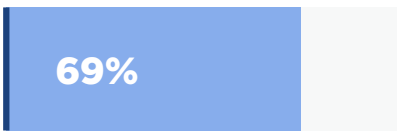
38% of households surveyed in Calhoun County have Children and students up to age 18. In these homes, 22% have broadband Internet.



24% of households with no Children and students up to age 18 report Internet access at broadband speeds or higher.

Calhoun County Resident Sentiment:

Of Calhoun County residents that have no Internet access, 73% report that no services are available at their address and 23% state that the price for service is too high.



69% of residents with no Internet access indicated that they are willing to pay between $26 and $100 for service, indicating that the majority of these residents would pay for Internet service at their properties if it was available.

Conclusion

Broadband is critical to a community's ability to thrive and remain competitive in terms of education, economic development, talent retention, employment opportunities and population growth. Much of Calhoun County is unconnected or insufficiently connected. Connectivity data indicates a problem more stark than established FCC data suggests. Residents without broadband desire service, and connected citizens believe that more provider options are needed. Data from this study will be used to support grant applications and broadband planning efforts in Calhoun County.

Calhoun County Broadband Task Force

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Angela Stewart
Community Initiatives Officer, Battle Creek Community Foundation

Art Kale
Village Manager, Village of Homer, MI

Gary Tompkins
District 7 Calhoun County Commissioner

Jake Smith
District 3 Calhoun County Commissioner

Jim Haadsma
62nd District, State Representative

Kathy Szenda Wilson
Co-executive Director of BC Pulse and Ward 4 Battle Creek City Commissioner

Lee Adams
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Dr. Paul Watson
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