Mahoning County

Connectivity Plan

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Acknowledgements

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EXECUTIVE SUMMARY

Executive Summary

Mahoning County has launched a Connectivity Plan assessment to determine and pursue the best solutions for improving local broadband access and affordability. This effort also aims to prepare the county for the upcoming Broadband Equity, Access, and Deployment (BEAD) and Digital Equity Act (DEA) federal funding programs. Broadband networks are essential community resources that enhance residents' quality of life and promote economic development in the 21st-century global economy. High-speed internet access enables e-commerce, remote work, online education, telehealth services, entrepreneurial activities, and more, all of which support social progress.

The COVID-19 pandemic has highlighted the vital importance of having broadband connections that are available, affordable, and dependable. This plan tackles the main needs identified, including the extension of broadband infrastructure to underserved areas, improvement of affordability programs, and increase of digital literacy among the community. These actions can be advanced by collaborating with ISPs to expand coverage, creating public Wi-Fi hotspots, and initiating targeted digital literacy programs.

Carrying out the suggested infrastructure would bring numerous benefits for residents, businesses, and anchor institutions, such as improved access to telehealth services, enhanced support for online learning, and increased economic opportunities through better internet connectivity. However this may not be feasible for the county to finance this infrastructure Furthermore, Mahoning County is dedicated to achieving digital equity. To this end, the plan includes specific recommendations such as increasing device distribution programs, setting up community technology hubs, and creating affordable internet plans for low-income households.

A strong and competitive broadband market in Mahoning County can create a more connected and technologically advanced community. We express our appreciation to the Family Tech Connect, Oak Hill Collaborative, Youngstown State University (YSU), Mahoning-Youngstown Community Action Partnership (MyCAP), Access Council, Eastgate Regional Council of Governments, local ISPs, and all other stakeholders for their invaluable guidance, help, and support in developing this plan.

SECTION 1

Preliminary research & readiness

Section 1. Preliminary Research and Readiness

A. Geographic and Demographic Profile

General Community Demographic Information

Mahoning County utilized demographic data from the [The State of Ohio, Census, American Community Survey, statistically significant community surveys, etc.] to obtain the following information:

Demographic	Demographic Data
Total Population Number	229,044
Square Miles Covered	425
Number of People per Square Mile	539
Number of Residents Who Identify as White	171,287
Total Minority	57,757
Number of Residents Who Identify as Black	32,253
Number of Residents Who Identify as Hispanic or Latino	15,013
Number of Residents Who Identify as Indigenous	235
Number of Residents Who Identify as Other	582
Total Number of Households	97,293
Number of Households That Are Owner Occupied	67,910
Average Household Size	2.29
Mean Household Income	69,698
Median Household Income	50,750
Mean Family Income	85,612
Median Family Income	68,311
Per Capita Income	30,421
Number of People Living Below the Poverty Line	38,534
Number of Low to Moderate Income Residents	92,800

Observations

Below is a table of social determinants to consider when observing a service area; these can vary significantly from one community to another. Addressing these determinants is crucial for promoting equity and improving the overall well-being of historically marginalized or underinvested communities.

Social Determinant	Description
Economic Factors	
Income Inequality	Significant disparities in income distribution; Gini index at 0.476 in 2022, indicating high inequality.
Unemployment Rate	Unemployment rate has fluctuated, reaching 5.2% in January 2024, with higher rates among minority groups.
Poverty Levels	About 20% of the population lives below the poverty line, with urban areas like Youngstown being more affected.
Lack of Economic Opportunities	Limited access to quality jobs, education, and career advancement, especially in rural and underserved urban areas.
Employment Quality	High prevalence of temporary and part-time jobs; job stability remains a concern.
Economic Mobility	Intergenerational mobility is low, with significant barriers for low-income families to improve their economic status.
Access to Capital	Limited access to financial resources and credit for small businesses and entrepreneurs, particularly in disadvantaged neighborhoods.
Education	
Educational Attainment	Low levels of educational attainment; high school graduation rate is around 84%, with high dropout rates in certain areas.

School Funding	Insufficient funding for schools, leading to disparities in educational quality and resources between districts.
Access to Quality Education	Limited access to quality schools and educational resources, especially in low-income and rural areas.
Educational Resources	Insufficient access to technology and high-speed internet in schools and homes, impacting learning outcomes.
Extracurricular Opportunities	Limited availability and quality of after-school programs, sports, and arts education.
Healthcare	
Healthcare Access	Limited access to healthcare facilities and services, particularly in rural areas.
Health Disparities	Higher rates of chronic illnesses such as diabetes and heart disease among minority populations.
Food Deserts	Several areas classified as food deserts, lacking access to fresh and nutritious food options.
Mental Health Services	Limited availability of mental health professionals and services, impacting overall community health.
Preventive Care	Low participation in preventive health measures, including screenings and vaccinations.
Housing	
Affordable Housing	A shortage of affordable and safe housing options, with a significant portion of income spent on housing costs.
Housing Segregation	Historical and ongoing segregation in housing patterns, leading to unequal access to resources.

Homeownership	Low rates of homeownership, with a significant proportion of the population living in rental housing.
Housing Stability	High eviction rates and homelessness, with limited support services available.
Housing Quality	Many housing units are in poor condition and lack energy efficiency.
Criminal Justice	
Over-Policing	Excessive police presence, particularly in minority communities, leading to strained community relations.
Mass Incarceration	High rates of incarceration, especially among African American and Latino populations.
Criminalization of Poverty	Laws and practices that disproportionately penalize poverty-related issues, such as minor infractions and fines.
Community Policing	Lack of effective community policing strategies, contributing to mistrust between law enforcement and residents.
Juvenile Justice	High rates of youth incarceration with limited rehabilitation and reentry support programs.
Infrastructure and Environment	
Infrastructure Investment	Lack of investment in infrastructure, including roads, public transit, and digital connectivity, hindering economic growth.
Environmental Hazards	Presence of environmental hazards such as industrial pollution, affecting health and quality of life.
Transportation Access	Limited access to affordable and reliable transportation options, impacting mobility and access to jobs and services.

Digital Infrastructure	Poor broadband access in rural areas, impacting education and economic opportunities.
Public Spaces	Limited availability and quality of parks, recreational facilities, and community centers.
Social Support	
Community Resources	Limited access to social services and support networks, particularly for vulnerable populations.
Social Capital	Weakened social bonds and trust within the community, reducing collective efficacy and resilience.
Discrimination	Experiences of discrimination and bias, particularly against racial and ethnic minorities, limiting social and economic mobility.
Civic Engagement	Low voter participation and civic involvement, weakening community advocacy and political influence.
Family Support Services	Inadequate availability of affordable childcare and elderly care services.

References

- Data USA: Mahoning County, OH Data USA
- FRED: Federal Reserve Bank of St. Louis FRED
- U.S. Bureau of Labor Statistics BLS
- Equitable Growth Equitable Growth
- Opportunity Insights Opportunity Insights

Based on social determinants, geographic, and demographic information of Mahoning County, the following observations can be made:

- **Economic Mobility**
    - Economic mobility is crucial for the long-term development of any community. In Mahoning County, the lack of intergenerational mobility significantly hampers economic growth and equality. Research shows that children from low-income families in disadvantaged neighborhoods have limited opportunities to improve their economic status as adults. This stagnation perpetuates the cycle of poverty

and restricts overall community progress (Equitable Growth) (Opportunity Insights).

- **Educational Attainment and Quality**
    - Low educational attainment and limited access to quality education are major barriers in Mahoning County. The high school graduation rate is lower than the state average, and disparities in school funding led to significant differences in educational quality. Improved access to quality education and resources can enhance skill development, leading to better employment opportunities and economic growth (FRED St. Louis Fed) (Opportunity Insights).

- **Healthcare Access and Health Disparities**
    - Limited access to healthcare services, combined with significant health disparities, affects the well-being of residents in Mahoning County. High rates of chronic illnesses such as diabetes and heart disease, particularly among minority populations, underscore the need for improved healthcare infrastructure and services. Addressing these health issues can lead to a healthier, more productive workforce (FRED St. Louis Fed) (Bureau of Labor Statistics).

- **Affordable Housing and Housing Stability**
    - A shortage of affordable housing and high rates of eviction contribute to housing instability in Mahoning County. Many residents spend a significant portion of their income on housing, leaving little for other essential needs. Ensuring access to safe, affordable housing is essential for improving quality of life and economic stability (FRED St. Louis Fed) (FRED St. Louis Fed).

Community Income Data that Supports Eligibility for Federal Funds (e.g. CRA eligibility)

According to the Federal Reserve Bank of Dallas' report, "*Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements*", the Community Reinvestment Act (CRA) is a law that encourages banks to make loans and investments and provide services to low- and moderate-income (LMI) communities. The report notes that each year, the CRA catalyzes more than $100 billion in capital to LMI communities throughout the United States and provides an opportunity to help address the digital divide.

As recommended in the report, Mahoning County identified the following additional demographic data to assist in determining eligibility for CRA investment:

Deposit Market Share

- **Local Banks' Market Share**: Community banks and credit unions play a significant role in providing financial services to LMI communities in Mahoning County. Their deposit market share highlights their engagement and potential for CRA investments.

Home Mortgage Disclosure Act (HMDA) Market Share

- **Mortgage Lending**: According to recent HMDA data, there is a significant proportion of home mortgage applications and originations in Mahoning County from LMI borrowers, indicating a critical need for affordable housing finance and CRA-eligible mortgage products.

CRA Small-Business/Small-Farm Share

- **Small Business Lending**: Small businesses in Mahoning County, particularly in underserved areas, benefit from CRA-related small-business lending. Data shows a robust demand for small-business loans in these communities, underlining the importance of continued support through CRA initiatives.

Applicable Opportunity Zone IDs

- **Opportunity Zones**: Mahoning County includes several designated Opportunity Zones, particularly in Youngstown, which offer tax incentives for investments in economically distressed areas. These zones provide strategic opportunities for CRA-eligible projects that can stimulate economic development and job creation.

Identified Needs

- **Affordable Housing**: There is a documented shortage of affordable and safe housing options in Mahoning County. CRA investments can address this by funding the construction and rehabilitation of affordable housing units.
- **Economic Development**: Investments in local infrastructure, small business support, and job training programs are critical. These initiatives can drive economic growth and improve living standards in LMI communities.
- **Healthcare Access**: Limited access to healthcare services in rural parts of Mahoning County suggests a need for CRA investments in health facilities and services to improve community health outcomes.
- **Digital Inclusion**: Bridging the digital divide is essential. CRA-eligible investments in broadband infrastructure and digital literacy programs can significantly enhance educational and economic opportunities for LMI residents.

References

- Federal Reserve Bank of Dallas, "Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements"
- City of Youngstown Community Development Division Youngstown CRA Program
- Mahoning County Economic Development Mahoning County CRA Information
- Opportunity Insights, "Mobility Report Cards: Income Segregation and Intergenerational Mobility Across Colleges in the United States" Opportunity Insights

Documented Presence of Covered Populations

Specific to both the Digital Equity and Broadband Equity, Access, and Deployment (BEAD) programs, Mahoning County has identified the following impact to covered populations, as defined in the Infrastructure Investment and Jobs Act (IIJA), as a result of the proposed project(s):

Covered Population	Presence in Mahoning County (Scale 1 to 5, i.e. 1 = Low)	Potential Impact (i.e., Low, Moderate, High)
Individuals who live in covered households	3	Moderate
Aging individuals	4	High
Incarcerated individuals, other than individuals who are incarcerated in a Federal correctional facility	5	High
Veterans	3	Moderate
Individuals with disabilities	4	High
Individuals with a language barrier	2	Low
Individuals who are English learners	2	Low
Those with low levels of literacy	4	High
Individuals who are members of a racial or ethnic minority group	4	High

Individuals who primarily reside in a rural area	3	Moderate

In general, Mahoning County's proposed project(s) would create a **high** impact on individuals with disabilities, members of racial or ethnic minority groups, and those residing in rural areas by **improving access to high-speed internet, enhancing educational and employment opportunities, and reducing social isolation**. Additionally, **the county would see moderate impacts on aging individuals, incarcerated individuals, and those with low levels of literacy**. The project aims to bridge the digital divide, offering better connectivity that can improve access to healthcare, educational resources, and economic opportunities. Mahoning County would continue to engage and seek feedback from these covered populations to ensure positive and measurable outcomes.

General Community Economic and Workforce Status

Mahoning County utilized additional data resources from the U.S. Census and Appalachian Regional Commission to further identify current and past economic drivers for the community.

Observations from Persistent Poverty Data:

1. **High Poverty Rates**: Certain areas within Mahoning County, particularly urban centers like Youngstown, have consistently high poverty rates, affecting economic growth and stability.
2. **Limited Economic Opportunities**: Persistent poverty is linked to limited economic opportunities, with few high-quality jobs available, particularly in rural areas.
3. **Education and Skills Gap**: There is a notable gap in educational attainment and workforce skills, which hampers economic development and reduces employability in emerging sectors.

Observations from Appalachian Regional Commission Data on Economic Distress:

1. **Economic Decline**: Mahoning County has experienced economic decline due to the reduction in manufacturing jobs, historically a significant economic driver.
2. **Unemployment and Underemployment**: High rates of unemployment and underemployment persist, with many residents working in low-wage or part-time jobs.
3. **Infrastructure Deficits**: Deficiencies in infrastructure, including transportation and digital connectivity, limit economic growth and access to opportunities.

References

- U.S. Census Bureau: Persistent Poverty in the United States U.S. Census
- Appalachian Regional Commission: Economic Distress in Appalachian Counties ARC

- Federal Reserve Bank of Dallas: Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements Dallas Fed

These observations highlight the critical need for targeted interventions to address the socio-economic challenges in Mahoning County, promoting digital equity and broader economic development.

B. State Data

Previous Broadband Studies

Broadband Plan/Study Name	***Date Completed***	***Relation to Mahoning County's Proposed Project***
Regional Middle Mile Backbone Network	July 2023	Feasibility and Engineering Study for a middle mile network in eastern Ohio
Eastgate Broadband Feasibility Study	June 2021	Broadband Study in 3 Counties in Ohio

According to the State of Ohio's BEAD Five-Year Action Plan and BEAD Initial Proposal Volume I and Volume II, the following priorities are being implemented:

Priority	**Description**
Invest in deploying last-mile broadband infrastructure	Bring reliable, affordable, high-speed internet to all via a competitive grant process.
Expand middle-mile network to facilitate last-mile deployment	Extend the reach of Ohio's network through unserved areas of the state to facilitate last-mile deployment, increase competition, and improve affordability.
Connect community anchor institutions to serve as digital hubs	Empower Community Anchor Institutions (CAIs) as local hubs for connectivity, digital inclusion, and innovation through access to gigabit symmetrical service.
Improve broadband affordability	Provide a low-cost broadband service option and a middle-class affordability plan to improve broadband affordability across the state.

Ensure universal coverage	Prioritize broadband deployment in unserved and underserved locations, followed by community anchor institutions, ensuring universal coverage across the state by the end of the BEAD process, funding allocations permitting.
Prioritize fiber projects	Prioritize end-to-end fiber projects while selectively using non-fiber options where the cost of fiber deployment is extremely high.
Workforce readiness and labor standards	Implement workforce readiness initiatives and adhere to labor standards and protections to ensure a skilled workforce for broadband deployment projects.
Local coordination and stakeholder engagement	Engage local governments, community organizations, and other stakeholders in the planning and implementation of broadband projects to ensure local needs and priorities are met.

These priorities align with the strategic objectives outlined in the BEAD program's requirements and aim to address the digital divide, promote digital inclusion, and enhance economic opportunities through improved broadband infrastructure and services.

For further details and specific examples, refer to the sources provided:

- Ohio BEAD Initial Proposal Volume I
- Ohio BEAD Initial Proposal Volume II

Additionally, the State's BEAD Five-Year Action Plan further describes how broadband connectivity impacts the following:

Area	Impact of Broadband Connectivity
Workforce Development	Ohio's BEAD Plan emphasizes enhancing workforce development by providing access to online training, job resources, and remote work opportunities. The plan highlights initiatives such as job training centers and partnerships with educational institutions to equip the workforce with necessary digital skills. Workforce readiness initiatives include collaboration with qualified apprenticeship programs and the 5G and Broadband Sector Partnership to ensure a skilled workforce for broadband projects.

Economic Development	Broadband connectivity is a cornerstone of Ohio's economic development strategy. The BEAD Plan underscores the importance of high-speed internet in attracting businesses, fostering innovation, and supporting SMEs. By expanding broadband infrastructure in unserved and underserved areas, Ohio aims to create economic opportunities, improve competitiveness, and support local economies through increased digital engagement and entrepreneurship.
Aging in Place	The BEAD Plan addresses the needs of aging populations by promoting telehealth services and digital inclusion programs tailored for seniors. Access to reliable broadband enables older adults to receive medical care remotely, participate in online communities, and maintain social connections, which are crucial for their well-being. The plan includes initiatives to connect senior centers and provide digital literacy training to enhance the quality of life for elderly residents.
Educational Attainment	Educational attainment is significantly impacted by broadband access, as outlined in Ohio's BEAD Plan. The plan supports connecting K-12 schools, libraries, and higher education institutions with high-speed internet to facilitate e-learning and digital resources. It also focuses on ensuring that all students, regardless of their location, have equitable access to educational opportunities through robust broadband infrastructure and support for digital literacy programs.

This table above provides a clear, structured overview of how broadband connectivity impacts different areas according to Ohio's BEAD Five-Year Action Plan and Initial Proposal Volumes I and II.

Method for Determining Eligibility

The State of Ohio's BEAD Initial Proposal Volume I describes the process being undertaken to identify eligible locations for funding, as shown below:

1. **Identification of Existing Broadband Funding (Requirement 3)**
    - The State identified the existing broadband funding allocated within Ohio, including sources of funding, description of the funded activities, total funding, amount expended, and remaining funding available. This step ensures that locations with existing broadband funding are not eligible to receive BEAD funding.
2. **Identification of Unserved and Underserved Locations (Requirement 5)**
    - The State defined unserved locations as those with service below 25 Megabits per second (Mbps) download and 3 Mbps upload speeds. Underserved locations are defined as those with service below 100 Mbps download and 20 Mbps upload speeds. This identification utilized FCC National Broadband Map data collected

through the Broadband Data Collection process, with data as of December 31, 2022.

3. **Identification of Community Anchor Institutions (Requirement 6)**
    - The State identified the types of Community Anchor Institutions (CAIs) eligible to receive BEAD funding, including schools, libraries, public safety entities, public housing, health clinics, higher education institutions, and community support organizations.
4. **Adoption of the BEAD Model Challenge Process (Requirement 7)**
    - The State confirmed that it would adopt the NTIA's BEAD Model Challenge process. This process allows for all identified eligible locations to be reviewed and challenged ahead of the BEAD Subgrantee selection process. Following the completion of the BEAD Challenge process, the State may modify the eligibility of certain locations based on enforceable commitments, planned service deployments, and allow for a rebuttal phase before making its final determination.
5. **Reports and Data Indicating Eligibility**
    - Any reports or data that indicate eligibility as defined by the State, including confirmed challenges or speed test data and any corresponding maps, would be included as applicable.

Further details regarding the State's Deployment Subgrantee Selection process (Requirement 8) can be found in Volume II of the BEAD Initial Proposal. According to the State's plans, the application, review, and prioritization process would involve a competitive grant process to extend the reach of Ohio's network through unserved areas, increase competition, and improve affordability. The State would accept BEAD proposals geographically based on collections of census block groups. Analysis demonstrating eligibility based on the stated criteria, including citations of challenges or alternative sources for speed test data, would be provided as necessary.

For specific details and further information, refer to the sources provided:

- Ohio BEAD Initial Proposal Volume I
- Ohio BEAD Initial Proposal Volume II

Summary of the State Digital Equity Priorities

According to the State of Ohio's BEAD Five-Year Action Plan and Digital Equity Plan, the following priorities are being implemented across both the BEAD and Digital Equity Act programs:

Priority	Description	Mitigation Approach
Bring reliable, affordable, high-speed internet to all, in their homes and communities	The aim is to ensure that all residents have access to affordable and high-speed internet, regardless of their location.	Utilize a competitive grant process to fund infrastructure projects in unserved and underserved areas, improve affordability through low-cost service options, and develop middle-class affordability plans.
Promote the creation of world-class broadband networks throughout the state via the use of best-in-class technologies	Deploy end-to-end fiber projects and selectively use non-fiber technologies where fiber deployment costs are prohibitively high.	Prioritize projects designed to provide fiber connectivity directly to the end-user, ensuring the deployment of future-proof broadband infrastructure.
Enable participation in the modern economy	Facilitate online job training, remote work opportunities, and access to digital resources to support economic growth and workforce development.	Implement workforce readiness initiatives in collaboration with apprenticeship programs and local economic development organizations, ensuring residents have the digital skills needed for the modern economy.
Empower Ohio through training, device access, and digital skills	Provide training, devices, and digital skills education to bridge the digital divide and promote digital inclusion.	Partner with educational institutions, libraries, and community organizations to offer digital literacy programs and ensure access to devices and high-speed internet for all residents.
Connect Community Anchor Institutions (CAIs) as digital hubs	Enable CAIs to serve as local hubs for connectivity, digital inclusion, and innovation.	Ensure CAIs have access to gigabit symmetrical service and support their role in providing digital literacy training and access to digital resources for the community.

The State's Digital Equity priorities focus on ensuring all residents have access to reliable, high-speed internet and the digital skills necessary to participate in the modern economy. By promoting world-class broadband networks and empowering residents through training and device access, Ohio aims to bridge the digital divide and foster economic growth.

Proposed Projects Alignment with Digital Equity Priorities

The proposed projects would directly align with and support the State's Digital Equity priorities by:

- **Expanding Broadband Infrastructure**: Implementing last-mile and middle-mile broadband projects in unserved and underserved areas to ensure reliable, high-speed internet access.
- **Enhancing Affordability**: Offering low-cost broadband plans and developing middle-class affordability strategies to make internet access affordable for all residents.
- **Supporting Digital Inclusion**: Partnering with CAIs to provide digital literacy training, access to devices, and high-speed internet, enabling them to act as digital hubs for their communities.
- **Facilitating Workforce Development**: Providing online training and job resources to enhance workforce readiness and economic participation, ensuring residents have the skills needed for the digital economy.

These initiatives would collectively advance Ohio's goals of digital equity, economic development, and community empowerment.

For specific details and further information, refer to the sources provided:

Specific details and further information, refer to the sources provided:

- Ohio BEAD Initial Proposal Volume I
- Ohio BEAD Initial Proposal Volume II

C. Applicant Grant Readiness

Mahoning County has obtained the following federal registrations and information, as required to apply federal funding programs:

- Assigned and active Federal Tax ID: 34-6001777
- Assigned and active Unique Entity Identification VVV5H95MAPG9
- Completed entity registration in SAM.gov

D. Current Internet Adoption and Use

This section aims to provide Mahoning County with a diagnosis of the current health of broadband infrastructure and services in the community. The results of this Connectivity Plan would enable Mahoning County to strategically target and prioritize areas in order to bridge the digital divide and offer equitable broadband opportunities to all residents and businesses, while minimizing risk and amplifying the likelihood of success.

Mahoning County's data analysis includes, but is not limited to, the following sources:

Availability

- **FCC Broadband Data Collection**: Internet availability data obtained from the FCC's Broadband Data Collection files provide a comprehensive view of broadband service availability across the county.
- **State/Local Mapping Initiatives**: Mahoning County utilized state and local mapping projects that detail the geographic distribution of internet services, identifying areas with limited or no broadband access.
- **Speed Test-Based Analysis**: Ground truth analysis using data from speed test platforms such as Ookla and M-Lab, which helps verify the actual internet speeds experienced by residents.

Affordability

- **NDIA Free & Low-Cost Plans List**: Data from the National Digital Inclusion Alliance (NDIA) on available free and low-cost internet plans, which helps identify affordable options for residents.

Adoption

- **American Community Survey (ACS)**: Internet adoption data derived from the 1-year and 5-year estimates provided by the U.S. Census Bureau's American Community Survey, which includes detailed statistics on household internet usage.
- **FCC Internet Access Services Reports**: Reports from the FCC that provide insights into the adoption rates of various internet services across different demographics and geographies.
- **EBB/ACP Enrollment Data**: Enrollment figures from the Emergency Broadband Benefit (EBB) and Affordable Connectivity Program (ACP), which indicate the number of households participating in these subsidy programs.
- **State/Local Surveys**: Additional data from surveys conducted by the state or local authorities to measure internet adoption rates among residents.

By leveraging these diverse data sources, Mahoning County is able to gain a detailed and accurate understanding of the state of broadband availability, affordability, and adoption within the county. This information supports efforts to improve internet access and digital inclusion for all residents.

This inventory map is available at this PlanEngage Site.

Currently Available Internet Services

The inventory of existing fiber networks in Mahoning County includes networks owned by various entities, including private ISPs and public initiatives. Key sources for this data include:

- **Eastgate Lake to River Broadband Implementation Plan**: This document details the existing fiber infrastructure along the SR-11 corridor, noting that the network is owned by

a combination of local governments and private ISPs. The plan highlights key fiber routes and their potential availability for use by other providers.

- **Local ISPs**: Major providers such as Spectrum, AT&T, and Armstrong have significant fiber networks in the area, with AT&T and Spectrum often allowing for leased access to their fiber lines under specific conditions.

Overview of Current Broadband Providers' Services, Pricing Strategies, and Coverage Areas

The main broadband providers in Mahoning County include Spectrum, AT&T, Armstrong, and various smaller regional providers. Their services, pricing strategies, and coverage areas are as follows:

- **Spectrum**: Offers cable internet services with speeds up to 1 Gbps. Pricing ranges from $49.99 to $109.99 per month, depending on the speed tier and bundled services.
- **AT&T**: Provides DSL and fiber services. Fiber plans offer speeds up to 1 Gbps, with pricing starting at $35 per month for the first year, increasing thereafter. DSL services offer lower speeds and are more widely available in rural areas.
- **Armstrong**: Offers cable internet with speeds up to 500 Mbps, with pricing from $44.95 to $119.95 per month. Armstrong also provides a range of bundled services.
- **Smaller Providers**: Include regional companies like Comcast Business and various wireless ISPs that offer niche services in less densely populated areas.
    - **Windstream:** Offers DSL and fiber services with speeds up to 1 Gbps. Pricing starts around $44.99/month for DSL and $39.99/month for fiber. Windstream also provides bundled services including internet, phone, and TV.
    - **Viasat:** Provides satellite internet with speeds up to 150 Mbps. Pricing starts at $50/month. Viasat is available in 100% of Mahoning County.
    - **HughesNet:** Offers satellite internet with speeds up to 25 Mbps. Pricing starts at $59.99/month. HughesNet is available in 100% of Mahoning County.
    - **Agile Networks**: Provides fixed wireless internet with speeds up to 25 Mbps. Pricing varies. Agile Networks has limited availability, covering around 7.5% of the area.
    - **Always ON:** Offers fixed wireless internet with speeds between 25 and 150 Mbps. Pricing starts around $50/month. Always ON has coverage in about 37.1% of the area.
    - **T-Mobile 5G Home Internet**: Provides 5G internet with speeds between 33 and 245 Mbps. Pricing starts at $50/month with AutoPay. T-Mobile covers around 37.1% of the area.

Investment and Deployment Plans of Incumbent Providers

Investment and deployment plans for the major ISPs include:

- **Spectrum**: Ongoing investments in expanding their fiber network and upgrading existing infrastructure to DOCSIS 3.1, enabling higher speeds and better service reliability.
- **AT&T**: Focused on expanding their fiber footprint, particularly in suburban and urban areas of Mahoning County. They also plan to phase out older DSL services in favor of fiber.
- **Armstrong**: Investing in network upgrades to increase capacity and improve service quality. Plans include expanding coverage in underserved areas through public-private partnerships.

Locations of Existing Fiber and Broadband-Related Electronics

The locations of existing fiber and broadband-related electronics include:

- **Eastgate Implementation Plan**: Identifies key fiber routes along SR-11, detailing connection points, meet-me locations, and other critical infrastructure. This includes fiber running through major commercial corridors and connecting community anchor institutions.
- **Local Government Data**: Mapping data from local government sources show fiber routes owned by the county and municipalities, which often align with major roads and public facilities like schools and libraries.
- **ISP Network Maps**: Provider-specific maps from companies like Spectrum and AT&T highlight their fiber routes, central offices, and major nodes.

- **Private Database**: Geotel database providing detailed fiber maps, cell towers, lit buildings and network nodes

Available Broadband Speeds by Provider

Broadband speeds available from providers in Mahoning County include:

- **Spectrum**: Offers speeds up to 1 Gbps for residential customers, with business plans offering similar speeds.
- **AT&T**: Fiber services offer speeds up to 1 Gbps, while DSL services range from 25 to 100 Mbps depending on the location.
- **Armstrong**: Provides speeds up to 500 Mbps, with higher speeds available for business customers.
- **Other Providers**: Smaller ISPs and wireless providers offer a range of speeds, typically from 10 Mbps to 100 Mbps, catering to more rural or specific customer needs.

Conclusion

Mahoning County's broadband landscape is shaped by a mix of large national providers and smaller regional ISPs. Investments are focused on expanding fiber infrastructure and upgrading existing networks to meet growing demand. Comprehensive data from various sources provide a clear picture of the current services, coverage, and future plans, aiding in strategic planning for enhanced broadband connectivity across the county.

For more detailed and specific data, references to the Eastgate Lake to River Broadband Implementation Plan and other local studies are recommended.

Data Sources and Purpose:

Source Name	Source Type	Source Description	Data Collected & Analyzed	Purpose
Federal Communications Commission (FCC)	Public	Federal Agency responsible for implementing and enforcing America's communications law and regulations (Federal Communications Commission (2022). About the FCC. Available at: https://www.fcc.gov/about/overview)	FCC Form 477 BDC Data	Determine broadband incumbents and technology penetration
BroadbandNow & BroadbandSearch	Private	Online databases of internet service options available in a given area (BroadbandNow (2022). About BroadbandNow's Team. Available at: https://broadbandnow.com/about; Broadbandsearch (2022). About. Available at: https://www.broadbandsearch.net/about)	Advertised internet service offerings including providers, speed, price and technologies	Determine broadband speed and corresponding price
Geotel	Private	Provider of telecommunications infrastructure data (GeoTel (2022). About GeoTel. Available at: GeoTel About)	Existing fiber infrastructure in the County	Assess existing fiber infrastructure and identify gaps

Truth on the Ground

The FCC Broadband Deployment Data identifies the following ISPs in Mahoning County, along with the corresponding broadband technologies and speeds they are currently providing:

According to this data, there are currently several broadband technologies deployed in Mahoning County for both residential and business purposes. These technologies can be categorized as follows:

1. **Wired Broadband**: Asymmetric DSL, Cable, and Fiber
    - **Spectrum**: Cable with speeds up to 1 Gbps
    - **AT&T**: Fiber with speeds up to 5 Gbps, DSL with speeds varying by location and plan
    - **Armstrong**: Cable with speeds up to 500 Mbps
2. **Satellite Broadband**:
    - **HughesNet**: Satellite with speeds up to 25 Mbps
    - **Viasat**: Satellite with speeds up to 150 Mbps
3. **Fixed Wireless Broadband**:
    - **Various smaller ISPs**: Fixed Wireless with speeds typically up to 50 Mbps

This data provides an overview of the current broadband landscape, illustrating the variety of technologies and services available to residents and businesses in Mahoning County.

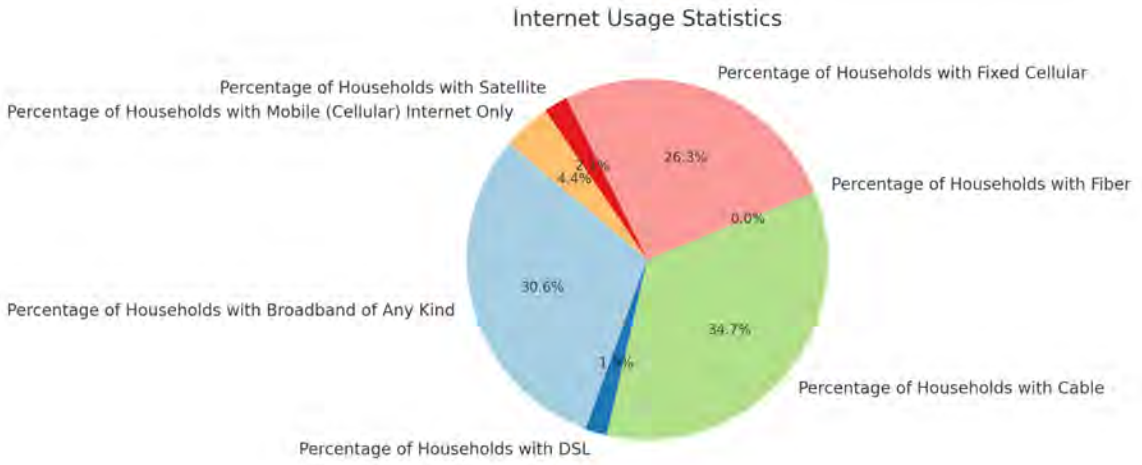
ISP Name	Technologies Available	Subscription Cost
Spectrum	Cable	$49.99 - $109.99 per month
AT&T	Fiber, DSL	Fiber: $35+ per month (first year), DSL: varies by location and plan
Armstrong	Cable	$44.95 - $119.95 per month
Verizon	Fixed Wireless, 5G Home Internet	Fixed Wireless: $40 - $100 per month, 5G Home Internet: $50 per month with AutoPay
Xfinity	Cable	$39.99 - $89.99 per month
HughesNet	Satellite	$59.99 - $150 per month
Viasat	Satellite	$70 - $200 per month
Various smaller ISPs	Fixed Wireless	$40 - $100 per month

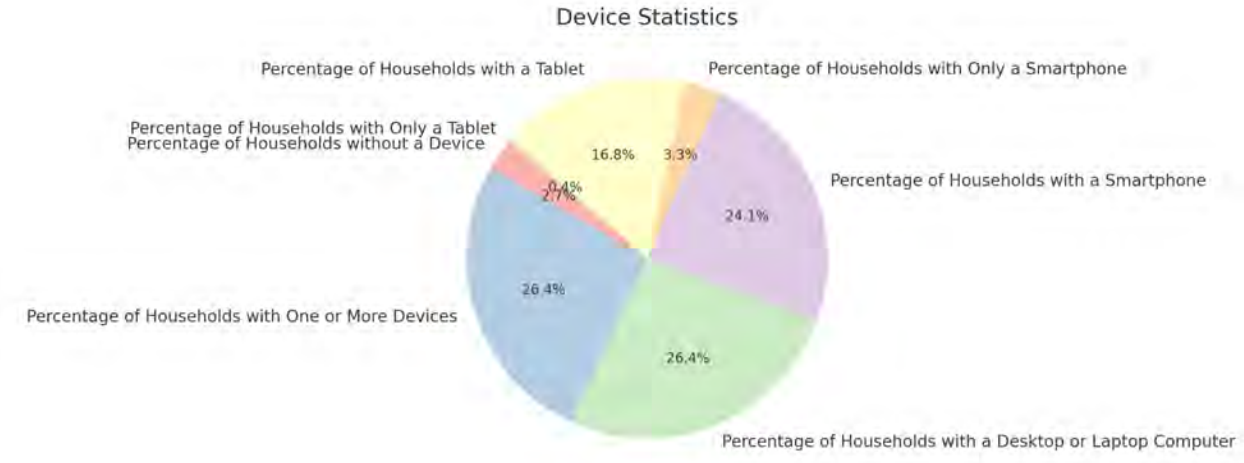
All providers offer broadband speeds equal to or higher than 100 Mbps download and equal to or higher than 20 Mbps upload in the county.

Internet Affordability

Mahoning County also collected broadband usage data from the ACS 5 Year Estimates specific to the community, which illustrates the overall profile of internet affordability and adoption percentages:

Internet/Usage Statistic	Number/Percentage per Household
Number of Total Households	97,293
Percentage of Households with Broadband of Any Kind	85.6%
Percentage of Households with DSL	5.4%
Percentage of Households with Cable	97.3%
Percentage of Households with Fiber	0.0%
Percentage of Households with Fixed Cellular	73.6%
Percentage of Households with Satellite	6%
Percentage of Households with Mobile (Cellular) Internet Only	12.2%
Percentage of Households without a Device	9.4%
Percentage of Households with One or More Devices	90.6%
Percentage of Households with a Desktop or Laptop Computer	90.6%
Percentage of Households with a Smartphone	82.7%
Percentage of Households with Only a Smartphone	11.3%
Percentage of Households with a Tablet	57.9%
Percentage of Households with Only a Tablet	1.3%





Observations

Based on the internet usage and median household income information of Mahoning County, the following observations can be made:

- **High Cable Internet Adoption**: The majority of households in Mahoning County have cable internet, with 97.3% of households using this technology, indicating a well-established cable infrastructure.
- **Device Usage**: A high percentage of households (90.6%) own one or more devices, with 90.6% having a desktop or laptop computer, and 82.7% owning a smartphone. This suggests strong digital device penetration in the community.

- **Significant Fixed Cellular Usage**: Fixed cellular internet is used by 73.6% of households, showing it is a popular option, possibly due to its availability in areas where wired options might be limited.

Statement of Connectivity Need

The following broadband speed map is based on the FCC Broadband Deployment data representing the highest ISP-reported speed per census block.

Download/Upload Speed Categories

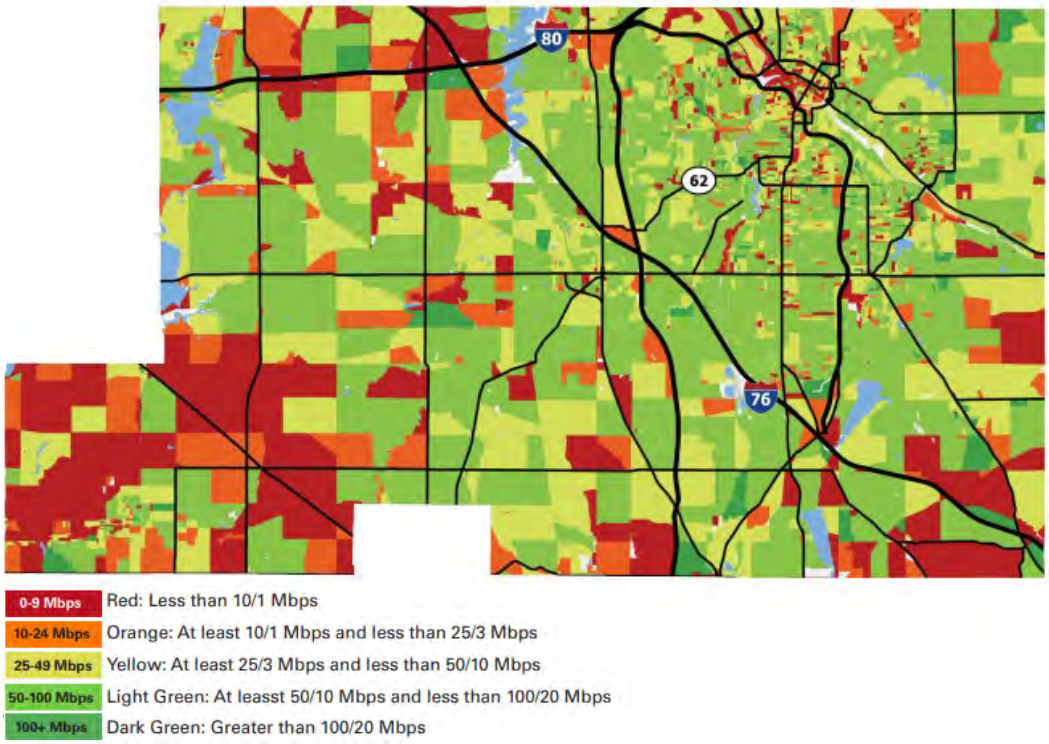
Speed Category	Description	Color on Map
No Service	No broadband service available	Gray
Below 25/3 Mbps	Download speeds below 25 Mbps	Red
	Upload speeds below 3 Mbps	
25/3 to 50/10 Mbps	Download speeds between 25 Mbps and 50 Mbps	Orange
	Upload speeds between 3 Mbps and 10 Mbps	

50/10 to 100/20 Mbps	Download speeds between 50 Mbps and 100 Mbps	Yellow
	Upload speeds between 10 Mbps and 20 Mbps	
100/20 to 200/50 Mbps	Download speeds between 100 Mbps and 200 Mbps	Green
	Upload speeds between 20 Mbps and 50 Mbps	
Above 200/50 Mbps	Download speeds above 200 Mbps	Dark Green
	Upload speeds above 50 Mbps	

Observations

- **Youngstown Area**: This area shows a variety of speeds, with significant portions having speeds between 100/20 Mbps and above 200/50 Mbps.
- **Sebring Area**: Predominantly lower speeds with some areas in the 25/3 to 50/10 Mbps range.
- **Central Mahoning**: Mostly high-speed coverage with areas having speeds above 100/20 Mbps, reflecting better broadband infrastructure.
- **Rural Areas**: Significant portions of rural Mahoning County have lower speeds, especially below 25/3 Mbps, indicating underserved areas.

This breakdown provides an overview of the broadband speed distribution in Mahoning County based on the provided map, highlighting the disparities in internet service quality across different regions.



Download Speeds from BroadbandOhio

Symmetrical download and upload broadband speeds best provide robust, reliable, and fast service.

Fiber is the best broadband technology for speed, durability, reliability, and security, and it can offer high download and upload speeds that are equal. The above maps illustrate the need for more robust service in the more rural areas. We suggest focusing on these areas for future broadband improvement and growth efforts in Mahoning County.

SECTION 2

Digital Equity

Section 2. Digital Equity Plan

A. Introduction and Vision for Digital Equity

Mahoning County aims to achieve digital equity by ensuring all residents have access to affordable, high-speed internet, and the digital skills necessary to participate fully in the modern economy. This vision aligns with the county's commitment to bridging the digital divide and enhancing opportunities for education, healthcare, and economic growth. The county's mission is to create an inclusive digital environment that empowers all community members, particularly underserved populations, by addressing key barriers such as affordability, access to devices, and digital literacy.

Problem Statement	Mahoning County struggles with affordable high-speed internet access, digital literacy, and connectivity, particularly impacting low-income, senior, disabled, and rural & urban populations, hindering education and economic growth.
Vision Statement	Mahoning County envisions a community where all residents, regardless of their socio-economic status or geographic location, have equitable access to high-speed internet and the necessary digital tools to thrive in a digital world
Mission Statement	Our mission is to implement comprehensive strategies that enhance digital inclusion, promote digital literacy, and provide affordable internet access to all residents of Mahoning County.
Values	**Inclusivity:** Ensuring no one is left behind in the digital age. **Accessibility:** Providing reliable internet access and digital resources to all. **Collaboration:** Working together with local organizations and stakeholders to achieve common goals. **Empowerment:** Enabling residents with the skills and tools needed to succeed digitally.

Broadband Infrastructure Relationship

The broadband plan for Mahoning County seeks a cooperative approach with local governments, schools, community groups, and private partners. The goal is to expand broadband access, enhance infrastructure, lower costs, and provide reliable high-speed internet for all residents, especially those underserved.

Key aspects of this relationship include:

1. **Public-Private Partnerships:**
    - Collaborate with internet service providers (ISPs) to extend broadband infrastructure to rural and underserved areas.

- Leverage state and federal funding, such as the Broadband Equity Access and Deployment (BEAD) program, to support infrastructure projects (tribtoday.com) (Mahoning County OH Gov).

2. **Community Engagement:**
   - Engage local communities and organizations to identify specific connectivity needs and tailor solutions accordingly.
   - Foster partnerships with community anchor institutions, such as schools, universities, and libraries, to provide accessible internet hubs and digital literacy programs.
3. **Infrastructure Development:**
   - Invest in the deployment of fiber optic networks and other high-speed internet technologies to ensure robust connectivity **where feasible.**
   - Utilize existing public infrastructure, such as utility poles and public buildings, to facilitate network expansion.
4. **Affordability and Accessibility:**
   - Work with ISPs to offer affordable internet plans for low-income households.
   - Implement programs to provide free or low-cost devices to residents in need, ensuring they have the necessary tools to access the internet.
5. **Sustainability and Future-Proofing:**
   - Ensure that new broadband infrastructure is scalable and can accommodate future technological advancements.
   - Promote digital literacy and cybersecurity awareness to help residents safely and effectively use online resources.

By fostering a strong, collaborative broadband infrastructure relationship, Mahoning County can achieve digital equity, enhancing the quality of life, educational opportunities, and economic growth for all its residents.

Desired Relationship with Broadband Infrastructure

Relationship Type	Description	Advantages	Disadvantages
Private Ownership	The community relies on private ISPs to provide broadband services.	Convenience, minimal direct public investment	Limited competition, varying service quality, higher costs
Municipal Broadband	The community owns and operates its broadband network through a local government entity.	Direct community control, prioritizes affordability and service quality	Requires significant public investment, potential for complex management and operational challenges

Cooperative	Community members collectively own and manage the broadband infrastructure.	Promotes local decision-making, strong community engagement, potential for shared benefits	Requires community buy-in, potential for uneven expertise among members, possible funding challenges
Public-Private Partnership	The community partners with a private company to build and manage the network while maintaining certain control and regulatory oversight.	Combines public interest with private expertise, potential for efficient management and innovative solutions	May require complex agreements, potential for conflicts of interest, and ensuring public benefits are maintained

Explanation and Context:

- **Private Ownership:** This model involves private ISPs providing broadband services with minimal direct public involvement. While convenient, this can lead to limited competition among providers, resulting in higher costs and inconsistent service quality for the community.
- **Municipal Broadband:** Under this model, the community's local government owns and operates the broadband network. This allows for direct control over pricing and service quality, ensuring that the community's needs are prioritized. However, it requires substantial public investment and can be challenging to manage effectively.
- **Cooperative:** A cooperative broadband infrastructure is collectively owned and managed by community members. This model fosters local decision-making and strong community engagement. It can effectively address the community's specific needs, but it requires significant buy-in from residents and can face funding and expertise challenges.
- **Public-Private Partnership:** This approach involves collaboration between the community and a private company. The partnership leverages private sector expertise while maintaining public oversight to ensure the network serves the community's best interests. While potentially efficient and innovative, these partnerships require careful negotiation to balance public and private interests and ensure community benefits.

By understanding these common broadband infrastructure relationship types, Mahoning County can strategically choose the model that best aligns with its goals of achieving digital equity, improving connectivity, and fostering community engagement.

Community Organization Engagement

The engagement of community organizations is a pivotal element in advancing digital equity in Mahoning County. This section recaps the insights and contributions from various community organizations, as detailed in the digital equity interview recaps included in the appendix.

Family Tech Connect focuses on supporting seniors in overcoming technological challenges. They provide in-home coaching, device setup assistance, and digital literacy training. Their primary goal is to ensure seniors can use technology effectively, which includes understanding basic concepts and overcoming financial barriers to internet access.

Oak Hill Collaborative offers a wide range of computer classes from basic skills to advanced technologies like 3D printing. They also provide free refurbished computers to financially qualified individuals who complete their training programs. Their emphasis is on reaching urban areas and creating community events that demonstrate the practical benefits of digital connectivity. All while providing these services at no cost to the recipients.

Youngstown State University (YSU) is committed to ensuring digital equity for its students and the broader community. They provide loaner laptops, focus on digital accessibility for individuals with disabilities, and offer digital literacy training. YSU also collaborates on initiatives to improve digital equity in Mahoning County.

Mahoning-Youngstown Community Action Partnership (MyCap) serves low-income individuals, focusing on affordability and maintaining internet service. They highlight the importance of device access and digital literacy, noting that many clients lack computers and rely solely on mobile phones, which limits their engagement with digital resources.

Access Council provides internet connectivity and data services to schools and libraries in Mahoning and Columbiana counties. They focus on expanding fiber infrastructure and ensuring reliable connectivity, particularly in rural areas. Their partnerships with various entities help enhance digital equity and support economic development.

Common challenges identified include the affordability of internet services, with high costs being a significant barrier, particularly for seniors and low-income individuals. Many residents lack access to necessary devices like computers and tablets, relying solely on mobile phones. There is a notable gap in digital literacy, especially among seniors, requiring targeted programs and support. Insufficient infrastructure in rural areas makes reliable internet access difficult. Effective communication and engagement strategies are needed to raise awareness of available resources. Better coordination among organizations is essential for pooling resources and creating comprehensive solutions.

Strategies for effective engagement include fostering stronger partnerships between community organizations, schools, libraries, and local governments to create a unified approach to digital equity. Developing outreach campaigns using traditional media, community events, and leveraging community leaders to disseminate information is crucial. Expanding device access programs to provide affordable or free devices, particularly targeting seniors and students, and enhancing digital literacy training to cover a range of digital skills, using various instructional

methods to meet diverse needs, are important steps. Advocating for investment in broadband infrastructure and exploring innovative solutions like community WiFi hotspots and mobile internet units can improve rural connectivity.

The engagement of community organizations in Mahoning County is crucial for addressing the digital equity challenges identified. Their unique insights and contributions provide a foundation for collaborative efforts to bridge the digital divide. The detailed recaps of these interviews, included in the appendix, offer further insights into the specific roles and strategies of each organization.

Appendix A: Digital Equity Interview Recaps. The detailed recaps of the digital equity meetings held in Mahoning County provide a comprehensive overview of the efforts and insights shared by the participants. These recaps are essential for understanding the current state of digital equity and the collaborative strategies required to enhance digital inclusion in the county.

Alignment with Existing Goals

The Mahoning County's Digital Equity vision, mission, and values support and are aligned with the following existing goals:

1. **Increase Broadband Access:**
    - **Goal:** Expand broadband infrastructure to ensure that all residents have access to high-speed internet.
    - **Alignment:** This supports the Digital Equity vision by addressing the key barrier of internet accessibility, particularly in underserved and rural areas.
2. **Enhance Digital Literacy:**
    - **Goal:** Provide digital literacy programs to improve residents' ability to use digital tools and resources.
    - **Alignment:** This aligns with the mission to empower all community members with the skills necessary to participate in the digital economy.
3. **Affordable Internet Services:**
    - **Goal:** Develop partnerships with ISPs to offer affordable internet plans to low-income households.
    - **Alignment:** This supports the value of inclusivity by ensuring that cost is not a barrier to digital access for underserved populations.
4. **Community Engagement and Collaboration:**
    - **Goal:** Foster collaborations with local organizations, educational institutions, and community groups to promote digital inclusion.
    - **Alignment:** This aligns with the value of collaboration by leveraging collective efforts to enhance digital equity.

Additionally, Mahoning County's goals are also aligned with the State of Ohio's Digital Equity priorities and goals in the following ways:

State-Aligned Digital Equity Goals:

1. **Economic and Workforce Development:**
    - **Alignment:** By increasing broadband access and digital literacy, Mahoning County supports Ohio's goal of enhancing economic opportunities and workforce development. Reliable internet is essential for job searches, remote work, and accessing online training programs.
2. **Educational Outcomes:**
    - **Alignment:** Ensuring all students have access to high-speed internet and necessary devices aligns with Ohio's goal to improve educational outcomes. This enables students to participate in online learning and access digital educational resources.
3. **Health Outcomes:**
    - **Alignment:** Expanding broadband access supports Ohio's goal to improve health outcomes by facilitating telehealth services. This is especially important for rural and underserved areas where healthcare access is limited.
4. **Civic Engagement:**
    - **Alignment:** Enhancing digital literacy and providing affordable internet access aligns with Ohio's goal to increase civic engagement. Residents can more easily access government services and participate in the democratic process online.

Support Statements:

- **Broadband Ohio Initiatives:**
    - Mahoning County's efforts align with the Broadband Ohio initiatives aimed at closing the digital divide across the state through infrastructure investments and public-private partnerships (tribtoday.com).
- **American Rescue Plan Act (ARPA) Funding:**
    - The utilization of ARPA funds to support broadband expansion in Mahoning County reflects alignment with state strategies to leverage federal resources for enhancing digital infrastructure (Mahoning County OH Gov).

By aligning with these state and local goals, Mahoning County ensures a coordinated approach to achieving digital equity, enhancing the quality of life for all residents, and fostering a more inclusive digital environment.

Planning Process Summary

The Mahoning County's development of its Digital Equity vision, mission, goals, and values involved participation from the following stakeholders:

- Family Tech Connect
- Oak Hill Collaborative
- Youngstown State University (YSU)
- Mahoning-Youngstown Community Action Partnership (MyCap)

- Access Council
- Eastgate Regional Council of Governments
- Local ISPs (e.g., Spectrum, Brightspeed)
- Mahoning County Planning Commission
- Community Anchor Institutions (e.g., schools, libraries)
- Local Government Representatives
- Nonprofit Organizations
- Community Members

These stakeholders collaborated to identify key barriers to digital equity, such as affordability, access to devices, digital literacy, and connectivity issues in rural areas. Their input was crucial in shaping the strategic approach to bridge the digital divide in Mahoning County, ensuring that the community's needs and perspectives were fully integrated into the planning process.

Asset Mapping Tool Development, Data Collection, and Dissemination

To develop the Mahoning County Single View, Mahoning County followed the steps below:

1. **Template Adoption and Development:**
    - **Step 1:** Identify and adopt a suitable template for the asset inventory by researching best practices and existing models from other communities.
    - **Step 2:** Customize the template to address the specific needs and characteristics of Mahoning County, ensuring it captures all relevant digital equity assets and resources.
2. **Data Gathering and Storage:**
    - **Step 3:** Collaborate with local stakeholders to gather data on existing digital equity assets, including public libraries, community centers, schools, ISPs, and nonprofit organizations.
    - **Step 4:** Incorporate publicly available data, including the Geotel communications database, FCC data, and other relevant sources.
    - **Step 5:** Utilize GIS mapping tools and databases to store and visualize the collected data, making it accessible for analysis and planning.

Throughout the Digital Equity planning process, Mahoning County leveraged partnerships with the following stakeholders to assist with gathering asset data and promoting awareness of the Mahoning County Single View:

- Family Tech Connect
- Oak Hill Collaborative
- Youngstown State University (YSU)
- Mahoning-Youngstown Community Action Partnership (MyCap)
- Access Council
- Eastgate Regional Council of Governments
- Local ISPs (e.g., Spectrum, Brightspeed)
- Community Anchor Institutions (e.g., schools, libraries)

- Local Government Representatives
- Nonprofit Organizations
- Community Members

These partners contributed significantly by identifying digital equity barriers for priority populations, assisting with community engagement convenings, and being actively involved with the plan implementation phase.

The Mahoning County developed a comprehensive strategy for disseminating the Mahoning County Single View data within the community. Methods utilized by the county **could** include:

1. **Website Publication:**
    - Publish the Mahoning County Single View on the official Mahoning County website and other relevant community websites to ensure broad accessibility.
2. **Internet Service Provider Channels:**
    - Partner with local ISPs to distribute information about the Mahoning County Single View through their communication channels, such as newsletters, customer emails, and service announcements.
3. **Targeted Email Communication:**
    - Send targeted emails to key partners, community organizations, educational institutions, and other stakeholders to inform them about the availability and use of the Mahoning County Single View.
4. **Community Events and Workshops:**
    - Present the Mahoning County Single View at community events, workshops, and town hall meetings to raise awareness and encourage community engagement.
5. **Social Media and Local Media:**
    - Utilize social media platforms and local media outlets to promote the Mahoning County Single View and provide updates on digital equity initiatives.
6. **Printed Materials:**
    - Distribute printed brochures, flyers, and posters in public spaces such as libraries, community centers, and government offices to reach residents who may not have regular internet access.

By employing these methods, Mahoning County aims to ensure that the Mahoning County Single View is widely accessible and effectively supports the community's digital equity goals.

A copy of the Mahoning County's Digital Equity Asset Inventory is available in the Appendix A of the Connectivity Plan.

C. Meaningful Community Engagement

Identify Priority Populations

Based on the demographic and internet usage data of Mahoning County, the following groups have been identified as priority populations most at risk of being impacted by the digital divide:

1. **Low-Income Households**
2. **Seniors**
3. **Individuals with Disabilities**
4. **Rural Residents**
5. **Members of Racial or Ethnic Minority Groups**

Demographic and Connectivity Statistics

Mahoning County, like many areas, faces significant digital equity challenges. According to recent data:

- **Low-Income Households:** A large portion of these households lack access to affordable high-speed internet, limiting their ability to engage in remote work, online education, and access essential services.
- **Seniors:** Many seniors struggle with digital literacy and the affordability of devices and internet services, impacting their ability to access telehealth and stay connected with family and community services.
- **Individuals with Disabilities:** This group faces unique challenges, including the need for accessible technologies and services that are often not readily available or affordable.
- **Rural Residents:** Geographic barriers contribute to limited broadband infrastructure, resulting in slow or non-existent internet services in rural parts of Mahoning County.
- **Members of Racial or Ethnic Minority Groups:** These communities often experience higher rates of digital exclusion due to economic disparities and systemic barriers to access.

To ensure these identified priority populations are engaged and included in the Digital Equity planning and implementation processes, Mahoning County could employ the following strategies:

1. **Community Outreach and Engagement:**
    - **Public Meetings and Workshops:** Host regular community meetings and workshops in accessible locations to gather input and feedback from residents about their digital needs and challenges.
    - **Partnerships with Local Organizations:** Collaborate with community organizations, such as Family Tech Connect, Oak Hill Collaborative, and MyCap, which have established relationships with these populations to facilitate engagement and information dissemination.
2. **Targeted Surveys and Focus Groups:**
    - Conduct surveys and focus groups specifically targeting these priority populations to better understand their unique barriers and needs regarding digital access and literacy.
3. **Accessible Communication Channels:**
    - Use multiple communication channels, including social media, local media, direct mail, and community bulletin boards, to reach residents who may not have regular internet access.
4. **Digital Literacy Programs:**

- Develop and expand digital literacy programs tailored to the needs of these priority groups, providing hands-on training and support to enhance their digital skills and confidence.

5. **Affordable Device and Internet Programs:**
    - Partner with ISPs and technology companies to offer subsidized internet plans and affordable devices to low-income households, seniors, and individuals with disabilities.

Impact of Proposed Projects on Priority Populations

The proposed digital equity projects could potentially directly impact these priority populations by:

- **Increasing Access:** Expanding broadband infrastructure to underserved areas, particularly rural regions, ensuring reliable high-speed internet access.
- **Enhancing Affordability:** Implementing programs to provide affordable internet plans and devices, reducing the financial barriers to connectivity.
- **Improving Digital Literacy:** Offering digital literacy training tailored to the needs of seniors, individuals with disabilities, and low-income residents, empowering them to use digital tools effectively.
- **Promoting Inclusivity:** Ensuring that all community members, regardless of their socio-economic status or geographic location, have the resources and support needed to participate fully in the digital world.

By focusing on these strategies, Mahoning County aims to bridge the digital divide, fostering a more inclusive and connected community where all residents can thrive in the digital age.

Stakeholder Engagement and Collaboration

As part of an inclusive Digital Equity planning process, Mahoning County understands that it must work collaboratively with additional stakeholders, including Community Anchor Institutions, to ensure that identified priority populations in the community are engaged throughout the process, especially during the planning and implementation phases, to ensure that equitable internet access for all is achieved.

Priority Population Stakeholder Table

Priority Population	Stakeholders Name	Role(s)
Low-Income Households	Oak Hill Collaborative, MyCap	Service Provider, Community Outreach
Seniors	Family Tech Connect, Oak Hill Collaborative	Digital Literacy Training, Support
Individuals with Disabilities	My Cap, Oak Hill Collaborative	Low Income, Accessibility Support, Advocacy
Rural Residents	Eastgate Regional Council	Infrastructure Planning, Advocacy
Racial/Ethnic Minority Groups	Youngstown State University (YSU), Oak Hill Collaborative	Research, Community Engagement

Mahoning County can use a diverse and collaborative method to gather participation, feedback, and data from priority populations to assess the effectiveness and progress towards achieving digital equity, aligning with State Digital Equity goals. Some valuable data from stakeholder engagement might include:

- **Low-Income Households:**
  - **Data Collected:** Income levels, existing internet service subscriptions, barriers to affordability.
  - **Utilization:** This data would inform the design of subsidized internet plans and affordable device programs, ensuring low-income households can maintain connectivity and access essential online services.
- **Seniors:**
  - **Data Collected:** Levels of digital literacy, types of devices used, primary online activities.
  - **Utilization:** This information would be used to tailor digital literacy programs to the specific needs of seniors, providing them with the skills to navigate digital tools and access online services like telehealth and social connections.
- **Individuals with Disabilities:**
  - **Data Collected:** Specific accessibility requirements, types of assistive technologies needed.

    - **Utilization:** By understanding the accessibility needs of this group, the county can develop accessible digital platforms and ensure that devices and services are inclusive and usable for individuals with disabilities.
- **Rural Residents:**
    - **Data Collected:** Broadband coverage maps, data on service speeds and reliability.
    - **Utilization:** This data would prioritize infrastructure investments in areas with the least connectivity, ensuring that rural residents have access to reliable high-speed internet, which is crucial for economic development, education, and healthcare.
- **Racial/Ethnic Minority Groups:**
    - **Data Collected:** Internet access disparities, socio-economic factors affecting digital inclusion.
    - **Utilization:** The data would address systemic barriers and inform targeted outreach programs that promote digital equity among minority groups, ensuring they have equal access to digital resources and opportunities.

Examples of Demographic Data Utilized:

- **Low-Income Households:** Many households lack affordable high-speed internet, limiting their ability to engage in remote work, online education, and access essential services.
- **Seniors:** Highlights that seniors face challenges with digital literacy and the affordability of devices and internet services, impacting their ability to access telehealth and stay connected with family and community services.
- **Rural Residents:** Geographic barriers contribute to limited broadband infrastructure, resulting in slow or non-existent internet services in rural parts of Mahoning County.
- **Racial/Ethnic Minority Groups:** These communities often experience higher rates of digital exclusion due to economic disparities and systemic barriers to access.

This information could assist Mahoning County in creating a comprehensive and adaptive digital equity plan that addresses the varied needs of its diverse population, ensuring that all residents can benefit from the digital era. Such a strategy would demonstrate achievements and outcomes aligned with state digital equity objectives.

Create Outreach and Engagement Plan

Mahoning County recognizes the necessity of employing diverse outreach strategies and techniques to encourage engagement from stakeholders involved in Digital Equity planning and those representing priority populations. The county places high importance on feedback, involvement, support, and commitment from the community, specifically from trusted partners who advocate for the populations most affected by the digital divide.

Consequently, through Mahoning County's Digital Equity planning process, the following Outreach and Engagement Plan has been formulated and could be executed:

Outreach and Engagement Planning Table

Component	Description	Key Activities	Responsible Party
Needs Assessment	Assess the digital equity needs of the target communities.	Conduct surveys and focus groups to gather data on digital access and literacy.	Digital Equity Team
Stakeholder Mapping	Identify key stakeholders and partners for collaboration.	Identify local nonprofits, government agencies, and businesses interested in digital equity.	Digital Equity Team
Community Engagement	Engage with underserved communities to understand their specific challenges and needs.	Host community meetings and workshops to gather input.	Outreach Coordinator
Digital Literacy Programs	Develop and implement digital literacy programs.	Create a curriculum for digital skills training; Partner with libraries and community centers to offer workshops.	Education Coordinator
Device Distribution	Ensure access to affordable devices for underserved populations.	Establish partnerships with device manufacturers; Organize device distribution events.	Technology Coordinator
Broadband Expansion	Improve internet access in underserved areas.	Partner with ISPs to extend coverage; Set up public Wi-Fi hotspots.	Infrastructure Team
Technology Hubs	Establish community technology hubs.	Identify suitable locations and secure funding; Equip hubs with computers and internet access.	Facilities Coordinator

Component	Description	Key Activities	Responsible Party
Policy Advocacy	Advocate for policies supporting digital equity.	Engage with policymakers and advocate for digital inclusion legislation.	Advocacy Team
Private Sector Engagement	Collaborate with businesses for support.	Reach out to local companies for sponsorship and support; Organize corporate volunteer programs.	Partnerships Coordinator
Progress Monitoring	Continuously track and evaluate progress.	Collect data on key performance indicators; Adjust strategies based on results.	Data Analyst
Community Outreach Events	Host community events to promote digital equity.	Organize digital fairs, workshops, and awareness campaigns.	Outreach Coordinator

Outreach and Engagement Plan Description

Needs Assessment: Mahoning County would conduct comprehensive needs assessments through surveys and focus groups to gather detailed data on digital access, literacy, and barriers faced by the community, particularly the priority populations. This data would inform targeted interventions and resource allocation.

Stakeholder Mapping: The county would identify and engage key stakeholders, including local nonprofits, government agencies, educational institutions, and businesses, to collaborate on digital equity initiatives. These stakeholders would play critical roles in outreach, service delivery, and advocacy.

Community Engagement: Mahoning County would host community meetings and workshops in accessible locations to gather input and feedback from residents, ensuring their voices are heard and their needs are addressed. This engagement would help tailor digital equity programs to the specific needs of different populations.

Digital Literacy Programs: The county would develop and implement digital literacy programs, partnering with libraries, community centers, and educational institutions to offer workshops and

training sessions. These programs would focus on enhancing digital skills among seniors, low-income households, and other underserved groups.

Device Distribution: Mahoning County would work with device manufacturers and technology companies to provide affordable or free devices to underserved populations. Distribution events would be organized to ensure that those in need have access to essential digital tools.

Broadband Expansion: The county would collaborate with ISPs to extend broadband coverage to underserved areas, particularly rural regions. This includes setting up public Wi-Fi hotspots and advocating for infrastructure investments to improve connectivity.

Technology Hubs: Community technology hubs would be established in strategic locations, providing residents with access to computers, high-speed internet, and digital literacy resources. These hubs would be equipped and managed in partnership with local organizations.

Policy Advocacy: Mahoning County would engage with policymakers at local, state, and federal levels to advocate for legislation and policies that support digital equity. This includes efforts to secure funding and create supportive regulatory environments for broadband expansion.

Private Sector Engagement: The county would reach out to local businesses for sponsorship and support, organizing corporate volunteer programs and other initiatives to involve the private sector in digital equity efforts.

Progress Monitoring: Continuous monitoring and evaluation of progress would be conducted through the collection of key performance data. This data would be used to adjust strategies and ensure that digital equity goals are being met effectively.

Community Outreach Events: Regular community outreach events, such as digital fairs, workshops, and awareness campaigns, would be organized to promote digital equity and engage residents in ongoing initiatives.

By implementing this comprehensive Outreach and Engagement Plan, Mahoning County aims to ensure active participation from all community members, particularly those most impacted by the digital divide, and achieve its digital equity goals in alignment with state priorities.

Survey Distribution and Promotion

Mahoning County should consider a blend of both online and offline strategies to execute the Digital Equity Community Survey. To effectively reach the particular demographics included in the survey, the following approaches should be adopted:

- **Community Groups:** Engaged local community groups such as MyCap and Oak Hill Collaborative to administer the survey at key community hubs and events.
- **Public Libraries:** Provided paper copies of the survey in public libraries and assisted residents in completing them.

- **Senior Centers:** Distributed the survey at senior centers to ensure older adults were represented.
- **Local Events:** Conducted outreach at local events and workshops to gather a broad range of responses.

Carry-out Community Engagement Activities

Beyond the Digital Equity Community Survey, Mahoning County could actively involve locals to gather feedback and boost participation in creating the digital equity plan. This included:

- **In-Person Events:** Hosted town hall meetings and community workshops to discuss digital equity and gather input.
- **Direct Mail:** Sent informational brochures and surveys to residents' homes.
- **Online Outreach:** Used social media campaigns and the county's official website to promote the survey and digital equity initiatives.
- **Workshops and Focus Groups:** Organized targeted workshops and focus groups with priority populations to gain deeper insights into their needs and challenges.
- **Marketing Campaigns:** Launched a public awareness campaign to highlight the importance of digital equity and encourage community involvement.

In this example 15 engagement activities **would** be conducted in the community across 45 days.

Example: Engagement Activity Matrix

Community Engagement Activities for Digital Equity	Description	Objective/ Outcome	Date/ Time	Location/ Venue	Lead/ Coordinator	Resources Needed	Notes
1. Community Meeting	Hold a town hall-style meeting	Share information on internet access options	Jan 15	Community Center	Outreach Coordinator	Presentation materials, AV equipment	Agenda and speakers confirmed
2. Stakeholder Roundtable	Convene key stakeholders	Discuss strategies and partnerships	Jan 20	Town Hall	Digital Equity Team	Meeting agenda, invitees	Stakeholders confirmed to attend
3. Community Webinar	Host an online information session	Raise awareness and educate community members	Jan 25	Online Platform	Outreach Coordinator	Webinar platform, speakers	Webinar registration open

4. Public Awareness Campaign	Launch a digital equity awareness campaign	Raise awareness and promote broadband access	Feb 1-Feb 28	Online and Local	Marketing Team	Marketing materials, media outreach	Social media content planned
5. Focus Group Discussions	Organize small group discussions	Gather in-depth insights and suggestions	Feb 10-20	Various Locations	Focus Group Facilitator	Facilitators, discussion guides	Focus group topics identified

By implementing this comprehensive Outreach and Engagement Plan, Mahoning County would aims to ensure active participation from all community members, particularly those most impacted by the digital divide, and achieve its digital equity goals in alignment with state priorities.

Mahoning County's Digital Equity planning process has contributed to its understanding of unique barriers to achieving digital equity across a wide range of covered populations. The table below summarizes the respective unique barriers for each of the covered populations present in the community:

Covered Population	**Description**
Individuals who live in covered households	Many households face economic barriers that limit their ability to afford high-speed internet and necessary devices. Additionally, there are significant disparities in digital literacy and access to educational resources, exacerbating the digital divide.
Aging individuals	Older adults often struggle with digital literacy, making it difficult for them to navigate online services. They may also face financial constraints that limit their ability to afford internet services and digital devices.
Incarcerated individuals, other than individuals who are incarcerated in a Federal correctional facility	Incarcerated individuals face barriers such as lack of access to digital literacy programs and limited availability of devices and internet services, hindering their ability to acquire necessary digital skills for reentry into society.
Veterans	Veterans may encounter challenges related to digital literacy and accessing affordable

	internet services and devices. Tailored digital literacy training and support for veterans are crucial to bridge these gaps.
Individuals with disabilities	This group requires accessible technologies and internet services. Barriers include high costs of specialized devices and a lack of digital resources tailored to their needs.
Individuals with a language barrier	Non-English speakers face language barriers in accessing digital resources and services. There is a need for bilingual digital literacy programs and multilingual support on digital platforms.
Individuals who are English learners	Similar to those with language barriers, English learners struggle with navigating online resources that are predominantly in English. Digital literacy programs that address language needs are essential.
Those with low levels of literacy	Individuals with low literacy levels often lack the foundational skills required to use digital tools effectively. There is a need for basic digital literacy programs to bridge this gap.
Individuals who are members of a racial or ethnic minority group	Racial and ethnic minorities often experience economic disparities and systemic barriers to digital access, including affordability and availability of high-speed internet and devices.
Individuals who primarily reside in a rural area	Rural residents face geographic barriers to broadband infrastructure, resulting in slower internet speeds and limited service availability compared to urban areas.
Other priority populations	Other groups, such as low-income families and single-parent households, face compounded challenges related to affordability, access to devices, and digital literacy, necessitating targeted support programs.

E. Developing Implementation Strategies

Existing Programs

Based on the unique barriers to achieving Digital Equity identified in the previous section, Mahoning County identified the following existing programs that address the respective needs/barriers of the applicable covered populations:

Covered Population	Lead Entity/ Organization of Existing Program	Existing Program Name	Needs/ Barriers Addressed	Possible Funding/ Sustainability
Individuals who live in covered households	Mahoning-Youngstown Community Action Partnership (MyCap)	Digital Literacy and Connectivity Program	Affordability of internet services, lack of digital literacy, access to devices	Funded by federal and state grants; seeking additional private sector partnerships for sustainability
Aging individuals	Oak Hill Collaborative	Senior Digital Assistance Program	Digital literacy training, device setup and support, access to affordable internet	Funded by local grants and donations; exploring sustainable funding through partnerships with tech companies
Incarcerated individuals	Mahoning County Jail Education Program	Reentry Digital Skills Program	Providing digital literacy and job readiness training to incarcerated individuals	Funded by county and state corrections education funds; looking for additional grant funding for expansion
Veterans	Mahoning County Veterans Service Commission	Veterans Digital Inclusion Program	Access to devices, affordable internet, and digital literacy training tailored to veterans	Funded by federal and state veterans' services grants; sustainable through ongoing government support

Individuals with disabilities	Oak Hill Collaborative	Accessible Technology Initiative	Ensuring access to accessible technologies and internet services for individuals with disabilities	Funded by state disability programs and local non-profits; seeking continuous funding through tech grants
Individuals with a language barrier	Hispanic Outreach Center	Bilingual Digital Access Program	Language barriers in accessing digital resources, digital literacy training in Spanish	Funded by local community grants and private donations; sustainability through community support and grants
Individuals who are English learners	Youngstown State University (YSU)	English Learners Digital Literacy Program	Providing digital literacy and internet access to English learners	Funded by educational grants and university funds; sustainable through continuous educational funding
Those with low levels of literacy	Mahoning County Library System	Literacy and Digital Skills Program	Addressing low literacy levels through digital literacy and educational resources	Funded by state library grants and local government support; exploring private donations for sustainability
Individuals who are members of a racial or ethnic minority group	Youngstown Urban Minority Alcoholism and Drug Abuse Outreach Program (YUMADAOP)	Minority Digital Equity Initiative	Addressing digital access and literacy disparities among racial and ethnic minorities	Funded by state and federal health grants; looking for additional funding through non-profit partnerships

Individuals who primarily reside in a rural area	Eastgate Regional Council of Governments	Rural Broadband Expansion Project	Expanding broadband infrastructure and improving connectivity in rural areas	Funded by federal and state infrastructure grants; sustainable through ongoing government and private sector investments
Other priority populations	Mahoning County Planning Commission	Inclusive Digital Access Program	General digital access and literacy support for various underserved populations	Funded by county development funds and state grants; exploring sustainable funding through partnerships

Description of Existing Efforts and Gaps

While these programs address various needs and barriers, there are areas where existing efforts fall short:

- **Geographic Barriers:** Many resources are centralized in downtown areas, creating transportation barriers for residents in outlying regions.
- **Funding Uncertainty:** Programs reliant on grant funding, such as the bilingual digital access program at Thrive MV face uncertainty regarding the renewal of grants.
- **Outreach Challenges:** Despite efforts, some programs struggle to reach all members of their target populations, particularly those who are unaware of available resources.

By addressing these gaps through enhanced outreach, sustainable funding strategies, and the expansion of services to more accessible locations, Mahoning County can better meet the needs of its diverse populations and move closer to achieving digital equity.

Mahoning County's Digital Equity Plan **could include** implementation strategies to address the following needs for each of the covered populations in the community:

Broadband Access Expansion

Objective: Increase the availability of affordable high-speed internet access.

1. **Expand Infrastructure:** Partner with ISPs and leverage state and federal grants to extend broadband infrastructure in underserved areas, particularly rural regions.
2. **Affordability Programs:** Implement subsidy programs for low-income households to reduce the cost of high-speed internet services.
3. **Public Wi-Fi:** Establish public Wi-Fi hotspots in community centers, libraries, and other public spaces to provide free internet access to residents.

Digital Literacy Programs

Objective: Improve digital literacy and technology skills among underserved populations.

1. **Collaborate with Libraries:** Partner with libraries, schools, and community centers to offer digital literacy workshops and one-on-one training sessions.
2. **Mobile Training Units:** Deploy mobile digital literacy units to reach residents in remote and underserved areas.
3. **Online Resources:** Develop an online portal with tutorials and resources to help residents improve their digital skills at their own pace.

Online Accessibility and Inclusivity of Public Resources and Services

Objective: Ensure everyone has the same opportunity to engage with public resources and services online to increase civic participation.

1. **Accessible Websites:** Ensure all county and public service websites comply with ADA standards for accessibility.
2. **Multilingual Support:** Provide multilingual support and translation services on public websites to cater to non-English speakers.
3. **User-Friendly Interfaces:** Simplify online interfaces to make public services more accessible to individuals with low digital literacy.

Awareness and Use of Cybersecurity and Online Privacy Tools

Objective: Empower individuals, organizations, and communities to protect their digital assets, personal information, and online activities from cyber threats and privacy breaches.

1. **Cybersecurity Workshops:** Offer regular workshops and training sessions on cybersecurity practices and online privacy.
2. **Resource Distribution:** Distribute informational brochures and online resources on best practices for maintaining digital security.
3. **Community Awareness Campaigns:** Launch community awareness campaigns to highlight the importance of cybersecurity and online privacy.

Availability and Affordability of Consumer Devices

Objective: Ensure access to affordable devices and software.

1. **Device Donation Programs:** Establish device donation and refurbishment programs to provide affordable or free devices to low-income households.
2. **Bulk Purchasing:** Partner with technology companies to purchase devices in bulk at reduced prices and distribute them to residents.
3. **Financial Assistance:** Implement financial assistance programs to help residents purchase necessary devices and software.

Community Technology Hubs

Objective: Establish community centers equipped with technology resources.

1. **Fund Technology Hubs:** Fund and support the creation of technology hubs in underserved neighborhoods, equipped with computers, high-speed internet, and digital literacy resources.
2. **Technical Support Services:** Provide ongoing technical support and maintenance services at community technology hubs.
3. **Community Engagement:** Use technology hubs as centers for community engagement, hosting workshops, training sessions, and other digital inclusion activities.

Public-Private Partnerships

Objective: Foster collaboration between government, businesses, and nonprofits.

1. **Incentivize Investment:** Create incentives for businesses to invest in digital equity initiatives, such as tax breaks or public recognition programs.
2. **Collaborative Projects:** Develop collaborative projects with private sector partners to enhance digital infrastructure and services.
3. **Stakeholder Engagement:** Engage a broad range of stakeholders in planning and implementing digital equity initiatives.

Digital Inclusion Policies

Objective: Implement policies that promote digital equity.

1. **Legislation:** Promote legislation that ensures equal access to digital resources and opportunities for all residents.
2. **Policy Development:** Develop and implement local policies that address digital equity, such as zoning regulations that support broadband expansion.
3. **Advocacy:** Advocate for state and federal policies that support digital equity and provide funding for local initiatives.

By adopting these strategies, Mahoning County aims to address the digital equity needs of its residents comprehensively, ensuring that all covered populations have access to the necessary resources and opportunities to participate fully in the digital age.

Mahoning County has estimated the following costs and potential funding sources, based on the unique needs identified in the county's Digital Equity Plan, needed to support existing programs and the implementation of new digital inclusion strategies:

Funding Need (Estimate)	Amount of Funding Needed	Potential Funding Source(s)
Broadband Access Expansion	$16,000,000	Federal Broadband Infrastructure Grants, State Digital Equity Fund
Digital Literacy Programs	$500,000	National Telecommunications and Information Administration (NTIA), Local Education Grants
Online Accessibility and Inclusivity	$300,000	ADA Compliance Grants, Local Government Funding
Cybersecurity and Online Privacy Tools	$150,000	Cybersecurity and Infrastructure Security Agency (CISA) Grants, Private Sector Sponsorships
Affordable Devices and Software	$700,000	Device Donation Programs, Tech Company Partnerships
Community Technology Hubs	$1,000,000	Community Development Block Grants (CDBG), Private Foundations
Public-Private Partnerships	$250,000	Corporate Sponsorships, Economic Development Grants
Digital Inclusion Policies	$100,000	State and Federal Policy Advocacy Grants

ESTIMATED TOTAL: $19,000,000

The Mahoning County intends to utilize the potential funding sources detailed above, in addition to the Digital Equity Act grant programs, to address the digital inclusion needs of the community.

Description of Funding Sources:

1. **Federal Broadband Infrastructure Grants:** These grants are aimed at expanding broadband access to underserved areas, particularly rural regions, to ensure high-speed internet availability.
2. **State Digital Equity Fund:** This state-level funding supports initiatives that aim to bridge the digital divide through various programs and projects.
3. **National Telecommunications and Information Administration (NTIA):** Provides grants for broadband deployment and digital inclusion projects, including digital literacy programs.
4. **Local Education Grants:** These grants support educational initiatives, including digital literacy training for underserved populations.
5. **ADA Compliance Grants:** Funding aimed at ensuring digital platforms and resources comply with ADA standards, enhancing accessibility for individuals with disabilities.
6. **Local Government Funding:** Municipal funds allocated for community development and public service improvement projects.
7. **Cybersecurity and Infrastructure Security Agency (CISA) Grants:** Federal grants to enhance cybersecurity measures and promote online safety awareness.
8. **Private Sector Sponsorships:** Financial support from private companies interested in promoting digital equity and supporting community initiatives.
9. **Device Donation Programs:** Initiatives by tech companies and non-profits to provide refurbished devices to low-income households.
10. **Tech Company Partnerships:** Collaborations with technology companies to secure affordable or donated devices and software.
11. **Community Development Block Grants (CDBG):** Federal grants aimed at supporting community development projects, including technology hubs.
12. **Private Foundations:** Non-profit organizations that provide funding for community improvement projects, including digital equity initiatives.
13. **Corporate Sponsorships:** Financial support from businesses that invest in community development and digital inclusion programs.
14. **Economic Development Grants:** Grants that support initiatives aimed at economic growth, including improving digital infrastructure.
15. **State and Federal Policy Advocacy Grants:** Funding to support efforts in advocating for policies that promote digital equity and inclusivity.

By leveraging these funding sources, Mahoning County aims to implement comprehensive strategies that would significantly enhance digital equity, ensuring all residents have access to the digital resources and skills necessary for success in the modern world.

Potential Responsible Party for Implementation Strategies

The table below reflects the **potential** owner/responsible party for each of Mahoning County's digital inclusion strategies in a hypothetical illustration:

Need	Implementation Strategy	Owner/Responsible Party
Availability and Affordability	**Broadband Access Expansion:** Partner with ISPs and leverage state and federal grants to extend broadband infrastructure in underserved areas.	Eastgate Regional Council of Governments
	Affordability Programs: Implement subsidy programs for low-income households to reduce the cost of high-speed internet services.	Mahoning-Youngstown Community Action Partnership (MyCap)
	Public Wi-Fi: Establish public Wi-Fi hotspots in community centers, libraries, and other public spaces to provide free internet access to residents.	Mahoning County Public Library System
Accessibility and Inclusivity of Public Resources and Services	**Accessible Websites:** Ensure all county and public service websites comply with ADA standards for accessibility.	Mahoning County IT Department
	Multilingual Support: Provide multilingual support and translation services on public websites to cater to non-English speakers.	Hispanic Outreach Center
	User-Friendly Interfaces: Simplify online interfaces to make public services more accessible to individuals with low digital literacy.	Mahoning County Government Services

Need	Implementation Strategy	Owner/Responsible Party
Awareness and Use of Cybersecurity and Online Privacy Tools	**Cybersecurity Workshops:** Offer regular workshops and training sessions on cybersecurity practices and online privacy.	Mahoning County Cybersecurity Task Force
	Resource Distribution: Distribute informational brochures and online resources on best practices for maintaining digital security.	Mahoning County Public Library System
	Community Awareness Campaigns: Launch community awareness campaigns to highlight the importance of cybersecurity and online privacy.	Mahoning County Communications Office
Availability and Affordability of Consumer Devices	**Device Donation Programs:** Establish device donation and refurbishment programs to provide affordable or free devices to low-income households.	Oak Hill Collaborative
	Bulk Purchasing: Partner with technology companies to purchase devices in bulk at reduced prices and distribute them to residents.	Oak Hill Collaborative
	Financial Assistance: Implement financial assistance programs to help residents purchase necessary devices and software.	Oak Hill Collaborative , Mahoning County Department of Job and Family Services
Technical Support for Devices Available to Covered Populations	**Tech Support Hotlines:** Establish tech support hotlines to assist residents with device setup and troubleshooting.	Family Tech Connect

Need	Implementation Strategy	Owner/Responsible Party
	Community Tech Support Centers: Set up centers in libraries and community hubs to offer in-person technical support.	Oak Hill Collaborative
	Online Support Resources: Develop an online portal with FAQs and guides for common technical issues.	Mahoning County IT Department

By designating clear responsibilities, Mahoning County would aim to ensure effective implementation and coordination of its digital inclusion strategies, addressing the needs of all covered populations and promoting digital equity throughout the community.

Hypothetical Timeframes for Implementation Strategies

To fund, develop, and implement the respective digital inclusion strategies detailed above, Mahoning County anticipates achieving the following milestones and timeframes over the next five years:

Quarter / Year	Description of Digital Equity Milestone(s) Completed
Q4 2024	**Needs Assessment**: Conduct initial community surveys and focus groups to identify specific digital equity needs. Establish baseline data and identify priority populations.
Q4 2024	**Stakeholder Mapping and Engagement:** Identify and engage key stakeholders, including local nonprofits, government agencies, and businesses. Hold initial stakeholder meetings and roundtables.
Q1 2025	**Broadband Access Expansion:** Partner with ISPs to begin planning and securing funding for broadband infrastructure projects in underserved areas. Launch public Wi-Fi hotspots in key locations.

Q1 2025	**Digital Literacy Programs:** Develop curriculum and collaborate with libraries and community centers to offer digital literacy workshops. Launch the first set of workshops.
Q1 2025	**Online Accessibility:** Begin implementing ADA compliance improvements on county and public service websites. Develop multilingual support services.
Q2 2025	**Cybersecurity Workshop**s: Launch initial cybersecurity awareness workshops and distribute informational resources. Begin community awareness campaigns.
Q3 2025	**Affordable Device Programs:** Establish partnerships for device donation and refurbishment programs. Begin distribution of affordable or free devices to low-income households.
Q4 2025	**Community Technology Hubs:** Identify locations and secure funding for technology hubs in underserved neighborhoods. Begin the setup of the first technology hubs.
Q1 2026	**Technical Support Services:** Establish tech support hotlines and online support resources. Begin offering in-person technical support at community tech hubs.
Q2 2026	**Policy Advocacy:** Engage with policymakers to advocate for digital inclusion legislation. Develop and propose local policies supporting digital equity.
Q3 2026	**Monitoring and Evaluation**: Implement a system for tracking progress on digital equity initiatives. Collect and analyze data to measure impact and adjust strategies as needed.

Q4 2026	**Expansion of Broadband Infrastructure:** Continue expanding broadband infrastructure with additional projects. Review and adjust affordability programs based on community feedback.
Q1 2027	**Enhanced Digital Literacy Programs**: Expand digital literacy workshops based on initial feedback. Introduce advanced courses and training for specific skills.
Q2 2027	**Sustained Cybersecurity Initiatives**: Increase the frequency and reach of cybersecurity workshops. Introduce advanced cybersecurity training sessions.
Q3 2027	**Increased Device Distribution:** Scale up the device donation and refurbishment programs. Secure additional funding to sustain these programs.
Q4 2027	**Community Technology Hubs Operational**: Ensure all planned technology hubs are fully operational. Evaluate their impact and community usage.
Q1 2028	**Continuous Stakeholder Engagement:** Regularly update and involve stakeholders in the progress of digital equity initiatives. Hold annual stakeholder meetings.
Q2 2028	**Advanced Digital Literacy:** Introduce specialized digital literacy programs for seniors, veterans, and other specific groups. Tailor content to meet their unique needs.
Q3 2028	**Further Policy Development:** Review the effectiveness of implemented policies. Propose new policies based on emerging needs and technological advancements.
Q4 2028	**Long-term Sustainability Planning**: Develop long-term plans for sustaining digital equity initiatives. Secure ongoing funding and partnerships.

Q1 2029	**Evaluation and Reporting**: Conduct a comprehensive evaluation of all digital equity initiatives. Publish a report on achievements, challenges, and future directions.
Q2 2029	**Community Feedback Loop:** Establish a continuous feedback loop with the community to gather input and make necessary adjustments to programs and strategies.
Q3 2029	**Ongoing Improvement:** Continue to refine and expand digital equity initiatives based on data and feedback. Ensure all programs remain relevant and effective.
Q4 2029	**Final Review:** Conduct a final review of the five-year digital equity plan. Develop a new strategic plan based on lessons learned and future needs.

By following this detailed timeframe, Mahoning County aims to systematically address digital equity challenges, ensuring that all residents have access to the digital tools and skills necessary for success in the modern world.

F. State-Aligned Digital Equity Evaluation Plan

Mahoning County understands the importance of aligning its Digital Equity Plan with the State of Ohio's Digital Opportunity Plan to:

1. **Track Progress Towards Achieving Digital Equity:** Mahoning County plans to implement a robust system to monitor and measure advancements in digital equity. This would include setting up mechanisms to assess and document progress towards achieving the goals outlined in the Digital Equity Plan.
2. **Demonstrate How Progress Furthers State Priorities:** Mahoning County would ensure that its Digital Equity Plan aligns with and contributes to the broader priorities, objectives, and goals of the State of Ohio to advance digital equity.

As Mahoning County implements its Digital Equity Plan, it would measure impact and progress toward addressing the unique challenges and barriers to affordability, access, and adoption faced by priority populations. The table below outlines the expected impact and progress towards addressing these barriers, which would be continually expanded throughout the Plan’s implementation:

Outcomes	Impact	Progress
Economic and Workforce Development	Mahoning County's Digital Equity Plan aims to support Ohio's economic and workforce development goals by increasing broadband infrastructure and affordable internet access. This would create new job opportunities and enable workforce training programs.	Mahoning County plans to initiate and track projects aimed at increasing broadband coverage, facilitating affordable internet plans, and collaborating with local businesses to support workforce development. Progress would be documented as not started, on-going, in progress, complete, etc.
Education Outcomes	Mahoning County's Digital Equity Plan aims to enhance the State's educational goals by providing reliable internet access to students, enabling effective remote learning, and increasing digital literacy among students and educators.	Mahoning County plans to implement programs that ensure students have the necessary devices and internet access for online learning. Progress would be documented as not started, on-going, in progress, complete, etc.
Health Outcomes	Mahoning County's Digital Equity Plan aims to improve health outcomes by facilitating telehealth services, ensuring that residents can access healthcare remotely, and enhancing the overall health and well-being of the community.	Mahoning County plans to collaborate with healthcare providers to expand telehealth services. Progress would be documented as not started, on-going, in progress, complete, etc.
Civic and Social Engagement	Mahoning County's Digital Equity Plan aims to strengthen civic and social engagement by providing access to online government services, enabling virtual participation in civic activities, and fostering community connections.	Mahoning County plans to enhance digital platforms for civic engagement and provide training for residents to use these platforms effectively. Progress would be documented as not started, on-going, in progress, complete, etc.

Outcomes	Impact	Progress
Other Essential Services	Mahoning County's Digital Equity Plan aims to support the delivery of essential services by ensuring access to online services such as housing assistance, public benefits, and social services, thereby improving quality of life for residents.	Mahoning County plans to work with local agencies to provide online access to essential services. Progress would be documented as not started, on-going, in progress, complete, etc.

Economic and Workforce Development

By improving broadband infrastructure and making internet access cheaper, Mahoning County's Digital Equity Plan would help Ohio's economy and workforce grow. This would create more jobs and support workforce education programs, matching the Ohio Broadband & 5G Workforce Strategy, which wants to raise career knowledge and learning in the broadband industry.

Education Outcomes

Mahoning County's Digital Equity Plan would bolster educational outcomes by ensuring that students have access to reliable internet, which is crucial for remote learning and digital literacy. This aligns with initiatives such as the Ohio Connectivity Champions, which work to remove barriers to internet access for families, thereby supporting the State's educational goals.

Health Outcomes

Mahoning County's Digital Equity Plan would improve health outcomes by facilitating telehealth services, allowing residents to access healthcare remotely. This supports the goals outlined in Ohio's State Health Improvement Plan (SHIP), which emphasizes the importance of access to care and telehealth services.

Civic and Social Engagement

Mahoning County's Digital Equity Plan would enhance civic and social engagement by providing access to online government services and enabling virtual participation in civic activities. This aligns with the State's efforts to increase civic engagement through digital inclusion.

Other Essential Services

Mahoning County's Digital Equity Plan would support the delivery of essential services by ensuring that residents can access online services such as housing assistance, public benefits, and social services. This effort aligns with the State's initiatives to provide high-speed internet

access to community anchor institutions (CAIs), ensuring that all Ohioans can access necessary resources.

Conclusion

Section 2 of the Mahoning Connectivity Plan deals with achieving digital equality in Mahoning County. The plan recognizes and tackles the specific challenges that different covered populations face, and aims to make sure that everyone has access to low-cost, high-speed internet and the digital skills they need to succeed in today's digital economy.

The plan shows the urgent need for extending broadband infrastructure, especially in rural and underserved areas. It also stresses the importance of programs that make internet affordable and teach digital skills to older people, veterans, people with disabilities, speakers of other languages, English learners, those with low literacy levels, racial and ethnic minorities, and other priority populations.

The suggested strategies, such as creating community technology hubs, partnerships between public and private sectors, and the adoption of inclusive digital policies, are intended to create a more equal digital situation. These initiatives aim to support all community members, improve their life quality, and stimulate economic development.

By working together with local governments, educational institutions, community organizations, and private sector partners, Mahoning County is dedicated to closing the digital gap. The actions described in this section would not only enhance connectivity but also make sure that every resident has the chance to take part fully in the digital age.

In summary, Section 2 sets the foundation for a comprehensive approach to digital equality, addressing both short-term needs and long-term goals. Through focused interventions and ongoing community involvement, Mahoning County is ready to create a more inclusive and connected future for all its residents.

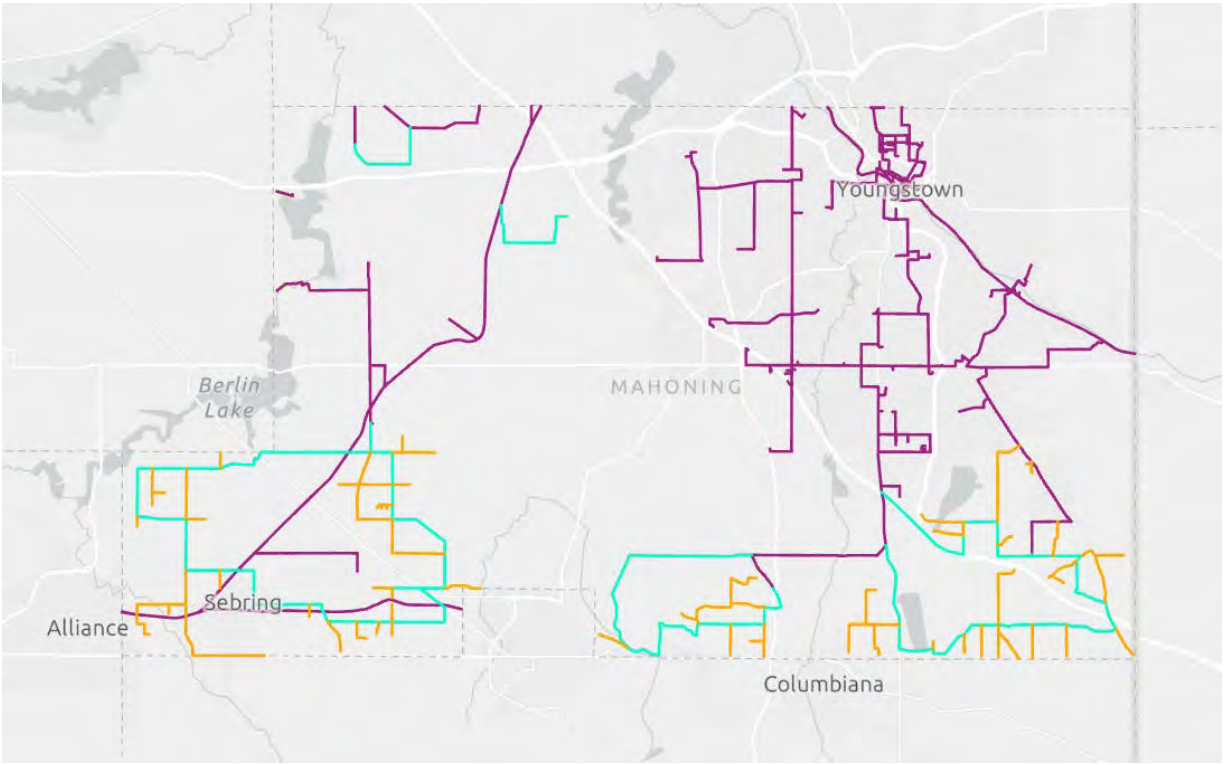
SECTION 3

Broadband Infrastructure

Section 3. Broadband Infrastructure

A. Service Area GIS

Through the development of the Mahoning County Connectivity Plan, it has defined a proposed project service area as shown below. The Project Team coordinated with Mahoning County to collect Geographic Information System (GIS) data to create a conceptual last-mile broadband network connecting residents and businesses.



The following GIS maps were obtained, analyzed, and utilized by Mahoning County to develop the design, technical details, and specifications of the proposed network infrastructure:

- Mapping Assets
    - Maps generated by town/county/state GIS mapping office
    - Base map of project area to include boundaries, subdivisions, parcels and street centerlines
    - To the extent available, existing fiber infrastructure in the Community
    - To the extent known to the public or from providers willing to share
    - To the extent known, already-funded broadband expansion projects in the community (confirm any overlap with the proposed project area)
    - Vertical infrastructure, such as towers, water towers, tall buildings/rooftops
        - In some rural areas this could include grain silos, some larger barn rooftops or other privately owned structures
    - Planned/ phased broadband expansion routes
    - Broadband Serviceable Location Fabric data points from the FCC]

B. Network Architecture, Design, and Topology

This state-of-the-art telecommunications fiber infrastructure is engineered to deliver high-speed internet access to residences and businesses in rural Mahoning County. The preliminary last-mile route design aims to pass 1,040 residential and business addresses. Network construction would proceed in phases to align with budgetary constraints and strategic considerations.

This narrative details the architecture, design, and topology of a typical broadband network.

Network Architecture

The Broadband Network features a robust architecture designed for reliability and high-speed connectivity. Key components include:

a. Central Office (CO)

The central office is the network's hub, housing essential equipment and servers for routing and managing internet traffic. Optical Line Terminals (OLTs) within the CO convert data from electrical signals to optical signals for transmission via fiber optic cables. This facility also contains backup power supplies and climate control systems to ensure continuous operation.

b. Fiber Optic Cables

Fiber optic cables form the network's backbone, capable of transmitting vast amounts of data at the speed of light. These cables are laid both underground and overhead, depending on the terrain and existing infrastructure. The high capacity and low latency of fiber optics make them ideal for delivering high-speed broadband.

c. Distribution Nodes

Strategically placed distribution nodes act as intermediaries between the central office and end-users. These nodes aggregate traffic from multiple homes and businesses, reducing the load on the central office. They also enable localized network management and troubleshooting.

d. Customer Premises Equipment (CPE)

Each subscriber is equipped with Customer Premises Equipment (CPE), typically an Optical Network Terminal (ONT) or a modem. The ONT converts optical signals back into electrical signals for use by the customer's devices. This equipment ensures a seamless connection to the broadband network.

Network Design

The Broadband Network is built to be reliable, flexible, and efficient, so it can stay online and meet future demands. Important design features are:

a. Redundancy

Critical components, such as central office equipment and distribution nodes, are duplicated to provide redundancy. In case of a failure, traffic is rerouted to maintain service continuity. This redundancy is achieved through backup systems and alternative routing paths.

b. Scalability

The network is designed to easily accommodate new subscribers and increased bandwidth demands. Additional distribution nodes and fiber optic cables can be integrated without major disruptions, allowing for gradual network expansion.

c. Load Balancing

Load balancing algorithms are employed to distribute network traffic evenly across available routes. This approach prevents congestion and ensures consistent performance, even during peak usage times.

Network Topology

The Broadband Network utilizes a combination of topologies to optimize efficiency and reliability:

a. Ring Topology

In the backbone, a ring topology connects central offices and distribution nodes in a circular fashion. This configuration provides redundancy, allowing data to travel in either direction around the ring, ensuring network resilience.

b. Star Topology

At the distribution node level, a star topology is used. Each distribution node radiates outward from the central office, connecting multiple subscribers in a star-like pattern. This layout simplifies maintenance and troubleshooting.

c. Point-to-Point Connections

Fiber optic cables establish point-to-point connections between the central office and distribution nodes. These dedicated connections ensure consistent bandwidth for each node, enhancing overall network performance.

d. Tree Topology

In the final leg of the network, a tree topology connects distribution nodes to individual customer premises. This hierarchical design facilitates efficient traffic routing and easy expansion.

Aerial vs. Buried Split and Make Ready Engineering Assessment

The project would involve a combination of aerial and underground work, with an anticipated 50/50 split. Approximately 50% of the feeder cables would be aerial (indicated in green), and 50% of the distribution cables would be underground (indicated in orange). This balance was determined based on a comprehensive Make Ready Engineering assessment, considering factors such as terrain, existing utility infrastructure, and cost-effectiveness.

Aerial Work

Aerial cables would utilize existing utility poles wherever possible. The Make Ready Engineering assessment includes a thorough review of the poles' condition, load capacity, and the need for reinforcements or replacements. This process ensures compliance with safety standards and minimizes disruptions.

Underground Work

Underground cables would be laid in trenches or conduits to protect them from environmental damage and ensure long-term reliability. The assessment also evaluates the feasibility of directional boring and trenchless technologies to minimize surface disruptions and reduce installation time.

By addressing these considerations, the project aims to deliver a resilient and high-performance broadband network to Mahoning County, leveraging both aerial and underground infrastructure to meet the community's connectivity needs.

References

- Federal Communications Commission (FCC). (n.d.). Utility Pole Attachments. Retrieved from FCC Utility Pole Attachments
- Fiber Broadband Association. (2021). Fiber Broadband: The Ultimate Broadband Solution. Retrieved from Fiber Broadband Association
- Mahoning County Broadband Initiative. (2023). Project Overview and Planning Documents.

C. Environmental, Historical, and Cultural Preservation Requirements

Mahoning County recognizes the importance of adhering to environmental, historical, and cultural preservation requirements, especially when utilizing federal funding for broadband network infrastructure deployment. The county would be committed to minimizing new ground disturbances and ensuring that no adverse environmental impacts arise during the fiber deployment process.

Compliance with Environmental Regulations

National Environmental Policy Act (NEPA)

Before commencing any construction activities, Mahoning County would conduct a thorough NEPA review. This would include an Environmental Assessment (EA) to determine if the project would significantly affect the environment. If significant impacts are identified, an Environmental Impact Statement (EIS) would be prepared to detail the potential effects and propose mitigation measures.

Endangered Species Act (ESA)

To comply with the ESA, Mahoning County would perform biological assessments to identify the presence of any endangered or threatened species within the project area. If such species are found, the county would work with the U.S. Fish and Wildlife Service (USFWS) to develop and implement strategies to avoid or minimize harm to these species and their habitats.

Historical and Cultural Preservation

National Historic Preservation Act (NHPA)

Under the NHPA, Mahoning County would collaborate with the State Historic Preservation Office (SHPO) to identify any historical or archaeological sites within the project area. This process includes consultations and surveys to assess the potential impact of the broadband deployment on these sites. If necessary, measures would be taken to preserve and protect any discovered artifacts or structures.

Climate Risk Mitigation

Incorporating insights from the Center on Rural Innovation's Broadband Climate Risk Mitigation Tool, Mahoning County would implement strategies to mitigate potential climate risks associated with broadband infrastructure deployment. These strategies include:

- **Flood Risk Assessment**: Evaluating areas prone to flooding and designing infrastructure to withstand potential flood events.
- **Heat Stress Adaptation**: Ensuring that equipment, especially those installed outdoors, can operate effectively under extreme heat conditions.
- **Storm Hardening**: Strengthening aerial and underground cables to resist damage from severe weather events, such as high winds and ice storms.

Additional Environmental Considerations

Wetland and Waterway Protection

Mahoning County would comply with the Clean Water Act (CWA) by avoiding wetland areas and ensuring that construction activities do not impact local waterways. If unavoidable, necessary permits would be obtained, and mitigation measures would be implemented to restore affected areas.

Soil and Erosion Control

Erosion control measures would be employed to prevent soil degradation and water contamination during construction. This includes using silt fences, sediment basins, and other best management practices to control runoff and protect local water quality.

Monitoring and Reporting

Throughout the project, Mahoning County would establish a monitoring and reporting framework to track compliance with environmental, historical, and cultural preservation requirements. Regular audits and inspections would be conducted to ensure that all activities adhere to regulatory standards. Any incidents of non-compliance would be addressed promptly with corrective actions.

Conclusion

Mahoning County is committed to responsible and sustainable broadband network deployment. By adhering to environmental, historical, and cultural preservation requirements, the county aims to protect its natural and cultural resources while providing high-speed internet access to its residents and businesses.

References

- National Environmental Policy Act (NEPA). (n.d.). Retrieved from NEPA.gov
- Endangered Species Act (ESA). (n.d.). Retrieved from U.S. Fish and Wildlife Service
- National Historic Preservation Act (NHPA). (n.d.). Retrieved from Advisory Council on Historic Preservation
- Center on Rural Innovation. (n.d.). Broadband Climate Risk Mitigation Tool. Retrieved from Broadband Climate Risk Mitigation Tool

D. Work Plans for Implementation and Operation

Mahoning County can explore several strategies to ensure residents and businesses have access to affordable broadband services. One such strategy is the Infrastructure Provider model, where the local government provides middle-mile conduit and/or dark fiber to local organizations. This network infrastructure is then made available to Internet Service Providers (ISPs) through lease or indefeasible right-to-use (IRU) agreements. The local government does not provide the service itself but enables ISPs to use the network.

An example of this model is Dublin, Ohio's "Dublink," a municipally-owned middle-mile fiber/conduit system leased to telecommunications providers and private entities through IRU agreements. This approach has led to commercial and residential growth and economic development in Dublin, leveraging its future-proofed networking infrastructure. For Mahoning County, this model could be highly beneficial, given the need for additional fiber capacity and connectivity. By reducing the cost to ISPs through access to middle-mile/backhaul fiber networks, the county can facilitate broader deployment.

If Mahoning County adopts this model, deploying middle-mile conduit and/or dark fiber in key areas would be crucial. Creating a ring network is recommended to ensure redundancy and reduce signal interruption risks. A ring topology allows the signal to reroute in the opposite direction if a disruption occurs, ensuring continuous connectivity. This redundancy is essential for connecting anchor institutions. Once constructed, Mahoning County could lease conduit and/or fiber on the network to local organizations, both public and private, and to area ISPs to facilitate last-mile expansion.

For the ISP leases, Mahoning County could charge a flat-rate monthly IRU fee. Alternatively, some ISP partners might prefer a revenue-share model, where the community receives more fees as user adoption increases. This approach balances initial costs with long-term revenue opportunities.

Owner-operator business models have their advantages and disadvantages. The Infrastructure Provider model reduces infrastructure costs for ISPs, encourages service expansion, and stimulates local economic development. It also supports future network expansions and technological advancements while ensuring continuous service through network design that mitigates single points of failure. However, it involves significant upfront costs for infrastructure deployment, requires management and maintenance of the physical network, and creates dependency on the county for middle-mile connectivity, which may limit service flexibility.

Other owner-operator models include Public-Private Partnerships (PPPs) and Municipal Broadband. In PPPs, the local government partners with private ISPs to share costs and responsibilities for network deployment and operation. This model combines public and private resources for efficient project execution and distributes financial and operational risks between partners, fostering innovative solutions. However, it requires complex agreements to define roles, responsibilities, and revenue sharing, and differing objectives between public and private entities may cause conflicts.

In the Municipal Broadband model, the local government owns and operates the broadband network, providing direct service to residents and businesses. This model ensures local control

over network decisions, retains all generated revenue within the community, and maintains high service standards through direct oversight. Nevertheless, it demands substantial investment in infrastructure and ongoing operations, necessitates expertise in managing and maintaining a broadband network, and competes directly with private ISPs, which may oppose municipal initiatives.

By evaluating these various owner-operator models, Mahoning County can strategically implement and operate a broadband network that meets the community's needs. The Infrastructure Provider model offers a balanced approach with potential economic and connectivity benefits, while the other models provide different advantages and challenges. Assessing each model's strengths and weaknesses would guide the county in selecting the most appropriate strategy for ensuring affordable and reliable broadband access.

References

- Dublin's Dublink: Dublink Information
- National Broadband Plan: Federal Communications Commission (FCC)
- Broadband Climate Risk Mitigation Tool: Center on Rural Innovation

Middle Mile Fiber Service Provider

Another strategy is the Middle Mile Fiber Service Provider model, where the local government owns and provides service via a middle-mile fiber ring that connects public and commercial organizations. This approach ensures competition, monetizes excess capacity, and proactively connects vital local institutions.

In this model, the local government owns the middle-mile fiber network and provides service to community anchor institutions such as local governments, school districts, libraries, public safety, and utility providers. The network may also be extended to commercial organizations to attract and retain local investment. Residential and small/medium business retail services are still provided by private ISPs through traditional deployment approaches. However, last-mile service providers can be encouraged to connect to Mahoning County's middle-mile network, expediting their build-out and reducing their costs.

An example of this model is Hudson, Ohio's "Velocity Broadband." Launched in 2014, Velocity Broadband is a city-owned and operated network that began deploying high-speed fiber broadband to business and commercial zones in 2015, offering speeds up to 10 Gbps. This initiative has helped local businesses access high-speed internet, driving economic growth and investment in the area.

For Mahoning County, this model can be particularly advantageous given the number of community anchor organizations in the area, including educational institutions, healthcare facilities, and emergency services. Instead of leasing dark fiber from the community, these anchor institutions would receive direct connectivity provided by Mahoning County. Consequently, instead of paying a monthly "lease" fee, the anchor institutions would pay a monthly "service" fee, similar to other broadband internet subscribers.

If Mahoning County adopts this model, the same recommendations regarding ring structure and redundancy would apply. Creating a ring network would ensure redundancy and minimize signal interruption risks, as the signal can reroute in the opposite direction if a disruption occurs. This redundancy is crucial for connecting anchor institutions and maintaining continuous service.

The Middle Mile Fiber Service Provider model has several advantages and disadvantages. One advantage is that it ensures competition by providing an open-access network to multiple service providers, fostering a competitive market for broadband services. It also monetizes excess capacity by leasing it to commercial organizations, generating additional revenue for the county. Additionally, it proactively connects vital local institutions, ensuring they have access to high-speed internet for their operations.

However, this model also has its challenges. It requires significant initial investment to deploy the middle-mile infrastructure and ongoing costs for operation and maintenance. Managing and operating the network requires technical expertise and resources, and the county must ensure that the network meets the needs of various stakeholders, including public institutions and commercial organizations.

By evaluating various owner-operator models, Mahoning County can strategically implement and operate a broadband network that meets the community's needs. The Middle Mile Fiber Service Provider model offers a balanced approach with potential economic and connectivity benefits, while other models provide different advantages and challenges. Assessing each model's strengths and weaknesses would guide the county in selecting the most appropriate strategy for ensuring affordable and reliable broadband access.

References

- **Hudson's Velocity Broadband:** Velocity Broadband Information
- **National Broadband Plan:** Federal Communications Commission (FCC)
- **Broadband Climate Risk Mitigation Tool:** Center on Rural Innovation

Public-Private Partnership (P3)

The Public-Private Partnership (P3) model falls on the "design-build-finance-operate-maintain" (DBFOM) spectrum of ISP deployment. In this model, the private partner can be tasked with as much or as little along that spectrum as necessary for the project's success. For instance, the local government could be responsible for network financing and ownership but could contract with one or more private entities to design, build, operate, and maintain the network, thereby reducing risk and cost. Alternatively, the private partner could be tasked with designing, building, financing, operating, and maintaining the network, subject to clear key performance indicators. Another approach could involve the private partner designing, building, and financing the network, owning it, and leasing it back to Mahoning County for a period aligning with the project financing. After this period, network ownership would revert to Mahoning County, which would then be responsible for ongoing network operation and maintenance, typically through a third-party contractor. The network could also revert back to Mahoning County if the private partner fails to meet the project schedule.

P3s provide the local government with more control than traditional broadband network deployment approaches by tying lease and availability payments to clearly defined metrics, without the full project risk. They also leverage private sector capital and the public sector's ability to finance broadband projects with patient capital at low, long-term interest rates, which are not traditionally available to private entities. This financing approach can make the network more affordable for local taxpayers.

It is important to note that there is no "one size fits all" P3 model; the distribution of risk and control between the public and private parties is crucial. For Mahoning County, P3s can be utilized to facilitate both middle-mile and last-mile deployment and can encompass other models listed here. For example, the city could own fiber capacity and partner with a new or existing provider through a public-private partnership to encourage targeted deployment in areas of ongoing need.

This model has several advantages. It allows the local government to retain significant control over the project while transferring substantial risks to the private partner. By leveraging private sector efficiency and innovation, the project can benefit from lower costs and faster implementation. The private partner's capital can be combined with public financing options to create a more affordable and sustainable broadband network for the community.

However, this model also has challenges. It requires careful negotiation and clear agreements to define roles, responsibilities, and performance metrics. The success of the partnership depends on the private partner's ability to meet the agreed-upon standards and timelines. Additionally, the local government must have the expertise to manage and oversee the partnership effectively.

By evaluating various owner-operator models, Mahoning County can strategically implement and operate a broadband network that meets the community's needs. The Public-Private Partnership model offers a balanced approach with potential economic and connectivity benefits while other models provide different advantages and challenges. Assessing each model's strengths and weaknesses would guide the county in selecting the most appropriate strategy for ensuring affordable and reliable broadband access.

References

- **Federal Communications Commission (FCC):** National Broadband Plan
- **Hudson's Velocity Broadband:** Velocity Broadband Information
- **Broadband Climate Risk Mitigation Tool:** Center on Rural Innovation
- **Public-Private Partnership Model:** World Bank Group: Public-Private Partnerships

Additional options not listed here, but could be explored by Mahoning County, include municipal FTTH last mile providers, Cooperatives, and networks operated by non-profit organizations. A high-level legal review of any model being considered should be conducted to confirm compliance with any state or local laws. A comparison of these models is provided below:

	City-provided FTTH Network	City-provided Middle Mile Network	Open Access Network	Public-Private Partnership
Access to private capital for last-mile deployment				
Access to public finance tools (including bonding)				
Access to grant dollars				
City control last-mile deployment				
City control CAI deployment				
User revenue opportunity for City				
City bears reduced project risk				
Less capital investment required from the City				

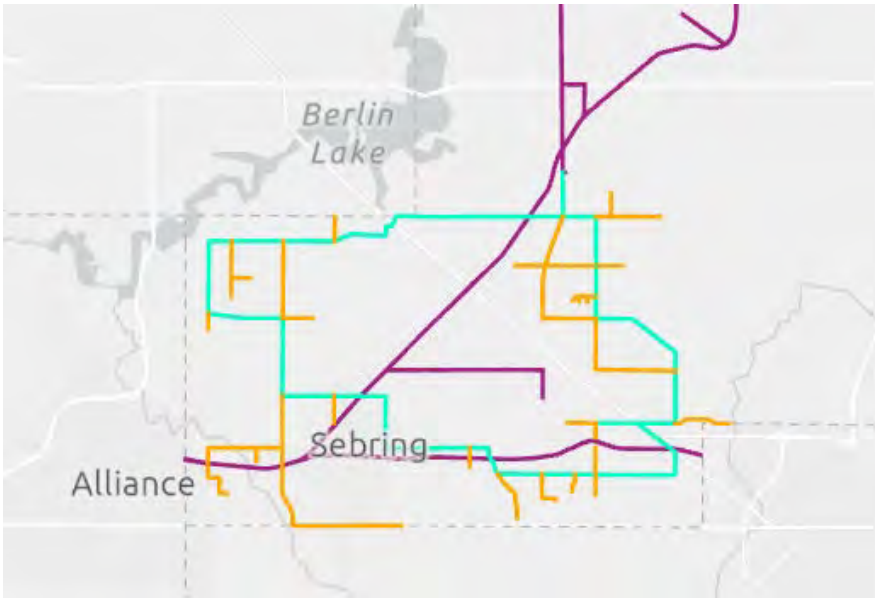
Green = Pro
Red = Con
Yellow = Neutral

Overview and Phases

Mahoning County would consider the possibility of building and operating its own broadband network infrastructure, **if it were feasible.** The deployment would follow a phased approach, with certain tasks in each phase running concurrently. The project plans to focus on deploying a last-mile fiber network, which would include approximately 75 route miles of fiber optic feeder cable and 60 miles of fiber optic distribution cables. These cables would be attached to existing utility poles or buried underground along existing utility rights-of-way throughout the county. By potentially taking on the construction and operation of the network, the county aims to ensure high-quality, reliable, and affordable broadband access for all residents.

Phase 1: Area 1 – Southwestern Mahoning County
Location: Proximity to the village of Sebring
Scope: Includes 524 unserved/underserved locations

Key Tasks:



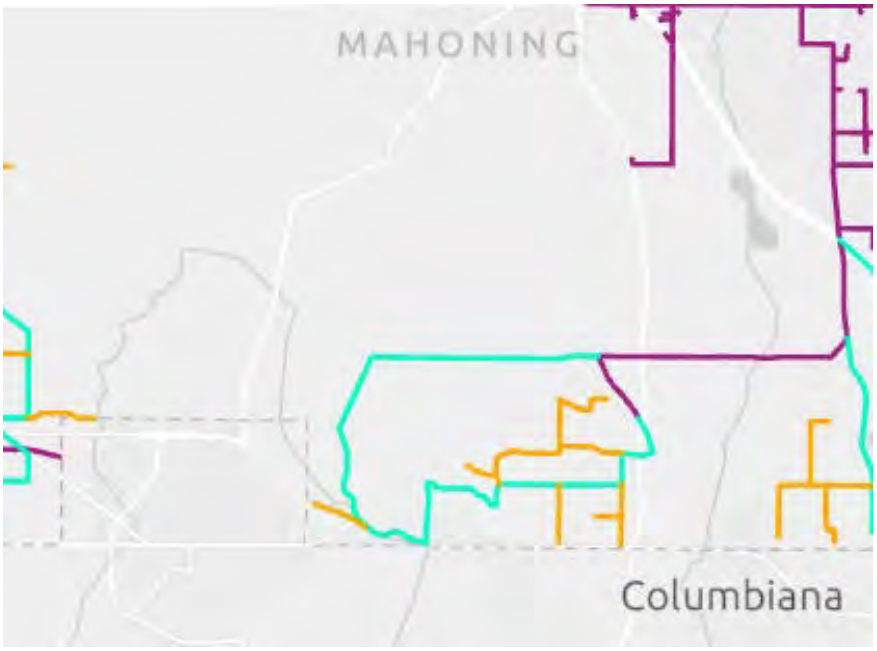
- **Site Surveys:** Conduct comprehensive site surveys to identify optimal routes for fiber deployment.
- **Permitting:** Obtain necessary permits for construction and pole attachments.
- **Feeder Cable Deployment:** Install feeder cables along designated routes.
- **Distribution Cable Deployment:** Extend distribution cables to individual locations.
- **Installation of Network Equipment:** Set up necessary networking equipment, such as Optical Line Terminals (OLTs) and splitters.
- **Testing and Commissioning:** Perform rigorous testing to ensure network integrity and performance.

Expected Outcomes:

- Provide high-speed broadband access to 524 locations.
- Improve connectivity for residential and business users, enhancing local economic opportunities.

Phase 2: Area 2 – Southern Mahoning County

Location: Proximity to the community of Locust Grove
Scope: Includes 130 unserved/underserved locations



Key Tasks:

- **Continuing Surveys and Permits:** Continue surveys and obtain additional permits as necessary.

- **Integration with Existing Infrastructure:** Ensure seamless integration with previously installed network components.
- **Public Engagement:** Conduct community meetings to inform residents and address concerns.
- **Deployment Activities:** Execute feeder and distribution cable deployment.
- **Quality Assurance:** Implement quality assurance measures to verify installation standards.

Expected Outcomes:

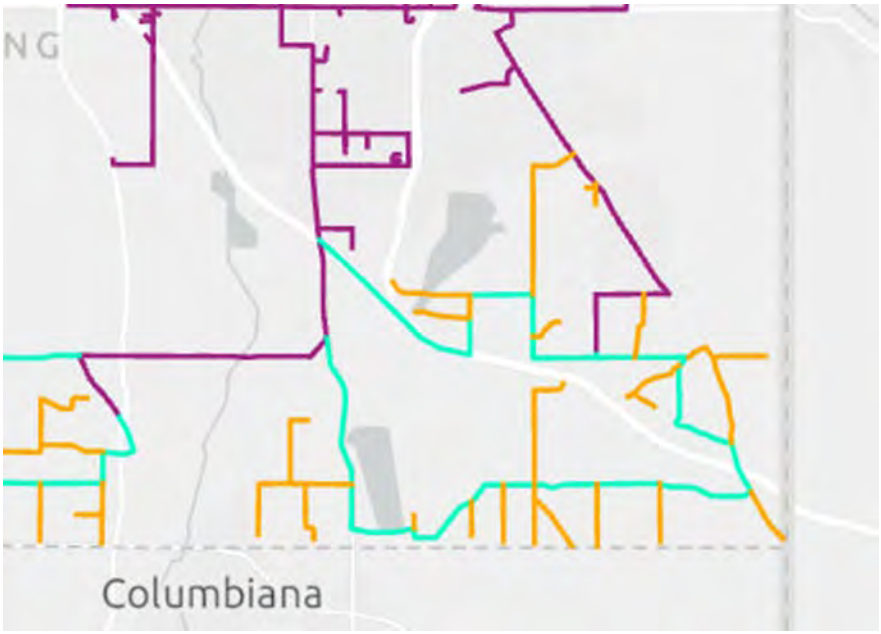
- Expand broadband access to an additional 130 locations.
- Facilitate improved educational and healthcare services through better connectivity.

Phase 3: Area 3 – Southeastern Mahoning County

Location: Proximity to the community of New Springfield

Scope: Includes 318 unserved/underserved locations

Key Tasks:



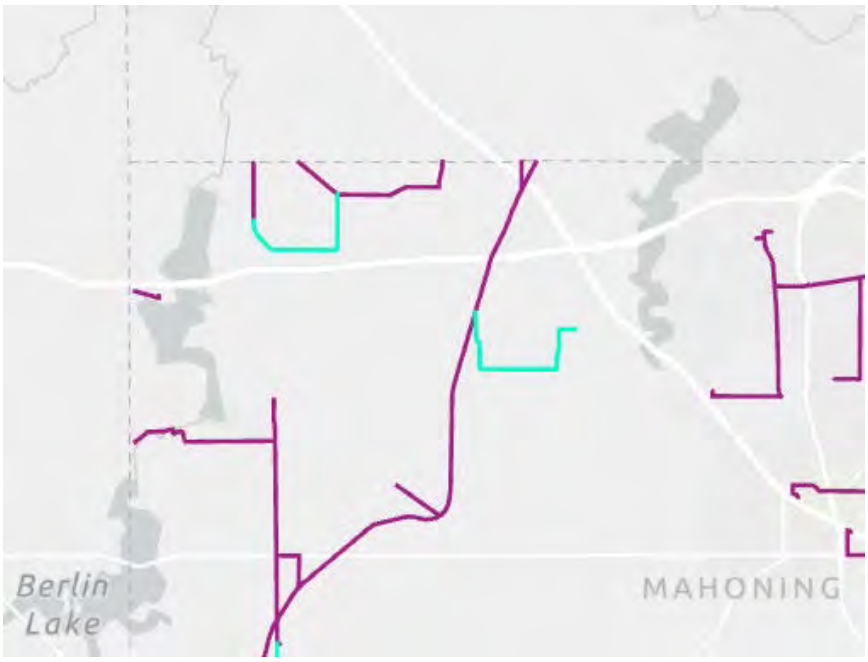
- **Advanced Planning:** Refine deployment strategies based on lessons learned from previous phases.
- **Resource Allocation:** Allocate resources efficiently to manage simultaneous tasks.
- **Network Optimization:** Optimize network design to enhance performance and reliability.
- **Deployment and Connection:** Continue deployment activities and connect new locations to the network.
- **Customer Support Setup:** Establish support mechanisms to assist new users with service activation.

Expected Outcomes:

- Reach an additional 318 locations with high-speed internet access.
- Support local businesses and community institutions with improved digital infrastructure.

Phase 4: Area 4 – Northwestern Mahoning County

Location: Proximity to the community of North Jackson
Scope: Includes 68 unserved/underserved locations
Key Tasks:



- **Final Surveys and Adjustments:** Conduct final surveys and make necessary adjustments to plans.
- **Coordination with Utilities:** Coordinate closely with utility companies for pole attachments and underground rights-of-way.
- **Completion of Deployment:** Finish the installation of both feeder and distribution cables.
- **System Integration:** Integrate this phase with the broader network to ensure seamless operation.
- **Final Testing and Handover:** Perform comprehensive testing and hand over the completed infrastructure to the service provider.

Expected Outcomes:

- Achieve the goal of providing broadband access to 68 additional locations.
- Ensure full operational readiness of the entire network.

Timeline and Availability

Following the completion of each network build phase, Mahoning County anticipates a four-month period for broadband services to become available. This includes time for system testing, service activation, and addressing any initial issues. As each subsequent phase is completed, broadband availability would increase, ultimately covering the entire project area.

Challenges and Considerations

- **Regulatory Approvals:** Navigating the regulatory landscape to obtain necessary approvals.
- **Environmental Factors:** Addressing any environmental concerns related to construction.
- **Community Engagement:** Ensuring active community participation and support throughout the project.
- **Supply Chain Management:** Managing supply chain issues to prevent delays in obtaining materials and equipment.

By addressing these factors and executing a well-coordinated phased approach, Mahoning County aims to significantly improve its broadband infrastructure, thereby enhancing connectivity and fostering economic growth in underserved areas.

Maintenance and Growth

Once the broadband infrastructure has been deployed, Mahoning County would be committed to implementing long-term plans to maintain these assets, ensuring the network's financial sustainability and facilitating future growth. The network maintenance would be carried out by a combination of community resources and a third-party service provider, leveraging local expertise for routine maintenance and specialized skills for more complex issues. Scheduled inspections would be conducted quarterly to assess the condition of the fiber optic cables, equipment, and infrastructure. A preventative maintenance program would be established to identify potential issues before they escalate, including regular cleaning of equipment, checking connections, and performing software updates. A rapid response team would be on standby to address any emergency repairs, ensuring minimal downtime for users.

Annual budgets would allocate specific funds for maintenance activities, with a contingency reserve for unforeseen repairs. Operational costs would be managed through efficient resource allocation and negotiating favorable contracts with the third-party service provider. As the network expands, economies of scale would be leveraged to reduce per-mile maintenance costs, spreading fixed costs over a larger infrastructure base.

The fiscal stability of Mahoning County's broadband network would be supported through multiple revenue streams, including user subscription fees, leasing fiber capacity to businesses, and partnerships with local institutions. A portion of the revenue would be reinvested into the network for continuous upgrades and technology improvements, ensuring the infrastructure remains cutting-edge and capable of supporting future demands. Robust financial management practices would be put in place to monitor cash flows, manage debts, and ensure funds are available for both operational needs and future expansions.

Expansion plans would be strategically developed, focusing on areas not currently funded by the Broadband Equity, Access, and Deployment (BEAD) program or other state and federal grants. This includes identifying high-demand areas and underserved regions. Mahoning County would actively seek additional funding opportunities through grants, private investments, and public-private partnerships to support further expansion. Engagement with local communities would be critical to understand their needs and garner support for new projects. This would involve regular community meetings, surveys, and collaboration with local leaders.

Sustainable practices would be integrated into maintenance and expansion efforts, such as using eco-friendly materials and minimizing environmental impact during construction. The network would incorporate energy-efficient technologies to reduce operational costs and support environmental sustainability goals. By combining routine maintenance, strategic financial management, and proactive growth strategies, Mahoning County is well-positioned to provide reliable, high-speed internet access to its residents and support ongoing technological advancements.

Key Milestones

To fund, develop, and implement the respective broadband deployment network proposed above, the Mahoning County anticipates that it can achieve the following milestones and timeframes over the next five years:

Quarter / Year	Area	Description of Deployment Milestone(s) Completed
Q1 2025	Sebring (Area 1)	Engineering begins
Q2 2025	Sebring (Area 1)	Engineering continues, Permitting begins
Q3 2025	Sebring (Area 1)	Engineering complete, Permitting complete, NTP to Contractor issued, Construction begins
Q4 2025	Locust Grove (Area 2)	Engineering begins
Q1 2026	Locust Grove (Area 2)	Engineering continues, Permitting begins
Q2 2026	Locust Grove (Area 2)	Engineering complete, Permitting complete, NTP to Contractor issued
Q3 2026	Locust Grove (Area 2)	Construction begins
Q4 2026	Sebring (Area 1)	Construction complete
Q1 2027	New Springfield (Area 3)	Engineering begins
Q2 2027	Locust Grove (Area 2), New Springfield (Area 3)	Locust Grove Construction complete, New Springfield Engineering continues, Permitting begins
Q3 2027	New Springfield (Area 3)	Engineering complete, Permitting complete, NTP to Contractor issued, Construction begins
Q4 2027	North Jackson (Area 4)	Engineering begins
Q1 2028	North Jackson (Area 4)	Permitting begins
Q2 2028	New Springfield (Area 3), North Jackson (Area 4)	New Springfield Construction complete, North Jackson Engineering complete, Permitting complete, NTP to Contractor issued
Q4 2028	North Jackson (Area 4)	Construction complete

Additionally, Mahoning County has included a detailed GANTT chart in the Appendix of the Connectivity Plan which illustrates how achievement of each milestone would be measured and verified.

E. Technology Risks

Cybersecurity Risk Management Plan

The Cybersecurity Risk Management Plan for Mahoning County outlines the strategies and procedures to manage and mitigate cybersecurity risks. It starts with conducting regular risk assessments to identify potential threats, vulnerabilities, and their impacts, focusing on asset identification and data classification. The Information Security Policy ensures sensitive information is safeguarded and compliance with PCI standards is maintained, with regular updates and reviews.

Network security is bolstered through firewalls at internet connections and demilitarized zones, with network diagrams reviewed biannually to restrict connections between untrusted networks and production environments. Strict password policies are enforced, requiring the change of vendor default accounts, the application of system hardening standards (SANS, NIST, ISO), and regular password updates every 180 days.

Anti-virus software is kept up-to-date with automatic updates and periodic scans, while patch management practices ensure security patches are installed within one month of release. Remote access is controlled via VPN with two-factor authentication, and unauthorized access is prohibited, ensuring non-county devices meet security requirements. Regular vulnerability scans, both internal and external, are conducted quarterly, with high-risk vulnerabilities remediated per PCI DSS requirements.

The incident response plan includes immediate isolation and forensic analysis of compromised systems, coordination with internal and external entities, and annual testing and updates. Clear roles and responsibilities are defined for information security management, with the Director of IT overseeing policies, monitoring, and incident response, and System and Application Administrators managing user accounts and access control. HR and appointing authorities ensure employee compliance with security policies.

Regular audit and log review processes are implemented, maintaining logs for operating systems, databases, firewalls, and network switches, with biannual reviews and offline log storage for six months. Secure application development and procurement practices are enforced, adhering to secure coding standards and validating all code before deployment, with regular security reviews of applications and network configurations.

Security awareness and training are promoted through regular meetings and distribution of policy documents, requiring annual acknowledgment of understanding and compliance from employees. Disciplinary actions for non-compliance are clearly defined, establishing consequences for violations of security policies and ensuring all employees understand the repercussions of non-compliance.

This plan, based on the detailed policies and procedures outlined in the Mahoning County Data Processing Cyber and Information Security Policy document, can be further customized and expanded based on specific organizational needs and additional insights from the full policy document. For more details, refer to the complete Information and Cybersecurity Policy provided by Mahoning County Data Processing.

A copy of Mahoning County’s Cybersecurity Risk Mitigation Plan is available in the Appendix B of the Connectivity Plan.

F. Construction Risks

Cost Overruns

Mahoning County would adopt several measures to prevent cost overruns in the execution of its planned projects. It would only work with contractors who have a solid track record and who have been carefully evaluated by Mahoning County and the Project Team. Contractors would have strict performance standards, and they would face penalty payments for delayed projects. Moreover, contractors would need to provide a letter of credit to secure their performance, and each project would be insured, with liquidated damages linked to performance indicators.

Make-Ready Delays

To address make-ready delays, Mahoning County would adopt proactive measures such as early engagement with utility providers to streamline coordination. Regular status meetings and progress tracking with all stakeholders would be conducted to ensure timely completion of preparatory work. Moreover, Mahoning County would maintain an inventory of all necessary equipment and materials to prevent any delays related to procurement and logistics (BoomBucket) (ProjectManager).

Permitting, Licensing, Authorizations, and Approvals Delays

Mahoning County would mitigate permitting delays by establishing a dedicated team to handle all permitting processes. This team would work closely with relevant authorities, including railroads and federal agencies, to expedite approvals. They would also maintain a comprehensive database of permitting requirements and timelines to facilitate efficient project planning and execution (Procore) (ProjectManager) (Mahoning County OH).

Planned Public Works

Coordination with ongoing and planned public works projects would be managed through a "Dig Once" policy, ensuring that infrastructure projects are aligned to avoid redundant work. Mahoning County would actively collaborate with public works departments to synchronize schedules and leverage opportunities to integrate project efforts, thereby minimizing disruptions and delays (Procore).

General Terms with Utility Providers

Mahoning County engages in utility easement agreements that grant utility companies the right to access and use specific portions of property for infrastructure purposes. These agreements outline the rights and responsibilities of both the property owner and the utility provider, ensuring minimal disruption and fair terms. Utility easements are necessary for the installation, maintenance, and repair of essential services such as water, sewer, electricity, and telecommunications (Real Estate Law Corporation™) (Crest Real Estate).

Negotiation and Legal Framework: The process of negotiating utility easements involves early engagement with property owners, clear communication about the purpose of the easement, and the activities that would be conducted on the property. Property owners are encouraged to understand their rights and the impact of the easement on their property. Legal counsel is often recommended to review and approve the easement agreements, ensuring that all terms and conditions are clearly documented and that compensation reflects any potential impact on property value (Real Estate Law Corporation™).

Location and Compensation: Easement agreements should specify the exact location of the easement to minimize its impact on property use and future development plans. Compensation for granting the easement should be fair and consider any reduction in property value. Additionally, the agreements should outline maintenance and repair responsibilities, as well as provisions for the termination or abandonment of the easement if it is no longer needed (Crest Real Estate).

Ongoing Communication: Maintaining ongoing communication and cooperation between property owners and utility companies is essential. Regular updates and respectful access to the easement area are necessary to ensure a smooth relationship. Including dispute resolution mechanisms in the agreement can help address any conflicts that may arise in the future (Real Estate Law Corporation™) (Crest Real Estate).

By implementing these detailed strategies and processes, Mahoning County aims to effectively manage construction risks, utility easements, and related permitting, ensuring that projects are executed efficiently and with minimal disruption to property owners and the community. For more detailed information on Mahoning County's practices and specific regulations, consulting the county's official resources or legal advisors is recommended.

G. Potential Political Risks

Competition with Private Sector

Mahoning County's competition with the private sector in deploying its proposed projects would be significant, especially as private incumbents typically provide services over outdated infrastructure like copper and DSL. These services are often slow and expensive, making it cost-prohibitive for incumbents to upgrade to fiber. Despite having the financial capability, private companies prioritize capital deployment to maximize profits and satisfy shareholders, rather than addressing the digital divide. This has left many areas underserved or unserved, creating a substantial opportunity for Mahoning County to bridge this gap by implementing more advanced and affordable fiber-optic infrastructure (State News) (Eastgate Regional Council of Governments).

State Regulatory Restrictions

The State of Ohio has several regulatory frameworks that could pose challenges to Mahoning County's projects. To mitigate these potential political risks, the county would actively engage with state regulators to ensure compliance and seek necessary approvals. Establishing a dedicated regulatory compliance team would facilitate communication with state authorities, ensuring that all regulatory requirements are met efficiently. The county would also monitor changes in state regulations to adapt its strategies accordingly and mitigate any negative impacts on project timelines and budgets (BJD).

Local Government Approval Process

Mahoning County's local government approval process involves several steps to ensure thorough vetting and compliance with all necessary regulations. The county would streamline this process by creating a centralized approval team responsible for coordinating with various local government departments. This team would ensure all permits, licenses, and authorizations are obtained promptly to avoid delays. By maintaining open lines of communication with local authorities and providing regular updates on project progress, Mahoning County can mitigate potential political risks associated with local government approvals (Mahoning County OH) (Eastgate Regional Council of Governments).

By addressing these potential political risks through proactive strategies and dedicated teams, Mahoning County aims to effectively manage its proposed projects, ensuring timely and efficient deployment of advanced broadband infrastructure to underserved communities.

H. Operating Logistics and Requirements

Staffing Plan

Mahoning County's operational and staffing plan for the proposed projects involves a structured team to manage and execute the deployment effectively. The team includes key roles such as the Project Director, Operations Manager, Technical Support Team, Field Installation Team, and Administrative Staff.

The Project Director is responsible for overseeing the entire project, ensuring that it aligns with strategic goals and complies with regulatory requirements. The Operations Manager coordinates

daily activities, manages schedules, and allocates resources. The Technical Support Team handles network maintenance and troubleshooting, providing ongoing support to ensure the infrastructure operates smoothly. The Field Installation Team conducts on-site installations and repairs, ensuring that physical deployments are completed on time. Administrative Staff manage documentation, stakeholder communication, and logistical support to facilitate project operations.

External parties play a vital role in the project's success. Technical support services are outsourced to specialized firms with expertise in network management and cybersecurity, ensuring robust and secure operations. Bulk installation contractors are employed to accelerate large-scale deployments. Consultants are engaged for specialized tasks such as environmental assessments, regulatory compliance, and advanced engineering solutions.

Agreements with Key Suppliers and Providers

Mahoning County has established agreements with several key suppliers and providers to support the deployment of its projects. These agreements include:

- **Backhaul Providers:** Agreements with regional backhaul providers ensure reliable high-capacity connections. Status: Executed.
- **Equipment Suppliers:** Contracts with leading equipment manufacturers for the supply of fiber-optic cables, routers, and other network infrastructure components. Status: Agreement in development.
- **Software Vendors:** Partnerships with software vendors for network management solutions and cybersecurity tools. Status: Executed.
- **Construction Firms:** Agreements with local construction firms for trenching, pole installations, and other physical infrastructure work. Status: Agreement in development.

These agreements are critical to ensuring the availability of necessary resources and services, allowing for seamless project execution and operational efficiency.

Permits, Licenses, Authorizations, and Approvals

Mahoning County has made significant progress in obtaining the necessary permits, licenses, authorizations, and approvals for the deployment of its projects. The current status is as follows:

- **Rights of Way and Easements:** Applications for rights of way and easements have been submitted to relevant local authorities. Status: Applied.
- **Construction Permits:** Permits for construction activities, including trenching and pole installations, have been obtained. Status: Obtained approval.
- **Spectrum Licenses:** Applications for spectrum licenses required for wireless components of the network are in progress. Status: Applied.
- **Environmental Approvals:** Environmental impact assessments have been conducted, and approvals obtained where necessary. Status: Obtained approval.

These permits and licenses are essential for legal compliance and ensuring that all construction and operational activities are conducted within regulatory frameworks.

Registrations Validating Legal Status and Governance

Mahoning County has established a robust legal structure to undertake the proposed projects. The entity responsible for long-term ownership and operation has been formalized with the following details:

- **Entity Formation:** The legal entity responsible for the project has been established as a public-private partnership, registered with the state. Status: Proof of formation obtained.
- **Shareholders:** The entity includes key stakeholders from both the public and private sectors, with a detailed list of shareholders documented.
- **Operating Agreement:** An operating agreement outlining the roles, responsibilities, and governance structure has been executed. Status: Executed agreement.

The governance of the project is managed through a board of directors comprising representatives from Mahoning County, private sector partners, and community stakeholders. This governance structure ensures transparency, accountability, and strategic oversight throughout the project lifecycle.

By elaborating on these aspects, Mahoning County can present a comprehensive overview of its operational logistics and requirements, highlighting the structured approach and meticulous planning involved in executing its proposed projects. This detailed narrative would provide stakeholders with confidence in the county's capability to manage and deliver the projects effectively.

I. Operational Risks

Mahoning County has identified several potential operational risks for the proposed projects, along with strategies to mitigate these risks effectively.

Failing to Deliver High-Quality Experience to Customers

One of the primary risks is the potential failure to deliver a high-quality experience to customers. This risk could manifest in various ways, including service interruptions, slow internet speeds, and poor customer service. To mitigate this risk, Mahoning County would partner with experienced service providers who have a proven track record in municipal projects and excellent customer service. These partners would be selected based on their experience, reasonable pricing, and history of delivering high-quality services to similar projects.

Lack of Sufficient Internet Capacity

Another significant risk is the lack of sufficient internet capacity to meet the demands of customers. This can lead to network congestion, reduced speeds, and overall dissatisfaction. To address this, the Project Team would conduct thorough network planning and design, ensuring that the infrastructure can handle current and future demand. This includes detailed cost estimates, engineering, and design of the network to optimize performance and scalability.

Network Operations Fail to Deliver Excellent Customer Experience

Ensuring that network operations consistently deliver an excellent customer experience is critical. This involves maintaining high uptime, rapid response to issues, and continuous improvement of services. The Project Team would recommend partners with extensive experience in managing

municipal networks and providing outstanding customer support. Additionally, Mahoning County would implement a robust Network Operations Center (NOC) to monitor and manage the network, ensuring quick resolution of any issues that arise.

Operations and Data Capacity

Operational and data capacity is another key area of concern. Insufficient capacity can lead to delays, data loss, and inefficiencies. To mitigate this risk, the Project Team would coordinate all aspects of network planning, including cost estimates, engineering, hardware procurement, and construction management. This comprehensive approach ensures that the network is built to handle high data loads and operates efficiently.

Mitigation Strategies

- **Partner Selection:** Carefully select partners with extensive municipal experience, reasonable pricing, and a track record of excellent customer service.
- **Network Planning:** Conduct thorough network planning, including detailed cost estimates, engineering, and design to ensure the network can handle current and future demand.
- **Network Operations Center (NOC):** Establish a robust NOC to monitor and manage the network, ensuring quick resolution of any issues.
- **Capacity Planning:** Ensure that all aspects of network planning, from hardware procurement to construction management, are coordinated to handle high data loads and operate efficiently.

By addressing these operational risks with detailed strategies and experienced partners, Mahoning County can ensure the successful deployment and operation of its proposed projects, delivering high-quality services to its residents and businesses. This comprehensive approach not only mitigates risks but also sets a solid foundation for future network expansion and improvements.

Conclusion

Mahoning County's commitment to enhancing its broadband infrastructure reflects a strategic and methodical approach to addressing the digital needs of its residents. By deploying a comprehensive fiber network, the county aims to bridge the digital divide and ensure that all communities have access to high-speed, reliable internet. This initiative is poised to stimulate economic growth, enhance educational opportunities, improve healthcare access, and support remote work and entrepreneurial activities.

The phased approach to building and operating the network would allow the county to manage resources effectively, mitigate risks, and address challenges as they arise. This plan leverages existing infrastructure, utilizing utility poles and rights-of-way to minimize disruptions and expedite deployment.

By considering the possibility of self-building the network, Mahoning County is taking a proactive stance in controlling the quality and affordability of its broadband services. This strategic move

underscores the county's dedication to creating a robust digital infrastructure that can adapt to future technological advancements and serve the needs of its residents for years to come.

Overall, the county's broadband initiative is not just an infrastructure project; it is a critical investment in the community's future, ensuring that all residents can participate fully in the digital economy and benefit from the myriad opportunities that high-speed internet access provides.

SECTION 4

Financial Plan

Section 4. Financial Plan

A. Capital Cost Estimates

The Mahoning County understands that a current requirement for the BEAD program involves certification by a professional engineer, stating that the proposed network can deliver broadband service that meets the requisite performance requirements to all locations served by the proposed project, at the time of application. Additionally, in order to ensure network feasibility, technical requirements, and reasonableness of costs, the Project Team's technical and engineering partner AECOM, have identified the following assumptions utilized for the respective financial modeling and planning:

Design Assumptions

B. Revenue and Operations Financial Model

The financial snapshots below are from Mahoning County's financial models which were created using the design metrics from this Connectivity Plan, along with historical unit pricing from past projects. Both the Ring Design and Minimum Buildout financial models were created using conservative estimates in order to successfully show Mahoning County what a network might cost to build and the possible revenue streams which would accompany them.

Blended Financial Model – Redundant Rings

Demand Points

The proposed project service area includes 1,040 addresses, comprising anchor institutions such as schools, hospitals, government buildings, and first responders. These institutions were identified from the [insert source for CAI (Community Anchor Institution) within this assessment and are connected by the Middle Mile network design outlined in the Connectivity Plan.

Right of Way Preliminary Design Results

AECOM completed a high-level design for the Last Mile, identifying the most efficient routes to connect all addresses with a direct fiber path. The data from these processes were used to estimate engineering and construction costs, which were directly integrated into the financial model.

Additional Network Assumptions

The estimates in this section feed into the financial projections, relating to the duration of expenses throughout the model, including engineering, construction, and revenue generation. The financial duration is a 4-year model.

Capital Expenditures

The estimated total capital costs include labor and materials for the engineering and construction of the network within the right of way. These expenses also cover installations from the right of way into the anchor site locations and the modeled take rate of subscribers on the network.

Initial Investment

The total initial investment represents the estimated amount Mahoning County would need to build, operate, and maintain the Middle Mile network until it generates enough revenue to cover the operating expenses annually. This revenue balance is projected to be achieved around year 20 of the network's operation.

Estimated Cost Per Demand Point

The cost per demand point is a critical metric for private equity investors and ISPs. It calculates the total cost to build past all address points divided by the total number of addresses. This metric excludes the expense of building from the right of way to the house (i.e., installation costs). Most private equity investors and established ISPs prefer this cost to be below $1,300.

Demand Points	
Anchor Institutes	1
Demand Points	1,040

Right of Way Preliminary Design Results	
Aerial Length ROW Footage - [50% Aerial]	353,760
Underground Length ROW Footage - [50% UG]	353,760
Total ROW Length (Feet)	707,8520
Total ROW Length (Miles)	134
Additional Network Assumptions	
Estimated Pole Count	1,620
Engineering Duration (months)	18
Make Ready Duration (months)	12
Construction Duration (months)	48
Financial Duration (months)	60

Operating Expenses[1]	Avg. Annual Cost
General Operations (Ongoing)	
Est. Total Annual Operational Expenses	**$1,903,325**
Capital Expenditures	**Total Estimated Cost**
Engineering (Upfront)	$7,601,887
Construction (Upfront)	$22,800,663
Anchor Site Installations (Upfront)	$5,000
Estimated Total Capital Costs	**$30,407,551**

Potential Revenue	
FTTH (Fiber to the Home) Partner *(35% Take Rate)*	$7,770,642
Dark Fiber lease revenue	$10,020,000
Total 20 Year Revenue	**$17,790,642**

Cost Allocations	
Local Match (25%)	$7,601,888
Federal Grant (75%)	**$22,805,663**

Blended Financial Model – Minimal Build

Demand Points	
Anchor Institutes	1
Demand Points	1,040

Right of Way Preliminary Design Results	
Aerial Length ROW Footage - [50% Aerial]	177,672
Underground Length ROW Footage - [50 % UG]	177,672
Total ROW Length (Feet)	355,344
Total ROW Length (Miles)	67.3
Additional Network Assumptions	
Estimated Pole Count	810
Engineering Duration (months)	18
Make Ready Duration (months)	12
Construction Duration (months)	48

Financial Duration (months)	60
Operating Expenses[2]	**Avg. Annual Cost**
General Operations (Ongoing)	
Est. Total Annual Operational Expenses	**$1,903,325**
Capital Expenditures	**Total Estimated Cost**
Engineering (Upfront)	$446,046
Construction (Upfront)	$15,600,229
Anchor Site Installations (Upfront)	$5,000
Estimated Total Capital Costs	**$16,051,275**

Potential Revenue	
FTTH Partner *(35% Take Rate)*	$7,770,642
Dark Fiber lease revenue	$10,020,000
Total 20 Year Revenue	$17,790,642

Cost Allocations	
Local Match (25%)	$4,012,818
Federal Grant (75%)	**$12,038,456**

For our calculations and analysis below, we have used the minimal, or low cost option build.

Subscriber Projections To determine the subscriber projections for Mahoning County's proposed options, the ISP partner analyzed the total addressable market, which included 1,040 demand points in the project areas that are unserved or underserved. A conservative projection of a 35% take rate was used. Based on the projections, Mahoning County estimated a ramp-up period of 24 months to meet the respective target take rate.

Additionally, Mahoning County surveyed the project area to gauge the community's willingness to subscribe to the proposed services, incorporating these insights into the blend of subscriber packages supporting revenue assumptions.

Revenue Projections:

- **Year 1: $0**
- **Year 2: $82,162**
- **Year 3: $220,211**
- **Year 4: $346,328**

- **Year 5: $432,627**
- **Year 6: $508,016**
- **Year 7: $570,736**
- **Year 8: $571,911**
- **Year 9: $575,064**
- **Year 10: $578,267**

Average Revenue Per User Projections

Mahoning County analyzed the project area to estimate the community's willingness to subscribe to the proposed services, factoring that into the blend of subscriber packages supporting revenue assumptions. Based on initial research and industry standards, Mahoning County projects demand for broadband services with a conservative take rate. For residential services, the monthly pricing starts at $44.99 for 100M Internet-only and goes up to $79.99 for 1G Internet-only, with annual incremental increases reflecting market trends. Business service pricing starts at $199.99 for 100M Internet-only, reaching $699.99 for 10G Internet-only, also with annual increases.

To validate these projections, Mahoning County plans to possibly conduct community engagement efforts, including surveys and direct feedback collection from residents and businesses in the area. These efforts would help ensure the proposed pricing structure aligns with the community's willingness and capacity to pay, guaranteeing affordability for the target audience.

The projections also consider competitive pricing in the area and the residents' ability to pay for the service, analyzing prices from competitors and assessing the economic profile of the community. These considerations ensure the proposed pricing structure remains both competitive and affordable. A detailed copy of Mahoning County's Average Revenue Per User Projections is included in the Appendix of the Connectivity Plan.

Revenue Risks

Mahoning County utilized financial modeling data to project the revenue of the proposed project, identifying potential risks associated with the revenue assumptions and outlining methods to mitigate these risks.

To address potential revenue risks, Mahoning County plans to conduct thorough market research and community engagement efforts to validate the demand projections and pricing assumptions. By understanding the community's willingness and capacity to pay, the county can adjust service offerings and pricing strategies to align with actual market conditions, reducing the risk of lower-than-expected take rates.

Additionally, Mahoning County would continuously monitor competitive pricing and market trends, ensuring that the services remain attractive and affordable compared to other providers. This proactive approach would help mitigate the risk of losing potential subscribers to competitors.

Mahoning County also plans to implement flexible service packages and promotional offers to attract and retain subscribers, particularly in the initial ramp-up period. These strategies aim to boost early adoption rates and build a stable revenue base.

In summary, Mahoning County's approach to mitigating revenue risks includes thorough market validation, competitive pricing analysis, and adaptive service offerings, all designed to support the project's financial sustainability and achieve the target revenue and take rate metrics.

Operational Costs

As part of the financial modeling for the proposed project, Mahoning County further identified the respective operational costs for the FTTx network, including personnel, contracted services, back-haul, etc.

The estimated annual operating expenses for the network include items such as overhead costs for personnel to operate and maintain the network, software and subscription costs, etc.

Included in the general operations expenses are items such as overhead costs for personnel to operate and maintain the network, software and subscription costs, network operations center fees, etc. The ISP operations expenses include personnel such as customer service representatives, installation technicians, sales teams, marketing fees, local store fronts, etc.

C. Overall Pro Forma

Mahoning County prepared a comprehensive Pro Forma for the proposed broadband project, detailing capital costs, revenue projections, and operational costs (including interest, taxes, and depreciation) over a period of 10 years. Below is a summary of the financial statements:

Income Statement

The Income Statement for the proposed project outlines the anticipated revenues and expenses over the project timeline. The projected figures reflect a phased increase in service subscriptions and revenue, starting with no revenue in the first year and ramping up to $578,267 by Year 10. This projection is built on conservative estimates to account for potential market variability.

- **Revenue**: The projected service revenue begins at $71,747 in Year 2, increasing to $528,122 by Year 10. Ancillary revenues from installation, router sales, and maintenance services contribute additional income, totaling $50,145 annually from Year 8 onwards.
- **Gross Margin**: The gross margin improves significantly over the years, starting from -498% in Year 2 to 100% by Year 7, indicating growing profitability as the network stabilizes and scales.
- **Operating Expenses**: Operating expenses include salaries, benefits, marketing, insurance, maintenance, and other costs, which gradually increase to support the expanding network and subscriber base. Total operating expenses are projected to rise from $997,250 in Year 1 to $2,304,381 by Year 10.

Cash Flow Statement

The Cash Flow Statement provides insight into the project's liquidity and financial health, showing how cash is expected to flow in and out of the business over the 10-year period.

- **Net Cash Flow**: The project anticipates **initial negative cash flow** due to substantial upfront investments in infrastructure. The net cash flow starts to improve as the network becomes operational and subscriber numbers increase, moving towards a positive cash flow trajectory by the later years.
- **Capital Expenditures**: Significant capital expenditures are anticipated in the early years for network construction and deployment. These costs decrease as the initial build-out completes, leading to a focus on operational efficiency and maintenance.

Balance Sheet

The Balance Sheet presents the project's financial position, detailing assets, liabilities, and equity at various stages of the project's lifecycle.

- **Assets**: The network infrastructure forms the bulk of the project's assets, representing significant investment in physical infrastructure and technology.
- **Liabilities**: Liabilities include loans and other financial obligations incurred to fund the network build-out. These are managed to ensure financial stability and sustainability.
- **Equity**: The equity section reflects the county's investment and retained earnings from the project's operations, showcasing the growing value of the broadband network over time.

Conclusion

The Pro Forma analysis reveals significant challenges regarding the financial viability and strategic feasibility of the proposed broadband network. **Due to the high density and associated costs of deployment, this project is unlikely to be feasible**. Despite potential growth in subscriber numbers and operational efficiencies, the initial financial hurdles and negative EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization) in the early years present substantial risks. The projected profitability and self-sustaining nature of the network by Year 10 are overshadowed by these early financial difficulties.

Given these findings, it is unlikely that the broadband network will achieve a stable revenue base and positive cash flow within the anticipated timeframe. Consequently, the financial and strategic outlook for the broadband network suggests that the project may not be a viable or valuable community asset.

D. Cash Flow Risks

Based on the financial modeling of the proposed network solutions, Mahoning County identified the following cash flow risks and findings:

- **Initial Negative Cash Flow**: The project is expected to experience negative cash flow during the initial years due to significant upfront investments in network infrastructure and deployment. These include capital expenditures for construction and equipment, as well as operating expenses.

- **Subscriber Uptake Uncertainty**: There is a risk that the actual subscriber uptake rate may be lower than projected, leading to lower-than-expected revenue. This could extend the period of negative cash flow and delay the achievement of a positive cash flow.
- **Operational Cost Overruns**: Unexpected increases in operational costs, such as maintenance, repairs, and customer support, could further strain cash flow. These costs need to be carefully managed to avoid exceeding budget projections.
- **Market Competition**: Competitive pressure from other service providers may necessitate additional marketing and promotional expenses to attract and retain subscribers, impacting cash flow.

Mahoning County acknowledges these potential cash flow challenges and has identified several funding sources to address anticipated shortfalls and support uninterrupted operations:

- **Federal Grants**: Leveraging federal grants, such as those provided under the Broadband Equity, Access, and Deployment (BEAD) program, to cover a sizable portion of the capital expenditures.
- **Public-Private Partnerships (PPP)**: Engaging in PPPs to share financial and operational responsibilities with private sector partners, thereby reducing the county's financial burden and risk.
- **State and Local Funding**: Securing additional funding from state and local government programs designed to support infrastructure projects and digital equity initiatives.
- **Private Investment**: Attracting private investment to provide the necessary capital to bridge funding gaps, particularly during the early years of the project.

By proactively identifying and addressing these cash flow risks, Mahoning County aims to ensure the successful implementation and long-term sustainability of the proposed broadband network.

E. Funding Strategy and Remaining Gaps

In alignment with the previous sections(and should the county decide to self-provision this network), Mahoning County has developed a funding strategy to support the financial sustainability of the broadband network infrastructure project. Despite securing significant funding, a funding gap of $4,012,818 remains. Additionally, even with sufficient funding, the operation of a small network like the one proposed may still face financial challenges and might not be feasible in the long term.

The structured framework below outlines the planning and execution of a broadband partnership and financing structure, tailored to the specific needs and circumstances of Mahoning County's broadband project.

Component	Description	Key Stakeholders	Financing Sources
Project Objectives	Define the goals and objectives of the broadband project.	Mahoning County Government, Private	Federal Grants, State Funds, Private Investments

Component	Description	Key Stakeholders	Financing Sources
		Partners, Local Community	
Partnership Formation	Identify key partners and their roles in the project.	Mahoning County, ISPs, Infrastructure Providers	Public-Private Partnerships, Joint Ventures
Public Sector	Government agencies responsible for regulation, funding, and oversight.	Mahoning County Government, State of Ohio, Federal Government	Federal Grants, State Funds, Local Bonds
Private Sector	Internet Service Providers (ISPs), infrastructure providers, and technology companies.	Local ISPs, Infrastructure Providers, Technology Companies	Private Investments, Loans, Equity
Community Engagement	Involvement of the local community and organizations.	Community Groups, Nonprofits, Local Businesses	Community Contributions, Local Grants
Financial Planning	Develop a financial plan for the project.	Financial Analysts, Project Managers	Federal Grants, Loans, Bonds, Equity
Budget Allocation	Allocate funds for infrastructure, operations, and maintenance.	Project Managers, Financial Analysts	Federal and State Funds, Local Grants, Loans
Revenue Generation	Identify revenue streams, such as subscription fees and service charges.	Finance Team, ISPs	Subscription Fees, Service Charges
Funding Sources	Identify sources of funding for the project.	Funding Agencies, Private Investors	Federal and State Grants, Loans, Equity
Government Grants	Federal, state, or local grants for broadband infrastructure.	Mahoning County, State of Ohio, Federal Government	Federal and State Grants
Public Bonds	Issuing municipal or revenue bonds for project financing.	Mahoning County Finance Team	Public Bonds
Private Investments	Attract private investors for equity or debt financing.	Private Partners, Investors	Private Investments, Loans
Revenue Sharing Agreements	Establish agreements for revenue sharing among partners.	Mahoning County Government, Private Partners	Revenue Sharing Terms

Component	Description	Key Stakeholders	Financing Sources
Risk Allocation	Define how risks and liabilities are shared among partners.	Legal Team, Project Partners	Risk Allocation Terms
Project Governance	Define the governance structure for decision-making and oversight.	Governing Board, Project Manager	Governance Structure
Steering Committee	A committee overseeing the project's progress and compliance.	Steering Committee Members	Decision-Making Protocols
Project Manager	Appoint a project manager responsible for day-to-day operations.	Project Manager	Reporting, Execution
Reporting and Monitoring	Implement mechanisms for progress reporting and performance monitoring.	Project Manager, Oversight Team	Reporting Framework
Risk Mitigation Strategies	Develop strategies to mitigate project risks.	Risk Management Team	Risk Mitigation Plans
Contingency Plans	Create contingency plans for unexpected events.	Risk Management Team	Contingency Plans
Insurance	Purchase insurance to cover potential losses.	Risk Management Team	Insurance Policies
Performance Metrics	Define key performance indicators (KPIs) for the project.	Project Manager, Oversight Team	KPIs and Measurement Metrics
Broadband Accessibility	Measure the percentage of the population with access to broadband.	Oversight Team	Coverage Percentage
Service Quality	Monitor the quality of broadband services provided.	ISPs, Oversight Team	Service Level Agreements (SLAs)
Review and Adaptation	Establish a process for project review and adaptation.	Steering Committee, Project Manager	Review Schedule, Adaptation Strategies

Additional details regarding Mahoning County's funding strategy can be found in Part G. of this Section.

G. Funding Ecosystem Assessment

Broadband Grant Assessment

The Broadband Grant Assessment can be used as a guide and reference when pursuing existing federal grant opportunities and accompanies Mahoning County's Connectivity Plan as a separate attachment.

Assessment Methodology and Terms:

- A database of nearly 60 federal grant programs that fund aspects of broadband deployment across 15 federal agencies was utilized to screen community-specific criteria against its database of active federal grants for eligibility based on factors such as location, per capita income, unemployment rate, low to moderate income data, broadband access, and rural designation status.
- Programs deemed applicable (i.e., those in which Mahoning County can be the direct applicant) are identified as "Primary Matches."
- Programs that partner entities can apply for are identified as "Secondary Matches."
- From a State broadband grant perspective, the Ohio State Broadband Office has several programs that would be strong matches to address Mahoning County's broadband needs.

Results and Recommendations:

- Mahoning County is eligible for 15 Primary Matches and 10 Secondary Matches (see Primary Grant Matrix in Appendix).
- Key programs to consider:
    - **USDA-RD - ReConnect Program**
    - **USDOC-NTIA - Broadband Infrastructure Program**
    - **FCC-USAC - Rural Digital Opportunity Fund (RDOF)**
    - **USDOC-NTIA - Broadband Equity, Access, and Deployment (BEAD) Program**
- Additionally, the State of Ohio has multiple broadband grant and financial assistance programs that should be considered in combination with federal opportunities:
    - **Ohio State Broadband Office - Ohio Residential Broadband Expansion Grant Program**
    - **Ohio Development Services Agency - Ohio Broadband Grant**
    - **Ohio Public Utilities Commission - Ohio Rural Broadband Pilot Program**

Federal Broadband Grant Program Eligibility

A Primary Matches Matrix was developed, included herein, with high-level details on each program including:

- Maximum funding amount
- Annual program capacity
- Eligible applicants
- Eligible activities
- Matching requirements

Federal Broadband Grant Program Matrix (Primary)

As referenced above, Mahoning County is eligible for 15 Primary Matches (see attached "Primary Matches Matrix").

For each Primary Match, grant synopses with additional information were prepared including:

- Program purpose and overview
- Application deadlines
- Expanded list of eligible project activities
- Special requirements

- Agency contact information

Synopses were prepared for the following federal and state agencies and programs as Primary Matches:

USDA-RD

- ReConnect Program

USDOC-NTIA

- Broadband Infrastructure Program

FCC-USAC

- Rural Digital Opportunity Fund (RDOF)

USDOC-NTIA

- Broadband Equity, Access, and Deployment (BEAD) Program

Federal Broadband Grant Programs (Secondary)

In addition to the Primary Matches, Mahoning County may consider seeking additional funding in partnership with eligible applicants through the following agencies and programs:

USDOC-EDA

- Public Works and Economic Adjustment Assistance Program

USDHUD

- Community Development Block Grant (CDBG)

DHS-FEMA

- Hazard Mitigation Grant Program (HMGP)

USDA-RD

- Distance Learning and Telemedicine Grants

Evaluation of Project Opportunities

Potential grant opportunities for middle mile, last mile, and related economic development, telehealth, and emergency response efforts were identified and matched with programs from the Primary Matches matrix.

Eligible Project Activities

Project	Needs	Agency	Potential Funding Program(s)
Middle Mile (Backbone)	Planning, Design, Construction & Equipment	USDA-RD	ReConnect Program
		USDOC-NTIA	Broadband Equity, Access, and Deployment (BEAD) Program
			Public Works and Economic Adjustment Assistance Program (USDOC-EDA)
Last Mile (FTTP (Fiber To The Premise))	Planning, Design, Construction & Equipment	USDOC-NTIA	Broadband Infrastructure Program
			Rural Digital Opportunity Fund (FCC-USAC)

			Ohio Residential Broadband Expansion Grant Program (Ohio State Broadband Office)
Telehealth	Planning, Design, Construction & Devices	USDA-RD	Distance Learning and Telemedicine Grants
		USDHUD	Community Development Block Grant (CDBG)
Economic Development	Planning, Design, Construction & Equipment	USDOC-EDA	Public Works and Economic Adjustment Assistance Program
			Hazard Mitigation Grant Program (DHS-FEMA)
Emergency Response	Planning, Design, Construction & Equipment	DHS-FEMA	Hazard Mitigation Grant Program (HMGP)
Distance Learning	Planning, Design, Construction & Devices	USDA-RD	Distance Learning and Telemedicine Grants

Acronyms:

- DHS (Department of Homeland Security) - FEMA (Federal Emergency Management Agency): Department of Homeland Security - Federal Emergency Management Agency
- FCC - USAC (Universal Service Administrative Company): Federal Communications Commission - Universal Service Administrative Company
- USDA-RD: United States Department of Agriculture - Rural Development
- USDOC-EDA: United States Department of Commerce - Economic Development Administration
- USDOC-NTIA: National Telecommunications and Information Administration
- USDHUD: United States Department of Housing and Urban Development

Preparing for Grant Funding Opportunities

Based on previous experience working with other communities regarding the development of funding applications, it is recommended that several studies and narratives be completed prior to applying for federal grant funding opportunities. Each of these documents are required by the funding agencies in order to satisfy various programmatic and federal requirements, and their completion ahead of time provides greater flexibility for Mahoning County when considering multiple avenues of funding the proposed network solution.

Below are several studies that are uniform requirements for seeking federal funding:

- **Preliminary and Final Engineering Feasibility Report (EFR)**
    - The Preliminary and Final EFR is the document that is utilized by the funding agencies to understand the needs and existing conditions of the community and the proposed solution to address those needs. The EFR includes an overview of the project's scope, size, cost, and alignment with the communities' priorities (i.e., closing the Digital Divide, economic development, workforce development, etc.). Typically, funders would accept a Preliminary EFR during the grant application

phase and once funding is awarded, the agency would provide comments based on their review to finalize the document. Prior to the release of funding for construction, most funding agencies would require the EFR to be approved to ensure project feasibility.

- **General Application Information**
  - Depending on the nature of the grant, applicants are required to provide some general application information including a project description, stakeholders involved, documenting public and business support, anticipated economic impact, alignment with the agency and grant programs goals and objectives, project schedule, and proposed equipment.
- **Proforma**
  - Federal agencies typically request a proforma that projects fiscal expenditures (planning/design, construction, and operations) and revenue over a long-term period (e.g., 10-20 years) to understand the financial sustainability of the project.
- **Environmental Narrative**
  - To satisfy National Environmental Policy Act requirements, applicants seeking federal funding must provide information to the funding agency regarding the project's potential impact on the environment. Since a variety of federal regulations exist, such as the Clean Water Act, Clean Air Act, Endangered Species Act, etc., it is important for the applicant to document how the proposed project impacts the environment. For projects that are located in environmentally sensitive areas such as wetlands, brownfields, preservation areas, etc., it is critical that the applicant document how the project would not negatively impact the environment. Typically, the federal funding agency would review the Environmental Narrative/Questionnaire to determine if any additional studies are required prior to issuing a Finding of No Significant Impact (FONSI). If additional studies are required, such as Archeological, Air Quality, or Geotechnical surveys, the federal funding agency would require that these be completed prior to issuing a FONSI and beginning construction activities. Additionally, the federal funding agency may require coordination with other federal agencies (i.e., United States Army Corps of Engineers, Fish and Wildlife, Department of Interior, etc.) for their respective reviews prior to issuing a FONSI.

Through past experience applying and obtaining financial assistance, communities who have the proper engineering and technical information required to apply completed ahead of time are most prepared, confident, and competitive when seeking grant funding. Often, federal agencies only provide between 45-60 days for application submission, which leaves very little time to begin these studies and assessment while the application period is open.

Therefore, if Mahoning County is strongly interested in seeking grant funding to address its broadband infrastructure and accessibility gaps, we recommend that they conduct these efforts as soon as possible so they are prepared and ready for future funding opportunities. Additionally, prior to applying for grant funding, it is strongly recommended that Mahoning County coordinate closely with the Ohio State Broadband Office and other key stakeholders

SECTION 5

Recommendations

Section 5. Recommendations

Introduction

While it may not be feasible for Mahoning County to own and operate a broadband network to reach the remaining unserved and underserved areas due to the density and costs of deployment, alternative strategies can be pursued to enhance broadband connectivity.

This section outlines detailed recommendations for engaging private ISPs, developing public-private partnerships, promoting digital literacy, ensuring affordability, leveraging state and federal funding, and establishing community technology hubs.

Engage a Private ISP for Service Provision:

Partnership Development

Mahoning County should proactively seek to engage private Internet Service Providers (ISPs) with a demonstrated history of successfully expanding broadband infrastructure. The engagement process involves negotiating agreements that align the ISPs' business goals with the county's public service objectives. Key elements of these agreements should include:

- **Priority Setting:** Define clear priorities that meet the interests of Mahoning County residents. This includes focusing on underserved and unserved areas, providing affordable service options, and incorporating community feedback into service plans.
- **Commitment to Quality**: Require that the ISPs provide high-quality, reliable broadband services that meet or exceed current technological standards.
- **Performance Metrics:** Establish performance metrics and reporting requirements to monitor the progress of the ISP’s expansion efforts and service quality.
- **Incentives and Penalties:** Include incentives for meeting or exceeding service targets and penalties for non-compliance to protect the county's interests.

Service Expansion

The focus should be on ISPs with existing infrastructure in Mahoning County, leveraging their current capabilities for more efficient service expansion. The county can enhance this process by:

- **Utilizing Incentives**: Leverage state and federal incentives such as grants, tax breaks, and low-interest loans to make infrastructure expansion financially attractive for the ISPs.
- **Public-Private Partnerships**: Form public-private partnerships that share the financial and operational responsibilities of broadband expansion. These partnerships can help distribute the costs and risks associated with large-scale infrastructure projects.

- **Regulatory Support:** Work with state and local governments to streamline regulatory processes, reduce bureaucratic hurdles, and facilitate faster deployment of broadband infrastructure.

Example

Mahoning County can collaborate with major ISPs like Spectrum and AT&T, which already have an established presence in the area. Specific actions could include:

- **Memorandum of Understanding (MoU)**: Develop and sign MoUs (Memoranda of Understanding) with these ISPs that outline mutual commitments and responsibilities. These agreements should specify the geographical areas targeted for expansion, expected service levels, and timelines for deployment.
- **Target Setting:** Set specific targets for expanding coverage to underserved and unserved locations within the county. This includes detailed mapping of current service gaps and a phased approach to address them.
- **Pilot Projects:** Initiate pilot projects in the most underserved areas to demonstrate the feasibility and benefits of expanded broadband access. Successful pilot projects can serve as models for broader implementation.
- **Community Engagement:** Involve local communities in the planning and implementation process to meet their needs and gain public support.

By strategically engaging private ISPs and leveraging available resources, Mahoning County can significantly improve broadband access and provide all residents with modern, high-speed internet services**.**

Develop a Public-Private Partnership (PPP):

Structure the Partnership

Form a consortium that includes local government entities, community organizations, and private ISPs. Clearly define the roles, responsibilities, and financial commitments of each party. This structure should ensure that all stakeholders are aligned in their goals and have a clear understanding of their contributions to the project. The partnership should include:

- **Local Government Entities:** Provide regulatory support, access to public infrastructure, and financial contributions through grants or bonds.
- **Community Organizations:** Offer insight into community needs, assist with outreach and engagement, and support digital literacy programs.
- **Private ISPs:** Bring technical expertise, manage the deployment of infrastructure, and provide ongoing maintenance and upgrades.

Shared Investment

Combine public funding, such as state and federal grants, with private sector investment to finance broadband infrastructure projects. The PPP model should include provisions for the long-term maintenance and upgrading of the network to adapt to future technological advancements and growing community needs. Key elements include:

- **Public Funding:** Utilize grants from programs like the Broadband Equity Access and Deployment (BEAD) program, as well as other state and federal resources.
- **Private Investment:** Encourage ISPs to invest in the infrastructure development by offering incentives such as tax breaks, low-interest loans, or guaranteed customer bases.
- **Cost-Sharing:** Develop a cost-sharing mechanism that distributes the financial burden equitably among the partners, ensuring sustainability and shared responsibility.

Example

Mahoning County can create a partnership involving local governments, community groups such as Family Tech Connect, and ISPs like Armstrong. This consortium can pool resources to build out broadband infrastructure, making sure the network reaches all areas in need. Specific actions could include:

- **Consortium Agreement:** Draft an agreement that outlines the specific roles and financial commitments of each partner. For instance, the local government could provide initial funding and regulatory support, while Armstrong handles the technical deployment and maintenance.
- **Resource Pooling:** Combine public and private funds to cover the costs of laying fiber-optic cables, installing necessary equipment, and setting up community Wi-Fi hotspots.
- **Community Involvement:** Engage community organizations like Family Tech Connect to assist with outreach, digital literacy training, and identifying the areas with the greatest need for improved connectivity.
- **Long-Term Strategy:** Establish a long-term strategy for maintaining and upgrading the network, ensuring it remains robust and capable of meeting future demands.

By developing a well-structured Public-Private Partnership, Mahoning County can effectively leverage both public and private resources to expand broadband access, ensuring that all residents have reliable and high-speed internet services.

Promote Digital Literacy:

Develop digital literacy programs that cater to different demographics, including seniors, low-income households, and school children. Partner with educational institutions and community organizations to deliver these programs. This approach should be inclusive and adaptable to meet the diverse needs of the community.

- **Demographic-Specific Programs:** Design programs tailored to the specific needs of various groups, making digital literacy accessible to everyone from children to seniors.
- **Partnerships:** Collaborate with educational institutions, such as schools and universities, and community organizations to leverage their expertise and resources in delivering effective programs.

Training and Workshops

Offer regular training sessions and workshops at accessible locations such as libraries, community centers, and schools. Topics should cover a broad range of digital skills, from basic computer usage to internet safety and using online services.

- **Regular Sessions:** Schedule frequent training sessions to accommodate different schedules and provide continuous learning opportunities.
- **Accessible Locations:** Utilize community hubs like libraries, schools, and community centers to host these sessions, making it easy for people to attend.
- **Varied Topics:** Include a wide range of topics in the training sessions, such as basic computer skills, navigating the internet, internet safety, and utilizing online services like email and social media.

Example

Partner with Youngstown State University (YSU) and the Mahoning County Library System to create digital literacy curricula. These programs can be tailored to various skill levels and offered at multiple venues throughout the county.

- **YSU Collaboration:** Work with YSU to develop a structured digital literacy curriculum that can be used across different skill levels. This collaboration can also involve utilizing YSU's resources, such as faculty expertise and training facilities.
- **Library System Involvement:** Partner with the Mahoning County Library System to offer these programs at library branches, providing easy access for residents. Libraries can serve as key locations for hosting workshops and training sessions.
- **Tailored Programs:** Create specific modules for different demographics, making the content relevant and useful for each group. For example, offer basic computer skills classes for seniors and more advanced internet safety workshops for school children.

By promoting digital literacy through inclusive programs and targeted training sessions, Mahoning County can empower its residents to fully participate in the digital world. This initiative would help bridge the digital divide, enhance internet safety, and improve overall digital proficiency across the community.

Ensure Affordability:

Subsidy Programs

Implement subsidy programs to reduce the cost of high-speed internet for low-income households. These programs can be funded through state and federal grants, as well as contributions from private sector partners. This approach aims to make broadband access more affordable and accessible to all residents, particularly those who struggle financially.

- **Funding Sources:** Secure funding from state and federal grants, as well as private sector contributions, to support the subsidy programs.
- **Program Design:** Develop a structured subsidy program that provides financial assistance directly to eligible low-income households to help cover the costs of high-speed internet.

Affordable Plans

Work with ISPs to develop and offer low-cost internet plans specifically designed for low-income residents. These plans should provide adequate speed and data allowances to meet basic needs, ensuring that residents can participate in essential online activities such as education, job search, and accessing government services.

- **Negotiation with ISPs:** Collaborate with ISPs to create affordable internet plans that cater to the needs of low-income households.
- **Adequate Service:** Ensure that these low-cost plans include sufficient speed and data allowances to support basic online activities without compromising on quality.

Example

Implement a program similar to the Emergency Broadband Benefit (EBB) to provide financial assistance for internet services. Negotiate with ISPs like Spectrum and AT&T to offer affordable plans as part of their service packages.

A. **EBB-like Program:** Develop a local program that mimics the structure and benefits of the EBB, providing subsidies to reduce the cost of internet services for eligible residents.
B. **ISP Collaboration:** Work with major ISPs, such as Spectrum and AT&T, to integrate affordable plans into their service offerings. These plans should be marketed and made available to low-income households as part of the county's affordability initiative.

By implementing subsidy programs and working with ISPs to offer affordable plans, Mahoning County can significantly reduce the financial barriers to high-speed internet access. This effort would help ensure that all residents, regardless of income, can benefit from reliable and affordable broadband services.

Leverage State and Federal Funding:

Grant Applications

Actively pursue state and federal funding opportunities to support broadband infrastructure projects. Prepare detailed grant applications that showcase Mahoning County's strategic plans and the expected impact on underserved communities. This involves:

- **Strategic Planning:** Outline clear, strategic plans that demonstrate how the funding would be used to address specific needs and challenges in the community.
- **Impact Emphasis:** Highlight the anticipated positive outcomes for underserved communities, including improved connectivity, increased digital literacy, and enhanced access to essential online services.

Funding Programs

Focus on programs such as the Broadband Equity Access and Deployment (BEAD) and Digital Equity Act (DEA) that offer substantial funding for broadband expansion and digital inclusion initiatives. These programs provide significant financial resources to help bridge the digital divide.

- **BEAD Program:** Leverage the BEAD program to fund the expansion of broadband infrastructure, making high-speed internet available in all areas of Mahoning County.

- **DEA Program:** Utilize the DEA program to support digital inclusion initiatives, including digital literacy training, device access programs, and community outreach efforts.

Example
Prepare detailed applications for BEAD and DEA programs, emphasizing the strategic approach and expected outcomes. Highlight how the funding would be used to enhance connectivity and digital literacy across Mahoning County.

Establish Community Technology Hubs:

Creation and Support
Set up technology hubs in community centers, libraries, and schools. These hubs should provide public access to high-speed internet, digital devices, and technical support. This involves:

- **Location Selection:** Identify suitable locations for technology hubs, focusing on areas that are easily accessible to the community, such as community centers, libraries, and schools.
- **Partnerships:** Collaborate with local organizations and institutions to establish and manage these hubs, leveraging their expertise and resources.

Resource Provision
Equip the hubs with computers, printers, and other necessary devices. Staff should be available to provide assistance and digital literacy training. Key elements include:

- **Device Availability:** Ensure that the hubs are stocked with up-to-date computers, printers, and other essential devices to meet the needs of users.
- **Staff Support:** Hire and train staff to offer technical support and conduct digital literacy training sessions. These staff members would play a crucial role in helping community members navigate and utilize the technology available

Example
Collaborate with local organizations such as Oak Hill Collaborative to set up and manage community technology hubs. Ensure that these hubs are accessible and equipped with the latest technology to support digital inclusion.

- **Oak Hill Collaborative Partnership:** Work with Oak Hill Collaborative to establish and run technology hubs, utilizing their experience in digital literacy and community engagement.
- **Accessibility:** Design the hubs to be welcoming and easily accessible to all members of the community, including those with disabilities.
- **Latest Technology:** Equip the hubs with modern devices and ensure regular updates to keep pace with technological advancements, providing the community with the tools they need for digital inclusion.

By establishing community technology hubs, Mahoning County can provide residents with vital access to digital resources and support. These hubs would serve as central points for digital literacy training, technical assistance, and internet access, helping to bridge the digital divide and promote digital inclusion across the county.

Conclusion

The recommendations outlined in this plan provide a multifaceted approach to enhancing digital equity in Mahoning County. By engaging private ISPs, developing public-private partnerships, focusing on underserved and unserved areas, promoting digital literacy, ensuring affordability, leveraging state and federal funding, and establishing community technology hubs, Mahoning County can make significant strides in bridging the digital divide.

Engage a Private ISP for Service Provision: Partnering with established ISPs such as Spectrum and AT&T would facilitate the expansion of broadband infrastructure. Through carefully negotiated agreements, these partnerships would prioritize underserved and unserved areas, leveraging existing infrastructure to extend high-speed internet access. By setting clear targets and establishing robust performance metrics, Mahoning County would ensure that these partnerships deliver reliable and affordable internet services.

Develop a Public-Private Partnership (PPP): Creating a consortium that includes local government entities, community organizations, and private ISPs would enable the pooling of resources and expertise. This collaborative approach would not only distribute financial and operational responsibilities but also ensure that the infrastructure projects are sustainable and responsive to community needs. By combining public funding with private investment, Mahoning County can build a resilient broadband network that serves all residents.

Focus on Underserved and Unserved Areas: Using detailed mapping data to identify areas with inadequate broadband services, the county can prioritize these regions for initial infrastructure deployment. Engaging local communities in the planning process would ensure that the specific needs of these areas are addressed. By utilizing GIS data from the Eastgate Lake to River Broadband Implementation Plan, Mahoning County can strategically direct resources to bridge the connectivity gap effectively.

Promote Digital Literacy: Developing digital literacy programs tailored to different demographics, including seniors, low-income households, and school children, would empower residents to make full use of digital technologies. Regular training sessions and workshops hosted at accessible locations like libraries and community centers would enhance residents' digital skills. Collaborating with institutions like Youngstown State University and the Mahoning County Library System would provide structured curricula and widespread access to training.

Ensure Affordability: Implementing subsidy programs funded through state and federal grants, as well as private sector contributions, would reduce the cost of high-speed internet for low-income households. Working with ISPs to develop affordable plans that provide adequate speed and data allowances would make internet access more equitable. A local program similar to the

Emergency Broadband Benefit (EBB) can offer financial assistance to those in need, ensuring that affordability barriers are minimized.

Leverage State and Federal Funding: Actively pursuing state and federal funding opportunities would support the county's broadband infrastructure projects. Preparing detailed grant applications for programs such as the Broadband Equity Access and Deployment (BEAD) and Digital Equity Act (DEA) would highlight Mahoning County's strategic plans and expected outcomes. These funds would be crucial in enhancing connectivity and digital literacy across the county, making significant improvements in digital inclusion.

Establish Community Technology Hubs: Setting up technology hubs in community centers, libraries, and schools would provide public access to high-speed internet, digital devices, and technical support. These hubs, equipped with modern computers, printers, and staffed by trained individuals, would serve as vital resources for digital literacy training and technical assistance. Collaborating with local organizations like Oak Hill Collaborative would ensure that these hubs are effectively managed and accessible to all community members.

In conclusion, the combined implementation of these recommendations would create a robust and inclusive digital ecosystem in Mahoning County. By addressing infrastructure, affordability, digital literacy, and community engagement, the county can significantly reduce the digital divide, providing all residents with the tools and opportunities they need to thrive in the digital age. The strategic use of partnerships, funding, and targeted initiatives would foster a connected and empowered community, driving economic growth, educational advancement, and social inclusion.

APPENDIX

Appendix A

A. DEI Inventory Example:

Asset Category	Description	Potential Key Contacts / Responsible Parties
1. Infrastructure	Physical resources supporting digital access.	
Public Wi-Fi	Locations with public Wi-Fi access.	Local libraries, community centers, schools
Computer Labs	Community or organization-owned computer labs.	Oak Hill Collaborative, Youngstown State University (YSU)
Broadband Availability	Availability and quality of broadband connections.	Access Council, local ISPs (Spectrum, AT&T, Armstrong)
Device Loan Programs	Programs offering device loans to underserved individuals.	YSU (loaner laptop program), MyCap
Digital Inclusion Centers	Centers providing digital literacy training and resources.	Family Tech Connect, Oak Hill Collaborative
2. Devices	Availability of computing devices.	
Desktop Computers	Number and availability of desktop computers.	Oak Hill Collaborative (computer lab)
Laptops	Number and availability of laptops.	YSU (loaner laptop program)
Tablets	Number and availability of tablets.	MyCap
Smartphones	Number and availability of smartphones.	MyCap, Family Tech Connect
3. Training & Support	Programs and resources for digital literacy training.	
Digital Literacy Workshops	Availability of workshops and training programs.	Oak Hill Collaborative, Family Tech Connect
Online Learning Platforms	Platforms for online courses and resources.	YSU, community centers

Asset Category	Description	Potential Key Contacts / Responsible Parties
Technical Support	Availability of technical support for digital issues.	Family Tech Connect, Oak Hill Collaborative
Digital Instructors	Trained individuals or volunteers providing instruction.	Family Tech Connect, Oak Hill Collaborative
4. Community Partnerships	Collaborations with other organizations and entities.	
Educational Institutions	Partnerships with local schools, colleges, or universities.	YSU
Nonprofit Organizations	Collaborations with nonprofits focused on digital equity.	Oak Hill Collaborative, Family Tech Connect, MyCap
Public Libraries	Partnerships with local libraries for digital resources.	Public libraries in Mahoning County
Local Businesses	Partnerships with businesses providing digital access.	Local ISPs (Spectrum, AT&T, Armstrong)
5. Funding & Grants	Financial resources and grant opportunities.	
Grants & Donations	Grants and donations supporting digital equity efforts.	Funding from programs like the Affordable Connectivity Program (ACP), local grants, and donations from foundations
Funding Sources	Identified sources of funding for ongoing initiatives.	Appalachia Regional Commission, Truist Foundation, Ford Foundation, Duke Energy
6. Outreach & Awareness	Efforts to raise awareness about digital equity.	
Outreach Campaigns	Campaigns to inform the community about available resources.	Family Tech Connect, Oak Hill Collaborative, MyCap
Marketing Materials	Brochures, flyers, or websites promoting digital equity.	Community organizations, local government
Community Events	Events to engage the community and raise awareness.	Oak Hill Collaborative, Family Tech Connect

Asset Category	Description	Potential Key Contacts / Responsible Parties
7. Data & Assessment	Data collection and assessment mechanisms.	
Data Collection Tools	Tools for collecting data on digital equity efforts.	Surveys, FCC Broadband Deployment Data
Impact Assessment	Evaluation methods for assessing the impact of initiatives.	Regular surveys and assessments by community organizations, YSU

Mahoning County Data Processing Cyber and Information Security Policy

By Jacob A. Williams, CISSP, Director of Information Technology
May 16, 2022

Contents

1. Introduction

This Policy Document encompasses all aspects of security surrounding confidential company information and must be distributed to all company employees. All company employees must read this document in its entirety and sign the form confirming they have read and understand this policy fully. This document will be reviewed and updated by Management on an annual basis or when relevant to include newly developed security standards into the policy and distribute to all employees, vendors, and professional service contracts as applicable.

2. Information Security Policy

Mahoning County employees handle sensitive information daily. Sensitive Information must have adequate safeguards in place to protect them, to protect data integrity and privacy, to ensure compliance with various regulations, and to guard the future of the organization.

Mahoning County commits to respecting the privacy of all its customers and to protecting any data about customers from outside parties. To this end, management is committed to maintaining a secure environment in which to process sensitive information so that we can meet these promises. We will work to adhere to PCI standards and pass all needed PCI compliance screening.

Employees handling sensitive data should ensure:

- Handle Company and cardholder information in a manner that fits with their sensitivity;
- Limit personal use of Mahoning County information and telecommunication systems and ensure it doesn't interfere with your job performance;
- Mahoning County reserves the right to monitor, access, review, audit, copy, store, or delete any electronic communications, equipment, systems, and network traffic for any purpose;
- Do not use e-mail, internet, and other Company resources to engage in any activity that is offensive, threatening, discriminatory, defamatory, slanderous, pornographic, obscene, harassing, or illegal;
- Do not disclose personnel information unless authorized;
- Protect sensitive cardholder information;
- Keep passwords and accounts secure;
- Request approval from the Data Processing Board before establishing any new software or hardware, third party connections, etc.;
- Do not install unauthorized software or hardware, including modems and wireless access unless you have explicit Data Processing approval;
- Always leave desks clear of sensitive data and lock computer screens when unattended;
- Store sensitive physical documents and information in locked drawers/cabinets, if possible.
- Information security incidents must be reported, without delay, to the Mahoning County Help Desk or Director of Information Technology.

We each have a responsibility for ensuring our County's systems and data are protected from unauthorized access and improper use. If you are unclear about any of the policies detailed herein you should seek advice and guidance from your Department Head or Appointing Authority.

3. Use Policy

The Management's intentions for publishing an Acceptable Use Policy are not to impose restrictions that are contrary to the county's established culture of openness, trust, and integrity. Management is committed to protecting the employees, partners, and the County from illegal or damaging actions by individuals, either knowingly or unknowingly. For more information, please reference "Chapter 15 - County Property" of the BMCC Personnel Manual – effective Aug 20th, 2020.

- Employees are responsible for exercising good judgment regarding the reasonableness of personal use.
- Employees should ensure that they have appropriate credentials and are authenticated for the use of technologies.
- Employees should take all necessary steps to prevent unauthorized access to confidential data.
- Employees should ensure that technologies should be used and set up in physically secure, acceptable network locations.
- Keep passwords secure and do not share accounts.
- Authorized users are responsible for the security of their passwords and accounts.
- All PCs, laptops, and workstations should be secured with a password-protected screensaver with the automatic activation feature.
- All POS and PIN entry devices should be appropriately protected and secured so they cannot be tampered with or altered.
- Because the information contained on portable computers is especially vulnerable, special care should be exercised.
- Employees must use extreme caution when opening e-mail attachments received from unknown senders, which may contain viruses, e-mail bombs, or Trojan horse code.
- Links in emails should be clicked with caution, if you are unsure about their destination.
- Employees should primarily use the County Help Desk to report any suspicious, support, or security incident.

4. Disciplinary Action

Violation of the standards, policies, and procedures presented in this document by an employee may result in disciplinary action, from warnings or reprimands up to and including termination of employment. Claims of ignorance, good intentions, or using poor judgment will not be used as excuses for non-compliance. Please reference "Chapter 21 –Discipline" of the BMCC Personnel Manual.

5. Protect Stored Data

- All sensitive cardholder data stored and handled by Mahoning County and its employees must be securely protected against unauthorized use at all times. Any sensitive card data that is no longer required by Mahoning County for business reasons must be discarded in a secure and irrecoverable manner.
- If there is no specific need to see the full PAN (Permanent Account Number), it has to be masked when displayed.
- PAN'S which are not protected as stated above should not be sent to the outside network via end-user messaging technologies like chats, messenger applications, etc.

It is strictly prohibited to store or retain:

1. The contents of the payment card magnetic stripe (track data) on any media whatsoever.
2. The CVV/CVC (the 3 or 4 digit number on the signature panel on the reverse of the payment card) on any media whatsoever.
3. The PIN or the encrypted PIN Block under any circumstance.

6. Information Classification

Data and media containing data must always be labeled to indicate sensitivity level.

- **Confidential data** might include information assets for which there are legal requirements for preventing disclosure or financial penalties for disclosure, or data that would cause severe damage to Mahoning County if disclosed or modified.
- **Internal Use data** might include information that the data owner feels should be protected to prevent unauthorized disclosure;
- **Public data** is information that may be freely disseminated.

7. Physical Security

Access to sensitive information in both hard and soft media format must be physically restricted to prevent unauthorized individuals from obtaining sensitive data.

- A “visitor” is defined as a vendor, guest of an employee, service personnel, or anyone who needs to enter the premises for a short duration, usually not more than one day.
- Keep passwords secure and do not share accounts. Authorized users are responsible for the security of their passwords and accounts.
- Media containing sensitive information must be handled and distributed securely by trusted individuals.
- Visitors must always be escorted by a trusted employee when in areas that sensitive information.
- Procedures must be in place to help all personnel easily distinguish between employees and visitors. “Employee” refers to full-time and part-time employees, temporary employees and personnel, and consultants who are “resident” on Mahoning County sites. A “visitor” is defined as a vendor, guest of an employee, service personnel, or anyone who needs to enter the premises for a short duration, usually not more than one day.
- Network Jacks located in public and areas accessible to visitors must be disabled and enabled when network access is explicitly authorized.
- Strict control is maintained over the external or internal distribution of any media and has to be approved by management.
- Strict control is maintained over the storage and accessibility of external media.

8. Protect Data in Transit

All sensitive data must be protected securely if it is to be transported physically or electronically.

- Sensitive data must never be sent over the internet via standard email, instant chat, or any other end-user technologies.
- If there is a business justification to send sensitive data via email or via the internet or any other modes then it should be done after authorization and by using the County's Encrypted email 3rd party solution. If the Solution is not available to you, please contact the County IT Department to securely send your data.
- USB Drives must be encrypted to be written to and used on the County PCs and Laptops. Please call the Help Desk for further information.
- The transportation of media containing sensitive data to another location must be authorized by management, logged, and inventoried before leaving the premises. Only secure courier services may be used for the transportation of such media. The status of the shipment should be monitored until it has been delivered to its new location.

9. Disposal of Stored Data

- As Data Custodian, Data Processing employees will not delete end-user data without the approval of the appointing authority of the Data Owner.
- All data must be securely disposed of when no longer required by Mahoning County, regardless of the media or application type on which it is stored.
- Where configurable, an automatic process must exist to permanently delete online data, when no longer required.
- Mahoning County Data Processing has documented procedures for the destruction of electronic media. This information is available upon request but generally consists of:
    - All Sensitive data on electronic media must be rendered unrecoverable when deleted e.g. through degaussing or electronically wiped using military grade secure deletion processes or the physical destruction of the media;
    - Hard Drives are logged and retained permanently by default.
    - If secure wipe programs are used, the process must define the industry accepted standards followed for secure deletion.

10. Security Awareness and Procedures

The policies and procedures outlined below must be incorporated into company practice to maintain a high level of security awareness. The protection of sensitive data demands regular training of all employees and contractors.

- Review handling procedures for sensitive information and hold periodic security awareness meetings to incorporate these procedures into day-to-day company practice.
- Distribute this security policy document to all company employees to read. It is required that all employees confirm that they understand the content of this security policy document by signing an acknowledgment form (see Appendix A).

- All employees that handle sensitive information will undergo background checks (such as criminal and credit record checks, within the limits of the local law) before they commence their employment with the Company.
- All third parties with access to credit card account numbers are contractually obligated to comply with card association security standards (PCI/DSS).
- Mahoning County security policies must be reviewed annually and updated as needed.

11. Network Security

- Firewalls must be implemented at each internet connection and any demilitarized zone and the internal company network.
- A network diagram detailing all the inbound and outbound connections must be maintained and reviewed every 6 months.
- A firewall and router configuration document must be maintained which includes a documented list of services, protocols, and ports including a business justification.
- Firewall and router configurations must restrict connections between untrusted networks and any systems in the production data environment.
- Stateful Firewall technology must be implemented where the Internet enters Mahoning County's network to mitigate known and ongoing threats. Firewalls must also be implemented to protect local network segments and the IT resources that attach to those segments such as the business network and open network.
- All inbound and outbound traffic must be restricted to that which is required for the data environment.
- All inbound network traffic is blocked by default unless explicitly allowed and the restrictions have to be documented.
- All outbound traffic has to be authorized by management (i.e. what are the whitelisted category of sites that can be visited by the employees) and the restrictions have to be documented
- Mahoning County will have firewalls between any wireless networks and the Production data environment.
- Mahoning County will quarantine wireless users into a DMZ, where they will be authenticated and firewalled as if they were coming in from the Internet.
- Disclosure of private IP addresses to external entities must be authorized by the County Director of Information Technology.
- A topology of the firewall environment has to be documented and has to be updated in accordance with the changes in the network.
- The firewall rules will be reviewed on a biannual basis to ensure validity and the firewall has to have a clean-up rule at the bottom of the rule base.
- No direct connections from the Internet to the production data environment will be permitted. All traffic has to traverse through a firewall.

12. System and Password Policy

All users, including outside contractors and vendors with access to Mahoning County systems, are responsible for taking the appropriate steps, as outlined below, to select and secure their passwords.

- The Data Processing Department will set configurations standards along industry acceptable hardening standards (SANS, NIST, ISO) on systems for which it controls.

- System configurations should be updated as new issues are identified.
- System configurations must include common security parameter settings.
- The systems configuration standard should be applied to any news systems configured.
- All vendor default accounts and passwords for the systems have to be changed at the time of provisioning the system/device into the Mahoning County network and all unnecessary services and user/system accounts have to be disabled.
- All unnecessary default accounts must be removed or disabled before installing a system on the network.
- All unnecessary functionality (scripts, drivers, features, subsystems, file systems, web servers, etc.) must be removed.
- All unnecessary services, protocols, daemons, etc. should be disabled if not in use by the system.
- Any insecure protocols, daemons, services in use must be documented and justified.
- All users with access to Mahoning County data must have a unique ID.
- All users must use a password to access the company network or any other electronic resources
- All user IDs for terminated users must be deactivated or removed immediately.
- The User ID will be locked out if there are more than 10 unsuccessful attempts. This locked account can only be enabled by the system administrator. Locked-out user accounts will be disabled for a minimum period of 30 minutes or until the administrator enables the account.
- All system and user-level passwords must be changed on at most a 180-day basis.
- A minimum password history of 10 must be implemented.
- A password must be set up for new users and the users are prompted to change the password on the first login.
- Group, shared, or generic user account or password or other authentication methods must not be used to administer any system components.
- Where SNMP is used, the community strings must be defined as something other than the Standard defaults of "public," "private" and "system" must be different from the passwords used to log in interactively.
- All non-console administrative access will use appropriate technologies like ssh, VPN, etc or strong encryption is invoked before the administrator password is requested
- System services and parameters will be configured to prevent the use of insecure technologies like telnet and other insecure remote login commands
- Administrator access to web-based management interfaces is encrypted using strong cryptography.
- The responsibility of selecting a password that is hard to guess generally falls to users. A strong password must:
    a) Be as long as possible (never shorter than 8 characters).
    b) Include mixed-case letters, if possible.
    c) Include digits and punctuation marks, if possible.
    d) Not be based on any personal information.
    e) Length is better than complexity.

13. Anti-virus policy

- All machines must be configured to run the latest anti-virus software as approved by Mahoning County Data Processing. The county application BitDefender Anti-Virus software must be configured to retrieve the latest updates to the antiviral program automatically daily. The antivirus

should have periodic scanning enabled for all the systems.

- The antivirus software in use will be capable of detecting all known types of malicious software (Viruses, Trojans, adware, spyware, worms, and rootkits).
- All removable media will be scanned for viruses before being used.
- All the logs generated from the antivirus solutions have to be retained as per legal/regulatory/contractual requirements.
- Master Installations of the Antivirus software should be set up for automatic updates and periodic scans
- End-users must not be able to modify any settings or alter the antivirus software.
- An E-mail with attachments coming from suspicious or unknown sources should not be opened. All such e-mails and their attachments should be deleted from the mail system as well as from the trash bin. No one should forward any e-mail, that they suspect may contain a virus.

14. Patch Management Policy

- All Workstations, servers, software, system components, etc. owned by Mahoning County must have up-to-date system security patches installed to protect the asset from known vulnerabilities.
- Where ever possible all systems, software must have automatic updates enabled for system patches released from their respective vendors. Security patches have to be approved and installed within one month of release from the respective vendor and have to follow the process in accordance with the change control process.
- Any exceptions to this process have to be documented.

15. Employee and Vendor Remote Access policy

Remote Access to the Mahoning County Network and its resources is considered as both a privileged luxury and a job necessity. Modern remote access encompasses needs for 24X7 IT support, from both in-house and outside 3rd party support, as well as application access for employees and vendors who service the Mahoning County public in a variety of ways and locations.

For employees, VPN Access is possible with a Windows Based PC or MAC OS.X Computer, or Android/IPAD Tablet.

County IT provides traditional remote access via a personal/home computer by utilizing**:**

- Cisco AnyConnect Client providing SSL VPN connectivity to the County IP Network via ASA Firewall.
- Active Directory integrated login via Customized Security Group.
- Remote Desktop Client, or application connectivity to resources within the County Network.

Detailed instructions are available from the Mahoning County Helpdesk, as well as support for setup and network connectivity. This above method of connectivity provides the closest duplication of a user on-site workstation, especially when using a Windows Based Computer for connectivity.

Non-County PCs and Apple devices may need to meet security requirements, including installation of Anti-virus/anti-malware minimum specifications, in order to connect via VPN.

Other means of connectivity to County owned Desktop/PC or Server consoles by employees for Employee Remote Access purposes are prohibited, unless written authorization is granted by the IT Director.

For Vendors, County IT has distinguished two types of Vendor Remote Access:

1. Vendor Remote Access - Contracted Application & Operating System Support
2. Vendor Remote Access – Application End-User

All 3rd party remote access connections for purposes of Application or Operating System Support, are to use Remote Access Software (RAS) that requires an ***attended*** session, effective immediately.

- This software service can be supplied by a 3rd party, or it can be a county-supplied solution (presently ScreenConnect).
- Mahoning County HelpDesk will keep a document, detailing the process for connectivity, and will make this document available upon request.

Exceptions to this Policy are allowed with the Director of IT approval and will be on an as-needed basis only.

Vendor Remote Access for contracted Application End users can be accomplished via unattended Sessions. Typical users would be data entry vendors for Tax Assessment Software, GIS Users & Munis. This Remote Access consists of:

- Cisco AnyConnect Client providing SSL VPN to the County IP Network.
- Active Directory-integrated login via Customized Security Group.
- Remote Desktop Client, VMWare, or application connectivity to resources within the County Network.

Other means of connectivity to the County network for Remote Access purposes are prohibited unless specific approval from the Data Processing Department has been given.

- It is the responsibility of Mahoning County employees, contractors, vendors, and agents with remote access privileges to Mahoning County's network to ensure that their remote access connection is given the same consideration as the user's on-site connection.
- Secure remote access must be strictly controlled. Control will be enforced on Non-County equipment by two-factor authentication.
- Vendor accounts with access to the Mahoning County network will only be enabled during the time period the access is required and will be disabled or removed once access is no longer required.
- All hosts that are connected to Mahoning County internal networks via remote access technologies will be monitored regularly.
- All remote access accounts used by vendors or 3rd parties will be reconciled at regular interviews and the accounts will be revoked if there is no further business justification.

16. Bring your own Device (BYOD) Policy

Mahoning County Automatic Data Processing (ADP) Board grants its employees the privilege of using **personally owned** Computers, Laptops, smartphones and tablets of their choosing for remote access to Line of Business applications for their convenience, as part of the Employee Remote Access and 'Bring Your Own Device' (BYOD) Policy. The Mahoning County Automatic Data Processing Board reserves the right to revoke this privilege if users do not abide by the policies and procedures outlined below.

This policy is intended to protect the security and integrity of Mahoning County's data and technology infrastructure. Limited exceptions to the policy may occur due to variations in devices and platforms. Mahoning County employees must agree to the terms and conditions set forth in this policy in order to be able to connect their devices to the company network.

If you do not wish to agree to the terms for the Mahoning County Remote Access and BYOD Policy, Mahoning County employees with standard network credentials can access their email, calendar and contacts using the Outlook Web Access (OWA) option (https://mail.mahoningcountyoh.gov) via their own personal device and under their own data plan.

Acceptable Use

- The ADP Board defines acceptable business use as activities that directly or indirectly support the business or operation of Mahoning County Government.
- The ADP Board has outlined Acceptable use of Mahoning County Government Resources in the Mahoning County "Personnel Handbook".
- Employees may use their personal device(s) to access the following Mahoning County-owned resources: email, calendars, contacts, documents, and computer and server consoles.

Devices and Support

- Smartphones including iPhone, Android, Blackberry and Windows phones are allowed.
- Tablets including iPad, Windows-based, and Android are allowed.
- Windows Based Computers running Windows 10 or later, and Apple Mac OS X 10.x are allowed.
- Connectivity issues are supported by County IT; operating system or hardware-related issues are not.
- Devices may need to be presented to IT for proper job provisioning and configuration of standard apps, such as browsers, office productivity software and security tools, before they can access the network.
- PC and MAC computers and laptops must have up-to-date anti-virus/mal-ware software installed and running.

Security

- In order to prevent unauthorized access, devices must be password protected using the features of the device.
- Access to County Resources will be accomplished with Users' Active Directory credentials.
- A cellular connected device must lock itself with a password or PIN if it's idle for 5 minutes.
- Rooted (Android) or jailbroken (iOS) devices are strictly forbidden from accessing the network.
- Employees' access to County data is limited based on user profiles defined by IT and automatically enforced.
- In the case of Smartphones and tablets, the employee's device may be remotely wiped if
    1) The device is lost or stolen.
    2) The employee terminates his or her employment.
    3) IT detects a data or policy breach, a virus or similar threat to the security of the company's data and technology infrastructure.

Risks/Liabilities/Disclaimers

- While IT will take every precaution to prevent the employee's personal data from being lost, in the event it must remote wipe a device, it is the employee's responsibility to take additional precautions, such as backing up personal email, contacts, etc.
- The County reserves the right to disconnect devices or disable services without notification.
- Lost or stolen handheld or tablet devices must be reported to the County IT within 24 hours. Employees are responsible for notifying their mobile carrier immediately upon loss of a device.
- The employee is expected to use his or her devices in an ethical manner at all times and adhere to the County's acceptable use policy as outlined above.
- The employee is personally liable for all costs associated with his or her device.
- The employee assumes full liability for risks including, but not limited to, the partial or complete loss of County and personal data due to an operating system crash, errors, bugs, viruses, malware, and/or other software or hardware failures, or programming errors that render the device unusable.

17. Vulnerability Management Policy

- All the vulnerabilities would be assigned a risk ranking such as High, Medium, and Low based on industry best practices such as CVSS base score.
- As part of the PCI-DSS Compliance requirements, Mahoning County will run internal and external network vulnerability scans at least quarterly and after any significant change in the network (such as new system component installations, changes in network topology, firewall rule modifications, product upgrades).
- Internal vulnerability scans must be performed by Mahoning County by internal staff or a 3rd party vendor and the scan process has to include that rescans will be done until passing results are obtained, or all High vulnerabilities as defined in PCI DSS Requirement 6.2 are resolved.
- When possible, and ideally annually, external vulnerability scans will be performed by an Approved Scanning Vendor (ASV) qualified by PCI SSC. Scans conducted after network changes may be performed by Mahoning County's internal staff. The scan process should include re-scans until passing results are obtained.

18. Configuration standards:

- Information systems that process, transmit, or store county data must be configured in accordance with the applicable standard for that class of device or system. Standards must be written and maintained by the entity responsible for the management of the system in conjunction with the Mahoning County Data Processing Department.
- All network device configurations must adhere to Mahoning County's Data Processing required standards before being placed on the network, and approved as such. Mahoning County Data Processing has a baseline configuration that can be applied to all network devices before being placed on the network.
- Before being deployed into production, a system must be checked by Mahoning County Data Processing to meet the applicable configuration standard.
- Updates to network device operating system and/or configuration settings that fall under the County standards are managed by Data Processing.
- Administrators of network devices that do not adhere to Data Processing's standards (as identified via a previous exception) must document and follow a review process of announced vendor updates to the operating system and/or configuration settings. This process must include a review schedule, risk analysis method, and update method.
- All network device configurations must be checked annually against the configuration baseline to ensure the configuration continues to meet required standards.
- Where possible, network configuration management software will be used to automate the process of confirming adherence to the baseline configuration.
- For other devices, an audit will be performed quarterly to compare the baseline configuration to the configuration currently in place.
- All discrepancies will be evaluated and remediated by Data Processing Network Administration.

19. Change Control Process

- Changes or updates to information resources shall be managed and executed according to a formal change control process. The control process will ensure that changes proposed are reviewed, authorized, tested, implemented, and released in a controlled manner; and that the status of each proposed change is monitored.
- The change control process shall be formally defined and documented. A change control process shall be in place to control changes to all critical company information resources (such as hardware, software, system documentation, and operating procedures).
- All change requests shall be logged whether approved or rejected via the County Help Desk centralized ticketing system. The approval of all change requests and the results thereof shall be documented. A documented audit trail containing relevant information shall be maintained at all times. This should include change request documentation, change authorization, and the outcome of the change. No single person should be able to effect changes to production information systems without the approval of other authorized personnel.
- A risk assessment should be performed for all changes and depending on the outcome, an impact assessment should be performed.
    - The impact assessment shall include the potential effect on other information resources and potential cost implications. The impact assessment should, where applicable, consider compliance with legislative requirements and standards.
- All change requests shall be prioritized in terms of benefits, urgency, the effort required, and potential impact on operations.
- Changes shall be tested in an isolated, controlled, and representative environment (where such an environment is feasible) before implementation to minimize the effect on the relevant business process, to assess its impact on operations and security, and to verify that only intended and approved changes were made.
- Any software change and/or update shall be controlled with version control. Older versions shall be retained in accordance with corporate retention and storage management policies.
- All changes shall be approved before implementation. Approval of changes shall be based on formal acceptance criteria i.e. the change request was done by an authorized user, the impact assessment was performed and proposed changes were tested.
- All users, significantly affected by a change, shall be notified of the change. Where applicable, the user representative shall sign off on the change. Users may be required to make submissions and comments before the acceptance of the change.
- Implementation will only be undertaken after appropriate testing and approval by stakeholders. All major changes shall be treated as new system implementation and shall be established as a project. Major changes will be classified according to the effort required to develop and implement said changes.
- Procedures for aborting and recovering from unsuccessful changes shall be documented. Should the outcome of a change be different from the expected result (as identified in the testing of the change), procedures and responsibilities shall be noted for the recovery and continuity of the affected areas. Fall back procedures will be in place to ensure systems can revert to what they were before the implementation of changes.

- Information resources documentation shall be updated on the completion of each change and old documentation shall be archived or disposed of as per the documentation and data retention policies.
- Specific procedures to ensure the proper control, authorization, and documentation of emergency changes shall be in place. Specific parameters will be defined as a standard for classifying changes as Emergency changes.
- All changes will be monitored once they have been rolled out to the production environment. Deviations from design specifications and test results will be documented and escalated to the solution owner for ratification.

20. Audit and Log review

- This procedure covers all logs generated for systems within the county data environment, based on the flow of data over the Mahoning County network, including the following components:

    - Operating System Logs (Event Logs and su logs).
    - 3rd party Audit logs (AD Audit, File Audit)
    - Database Audit Logs.
    - Firewalls & Network Switch Logs.
    - IDS Logs- ALBERT.
    - Antivirus Logs.
    - CCTV or IP Video recordings.
    - File integrity monitoring system logs.
    - Voice mails or Call accounting logs.

- Audit logs must be maintained for a minimum of 1 month online (available for immediate analysis) and 6 months offline.
- A review of logs is to be carried out through Mahoning County's network monitoring system, where applicable. The console is installed within the Mahoning County data center environment.
- AD Audit logs will be accessible by personnel permitted to access log files via Active Directory Group Security and are limited to the Domain Admin Group.
- Other access logs will be accessed by specific support personnel as defined by the work role.
- The AD Audit monitoring system software is configured to alert the "ChangeAuditor Group" to any conditions deemed to be potentially suspicious, for further investigation. Alerts are configured to: changeauditor@mahoningcountyoh.gov
- The following Operating System Events are configured for logging, and are monitored Data Processing:

    a) Any additions, modifications, or deletions of user accounts.
    b) Any failed or unauthorized attempt at user logon.
    c) Any modification to system files.

d) Any access to the server, or application running on the server, including files that hold cardholder data.
e) Actions are taken by any individual with root or administrative privileges.
f) Any user access to audit trails.
g) Any creation/deletion of system-level objects installed by Windows. (Almost all system-level objects run with administrator privileges, and some can be abused to gain administrator access to a system.)

- The following Database System Events are configured for logging, and are monitored by Data Processing:

a) Any failed user access attempts to log in to the SQL database.
b) Any login that has been added or removed as a database user to a database.
c) Any login that has been added or removed from a role.
d) Any database role that has been added or removed from a database.
e) Any password that has been changed for an application role.
f) Any database that has been created, altered or dropped.
g) Any database object, such as a schema, that has been connected to.
h) Actions taken by any individual with DBA privileges.

- The following Firewall Events are configured for logging, and will send email to the Director of IT when changes to the configuration code have been made, and are monitored by Solarwinds:

a) ACL violations.
b) Invalid user authentication attempts.
c) Logon and actions taken by any individual using privileged accounts.
d) Configuration changes made to the firewall (e.g. policies disabled, added, deleted, or modified). (email sent to the Director of Information Technology)

- The following Switch Events are to be configured for logging and monitored by the network monitoring system (the Company to define software and hostname):

a) Invalid user authentication attempts.
b) Logon and actions taken by any individual using privileged accounts.
c) Configuration changes made to the switch (e.g. configuration disabled, added, deleted, or modified).

- The following Intrusion Detection Events are to be configured for logging, and are monitored by the network monitoring system (the Company to define software and hostname):

a) Any vulnerability listed in the Common Vulnerability Entry (CVE) database.
b) Any generic attack(s) not listed in CVE.
c) Any known denial of service attack(s).
d) Any traffic patterns that indicated pre-attack reconnaissance occurred.
e) Any attempts to exploit security-related configuration errors.
f) Any authentication failure(s) that might indicate an attack.
g) Any traffic to or from a back-door program.

h) Any traffic typical of known stealth attacks.

- The following File Integrity Events are to be configured for logging and monitored by (the Company to define software and hostname):

a) Any modification to system files.
b) Actions taken by any individual with Administrative privileges.
c) Any user access to audit trails.
d) Any Creation / Deletion of system-level objects installed by Windows. (Almost all system-level objects run with administrator privileges, and some can be abused to gain administrator access to a system.)

21. Secure Application Development and Procurement

While Mahoning County Data Processing does not develop in-house applications, we do require vendors to follow standards and guidelines when developing solutions for the county. Additionally, all software that is procured should be approved by Data Processing to meet the basic security standards.

- The Secure Application development policy is a plan of action to guide developers' decisions and actions during the software development lifecycle (SDLC) to ensure software security. This policy aims to be language and platform-independent so that it is applicable across all software development projects.
- The adherence to and use of Secure Application Development Coding Policy is a requirement for all software development on Mahoning County information technology systems and trusted 3rd party vendor sites processing the Mahoning County's data.
- Each phase of the SDLC is mapped with security activities, as explained below:

a) Design

- Identify Design Requirements from a security perspective
- Architecture & Design Reviews
- Threat Modelling

b) Coding

- Coding Best Practices
- Perform Static Analysis

c) Testing

- Vulnerability Assessment
- Fuzzing

d) Deployment

- Server Configuration Review
- Network Configuration Review

- Development of code shall be checked and validated with the most current versions of Mahoning County's Coding Standards for Secure Application Development. All code developers shall verify that their code complies with the most recent and approved coding standards and guidelines.

- Only validated code shall be implemented into Mahoning County's production environment. A review and validation ensure that code exhibits fundamental security properties to include correctness, predictability, and attack tolerance.

Application Code Developers shall:

- Ensure code meets the level of confidence that software is free from exploitable code vulnerabilities, regardless of whether they are already designed into the software or inserted later in its life cycle.
- Ensure code provides predictable execution or justifiable confidence and that the software, when executed, will provide security functionality as intended.
- Coding techniques must address injection flaws particularly SQL injection, buffer overflow vulnerabilities, cross-site scripting vulnerabilities, improper access control (insecure direct object reference, failure to restrict URL access, directory traversal, etc.), cross-site request forgery (CSRF), broken authentication, and session management.
- Never trust incoming data to the system, apply checks to this data.
- Disable Error messages that return any information to the user.
- Use object inheritance, encapsulation, and polymorphism wherever possible.
- Use environment variables prudently and always check boundaries and buffers.
- Applications must validate input to ensure it is well-formed and meaningful.

22. Penetration testing methodology

- Mahoning County Data Processing will use internal and 3rd party resources to periodically perform penetration testing of the network. There are risks inherent in conducting penetration testing over the information systems of Mahoning County.

Potential Risk:

Risk: Denial of Service in systems or network devices because of the network scans.

Mitigation measure 1: network scans must be performed in a controlled manner. The start and end of the scan must be notified to responsible personnel to allow monitoring during testing.

Mitigation measure 2: scanning tools must be configured to guarantee that the volume of sent packets or sessions established per minute does not cause a problem for network elements. In this sense, we must perform the first scans in a very controlled way and use a minimum configuration that may be expanded when is evident that the configuration is not dangerous for network devices or servers in the organization.

- Key staff involved in the Penetration Testing by the organization are:

Director of Information Technology:
System Administrator:
Risk Manager:
Purchasing:
Prosecutors:

- External intrusion tests will be performed remotely from the supplier's premises. Internal intrusion tests will be conducted in the Data Processing Department location. The audit team must have access to the Organization's network. It must manage access permissions to the building early enough to ensure that the audit team can access without problems during the planning period.
- All the tests will be conducted from the equipment owned by the audit team so no equipment for the execution of the tests is required. The only requirement in this regard will be to have an active network connection for each member of the audit team. Those connections must provide access to the target network segment in every case.
- If an incident occurs during the execution of the tests that have an impact on the systems or services of the organization, the incident should be brought immediately to the attention of those responsible for incident management in the project
- It should be noted that to comply with PCI DSS the scope of the test should include, at least the following:
    - All systems and applications are part of the perimeter of the cardholder data environment card (CDE).
- Systems included should also be:
    - External websites hosted by 3rd parties.
    - Primary and secondary Internet entry (edge) firewalls
    - WiFi networks
- Systems excluded from the scope will be determined by Data Processing at the time of Procurement.

- Technical tests must follow the OSSTMM methodology. Tests must be conducted at network, system, and application-level and must ensure that at least identifies any vulnerabilities documented by OWASP and SANS, as well as those identified in the PCI DSS standard v3:

1. Injections: Code, SQL, OS commands, LDAP, XPath, etc.
2. Buffer overflows.
3. Insecure storage of cryptographic keys
4. Insecure Communications
5. Improper error handling
6. Cross-site scripting (XSS)
7. Control of inappropriate access.
8. Cross-site request forgery (CSRF).
9. Broken authentication and incorrect session management.
10. Any other vulnerability is considered High Risk by the organization.

- All findings or vulnerabilities identified during the tests carried out will be generated and documented sufficient evidence to prove the existence of the same. The format of the evidence can be variable in each case, screen capture, the raw output of security tools, photographs, paper documents, etc.
- As a result of tests performed should generate a document containing at least the following sections:

Introduction
Executive Summary

Methodology
Identified vulnerabilities
Recommendations for correcting vulnerabilities
Conclusions
Evidence

23. Incident Response Plan

'Security incident' means any incident (accidental, intentional, or deliberate) relating to your communications or information processing systems. The attacker could be a malicious stranger, a competitor, or a disgruntled employee, and their intention might be to steal information or money or just to damage your company.

The Incident response plan should be tested once annually. Copies of this incident response plan are to be made available to all relevant staff members and take steps to ensure that they understand it and what is expected of them.

Employees of the company will be expected to report to the security officer for any security-related issues.

The Mahoning County Security Incident Response Team (MC-SIRT):

1. Director of Information Technology
2. Systems Administrator
3. County Auditor
4. Prosecutor assigned to Information Technology
5. Risk Manager
6. Board of Mahoning County Commissioners
7. Automatic Data Processing Board

Mahoning County Data Processing security incident response plan is as follows:

1. Each department must report an incident to the Mahoning County Help Desk (preferably) or another member of the Data Processing Team. That member of the team receiving the report will advise the Help Desk of the incident.
2. The Help Desk will involve the MC-SIRT 1 & 2 to investigate the incident and assist the potentially compromised department in limiting the exposure of county data and in mitigating the risks associated with the incident.
3. MC-SIRT 1 & 2 will resolve the problem to the satisfaction of all parties involved, including reporting the incident and findings to the appropriate parties (3rd parties, credit card associations, credit card processors, etc.) as necessary.
4. MC-SIRT 1, 2 & 3 will evaluate the need to notify all members of the MC-SIRT.
5. If notified, The MC-SIRT will determine if policies and processes need to be updated to avoid a similar incident in the future and whether additional safeguards are required in the environment where the incident occurred, or for the institution.
6. If an unauthorized wireless access point or device is identified or detected as part of the quarterly test this is should be immediately escalated to the Director of IT or someone with

similar privileges who has the authority to stop, cease, shut down, and remove the offending device immediately.

7. A department that reasonably believes it may have an account breach, data breach, or a breach of cardholder information (of systems related to the PCI environment) in general, must inform MC-SIRT. After being notified of a compromise, the MC-SIRT, along with other designated staff, will implement the Incident Response Plan to assist and augment departments' response plans.

In response to a systems compromise, the MC-SIRT and designees will:

1. Ensure compromised system/s is isolated on/from the network.
2. Gather, review and analyze the logs and related information from various central and local safeguards and security controls
3. Conduct appropriate forensic analysis of the compromised system.
4. Contact internal and external departments and entities as appropriate.
5. Make forensic and log analysis available to appropriate law enforcement or card industry security personnel, as required.
6. Assist law enforcement and other security personnel in investigative processes, including in prosecutions.

24. Roles and Responsibilities

- The Director of IT is responsible for overseeing all aspects of information security, including but not limited to:
    - Creating and distributing security policies and procedures.
    - Monitoring and analysing security alerts and distributing information to appropriate information security and business unit management personnel.
    - creating and distributing security incident response and escalation procedures that include:
        - Maintaining a security awareness program for all employees that provide multiple methods of communicating awareness and educating employees (for example, posters, letters, meetings).
- The Data Processing Department shall maintain daily administrative and technical operational security procedures.
- System and Application Administrators shall:
    - monitor and analyse security alerts and information and distribute to appropriate personnel
    - administer user accounts and manage authentication
    - Monitor and control all access to data.
    - Maintain a list of service providers.
    - Ensure there is a process for engaging service providers including proper due diligence before engagement.
    - Maintain a program to verify service providers' PCI-DSS compliant status, with supporting documentation.
- Each Appointing Authority or Human Resources is responsible for tracking employee participation in the security awareness program, including:
    - Facilitating participation upon hire and at least annually.

- Ensuring that employees acknowledge in writing at least annually that they have read and understand the Company's information security policy.

25. User Access Management

- Access to Mahoning County Data network is controlled through a formal user registration process beginning with a formal notification from HR and Payroll.
- Each user is identified by a unique user ID so that users can be linked to and made responsible for their actions. The use of group IDs is only permitted where they are suitable for the work carried out.
- There is a standard level of access; other services can be accessed when specifically authorized by the Appointing Authority, in conjunction with County Data Processing.
- The job function of the user decides the level of access the employee has to County data.
- An access request must be made in writing (email or hard copy) by the requestor's manager or by HR. There is a request form (SAR) available on the county's intranet site. Information supplied must include:
  - Name of person making request
  - Job title of the requestor
  - Start date
  - Access to systems required
- A copy of the SAR form to provide a written statement of their access rights will be kept in IT, for at least 3 years for audit purposes.
- Access to all Mahoning County systems is provided by IT and can only be started after proper procedures are completed. **Please allow 5 business days for completion.**
- As soon as an individual leaves the Company employment, all his/her system logons must be immediately revoked.
- As part of the employee termination process, department managers, HR, or Appointing Authority, must inform IT operations of all leavers and their date of leaving.

26. Access Control Policy

- Access Control systems are in place to protect the interests of all users of the Mahoning County computer systems by providing a safe, secure, and readily accessible environment in which to work.
- Mahoning County will provide all employees and other users with the information they need to carry out their responsibilities in an as effective and efficient manner as possible.
- Generic or group IDs shall not normally be permitted, but may be granted under exceptional circumstances if sufficient other controls on access are in place.
- The allocation of privilege rights (e.g. local administrator, domain administrator, super-user, root access) shall be restricted and controlled, and authorization provided jointly by the system owner and IT Services. Data Processing shall guard against issuing privilege rights to entire teams to prevent loss of confidentiality.
- Access rights will be accorded following the principles of least privilege and need to know.

- Every user should attempt to maintain the security of data at its classified level even if technical security mechanisms fail or are absent.
- Users electing to place information on digital media or storage devices or maintaining a separate database must only do so where such an action is in accord with the data's classification.
- Users are obligated to report instances of non-compliance to the Director of IT.
- Access to The Company IT resources and services will be given through the provision of a unique Active Directory account and complex password.
- No access to any Mahoning County IT resources and services will be provided without prior authentication and authorization of a user's Mahoning County Windows Active Directory account.
- Password issuing, strength requirements, changing, and control will be managed through formal processes. Password length, complexity, and expiration times will be controlled through Windows Active Directory Group Policy Objects.
- Access to Confidential, Restricted, and Protected information will be limited to authorized persons whose job responsibilities require it, as determined by the data owner or their designated representative. Requests for access permission to be granted, changed, or revoked must be made in writing.
- Users are expected to become familiar with and abide by Mahoning County's policies, standards, and guidelines for appropriate and acceptable usage of the networks and systems.
- Access for remote users shall be subject to authorization by IT Services and be provided per the Remote Access Policy and the Information Security Policy. No uncontrolled external access shall be permitted to any network device or networked system.
- Access to data is variously and appropriately controlled according to the data classification levels described in the Information Security Management Policy.
- Access control methods include logon access rights, Windows share, and NTFS permissions, user account privileges, server and workstation access rights, firewall permissions, IIS intranet/extranet authentication rights, SQL database rights, isolated networks, and other methods as necessary.
- A formal process shall be conducted at regular intervals by system owners and data owners in conjunction with IT Services to review users' access rights. The review shall be logged and IT Services shall sign off the review to give authority for users' continued access rights.

27. Wireless Policy

- Installation or use of any wireless device or wireless network intended to be used to connect to any of the Mahoning County networks or environments is prohibited.
- Data Processing will run quarterly tests to discover and reconcile any wireless access points connected to the County network.
- Usage of appropriate testing using tools like net stumbler, kismet, etc. be performed quarterly to ensure that:

- Any devices which support wireless communication remain disabled or decommissioned.
- If any violation of the Wireless Policy is discovered as a result of the normal audit processes, the security officer or anyone with a similar job description has the authorization to stop, cease, shut down, and remove the offending device immediately.

The wireless network offered by Mahoning County is wholly managed by Data Processing and is considered an extension of our wired network.

We have 3 networks available for use:

1. MC_GOV : Secure network for County Managed Device only. This configuration must be set up by a Data Processing Employee.
2. MC_Guest: Secure network for County Employees to use with Personal Devices. Routes directly to the internet, with basic HTTP/HTTPS access.
3. MC_Public: A basic secure network that the public can use with authentication with email.

General Guidelines to ensure security:

1. Default SNMP community strings and passwords, passphrases, Encryption keys/security-related vendor defaults (if applicable) should be changed immediately after the installation of the device and if anyone with knowledge of these leaves the company.
2. The firmware on the wireless devices has to be updated accordingly as per the vendor's release schedule
3. The firmware on the wireless devices must support strong encryption for authentication and transmission over wireless networks.
4. Any other security-related wireless vendor defaults should be changed if applicable.
5. Wireless networks must implement industry best practices (IEEE 802.11i) and strong encryption for authentication and transmission of data.
6. An Inventory of authorized access points will be maintained by Data Processing.

Appendix A – Agreement to Comply Form – Agreement to Comply With Information Security Policies

_____

Employee Name (printed)

_____

Department

I agree to take all reasonable precautions to assure that company internal information, or information that has been entrusted to the Company by third parties such as customers, will not be disclosed to unauthorized persons. At the end of my employment or contract with the Company, I agree to return all information to which I have had access as a result of my position. I understand that I am not authorized to use sensitive information for my purposes, nor am I at liberty to provide this information to third parties without the express written consent of the internal manager who is the designated information owner.
I have access to a copy of the Information Security Policies, I have read and understand these policies, and I understand how it impacts my job. As a condition of continued employment, I agree to abide by the policies and other requirements found in the Company security policy. I understand that non-compliance will be cause for disciplinary action up to and including dismissal, and perhaps criminal and/or civil penalties.
I also agree to promptly report all violations or suspected violations of information security policies to the designated security officer.

_____

Employee Signature

Assumptions Dashboard

ACTIVE CASE	Case 2		Downside Case Case 1	Base Case Case 2
Terminal Year Take Rate				
Residential Take Rate	50.0%		35.0%	50.0%
Commercial Take Rate	50.0%		35.0%	50.0%
Exit				
Exit Year	Year 7		Year 7	Year 7
LTM EBITDA Exit Multiple	15.0x		15.0x	15.0x
Cost of Sale	1.0%		1.0%	1.0%
Financing				
Leverage (LTC)	50.0%		50.0%	50.0%
Equity (% of capital structure)	50.0%		50.0%	50.0%
Credit Spread	450 bps		450 bps	450 bps
LIBOR Floor	50 bps		50 bps	50 bps
Loan Commitment Fee	1.0%		1.0%	1.0%
Financial Advisory Fee (% of Debt)	1.0%		1.0%	1.0%
Budget				
Hard Cost Contingency	5.0%		5.0%	5.0%
Soft Cost Contingency	3.5%		3.5%	3.5%
Operations				
Annual Revenue Escalation	3.0%		3.0%	3.0%
Annual Expense Inflation	2.5%		2.5%	2.5%
Annual Suibscriber Churn Rate (Residential)	3.0%		3.0%	3.0%
Annual Subscriber Churn Rate (Commercial)	1.5%		1.5%	1.5%
Bad Debt Expense	1.0%		0.5%	0.5%
Federal Tax Rate Assumption	25.0%		25.0%	25.0%
State Tax Rate - OH	10.0%		10.0%	10.0%

Pro Forma

Case Toggle	$ -
Case Shown:	**Downside Case**

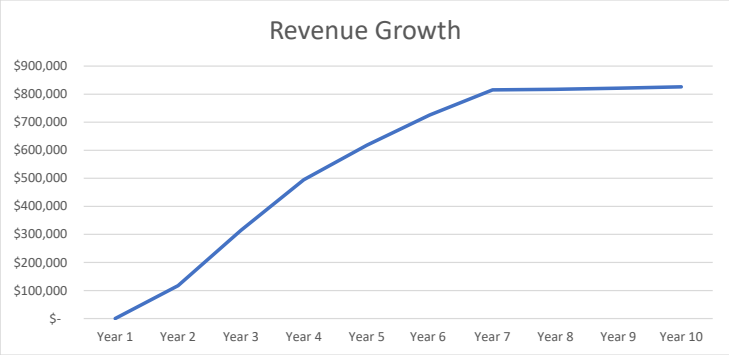
Pro Forma	Year 1E	Year 2E	Year 3E	Year 4E	Year 5E	Year 6E	Year 7E	Year 8E	Year 9E	Year 10E
Revenue										
Residential Service/Subscriber Revenue	-	40,536	110,086	174,494	218,631	256,454	287,552	287,293	287,034	286,776
Commercial Service/Subscriber Revenue	-	31,211	85,245	136,154	172,240	204,020	231,111	234,473	237,885	241,346
Total Service Revenue	**-**	**71,747**	**195,331**	**310,648**	**390,872**	**460,475**	**518,662**	**521,766**	**524,919**	**528,122**
Installation Revenue	-	2,893	4,822	4,340	2,893	2,411	1,929	-	-	-
Router Revenue	-	3,925	10,466	16,353	20,277	23,548	26,164	26,164	26,164	26,164
Maintenance Revenue	-	3,597	9,592	14,988	18,585	21,582	23,980	23,980	23,980	23,980
Total Ancillary Revenue	**-**	**10,415**	**24,880**	**35,680**	**41,755**	**47,541**	**52,073**	**50,145**	**50,145**	**50,145**
Total Revenue	**-**	**82,162**	**220,211**	**346,328**	**432,627**	**508,016**	**570,736**	**571,911**	**575,064**	**578,267**
Direct PON Network Costs										
Distribution Estimate	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!			
Residential Subscriber Connection Costs	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Business Subscriber Connection Costs	8,463	7,053	5,642	4,232	1,411	846	564	-	-	-
Central Hub Costs	151,460	126,216	100,973	75,730	25,243	15,146	10,097	-	-	-
Total Direct Costs	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**
Gross Margin	**-**	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***
Operating Expenses										
Salaries & Benefits	805,000	1,117,550	1,151,077	1,185,609	1,221,177	1,257,812	1,295,547	1,334,413	1,374,446	1,415,679
Data Center Colo / Interconnection	60,000	90,000	120,000	150,000	150,000	150,000	150,000	180,000	180,000	180,000
Marketing	25,000	50,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Office & Warehouse Space Allocation	-	-	-	-	-	-	-	-	-	-
Legal	25,000	25,000	25,625	26,266	26,922	27,595	28,285	28,992	29,717	30,460
Insurance	40,000	41,000	42,025	43,076	44,153	45,256	46,388	47,547	48,736	49,955
Tax / Audit	-	-	-	-	-	-	-	-	-	-
Repairs & Maintenance	-	15,000	17,500	19,000	21,000	23,500	25,000	26,900	28,550	29,950
Utility Expenses	12,000	12,500	13,000	13,500	14,000	14,500	15,000	15,500	16,000	16,500
Network IT Systems	5,250	5,381	5,516	5,654	5,795	5,940	6,088	6,241	6,397	6,557
Customer Care	-	150,000	200,000	250,000	300,000	310,000	320,000	330,000	340,000	350,000
Travel & Entertainment	25,000	30,000	35,000	40,000	45,000	50,000	55,000	60,000	65,000	70,000
Bad Debt	-	717	1,953	3,106	3,909	4,605	5,187	5,218	5,249	5,281
Total Operating Expenses	**997,250**	**1,537,149**	**1,761,696**	**1,886,210**	**1,981,956**	**2,039,209**	**2,096,495**	**2,184,811**	**2,244,095**	**2,304,381**
EBITDA	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**
EBITDA Margin	**-**	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***	***#REF!***

Summary Revenue - Downside Case

	Annual Revenue (Downside Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential	$ -	$ 48,877	$ 129,874	$ 202,699	$ 251,494	$ 293,811	$ 328,423	$ 326,526	$ 326,268	$ 326,009
Business	$ -	$ 33,285	$ 90,338	$ 143,628	$ 181,133	$ 214,204	$ 242,313	$ 245,385	$ 248,796	$ 252,257
Revenue	**$ -**	**$ 82,162**	**$ 220,211**	**$ 346,328**	**$ 432,627**	**$ 508,016**	**$ 570,736**	**$ 571,911**	**$ 575,064**	**$ 578,267**

Summary Revenue - Base Case

	Annual Revenue (Base Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential	$ -	$ 69,825	$ 185,534	$ 289,571	$ 359,277	$ 419,731	$ 469,175	$ 466,466	$ 466,097	$ 465,728
Business	$ -	$ 47,550	$ 129,054	$ 205,183	$ 258,762	$ 306,006	$ 346,161	$ 350,549	$ 355,423	$ 360,368
Revenue	**$ -**	**$ 117,375**	**$ 314,587**	**$ 494,754**	**$ 618,039**	**$ 725,737**	**$ 815,337**	**$ 817,015**	**$ 821,520**	**$ 826,095**



Service Pricing

Residential Service Pricing	Month 1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential 100M Internet-Only	$ 44.99	$ 45	$ 46	$ 48	$ 49	$ 51	$ 52	$ 54	$ 55	$ 57	$ 59
Residential 300M Internet-Only	$ 59.99	$ 60	$ 62	$ 64	$ 66	$ 68	$ 70	$ 72	$ 74	$ 76	$ 78
Residential 500M Internet-Only	$ 69.99	$ 70	$ 72	$ 74	$ 76	$ 79	$ 81	$ 84	$ 86	$ 89	$ 91
Residential 1G Internet-Only	$ 79.99	$ 80	$ 82	$ 85	$ 87	$ 90	$ 93	$ 96	$ 98	$ 101	$ 104

Business Service Pricing	Month 1										
Business 100M Internet-Only	$ 199.99	$ 200	$ 206	$ 212	$ 219	$ 225	$ 232	$ 239	$ 246	$ 253	$ 261
Business 500M Internet-Only	$ 349.99	$ 350	$ 360	$ 371	$ 382	$ 394	$ 406	$ 418	$ 430	$ 443	$ 457
Business 1G Internet-Only	$ 499.99	$ 500	$ 515	$ 530	$ 546	$ 563	$ 580	$ 597	$ 615	$ 633	$ 652
Business 10G Internet-Only	$ 699.99	$ 700	$ 721	$ 743	$ 765	$ 788	$ 811	$ 836	$ 861	$ 887	$ 913

Optional Fees and Services (Enter zero if not used)				
Residential Installation	$49.99	*One time fee	Business Installation	$79.99
Residential Router Rental	$4.99	*Monthly	Business Router Rental	$14.99
Residential Inside Wire Maintenance	$4.99	*Monthly	Business Inside Wire Maintenance	$9.99

Residential Revenue

Subscription Ramp:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	0.0%	15.0%	25.0%	22.5%	15.0%	12.5%	10.0%

CoC Service Area (Downside Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
Number of New Subscribers		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		0	49	82	74	49	41	33	0	0	0
Residential 100M Internet-Only	15%	0	7	12	11	7	6	5	49	49	49
Residential 300M Internet-Only	25%	0	12	20	18	12	10	8	82	82	82
Residential 500M Internet-Only	30%	0	15	25	22	15	12	10	98	98	98
Residential 1G Internet Only	30%	0	15	25	22	15	12	10	98	98	98
	Totals	0	49	82	74	49	41	33	328	328	328

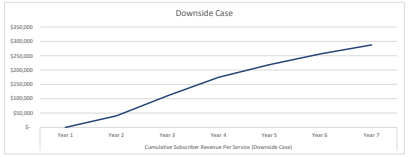
Annual New Subscriber Revenue Per Service (Downside Case)										
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 4,099	$ 7,036	$ 6,523	$ 4,479	$ 3,844	$ 3,168	$ -	$ -	$ -
$ -	$ 9,109	$ 15,637	$ 14,496	$ 9,954	$ 8,544	$ 7,040	$ -	$ -	$ -
$ -	$ 12,753	$ 21,893	$ 20,294	$ 13,935	$ 11,961	$ 9,856	$ -	$ -	$ -
$ -	$ 14,575	$ 25,021	$ 23,194	$ 15,927	$ 13,670	$ 11,264	$ -	$ -	$ -
$ -	$ 40,536	$ 69,587	$ 64,507	$ 44,295	$ 38,020	$ 31,328	$ -	$ -	$ -

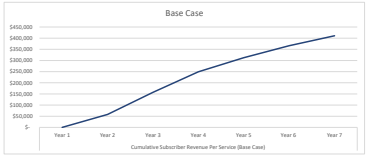
Cumulative Subscriber Revenue Per Service (Downside Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 4,099	$ 11,131	$ 17,644	$ 22,107	$ 25,932	$ 29,076	$ 29,050	$ 29,024	$ 28,998
$ -	$ 9,109	$ 24,738	$ 39,211	$ 49,130	$ 57,629	$ 64,617	$ 64,559	$ 64,501	$ 64,443
$ -	$ 12,753	$ 34,634	$ 54,897	$ 68,783	$ 80,683	$ 90,466	$ 90,385	$ 90,304	$ 90,222
$ -	$ 14,575	$ 39,582	$ 62,741	$ 78,611	$ 92,211	$ 103,392	$ 103,299	$ 103,206	$ 103,113
$ -	$ 40,536	$ 110,086	$ 174,494	$ 218,631	$ 256,454	$ 287,552	$ 287,293	$ 287,034	$ 286,776

Coc Service Area (Base Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
Number of New Subscribers		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		0	70	117	105	70	59	47	0	0	0
Residential 100M Internet-Only	15%	0	11	18	16	11	9	7	70	70	70
Residential 300M Internet-Only	25%	0	18	29	26	18	15	12	117	117	117
Residential 500M Internet-Only	30%	0	21	35	32	21	18	14	140	140	140
Residential 1G Internet Only	30%	0	21	35	32	21	18	14	140	140	140
	Totals	0	70	117	105	70	59	47	468	468	468

Annual Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 5,855	$ 10,052	$ 9,318	$ 6,398	$ 5,492	$ 4,525	$ -	$ -	$ -
$ -	$ 13,013	$ 22,339	$ 20,708	$ 14,220	$ 12,205	$ 10,057	$ -	$ -	$ -
$ -	$ 18,219	$ 31,275	$ 28,992	$ 19,908	$ 17,088	$ 14,080	$ -	$ -	$ -
$ -	$ 20,822	$ 35,744	$ 33,134	$ 22,752	$ 19,529	$ 16,092	$ -	$ -	$ -
$ -	$ 57,908	$ 99,409	$ 92,153	$ 63,278	$ 54,314	$ 44,754	$ -	$ -	$ -

Cumulative Subscriber Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 5,855	$ 15,902	$ 25,206	$ 31,582	$ 37,045	$ 41,537	$ 41,500	$ 41,463	$ 41,425
$ -	$ 13,013	$ 35,340	$ 56,016	$ 70,185	$ 82,327	$ 92,310	$ 92,227	$ 92,144	$ 92,061
$ -	$ 18,219	$ 49,477	$ 78,425	$ 98,262	$ 115,261	$ 129,238	$ 129,121	$ 129,005	$ 128,889
$ -	$ 20,822	$ 56,546	$ 89,630	$ 112,301	$ 131,729	$ 147,703	$ 147,570	$ 147,437	$ 147,304
$ -	$ 57,908	$ 157,266	$ 249,277	$ 312,331	$ 366,363	$ 410,788	$ 410,418	$ 410,049	$ 409,680





Service	Cumulative & One-Time Optional Fees (Downside Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 2,457	$ 4,094	$ 3,685	$ 2,457	$ 2,047	$ 1,638	$ -	$ -	$ -
Router Rental	$ -	$ 2,943	$ 7,847	$ 12,260	$ 15,203	$ 17,655	$ 19,617	$ 19,617	$ 19,617	$ 19,617
Inside Wire Maintenance	$ -	$ 2,943	$ 7,847	$ 12,260	$ 15,203	$ 17,655	$ 19,617	$ 19,617	$ 19,617	$ 19,617
	$ -	$ 8,342	$ 19,788	$ 28,206	$ 32,862	$ 37,357	$ 40,871	$ 39,233	$ 39,233	$ 39,233

Service	Cumulative & One-Time Optional Fees (Base Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 3,509	$ 5,849	$ 5,264	$ 3,509	$ 2,924	$ 2,340	$ -	$ -	$ -
Router Rental	$ -	$ 4,204	$ 11,210	$ 17,515	$ 21,718	$ 25,221	$ 28,024	$ 28,024	$ 28,024	$ 28,024
Inside Wire Maintenance	$ -	$ 4,204	$ 11,210	$ 17,515	$ 21,718	$ 25,221	$ 28,024	$ 28,024	$ 28,024	$ 28,024
	$ -	$ 11,916	$ 28,268	$ 40,294	$ 46,946	$ 53,367	$ 58,387	$ 56,048	$ 56,048	$ 56,048

Commercial Revenue

Subscription Ramp:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	0.0%	15.0%	25.0%	22.5%	15.0%	12.5%	10.0%

CoC Service Area (Downside Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of New Subscribers		0	5	9	8	5	5	4	0	0	0
Business 100M Internet-Only	20%	0	1	2	2	1	1	1	7	7	7
Business 500M Internet-Only	25%	0	1	2	2	1	1	1	9	9	9
Business 1G Internet-Only	25%	0	1	2	2	1	1	1	9	9	9
Business 10G Internet-Only	30%	0	2	3	2	2	1	1	11	11	11
	Totals	0	5	9	8	5	5	4	36	36	36

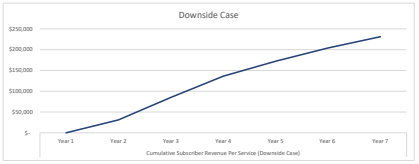
Annual New Subscriber Revenue Per Service (Downside Case)										
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 2,699	$ 4,634	$ 4,296	$ 2,950	$ 2,532	$ 2,086	$ -	$ -	$ -
$ -	$ 5,905	$ 10,137	$ 9,397	$ 6,452	$ 5,538	$ 4,564	$ -	$ -	$ -
$ -	$ 8,436	$ 14,481	$ 13,424	$ 9,218	$ 7,912	$ 6,519	$ -	$ -	$ -
$ -	$ 14,172	$ 24,328	$ 22,552	$ 15,486	$ 13,292	$ 10,953	$ -	$ -	$ -
$ -	$ 31.211	$ 53.580	$ 49.668	$ 34.106	$ 29.274	$ 24.122	$ -	$ -	$ -

Cumulative Subscriber Revenue Per Service (Downside Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 2,699	$ 7,372	$ 11,775	$ 14,896	$ 17,645	$ 19,987	$ 20,278	$ 20,573	$ 20,873
$ -	$ 5,905	$ 16,127	$ 25,759	$ 32,586	$ 38,598	$ 43,723	$ 44,359	$ 45,005	$ 45,660
$ -	$ 8,436	$ 23,039	$ 36,798	$ 46,552	$ 55,141	$ 62,462	$ 63,371	$ 64,293	$ 65,229
$ -	$ 14,172	$ 38,706	$ 61,822	$ 78,207	$ 92,637	$ 104,937	$ 106,464	$ 108,013	$ 109,585
$ -	$ 31.211	$ 85.245	$ 136.154	$ 172.240	$ 204.020	$ 231.111	$ 234.473	$ 237.885	$ 241.346

Coc Service Area (Base Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of New Subscribers		0	8	13	12	8	7	5	0	0	0
Business 100M Internet-Only	20%	0	2	3	2	2	1	1	10	10	10
Business 500M Internet-Only	25%	0	2	3	3	2	2	1	13	13	13
Business 1G Internet-Only	25%	0	2	3	3	2	2	1	13	13	13
Business 10G Internet-Only	30%	0	2	4	4	2	2	2	16	16	16
	Totals	0	8	13	12	8	7	5	52	52	52

Annual Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 3,856	$ 6,620	$ 6,136	$ 4,214	$ 3,617	$ 2,980	$ -	$ -	$ -
$ -	$ 8,435	$ 14,481	$ 13,424	$ 9,218	$ 7,912	$ 6,519	$ -	$ -	$ -
$ -	$ 12,051	$ 20,687	$ 19,177	$ 13,168	$ 11,303	$ 9,313	$ -	$ -	$ -
$ -	$ 20,245	$ 34,755	$ 32,218	$ 22,123	$ 18,989	$ 15,647	$ -	$ -	$ -
$ -	$ 44.588	$ 76.542	$ 70.955	$ 48.722	$ 41.820	$ 34.460	$ -	$ -	$ -

Cumulative Subscriber Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 3,856	$ 10,532	$ 16,822	$ 21,280	$ 25,206	$ 28,553	$ 28,969	$ 29,390	$ 29,818
$ -	$ 8,435	$ 23,039	$ 36,798	$ 46,551	$ 55,140	$ 62,462	$ 63,371	$ 64,293	$ 65,228
$ -	$ 12,051	$ 32,913	$ 52,569	$ 66,502	$ 78,772	$ 89,232	$ 90,530	$ 91,848	$ 93,184
$ -	$ 20,245	$ 55,295	$ 88,317	$ 111,724	$ 132,339	$ 149,911	$ 152,092	$ 154,305	$ 156,550
$ -	$ 44.588	$ 121.779	$ 194.505	$ 246.058	$ 291.458	$ 330.158	$ 334.962	$ 339.835	$ 344.780



Optional Fees (Downside Case)										
Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 437	$ 728	$ 655	$ 437	$ 364	$ 291	$ -	$ -	$ -
Router Rental	$ -	$ 982	$ 2,619	$ 4,092	$ 5,074	$ 5,893	$ 6,548	$ 6,548	$ 6,548	$ 6,548
Inside Wire Maintenance	$ -	$ 655	$ 1,745	$ 2,727	$ 3,382	$ 3,927	$ 4,364	$ 4,364	$ 4,364	$ 4,364
	$ -	$ 2.073	$ 5.092	$ 7.475	$ 8.893	$ 10.184	$ 11.202	$ 10.911	$ 10.911	$ 10.911

Optional Fees (Base Case)										
Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 624	$ 1,040	$ 936	$ 624	$ 520	$ 416	$ -	$ -	$ -
Router Rental	$ -	$ 1,403	$ 3,742	$ 5,846	$ 7,249	$ 8,418	$ 9,354	$ 9,354	$ 9,354	$ 9,354
Inside Wire Maintenance	$ -	$ 936	$ 2,494	$ 3,896	$ 4,831	$ 5,610	$ 6,234	$ 6,234	$ 6,234	$ 6,234
	$ -	$ 2.962	$ 7.275	$ 10.678	$ 12.704	$ 14.549	$ 16.003	$ 15.588	$ 15.588	$ 15.588

Capital Expenditure Budget

67.3 1620 Poles

Annual Capital Expenditures Cost Curve				
Year 1	Year 2	Year 3	Year 4	Year 5
30%	25%	25%	20%	0%

Fiber Installation ROM									
Demand Points	Poles	Miles OH	Miles UG	Residential	Commercial	Reel Size	Slack	Splice Allow	Service Loop
1,040	810	34	34	1,040	0	16,000	3%	10	3%

Budget Detail

HARD COSTS			
Hard Costs - Blended			$
Fiber Optic Cable (materials)		$	3,198,096.00
Fiber, Strand & Lash Install		$	5,507,832.00
Splicing, Testing and Enclosures	430		$215,000
Fiber Engineering	10% of Hard Costs		$892,093
Permits & Crossings	2% of Hard Costs		$178,419
Traffic Control	3% of Hard Costs		$267,628
Make Ready			$1,215,000
Hard Costs Total			**$11,474,067**
Hard Costs - Fiber Hubs			
Distribution Estimate	72.5' per location for distribution	#REF!	
Residential Install Costs			#REF!
Commercail Install Costs		$	28,210.00
Central Hub Costs		$	504,865.00
Fiber Hub Costs Total			**#REF!**
Hard Costs - Contingency			
Hard Cost Contingency	5.0%		#REF!
Total Hard Costs			**#REF!**
SOFT COSTS			
General Project Soft Costs			$
Project Management	5%		#REF!
Quality control & Qulity Assurance	2%		#REF!
Storage & Logistics			$250,000
Development Fee	3.0%		#REF!
Construction Management Fee	0.0%		#REF!
Project Soft Costs Total			**#REF!**
Advisory Costs			
Technical Advisor			$250,000
Commercialization Advisor			$0
Advisory Costs Total			**$250,000**
Soft Costs - Contingency			
Soft Cost Contingency	3.5%		#REF!
Total Soft Costs			**#REF!**
TOTAL BUDGET			**#REF!**

Gross Capex per Passing: ***#REF!***

Net Per Take Rate: ***#REF!***

Percentage Deployed

Make Ready Cost (Per Pole)		$ 1,500.00		
Aerial Labor	50%	$ 10.50	$ 1,865,556.00	
UG Labor	50%	$ 20.50	$ 3,642,276.00	
Aerial Material	50%	$ 5.50	$ 977,196.00	
UG Material	50%	$ 12.50	$ 2,220,900.00	
Splicing Testing, Enclosures		$ 500.00	$215,000	430
			$ 25.11	per foot

PON Network Direct Costs

Downside Case

Take Rate	# of Homes passed	# of Businesses passed
35%	1,040	104
Total Subscribers	**328**	**36**

Residential Subscriber Connection Costs			
Pre-connectorized fiber drop:	$ 75.00	$	24,570.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	16,380.00
Optical Network Terminal*	$ 100.00	$	32,760.00
Wi-Fi Broadband Router	$ 75.00	$	24,570.00
Internal wiring materials	$ 75.00	$	24,570.00
Labor	$ 150.00	$	49,140.00
Distribution Estimate (72.5' Each)	#REF!		#REF!
		Total	**#REF!**

Business Subscriber Connection Costs			
Pre-connectorized, fiber drop:	$ 100.00	$	3,640.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	1,820.00
Optical Network Terminal	$ 150.00	$	5,460.00
Wi-Fi Broadband Router	$ 75.00	$	2,730.00
Internal wiring materials	$ 150.00	$	5,460.00
Labor	$ 250.00	$	9,100.00
Distribution Estimate (72.5' Each)	#REF!		#REF!
		Total	**$ 28,210.00**

Central Hub Costs				
Optical Line Terminal Chassis and Power Systems	1	$ 35,000.00	$	35,000.00
Telecommunications Shelter	1	$ 35,000.00	$	35,000.00
Generator	1	$ 10,000.00	$	10,000.00
6 Port Fiber Terminal	2	$ 120.00	$	240.00
12 Port Fiber Terminal	3	$ 175.00	$	525.00
24 Port Fiber Terminal	4	$ 225.00	$	900.00
32 Port Fiber Terminal	2	$ 300.00	$	600.00
64 Port Fiber Hub	4	$ 475.00	$	1,900.00
96 Port Fiber Hub	5	$ 625.00	$	3,125.00
128 Port Fiber Hub	2	$ 900.00	$	1,800.00
144 Port Fiber Hub	1	$ 1,200.00	$	1,200.00
288 Port Fiber Hub	5	$ 3,200.00	$	16,000.00
432 Port Fiber Hub	6	$ 4,300.00	$	25,800.00
576 Port Fiber Hub	5	$ 4,800.00	$	24,000.00
864 Port Fiber Hub	2	$ 5,850.00	$	11,700.00
1x32 Splitter		$ 550.00	$	-
GPON management system	1	$ 60,000.00	$	60,000.00
Core Switch	1	$ 50,000.00	$	50,000.00
Router	1	$ 75,000.00	$	75,000.00
DHCP, Firewall, Traffic Shaping	1	$ 75,000.00	$	75,000.00
Racks	2	$ 850.00	$	1,700.00
Fiber Panels	25	$ 75.00	$	1,875.00
Fiber Patch Cables	25	$ 20.00	$	500.00
Miscellaneouse Materials	1	$ 3,000.00	$	3,000.00
Licensing and Maintenance Support	1	$ 20,000.00	$	20,000.00
Labor	1	$ 50,000.00	$	50,000.00
		Total	**$**	**504,865.00**

Annual PON Network Deployment Costs (Downside Case)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Residential Subscriber Connection Costs	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Business Subscriber Connection Costs	8,463	7,053	5,642	4,232	1,411	846	564	0	0	0	$28,210
Central Hub Costs	151,460	126,216	100,973	75,730	25,243	15,146	10,097	0	0	0	$504,865
Distribution Fiber Estimate	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!				#REF!
Total Costs	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	
Deployment Curve	30.0%	25.0%	20.0%	15.0%	5.0%	3.0%	2.0%	0.0%	0.0%	0.0%	

Totals	
Central Office Equipment	$504,865
Subscriber connection costs	#REF!
Total	**#REF!**

Base Case

Take Rate	# of Homes passed	# of Businesses passed
50%	1,040	104
Total Subscribers	**468**	**52**

Residential Subscriber Connection Costs			
Pre-connectorized fiber drop:	$ 75.00	$	35,100.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	23,400.00
Optical Network Terminal*	$ 100.00	$	46,800.00
Wi-Fi Broadband Router	$ 75.00	$	35,100.00
Internal wiring materials	$ 75.00	$	35,100.00
Labor	$ 150.00	$	70,200.00
Distribution Estimate (72.5' Each)	#REF!		#REF!
		Total	**#REF!**

Business Subscriber Connection Costs			
Pre-connectorized, fiber drop:	$ 100.00	$	5,200.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	2,600.00
Optical Network Terminal	$ 150.00	$	7,800.00
Wi-Fi Broadband Router	$ 75.00	$	3,900.00
Internal wiring materials	$ 150.00	$	7,800.00
Labor	$ 250.00	$	13,000.00
Distribution Estimate (72.5' Each)	#REF!		#REF!
		Total	**#REF!**

Central Hub Costs				
Optical Line Terminal Chassis and Power Systems	1	$ 35,000.00	$	35,000.00
Telecommunications Shelter	1	$ 35,000.00	$	35,000.00
Generator	2	$ 10,000.00	$	20,000.00
6 Port Fiber Terminal	3	$ 120.00	$	360.00
12 Port Fiber Terminal	4	$ 175.00	$	700.00
24 Port Fiber Terminal	2	$ 225.00	$	450.00
32 Port Fiber Terminal	4	$ 300.00	$	1,200.00
64 Port Fiber Hub	5	$ 475.00	$	2,375.00
96 Port Fiber Hub	2	$ 625.00	$	1,250.00
128 Port Fiber Hub	1	$ 900.00	$	900.00
144 Port Fiber Hub	5	$ 1,200.00	$	6,000.00
288 Port Fiber Hub	6	$ 3,200.00	$	19,200.00
432 Port Fiber Hub	5	$ 4,300.00	$	21,500.00
576 Port Fiber Hub	2	$ 4,800.00	$	9,600.00
864 Port Fiber Hub		$ 5,850.00	$	-
1x32 Splitter	1	$ 550.00	$	550.00
GPON management system	1	$ 60,000.00	$	60,000.00
Core Switch	1	$ 50,000.00	$	50,000.00
Router	1	$ 75,000.00	$	75,000.00
DHCP, Firewall, Traffic Shaping	2	$ 75,000.00	$	150,000.00
Racks	25	$ 850.00	$	21,250.00
Fiber Panels	25	$ 75.00	$	1,875.00
Fiber Patch Cables	1	$ 20.00	$	20.00
Miscellaneouse Materials	1	$ 3,000.00	$	3,000.00
Licensing and Maintenance Support	1	$ 20,000.00	$	20,000.00
Labor	1	$ 50,000.00	$	50,000.00
		Total	**$**	**585,230.00**

Annual PON Network Deployment Costs (Base Case)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Residential Subscriber Connection Costs	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Business Subscriber Connection Costs	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Central Hub Costs	175,569	146,308	117,046	87,785	29,262	17,557	11,705	0	0	0	$585,230
Distribution Fiber Estimate	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!				#REF!
Total Costs	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	**#REF!**	
Deployment Curve	30.0%	25.0%	20.0%	15.0%	5.0%	3.0%	2.0%	0.0%	0.0%	0.0%	

Totals	
Central Office Equipment	$585,230
Subscriber connection costs	#REF!
Total	**#REF!**

Personnel Forecast

Position	Annual Salary & Benefits	Annual Raise	Year 1E	Year 2E	Year 3E	Year 4E	Year 5E	Year 6E	Year 7E	Year 8E	Year 9E	Year 10E
Salary + Benefits Per Position												
CEO	$250,000	3.0%	$250,000	$257,500	$265,225	$273,182	$281,377	$289,819	$298,513	$307,468	$316,693	$326,193
VP Operations	100,000	3.0%	100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
VP Construction	120,000	3.0%	120,000	123,600	127,308	131,127	135,061	139,113	143,286	147,585	152,012	156,573
VP Customer Experience	100,000	3.0%	100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
VP Network Engineering	150,000	3.0%	150,000	154,500	159,135	163,909	168,826	173,891	179,108	184,481	190,016	195,716
VP Sales & Marketing	100,000	3.0%	100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
Remote Customer Support Technician	50,000	3.0%	50,000	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Senior Network Engineer	100,000	3.0%	100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
Network Engineer	85,000	3.0%	85,000	87,550	90,177	92,882	95,668	98,538	101,494	104,539	107,675	110,906
Maintenance Technician	55,000	3.0%	55,000	56,650	58,350	60,100	61,903	63,760	65,673	67,643	69,672	71,763
Business & Enterprise Sales Associate	80,000	3.0%	80,000	82,400	84,872	87,418	90,041	92,742	95,524	98,390	101,342	104,382
Marketing Associate	50,000	3.0%	50,000	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Installation Technician	50,000	3.0%	50,000	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Office Manager/ Receiving & Inventory	45,000	3.0%	45,000	46,350	47,741	49,173	50,648	52,167	53,732	55,344	57,005	58,715
Headcount												
CEO			0	0	0	0	0	0	0	0	0	0
VP Operations			1	1	1	1	1	1	1	1	1	1
VP Construction			1	1	1	1	1	1	1	1	1	1
VP Customer Experience			1	1	1	1	1	1	1	1	1	1
VP Network Engineering			1	1	1	1	1	1	1	1	1	1
VP Sales & Marketing			0	1	1	1	1	1	1	1	1	1
Remote Customer Support Technician			0	1	1	1	1	1	1	1	1	1
Senior Network Engineer			1	1	1	1	1	1	1	1	1	1
Network Engineer			1	1	1	1	1	1	1	1	1	1
Maintenance Technician			1	1	1	1	1	1	1	1	1	1
Business & Enterprise Sales Associate			0	1	1	1	1	1	1	1	1	1
Marketing Associate			0	1	1	1	1	1	1	1	1	1
Installation Technician			1	1	1	1	1	1	1	1	1	1
Office Manager/ Receiving & Inventory			1	1	1	1	1	1	1	1	1	1
Total Headcount			**9**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**	**13**
Salaries & Benefits												
CEO			$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
VP Operations			100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
VP Construction			120,000	123,600	127,308	131,127	135,061	139,113	143,286	147,585	152,012	156,573
VP Customer Experience			100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
VP Network Engineering			150,000	154,500	159,135	163,909	168,826	173,891	179,108	184,481	190,016	195,716
VP Sales & Marketing			-	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
Remote Customer Support Technician			-	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Senior Network Engineer			100,000	103,000	106,090	109,273	112,551	115,927	119,405	122,987	126,677	130,477
Network Engineer			85,000	87,550	90,177	92,882	95,668	98,538	101,494	104,539	107,675	110,906
Maintenance Technician			55,000	56,650	58,350	60,100	61,903	63,760	65,673	67,643	69,672	71,763
Business & Enterprise Sales Associate			-	82,400	84,872	87,418	90,041	92,742	95,524	98,390	101,342	104,382
Marketing Associate			-	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Installation Technician			50,000	51,500	53,045	54,636	56,275	57,964	59,703	61,494	63,339	65,239
Office Manager/ Receiving & Inventory			45,000	46,350	47,741	49,173	50,648	52,167	53,732	55,344	57,005	58,715
Total Salaries & Benefits Expense			**$805,000**	**$1,117,550**	**$1,151,077**	**$1,185,609**	**$1,221,177**	**$1,257,812**	**$1,295,547**	**$1,334,413**	**$1,374,446**	**$1,415,679**

Assumptions Dashboard

ACTIVE CASE	Case 2		Downside Case Case 1	Base Case Case 2
Terminal Year Take Rate				
Residential Take Rate	50.0%		35.0%	50.0%
Commercial Take Rate	50.0%		35.0%	50.0%
Exit				
Exit Year	Year 7		Year 7	Year 7
LTM EBITDA Exit Multiple	15.0x		15.0x	15.0x
Cost of Sale	1.0%		1.0%	1.0%
Financing				
Leverage (LTC)	50.0%		50.0%	50.0%
Equity (% of capital structure)	50.0%		50.0%	50.0%
Credit Spread	450 bps		450 bps	450 bps
LIBOR Floor	50 bps		50 bps	50 bps
Loan Commitment Fee	1.0%		1.0%	1.0%
Financial Advisory Fee (% of Debt)	1.0%		1.0%	1.0%
Budget				
Hard Cost Contingency	5.0%		5.0%	5.0%
Soft Cost Contingency	3.5%		3.5%	3.5%
Operations				
Annual Revenue Escalation	3.0%		3.0%	3.0%
Annual Expense Inflation	2.5%		2.5%	2.5%
Annual Suibscriber Churn Rate (Residential)	3.0%		3.0%	3.0%
Annual Subscriber Churn Rate (Commercial)	1.5%		1.5%	1.5%
Bad Debt Expense	1.0%		0.5%	0.5%
Federal Tax Rate Assumption	25.0%		25.0%	25.0%
State Tax Rate - OH	10.0%		10.0%	10.0%

Pro Forma

Case Toggle	$	-
Case Shown:	**Downside Case**	

Pro Forma	Year 1E	Year 2E	Year 3E	Year 4E	Year 5E	Year 6E	Year 7E	Year 8E	Year 9E	Year 10E
Revenue										
Residential Service/Subscriber Revenue	-	40,536	110,086	174,494	218,631	256,454	287,552	287,293	287,034	286,776
Commercial Service/Subscriber Revenue	-	31,211	85,245	136,154	172,240	204,020	231,111	234,473	237,885	241,346
Total Service Revenue	**-**	**71,747**	**195,331**	**310,648**	**390,872**	**460,475**	**518,662**	**521,766**	**524,919**	**528,122**
Installation Revenue	-	2,893	4,822	4,340	2,893	2,411	1,929	-	-	-
Router Revenue	-	3,925	10,466	16,353	20,277	23,548	26,164	26,164	26,164	26,164
Maintenance Revenue	-	3,597	9,592	14,988	18,585	21,582	23,980	23,980	23,980	23,980
Total Ancillary Revenue	**-**	**10,415**	**24,880**	**35,680**	**41,755**	**47,541**	**52,073**	**50,145**	**50,145**	**50,145**
Total Revenue	**-**	**82,162**	**220,211**	**346,328**	**432,627**	**508,016**	**570,736**	**571,911**	**575,064**	**578,267**
Direct PON Network Costs										
Distribution Estimate	196,381	163,651	130,921	98,191	32,730	19,638	13,092			
Residential Subscriber Connection Costs	228,340	190,283	152,227	114,170	38,057	22,834	15,223	-	-	-
Business Subscriber Connection Costs	8,463	7,053	5,642	4,232	1,411	846	564	-	-	-
Central Hub Costs	303,944	253,286	202,629	151,972	50,657	30,394	20,263	-	-	-
Total Direct Costs	**737,128**	**614,273**	**491,419**	**368,564**	**122,855**	**73,713**	**49,142**	**-**	**-**	**-**
Gross Margin	**-**	***-648%***	***-123%***	***-6%***	***72%***	***85%***	***91%***	***100%***	***100%***	***100%***
Operating Expenses										
Salaries & Benefits	805,000	1,117,550	1,151,077	1,185,609	1,221,177	1,257,812	1,295,547	1,334,413	1,374,446	1,415,679
Data Center Colo / Interconnection	60,000	90,000	120,000	150,000	150,000	150,000	150,000	180,000	180,000	180,000
Marketing	25,000	50,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Office & Warehouse Space Allocation	-	-	-	-	-	-	-	-	-	-
Legal	25,000	25,000	25,625	26,266	26,922	27,595	28,285	28,992	29,717	30,460
Insurance	40,000	41,000	42,025	43,076	44,153	45,256	46,388	47,547	48,736	49,955
Tax / Audit	-	-	-	-	-	-	-	-	-	-
Repairs & Maintenance	-	15,000	17,500	19,000	21,000	23,500	25,000	26,900	28,550	29,950
Utility Expenses	12,000	12,500	13,000	13,500	14,000	14,500	15,000	15,500	16,000	16,500
Network IT Systems	5,250	5,381	5,516	5,654	5,795	5,940	6,088	6,241	6,397	6,557
Customer Care	-	150,000	200,000	250,000	300,000	310,000	320,000	330,000	340,000	350,000
Travel & Entertainment	25,000	30,000	35,000	40,000	45,000	50,000	55,000	60,000	65,000	70,000
Bad Debt	-	717	1,953	3,106	3,909	4,605	5,187	5,218	5,249	5,281
Total Operating Expenses	**997,250**	**1,537,149**	**1,761,696**	**1,886,210**	**1,981,956**	**2,039,209**	**2,096,495**	**2,184,811**	**2,244,095**	**2,304,381**
EBITDA	**($1,734,378)**	**($2,069,260)**	**($2,032,903)**	**($1,908,446)**	**($1,672,183)**	**($1,604,906)**	**($1,574,901)**	**($1,612,901)**	**($1,669,031)**	**($1,726,115)**
EBITDA Margin	**-**	***(2519%)***	***(923%)***	***(551%)***	***(387%)***	***(316%)***	***(276%)***	***(282%)***	***(290%)***	***(298%)***

Summary Revenue - Downside Case

	Annual Revenue (Downside Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential	$ -	$ 48,877	$ 129,874	$ 202,699	$ 251,494	$ 293,811	$ 328,423	$ 326,526	$ 326,268	$ 326,009
Business	$ -	$ 33,285	$ 90,338	$ 143,628	$ 181,133	$ 214,204	$ 242,313	$ 245,385	$ 248,796	$ 252,257
Revenue	**$ -**	**$ 82,162**	**$ 220,211**	**$ 346,328**	**$ 432,627**	**$ 508,016**	**$ 570,736**	**$ 571,911**	**$ 575,064**	**$ 578,267**

Summary Revenue - Base Case

	Annual Revenue (Base Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential	$ -	$ 69,825	$ 185,534	$ 289,571	$ 359,277	$ 419,731	$ 469,175	$ 466,466	$ 466,097	$ 465,728
Business	$ -	$ 47,550	$ 129,054	$ 205,183	$ 258,762	$ 306,006	$ 346,161	$ 350,549	$ 355,423	$ 360,368
Revenue	**$ -**	**$ 117,375**	**$ 314,587**	**$ 494,754**	**$ 618,039**	**$ 725,737**	**$ 815,337**	**$ 817,015**	**$ 821,520**	**$ 826,095**

Service Pricing

Residential Service Pricing	Month 1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Residential 100M Internet-Only	$ 44.99	$ 45	$ 46	$ 48	$ 49	$ 51	$ 52	$ 54	$ 55	$ 57	$ 59
Residential 300M Internet-Only	$ 59.99	$ 60	$ 62	$ 64	$ 66	$ 68	$ 70	$ 72	$ 74	$ 76	$ 78
Residential 500M Internet-Only	$ 69.99	$ 70	$ 72	$ 74	$ 76	$ 79	$ 81	$ 84	$ 86	$ 89	$ 91
Residential 1G Internet-Only	$ 79.99	$ 80	$ 82	$ 85	$ 87	$ 90	$ 93	$ 96	$ 98	$ 101	$ 104

Business Service Pricing	Month 1										
Business 100M Internet-Only	$ 199.99	$ 200	$ 206	$ 212	$ 219	$ 225	$ 232	$ 239	$ 246	$ 253	$ 261
Business 500M Internet-Only	$ 349.99	$ 350	$ 360	$ 371	$ 382	$ 394	$ 406	$ 418	$ 430	$ 443	$ 457
Business 1G Internet-Only	$ 499.99	$ 500	$ 515	$ 530	$ 546	$ 563	$ 580	$ 597	$ 615	$ 633	$ 652
Business 10G Internet-Only	$ 699.99	$ 700	$ 721	$ 743	$ 765	$ 788	$ 811	$ 836	$ 861	$ 887	$ 913

Optional Fees and Services (Enter zero if not used)				
Residential Installation	$49.99	*One time fee	Business Installation	$79.99
Residential Router Rental	$4.99	*Monthly	Business Router Rental	$14.99
Residential Inside Wire Maintenance	$4.99	*Monthly	Business Inside Wire Maintenance	$9.99

Residential Revenue

Subscription Ramp:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	0.0%	15.0%	25.0%	22.8%	15.0%	12.5%	10.0%

CoC Service Area (Downside Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
Number of New Subscribers		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		0	49	82	74	49	41	33	0	0	0
Residential 100M Internet-Only	15%	0	7	12	11	7	6	5	49	49	49
Residential 300M Internet-Only	25%	0	12	20	18	12	10	8	82	82	82
Residential 500M Internet-Only	30%	0	15	25	22	15	12	10	98	98	98
Residential 1G Internet Only	30%	0	15	25	22	15	12	10	98	98	98
	Totals	0	49	82	74	49	41	33	328	328	328

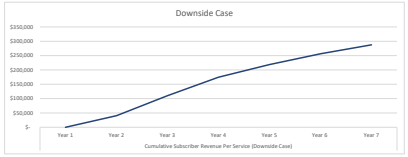
Annual New Subscriber Revenue Per Service (Downside Case)										
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 4,099	$ 7,036	$ 6,523	$ 4,479	$ 3,844	$ 3,168	$ -	$ -	$ -
$ -	$ 9,109	$ 15,637	$ 14,496	$ 9,954	$ 8,544	$ 7,040	$ -	$ -	$ -
$ -	$ 12,753	$ 21,893	$ 20,294	$ 13,935	$ 11,961	$ 9,856	$ -	$ -	$ -
$ -	$ 14,575	$ 25,021	$ 23,194	$ 15,927	$ 13,670	$ 11,264	$ -	$ -	$ -
$ -	$ 40,536	$ 69,587	$ 64,507	$ 44,295	$ 38,020	$ 31,328	$ -	$ -	$ -

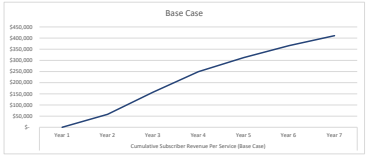
Cumulative Subscriber Revenue Per Service (Downside Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 4,099	$ 11,131	$ 17,644	$ 22,107	$ 25,932	$ 29,076	$ 29,050	$ 29,024	$ 28,998
$ -	$ 9,109	$ 24,738	$ 39,211	$ 49,130	$ 57,629	$ 64,617	$ 64,559	$ 64,501	$ 64,443
$ -	$ 12,753	$ 34,634	$ 54,897	$ 68,783	$ 80,683	$ 90,466	$ 90,385	$ 90,304	$ 90,222
$ -	$ 14,575	$ 39,582	$ 62,741	$ 78,611	$ 92,211	$ 103,392	$ 103,299	$ 103,206	$ 103,113
$ -	$ 40,536	$ 110,086	$ 174,494	$ 218,631	$ 256,454	$ 287,552	$ 287,293	$ 287,034	$ 286,776

Coc Service Area (Base Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
Number of New Subscribers		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		0	70	117	105	70	59	47	0	0	0
Residential 100M Internet-Only	15%	0	11	18	16	11	9	7	70	70	70
Residential 300M Internet-Only	25%	0	18	29	26	18	15	12	117	117	117
Residential 500M Internet-Only	30%	0	21	35	32	21	18	14	140	140	140
Residential 1G Internet Only	30%	0	21	35	32	21	18	14	140	140	140
	Totals	0	70	117	105	70	59	47	468	468	468

Annual Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 5,855	$ 10,052	$ 9,318	$ 6,398	$ 5,492	$ 4,525	$ -	$ -	$ -
$ -	$ 13,013	$ 22,339	$ 20,708	$ 14,220	$ 12,205	$ 10,057	$ -	$ -	$ -
$ -	$ 18,219	$ 31,275	$ 28,992	$ 19,908	$ 17,088	$ 14,080	$ -	$ -	$ -
$ -	$ 20,822	$ 35,744	$ 33,134	$ 22,752	$ 19,529	$ 16,092	$ -	$ -	$ -
$ -	$ 57,908	$ 99,409	$ 92,153	$ 63,278	$ 54,314	$ 44,754	$ -	$ -	$ -

Cumulative Subscriber Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 5,855	$ 15,902	$ 25,206	$ 31,582	$ 37,045	$ 41,537	$ 41,500	$ 41,463	$ 41,425
$ -	$ 13,013	$ 35,340	$ 56,016	$ 70,185	$ 82,327	$ 92,310	$ 92,227	$ 92,144	$ 92,061
$ -	$ 18,219	$ 49,477	$ 78,425	$ 98,262	$ 115,261	$ 129,238	$ 129,121	$ 129,005	$ 128,889
$ -	$ 20,822	$ 56,546	$ 89,630	$ 112,301	$ 131,729	$ 147,703	$ 147,570	$ 147,437	$ 147,304
$ -	$ 57,908	$ 157,266	$ 249,277	$ 312,331	$ 366,363	$ 410,788	$ 410,418	$ 410,049	$ 409,680





Service	Cumulative & One-Time Optional Fees (Downside Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 2,457	$ 4,094	$ 3,685	$ 2,457	$ 2,047	$ 1,638	$ -	$ -	$ -
Router Rental	$ -	$ 2,943	$ 7,847	$ 12,260	$ 15,203	$ 17,655	$ 19,617	$ 19,617	$ 19,617	$ 19,617
Inside Wire Maintenance	$ -	$ 2,943	$ 7,847	$ 12,260	$ 15,203	$ 17,655	$ 19,617	$ 19,617	$ 19,617	$ 19,617
	$ -	$ 8.342	$ 19.788	$ 28.206	$ 32.862	$ 37.357	$ 40.871	$ 39.233	$ 39.233	$ 39.233

Service	Cumulative & One-Time Optional Fees (Base Case)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 3,509	$ 5,849	$ 5,264	$ 3,509	$ 2,924	$ 2,340	$ -	$ -	$ -
Router Rental	$ -	$ 4,204	$ 11,210	$ 17,515	$ 21,718	$ 25,221	$ 28,024	$ 28,024	$ 28,024	$ 28,024
Inside Wire Maintenance	$ -	$ 4,204	$ 11,210	$ 17,515	$ 21,718	$ 25,221	$ 28,024	$ 28,024	$ 28,024	$ 28,024
	$ -	$ 11.916	$ 28.268	$ 40.294	$ 46.946	$ 53.367	$ 58.387	$ 56.048	$ 56.048	$ 56.048

Commercial Revenue

Subscription Ramp:	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
	0.0%	15.0%	25.0%	22.5%	15.0%	12.5%	10.0%

CoC Service Area (Downside Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of New Subscribers		0	5	9	8	5	5	4	0	0	0
Business 100M Internet-Only	20%	0	1	2	2	1	1	1	7	7	7
Business 500M Internet-Only	25%	0	1	2	2	1	1	1	9	9	9
Business 1G Internet-Only	25%	0	1	2	2	1	1	1	9	9	9
Business 10G Internet-Only	30%	0	2	3	2	2	1	1	11	11	11
	Totals	0	5	9	8	5	5	4	36	36	36

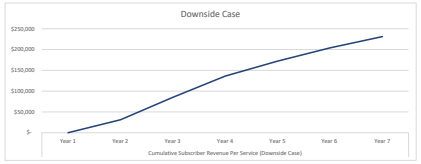
Annual New Subscriber Revenue Per Service (Downside Case)										
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 2,699	$ 4,634	$ 4,296	$ 2,950	$ 2,532	$ 2,086	$ -	$ -	$ -
$ -	$ 5,905	$ 10,137	$ 9,397	$ 6,452	$ 5,538	$ 4,564	$ -	$ -	$ -
$ -	$ 8,436	$ 14,481	$ 13,424	$ 9,218	$ 7,912	$ 6,519	$ -	$ -	$ -
$ -	$ 14,172	$ 24,328	$ 22,552	$ 15,486	$ 13,292	$ 10,953	$ -	$ -	$ -
$ -	$ 31.211	$ 53.580	$ 49.668	$ 34.106	$ 29.274	$ 24.122	$ -	$ -	$ -

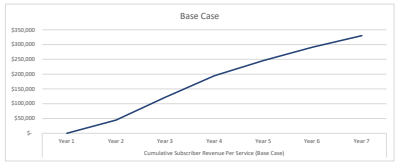
Cumulative Subscriber Revenue Per Service (Downside Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 2,699	$ 7,372	$ 11,775	$ 14,896	$ 17,645	$ 19,987	$ 20,278	$ 20,573	$ 20,873
$ -	$ 5,905	$ 16,127	$ 25,759	$ 32,586	$ 38,598	$ 43,723	$ 44,359	$ 45,005	$ 45,660
$ -	$ 8,436	$ 23,039	$ 36,798	$ 46,552	$ 55,141	$ 62,462	$ 63,371	$ 64,293	$ 65,229
$ -	$ 14,172	$ 38,706	$ 61,822	$ 78,207	$ 92,637	$ 104,937	$ 106,464	$ 108,013	$ 109,585
$ -	$ 31.211	$ 85.245	$ 136.154	$ 172.240	$ 204.020	$ 231.111	$ 234.473	$ 237.885	$ 241.346

Coc Service Area (Base Case)		Number of Additional Subscribers Per Service							Final # Subscribers		
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of New Subscribers		0	8	13	12	8	7	5	0	0	0
Business 100M Internet-Only	20%	0	2	3	2	2	1	1	10	10	10
Business 500M Internet-Only	25%	0	2	3	3	2	2	1	13	13	13
Business 1G Internet-Only	25%	0	2	3	3	2	2	1	13	13	13
Business 10G Internet-Only	30%	0	2	4	4	2	2	2	16	16	16
	Totals	0	8	13	12	8	7	5	52	52	52

Annual Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 3,856	$ 6,620	$ 6,136	$ 4,214	$ 3,617	$ 2,980	$ -	$ -	$ -
$ -	$ 8,435	$ 14,481	$ 13,424	$ 9,218	$ 7,912	$ 6,519	$ -	$ -	$ -
$ -	$ 12,051	$ 20,687	$ 19,177	$ 13,168	$ 11,303	$ 9,313	$ -	$ -	$ -
$ -	$ 20,245	$ 34,755	$ 32,218	$ 22,123	$ 18,989	$ 15,647	$ -	$ -	$ -
$ -	$ 44,588	$ 76,542	$ 70,955	$ 48,722	$ 41,820	$ 34,460	$ -	$ -	$ -

Cumulative Subscriber Revenue Per Service (Base Case)									
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
$ -	$ 3,856	$ 10,532	$ 16,822	$ 21,280	$ 25,206	$ 28,553	$ 28,989	$ 29,390	$ 29,818
$ -	$ 8,435	$ 23,039	$ 36,798	$ 46,551	$ 55,140	$ 62,462	$ 63,371	$ 64,293	$ 65,228
$ -	$ 12,051	$ 32,913	$ 52,569	$ 66,502	$ 78,772	$ 89,232	$ 90,530	$ 91,848	$ 93,184
$ -	$ 20,245	$ 55,295	$ 88,317	$ 111,724	$ 132,339	$ 149,911	$ 152,092	$ 154,305	$ 156,550
$ -	$ 44,588	$ 121,779	$ 194,505	$ 246,058	$ 291,458	$ 330,158	$ 334,962	$ 339,835	$ 344,780





Optional Fees (Downside Case)										
Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 437	$ 728	$ 655	$ 437	$ 364	$ 291	$ -	$ -	$ -
Router Rental	$ -	$ 982	$ 2,619	$ 4,092	$ 5,074	$ 5,893	$ 6,548	$ 6,548	$ 6,548	$ 6,548
Inside Wire Maintenance	$ -	$ 655	$ 1,745	$ 2,727	$ 3,382	$ 3,927	$ 4,364	$ 4,364	$ 4,364	$ 4,364
	$ -	$ 2.073	$ 5.092	$ 7.475	$ 8.893	$ 10.184	$ 11.202	$ 10.911	$ 10.911	$ 10.911

Optional Fees (Base Case)										
Service	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Installation	$ -	$ 624	$ 1,040	$ 936	$ 624	$ 520	$ 416	$ -	$ -	$ -
Router Rental	$ -	$ 1,403	$ 3,742	$ 5,846	$ 7,249	$ 8,418	$ 9,354	$ 9,354	$ 9,354	$ 9,354
Inside Wire Maintenance	$ -	$ 935	$ 2,494	$ 3,896	$ 4,831	$ 5,610	$ 6,234	$ 6,234	$ 6,234	$ 6,234
	$ -	$ 2.962	$ 7.275	$ 10.678	$ 12.704	$ 14.549	$ 16.003	$ 15.588	$ 15.588	$ 15.588

Operating Expenses

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Salaries & Benefits	$805,000	$1,117,550	$1,151,077	$1,185,609	$1,221,177	$1,257,812	$1,295,547	$1,334,413	$1,374,446	$1,415,679
Data Center Colo / Interconnection	$60,000	$90,000	$120,000	$150,000	$150,000	$150,000	$150,000	$180,000	$180,000	$180,000
Marketing	$25,000	$50,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
Office & Warehouse Space Allocation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Legal	$25,000	$25,000	$25,625	$26,266	$26,922	$27,595	$28,285	$28,992	$29,717	$30,460
Insurance	$40,000	$41,000	$42,025	$43,076	$44,153	$45,256	$46,388	$47,547	$48,736	$49,955
Tax / Audit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Repairs & Maintenance	$0	$15,000	$17,500	$19,000	$21,000	$23,500	$25,000	$26,900	$28,550	$29,950
Utility Expenses	$12,000	$12,500	$13,000	$13,500	$14,000	$14,500	$15,000	$15,500	$16,000	$16,500
Network IT Systems	$5,250	$5,381	$5,516	$5,654	$5,795	$5,940	$6,088	$6,241	$6,397	$6,557
Customer Care	$0	$150,000	$200,000	$250,000	$300,000	$310,000	$320,000	$330,000	$340,000	$350,000
Travel & Entertainment	$25,000	$30,000	$35,000	$40,000	$45,000	$50,000	$55,000	$60,000	$65,000	$70,000
Bad Debt	$0	$717	$1,953	$3,106	$3,909	$4,605	$5,187	$5,218	$5,249	$5,281
Total	**$997,250**	**$1,537,149**	**$1,761,696**	**$1,886,210**	**$1,981,956**	**$2,039,209**	**$2,096,495**	**$2,184,811**	**$2,244,095**	**$2,304,381**

Capital Expenditure Budget

134.6 1620 Poles

Annual Capital Expenditures Cost Curve				
Year 1	Year 2	Year 3	Year 4	Year 5
30%	25%	25%	20%	0%

Fiber Installation ROM									
Demand Points	Poles	Miles OH	Miles UG	Residential	Commercial	Reel Size	Slack	Splice Allow	Service Loop
1,040	1,620	67	67	1,040	0	16,000	3%	10	3%

Budget Detail

HARD COSTS			
Hard Costs - Blended			$
Fiber Optic Cable (materials)		$	6,396,192.00
Fiber, Strand & Lash Install		$	11,015,664.00
Splicing, Testing and Enclosures	430		$215,000
Fiber Engineering	10% of Hard Costs		$1,762,686
Permits & Crossings	2% of Hard Costs		$352,537
Traffic Control	3% of Hard Costs		$528,806
Make Ready			$2,430,000
Hard Costs Total			**$22,700,884**
Hard Costs - Fiber Hubs			
Distribution Estimate	72.5' per location for distribution		654,604.06
Residential Install Costs		$	761,133.65
Commercail Install Costs		$	28,210.00
Central Hub Costs		$	1,013,145.00
Fiber Hub Costs Total			**2,457,092.71**
Hard Costs - Contingency			
Hard Cost Contingency	5.0%		$1,225,169
Total Hard Costs			**$26,383,146**
SOFT COSTS			
General Project Soft Costs			$
Project Management	5%		$1,319,157
Quality control & Qulity Assurance	2%		$527,663
Storage & Logistics			$250,000
Development Fee	3.0%		$791,494
Construction Management Fee	0.0%		$0
Project Soft Costs Total			**$2,888,315**
Advisory Costs			
Technical Advisor			$250,000
Commercialization Advisor			$0
Advisory Costs Total			**$250,000**
Soft Costs - Contingency			
Soft Cost Contingency	3.5%		$109,841
Total Soft Costs			**$3,248,156**
TOTAL BUDGET			**$29,631,301**

Gross Capex per Passing: ***$28,146***

Net Per Take Rate: ***$28,492***

Percentage Deployed

Make Ready Cost (Per Pole)		$	1,500.00	
Aerial Labor	50%	$	10.50	$ 3,731,112.00
UG Labor	50%	$	20.50	$ 7,284,552.00
Aerial Material	50%	$	5.50	$ 1,954,392.00
UG Material	50%	$	12.50	$ 4,441,800.00

Splicing Testing, Enclosures $ 500.00 $215,000 430

$ 24.80 per foot

PON Network Direct Costs

Downside Case

Take Rate	# of Homes passed	# of Businesses passed
35%	1,040	104
Total Subscribers	**328**	**36**

Residential Subscriber Connection Costs			
Pre-connectorized fiber drop:	$ 75.00	$	24,570.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	16,380.00
Optical Network Terminal*	$ 100.00	$	32,760.00
Wi-Fi Broadband Router	$ 75.00	$	24,570.00
Internal wiring materials	$ 75.00	$	24,570.00
Labor	$ 150.00	$	49,140.00
Distribution Estimate (72.5' Each)	$ 1,798.36	$	589,143.65
		Total	**$ 761,133.65**

Business Subscriber Connection Costs			
Pre-connectorized, fiber drop:	$ 100.00	$	3,640.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	1,820.00
Optical Network Terminal	$ 150.00	$	5,460.00
Wi-Fi Broadband Router	$ 75.00	$	2,730.00
Internal wiring materials	$ 150.00	$	5,460.00
Labor	$ 250.00	$	9,100.00
Distribution Estimate (72.5' Each)	$ 1,798.36	$	65,460.41
		Total	**$ 28,210.00**

Central Hub Costs				
Optical Line Terminal Chassis and Power Systems	1	$ 35,000.00	$	35,000.00
Telecommunications Shelter	1	$ 35,000.00	$	35,000.00
Generator	1	$ 10,000.00	$	10,000.00
6 Port Fiber Terminal	10	$ 120.00	$	1,200.00
12 Port Fiber Terminal	3	$ 175.00	$	525.00
24 Port Fiber Terminal	4	$ 225.00	$	900.00
32 Port Fiber Terminal	2	$ 300.00	$	600.00
64 Port Fiber Hub	4	$ 475.00	$	1,900.00
96 Port Fiber Hub	5	$ 625.00	$	3,125.00
128 Port Fiber Hub	2	$ 900.00	$	1,800.00
144 Port Fiber Hub	1	$ 1,200.00	$	1,200.00
288 Port Fiber Hub	5	$ 3,200.00	$	16,000.00
432 Port Fiber Hub	6	$ 4,300.00	$	25,800.00
576 Port Fiber Hub	5	$ 4,800.00	$	24,000.00
864 Port Fiber Hub	10	$ 5,850.00	$	58,500.00
1x32 Splitter		$ 550.00	$	-
GPON management system	1	$ 60,000.00	$	60,000.00
Core Switch	10	$ 50,000.00	$	500,000.00
Router	1	$ 75,000.00	$	75,000.00
DHCP, Firewall, Traffic Shaping	1	$ 75,000.00	$	75,000.00
Racks	10	$ 850.00	$	8,500.00
Fiber Panels	73	$ 75.00	$	5,475.00
Fiber Patch Cables	31	$ 20.00	$	620.00
Miscellaneouse Materials	1	$ 3,000.00	$	3,000.00
Licensing and Maintenance Support	1	$ 20,000.00	$	20,000.00
Labor	1	$ 50,000.00	$	50,000.00
			Total	**$ 1,013,145.00**

Annual PON Network Deployment Costs (Downside Case)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Residential Subscriber Connection Costs	$228,340	$190,283	$152,227	$114,170	$38,057	$22,834	$15,223	$0	$0	$0	$761,134
Business Subscriber Connection Costs	8,463	7,053	5,642	4,232	1,411	846	564	0	0	0	$28,210
Central Hub Costs	303,944	253,286	202,629	151,972	50,657	30,394	20,263	0	0	0	$1,013,145
Distribution Fiber Estimate	196,381	163,651	130,921	98,191	32,730	19,638	13,092				$654,604
Total Costs	**$ 540,747**	**$ 450,622**	**$ 360,498**	**$ 270,373**	**$ 90,124**	**$ 54,075**	**$ 36,050**	**$ -**	**$ -**	**$ -**	
Deployment Curve	30.0%	25.0%	20.0%	15.0%	5.0%	3.0%	2.0%	0.0%	0.0%	0.0%	

Totals	
Central Office Equipment	$1,013,145
Subscriber connection costs	$789,344
Total	**$1,802,489**

Base Case

Take Rate	# of Homes passed	# of Businesses passed
50%	1,040	104
Total Subscribers	**468**	**52**

Residential Subscriber Connection Costs			
Pre-connectorized fiber drop:	$ 75.00	$	35,100.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	23,400.00
Optical Network Terminal*	$ 100.00	$	46,800.00
Wi-Fi Broadband Router	$ 75.00	$	35,100.00
Internal wiring materials	$ 75.00	$	35,100.00
Labor	$ 150.00	$	70,200.00
Distribution Estimate (72.5' Each)	$ 1,798.36	$	841,633.79
		Total	**$ 1,087,333.79**

Business Subscriber Connection Costs			
Pre-connectorized, fiber drop:	$ 100.00	$	5,200.00
Network Interface Device (NID) and misc. materials	$ 50.00	$	2,600.00
Optical Network Terminal	$ 150.00	$	7,800.00
Wi-Fi Broadband Router	$ 75.00	$	3,900.00
Internal wiring materials	$ 150.00	$	7,800.00
Labor	$ 250.00	$	13,000.00
Distribution Estimate (72.5' Each)	$ 1,798.36	$	93,514.87
		Total	**$ 133,814.87**

Central Hub Costs				
Optical Line Terminal Chassis and Power Systems	1	$ 35,000.00	$	35,000.00
Telecommunications Shelter	1	$ 35,000.00	$	35,000.00
Generator	1	$ 10,000.00	$	10,000.00
6 Port Fiber Terminal	9	$ 120.00	$	1,080.00
12 Port Fiber Terminal	3	$ 175.00	$	525.00
24 Port Fiber Terminal	4	$ 225.00	$	900.00
32 Port Fiber Terminal	2	$ 300.00	$	600.00
64 Port Fiber Hub	4	$ 475.00	$	1,900.00
96 Port Fiber Hub	5	$ 625.00	$	3,125.00
128 Port Fiber Hub	2	$ 900.00	$	1,800.00
144 Port Fiber Hub	1	$ 1,200.00	$	1,200.00
288 Port Fiber Hub	5	$ 3,200.00	$	16,000.00
432 Port Fiber Hub	6	$ 4,300.00	$	25,800.00
576 Port Fiber Hub	5	$ 4,800.00	$	24,000.00
864 Port Fiber Hub	10	$ 5,850.00	$	58,500.00
1x32 Splitter		$ 550.00	$	-
GPON management system	1	$ 60,000.00	$	60,000.00
Core Switch	10	$ 50,000.00	$	500,000.00
Router	1	$ 75,000.00	$	75,000.00
DHCP, Firewall, Traffic Shaping	1	$ 75,000.00	$	75,000.00
Racks	1	$ 850.00	$	850.00
Fiber Panels	73	$ 75.00	$	5,475.00
Fiber Patch Cables	31	$ 20.00	$	620.00
Miscellaneouse Materials	1	$ 3,000.00	$	3,000.00
Licensing and Maintenance Support	1	$ 20,000.00	$	20,000.00
Labor	1	$ 50,000.00	$	50,000.00
			Total	**$ 1,005,375.00**

Annual PON Network Deployment Costs (Base Case)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Residential Subscriber Connection Costs	$326,200	$271,833	$217,467	$163,100	$54,367	$32,620	$21,747	$0	$0	$0	$1,087,334
Business Subscriber Connection Costs	40,144	33,454	26,763	20,072	6,691	4,014	2,676	0	0	0	$133,815
Central Hub Costs	301,613	251,344	201,075	150,806	50,269	30,161	20,108	0	0	0	$1,005,375
Distribution Fiber Estimate	280,545	233,787	187,030	140,272	46,757	28,054	18,703				$935,149
Total Costs	**$ 948,502**	**$ 790,418**	**$ 632,334**	**$ 474,251**	**$ 158,084**	**$ 94,850**	**$ 63,233**	**$ -**	**$ -**	**$ -**	
Deployment Curve	30.0%	25.0%	20.0%	15.0%	5.0%	3.0%	2.0%	0.0%	0.0%	0.0%	

Totals	
Central Office Equipment	$1,005,375
Subscriber connection costs	$1,221,149
Total	**$ 2,226,524**

Operating Expenses

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Salaries & Benefits	$805,000	$1,117,550	$1,151,077	$1,185,609	$1,221,177	$1,257,812	$1,295,547	$1,334,413	$1,374,446	$1,415,679
Data Center Colo / Interconnection	$60,000	$90,000	$120,000	$150,000	$150,000	$150,000	$150,000	$180,000	$180,000	$180,000
Marketing	$25,000	$50,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
Office & Warehouse Space Allocation	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Legal	$25,000	$25,000	$25,625	$26,266	$26,922	$27,595	$28,285	$28,992	$29,717	$30,460
Insurance	$40,000	$41,000	$42,025	$43,076	$44,153	$45,256	$46,388	$47,547	$48,736	$49,955
Tax / Audit	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Repairs & Maintenance	$0	$15,000	$17,500	$19,000	$21,000	$23,500	$25,000	$26,900	$28,550	$29,950
Utility Expenses	$12,000	$12,500	$13,000	$13,500	$14,000	$14,500	$15,000	$15,500	$16,000	$16,500
Network IT Systems	$5,250	$5,381	$5,516	$5,654	$5,795	$5,940	$6,088	$6,241	$6,397	$6,557
Customer Care	$0	$150,000	$200,000	$250,000	$300,000	$310,000	$320,000	$330,000	$340,000	$350,000
Travel & Entertainment	$25,000	$30,000	$35,000	$40,000	$45,000	$50,000	$55,000	$60,000	$65,000	$70,000
Bad Debt	$0	$717	$1,953	$3,106	$3,909	$4,605	$5,187	$5,218	$5,249	$5,281
Total	**$997,250**	**$1,537,149**	**$1,761,696**	**$1,886,210**	**$1,981,956**	**$2,039,209**	**$2,096,495**	**$2,184,811**	**$2,244,095**	**$2,304,381**

Appendix E - Digital Equity Interview Recaps

Introduction

This document provides detailed recaps of the digital equity meetings held in Mahoning County on May 13 and May 21, 2024. The objective of these meetings was to assess the current state of digital equity and connectivity across various communities and organizations in Mahoning County. The participants included representatives from Family Tech Connect, Oak Hill Collaborative, Youngstown State University, Mahoning-Youngstown Community Action Partnership (MyCap), and the Access Council.

Each meeting focused on identifying the key challenges and barriers to achieving digital equity, exploring the potential roles of different organizations, and discussing collaborative strategies to enhance digital inclusion. The discussions highlighted the importance of addressing affordability, accessibility, and digital literacy to ensure that all residents, particularly underserved populations such as seniors and low-income individuals, have the necessary tools and resources to participate fully in the digital world.

Through these recaps, this document aims to provide a comprehensive overview of the efforts and insights shared by the participants, emphasizing the need for continued collaboration and innovative approaches to bridge the digital divide in Mahoning County.

Shared Problems Across Interviews

Upon reviewing the interviews from the various meetings on digital equity in Mahoning County, several common problems and challenges emerge:

1. Affordability of Internet Services

One of the most frequently mentioned issues is the high cost of internet services, which is a significant barrier for many residents, especially seniors and low-income individuals. With the discontinuation of programs like the Affordable Connectivity Program (ACP), many people struggle to maintain their internet connections. This problem was highlighted by participants from Family Tech Connect, Oak Hill Collaborative, and MyCap.

2. Lack of Devices

A critical barrier to digital equity is the lack of access to necessary devices, such as computers and tablets. Many residents rely solely on mobile phones, which limits their ability to fully engage with digital resources. This issue was particularly emphasized by MyCap, which noted that around 30-40% of their clients do not have access to a computer at home.

3. Digital Literacy

There is a significant gap in digital literacy, particularly among seniors. Many individuals do not have the skills to effectively use digital tools and resources. This was a major point of discussion for both Family Tech Connect and Oak Hill Collaborative, which offer various classes and support to help bridge this gap. Ensuring that people understand how to use technology is as important as providing access to it.

4. Connectivity Issues in Rural Areas

Rural areas face unique challenges due to the lack of infrastructure, making it difficult for residents to obtain reliable internet access. This issue was raised by both Oak Hill Collaborative and the

Access Council. High costs associated with extending fiber networks to sparsely populated regions exacerbate this problem.

5. Outreach and Awareness

Reaching the individuals who need digital equity services the most remains a challenge. Despite various outreach efforts, many people remain unaware of the available resources and programs that can assist them. This was a point of concern for both Family Tech Connect and MyCap, highlighting the need for effective communication and engagement strategies.

6. Collaborative Efforts and Coordination

The need for better coordination and collaboration among different organizations and agencies was a recurring theme. Many participants, including those from YSU and MyCap, emphasized the importance of partnerships in addressing the digital divide. Effective collaborations can pool resources, share knowledge, and create more comprehensive solutions to digital equity challenges.

7. Specific Needs of Different Demographics

Different demographics have unique needs when it comes to digital equity. For instance, seniors may need more basic digital literacy training, while younger individuals might require more advanced skills for academic and professional purposes. Addressing these varied needs requires tailored approaches and programs, as discussed by YSU and Family Tech Connect.

Conclusion

The interviews highlight that while each organization faces unique challenges in promoting digital equity, many of the problems are shared across the board. Affordability, lack of devices, digital literacy, connectivity in rural areas, outreach, and the need for collaboration are common themes. Addressing these issues would require a concerted effort from all stakeholders, leveraging their strengths and working together to create a more digitally inclusive Mahoning County.

Interview Summaries

Date:5/13/24

Attendees: Family Tech Connect: Vince Bevacqua, Bill Callahan , Anna DeAscentis, Jeff Whitman, Steve Kristian

Discussion:

Introduction and Services Provided

Vince Bevacqua began the meeting by describing the services offered by Family Tech Connect, which focuses on supporting seniors in overcoming technological challenges. Their grants do not require gathering extensive income information, allowing them to serve seniors regardless of their financial status. Their primary service is coaching, where they visit clients' homes to assist with device setup, usage, and light IT work like connecting printers and setting up routers.

Device Setup and Digital Literacy

Jeffrey Whitman inquired about additional services beyond education. Vince explained that they also help with device setup for new equipment that seniors purchase. Although their grants do not cover the cost of devices, they provide support for setup and usage. The emphasis is on helping seniors understand and effectively use their technology.

Differences Between Digital Equity and Digital Connectivity

Jeffrey asked about the differences between digital equity and digital connectivity. Vince highlighted that digital equity involves ensuring underserved populations, like seniors, have

access to services that enhance their tech literacy. While connectivity is crucial, many seniors lack the skills to utilize the technology available to them effectively.

Access to Broadband and Affordability

Vince discussed the challenges seniors face in accessing broadband. In rural areas, connectivity is a significant issue. More recently, affordability has become a concern, with some seniors expressing worries about losing their internet service due to costs. Vince noted that while some seniors find solutions through mobile providers, the cost remains a barrier for many.

Digital Literacy vs. Affordability

Jeffrey asked whether the primary issue for seniors is literacy, affordability, or availability. Vince responded that it is a combination of all three. Many seniors are overwhelmed by technology, lack understanding of the basic concepts, and face financial barriers in accessing and maintaining connectivity.

Outreach and Client Engagement

Vince described the challenges in reaching seniors who need these services. Despite efforts like TV commercials and speaking at various venues, many seniors remain unaware of the services available. Word of mouth has been effective, but spreading awareness continues to be a significant challenge.

Vision for the Future

Jeffrey asked Vince about his vision for the future in Mahoning County and the obstacles to achieving it. Vince envisions a community where seniors are tech literate and can utilize digital tools for health, communication, and daily tasks. The primary obstacles are awareness and the availability of qualified staff to meet the growing demand for their services.

Staff Challenges and Operational Model

Vince explained the operational challenges of running a small company reliant on part-time staff. Finding individuals with the right skills, patience, and ability to explain tech concepts to seniors is difficult. While current funding is sufficient, future growth may require additional resources.

Anticipated Needs in the Next 5-10 Years

Vince anticipates that as more services move to digital platforms, seniors would need ongoing support to adapt. The fear of scams and cybersecurity concerns is significant among seniors, requiring education on digital safety and hygiene.

Effective Engagement Strategies

To engage with seniors, Vince emphasized the importance of traditional methods like speaking at local venues and using TV ads. Digital methods are less effective for this population. Personal referrals and word of mouth have been the most successful strategies for outreach.

Barriers to Digital Equity

Vince identified key barriers to digital equity for seniors: access to reliable internet, affordability of services, and the need for updated equipment. Seniors often hold onto outdated devices, which adds to their frustration and reluctance to engage with new technology.

Local Digital Equity Initiatives

Vince highlighted several effective local initiatives, including partnerships with organizations like Oak Hill Collaborative, which provides classroom environments for seniors, and the Senior Support Action Group, which distributes Alexa devices programmed with essential contacts. These partnerships enhance the services provided and support the broader goal of digital equity.

Final Remarks and Future Collaboration

The meeting concluded with a discussion on potential future collaborations and the importance of continued efforts to address digital equity. Vince expressed openness to further engagement and support from the participants in expanding and improving their services for seniors in Mahoning County.

Conclusion

The meeting underscored the importance of digital equity and the challenges faced by seniors in Mahoning County. Family Tech Connect's efforts to enhance tech literacy and connectivity among seniors are crucial, with a focus on personalized, patient-centered support. Continued collaboration and innovative outreach strategies are essential to achieving digital equity for all residents.

Date:5/13/24

Attendees: Oak Hill Collaborative: Pat Kerrigan, Bill Callahan , Anna DeAscentis, Jeff Whitman, Steve Kristian

Discussion:

Introduction to Oak Hill Collaborative

Pat Kerrigan began by providing an overview of Oak Hill Collaborative's activities, which started as a neighborhood center focused on community development. Over time, it evolved to include an incubator and makerspace. The collaborative now teaches a wide range of computer classes, from basic skills to advanced technologies like 3D printing and CNC routing. They aim to engage people by aligning tech education with their interests, such as creating digital content for religious shows or learning 3D printing.

Facilities and Services

Oak Hill Collaborative operates a 15-station computer lab, six 3D printers, a digital recording studio, and a CNC router. They offer classes primarily in Mahoning County but have expanded into other areas, including Hispanic organizations and suburban regions like Campbell. The collaborative also sells discounted refurbished computers and provides free computers to financially qualified individuals who complete five classes.

Addressing Digital Equity Challenges

Jeffrey Whitman asked about the biggest challenges and strategies for addressing digital equity if money were not an issue. Pat emphasized the need to reach rural areas by setting up small facilities with internet connections and laptops. He highlighted the importance of having committed staff available regularly to maintain these facilities and engage the community.

Infrastructure Needs

Jeffrey inquired about digital infrastructure needs in Mahoning County. Pat noted that while urban and suburban areas have good coverage, rural areas lack infrastructure due to the high costs of extending services to sparsely populated regions. He stressed that government support is crucial for subsidizing these costs and highlighted the need for a balanced investment in both infrastructure and digital inclusion efforts.

Digital Inclusion and Community Engagement

Pat discussed the importance of teaching people the value of digital connectivity. He mentioned that many people in urban areas do not see the value of having internet access due to a lack of awareness about its benefits. He advocated for creating community events and classes that

demonstrate the practical advantages of being connected, such as applying for jobs or accessing government benefits online.

Overcoming Barriers and Promoting Digital Literacy

Jeffrey asked about the biggest challenges in promoting digital literacy. Pat pointed out that many people, especially in urban areas, do not understand the benefits of being connected and are hesitant to invest in internet services. He emphasized the need for community leaders and organizations, such as churches and local action groups, to help spread the word and educate people about the importance of digital literacy.

Collaboration and Inclusivity

Bill Callahan asked about the inclusivity of Oak Hill Collaborative's efforts. Pat acknowledged that while they reach a diverse group of people, there is still room for improvement in engaging certain communities, particularly in rural areas. He stressed the importance of building coalitions and working with various community organizations to ensure broad-based participation in digital inclusion efforts.

Success Stories and Lessons Learned

Pat shared success stories of individuals who benefited from their programs, such as learning new skills or obtaining jobs through digital literacy classes. He emphasized the importance of having community buy-in and the role of reliable sources in spreading the message about the value of digital connectivity.

Challenges with Local Organizations

Pat highlighted challenges in collaborating with local organizations like the Metropolitan Housing Authority, which has been resistant to participating in digital inclusion efforts. He expressed frustration with their lack of engagement and support for initiatives like discounted computer sales and ACP sign-ups.

Conclusion and Future Collaboration

The meeting concluded with discussions on potential future collaborations and the importance of continued efforts to address digital equity. Pat expressed willingness to work with other organizations and stressed the need for a unified approach to tackling digital literacy and connectivity challenges in Mahoning County.

Conclusion

The meeting underscored the critical role of community engagement and collaboration in promoting digital equity. Oak Hill Collaborative's multifaceted approach to digital inclusion, from teaching basic computer skills to offering advanced tech classes, highlights the importance of making technology accessible and relevant to diverse communities. Continued efforts to build coalitions and engage local organizations would be key to achieving digital equity for all residents.

Date:5/21/22

Attendees: Youngstown State University :Jim Yukech, Rosalyn Donaldson, Jeremy Yerse, Bill Callahan, Kirsta Beniston, Anna DeAscentis, Jeff Whitman, Steve Kristian

Discussion:

Introductions and Definitions of Digital Equity

Jeffrey Whitman initiated the meeting by introducing the participants and discussing the purpose of the meeting, which was to explore digital equity in Mahoning County. Each participant then introduced themselves and their roles at Youngstown State University (YSU).

Jim Yukech defined digital equity as ensuring that every student and community member associated with YSU has the same access to digital technology, regardless of their background. **Rosalyn Donaldson** added that digital accessibility must also consider individuals with disabilities, ensuring they have appropriate tools and resources to use technology effectively.

Challenges of Digital Accessibility

Rosalyn explained specific digital accessibility challenges, such as accommodating those with vision or hearing impairments. This includes ensuring websites and digital presentations are accessible through features like captions and color adjustments for colorblind individuals. Jim emphasized the importance of making sure all digital interfaces address these needs.

Campus and Community Connectivity

Jim highlighted that while YSU has robust on-campus WiFi, off-campus connectivity remains an issue for some students, especially those in rural or urban areas with limited access. During the pandemic, YSU addressed this by providing mobile hotspots, though this program has since been discontinued. They do not currently have specific data on the extent of connectivity issues among their students.

Loaner Laptop Program

YSU has a loaner laptop program with around 1500 laptops available to students. Initially, the program was underutilized, but it has since gained popularity, indicating a growing need. The first semester of the loan is free, with subsequent semesters costing $50. This program ensures students have access to necessary devices.

Potential Role of YSU in Digital Equity

Jeffrey asked how YSU could support digital equity and literacy in Mahoning County. Jim expressed a strong interest in being a good community partner and indicated that YSU is open to collaborating on initiatives to improve digital equity. He acknowledged that while YSU primarily focuses on its students, it also recognizes its role in the broader community.

Employee Access and Remote Work

Jim noted that YSU shifted from desktop to laptop standards during the pandemic to support remote work. While IT and finance departments actively use remote work, there is no comprehensive data on whether employees have adequate internet access at home. Jim suggested that a survey could be conducted to gather this information.

Future Digital Needs and AI (Artificial Intelligence) Integration

Jim predicted that AI would significantly impact digital needs in the next five to ten years, similar to the internet revolution in the late 1990s. He emphasized the importance of incorporating AI into software contracts to ensure students and employees can access AI-enabled tools. The main challenge would be ensuring equitable access to these technologies at home and work.

Collaboration on Digital Equity

Jeffrey asked if YSU would consider participating in external collaborations on digital equity. Jim confirmed YSU's willingness to collaborate, emphasizing their role as a major employer and educational institution in the area.

Addressing Incoming Students' Digital Literacy

Steve Kristan asked about incoming students' digital literacy levels. Jim noted that while students are proficient with smartphones, they often lack deeper understanding and skills with applications needed for academic work. YSU is proactive in offering training to bridge these gaps, led by Rosalyn's team.

Rosalyn added that students often come from Google Classroom environments and need to transition to Microsoft tools used in professional settings. This transition requires additional training and support.

Addressing Specific Software Needs

Jim highlighted the importance of training students and staff on specific applications like Microsoft Office, given the frequent updates and changes. Steve asked about the importance of offering both PC and Mac platforms. Jim explained that while YSU primarily uses PCs due to cost, they also support Macs for specific programs like digital media and art.

Conclusion and Future Steps

The meeting concluded with a commitment to continued collaboration on digital equity initiatives. Jim emphasized YSU's openness to participating in community efforts and encouraged further communication to identify specific roles YSU can play in advancing digital equity in Mahoning County.

Conclusion

The meeting highlighted YSU's commitment to digital equity and accessibility for its students and the broader community. With robust on-campus resources and proactive training programs, YSU aims to address digital literacy gaps and support equitable access to technology. Continued collaboration with community partners would be crucial in achieving these goals and ensuring that all individuals in Mahoning County have the tools and skills needed for success in the digital age.

Date:5/13/24

Attendees: Mahoning-Youngstown Community Action Partnership : Teresa (myCAP)Bill Callahan, Kirsta Beniston, Anna DeAscentis, Jeff Whitman, Steve Kristian

Discussion:

Introduction and Current Client Needs

The meeting began with an introduction by Teresa from MyCap, explaining the organization's focus on serving marginalized communities, particularly low-income individuals. Teresa mentioned that clients are currently facing significant challenges in paying their bills due to the discontinuation of financial assistance programs that previously helped with utility and internet bills. This has led to many clients, including seniors, having their internet services disconnected.

Immediate Concerns and Digital Connectivity Challenges

Jeffrey Whitman asked about the primary challenges related to digital connectivity in Mahoning County. Teresa highlighted that the biggest issues are affordability and the ability to get and maintain internet service. Many clients were able to afford internet with the help of the Affordable Connectivity Program (ACP) and other similar programs, but without this assistance, they struggle to keep their services.

Policies and Programs Impacting Connectivity

The discussion touched on the potential impact of local, state, and federal policies. Teresa mentioned the Lifeline program as another means of support, which helps some clients by

reducing the cost of internet service. Bill Callahan added that there are specific programs like AT&T Access and Spectrum's program for school kids, but these often have eligibility requirements such as receiving SNAP benefits or having school-aged children.

Access to Broadband and Devices

Jeffrey inquired about how clients access broadband, whether through mobile devices or fixed-line connections. Teresa noted that the application process does not currently capture this information, but suggested that a survey could be conducted to gather data on how clients connect to the internet.

Future Digital Needs and Technological Changes

Jeffrey asked about how technological changes in the next five to ten years might shape digital needs. Teresa observed that while younger clients and middle-aged individuals might adapt to using more portable internet solutions like T-Mobile's modems, seniors typically prefer more traditional setups. She emphasized the importance of ongoing education to help clients adapt to new technologies.

Barriers to Digital Equity

Beyond pricing and affordability, Teresa identified a lack of devices as a critical barrier to digital equity. Many clients do not have computers or tablets and rely solely on their phones, which limits their ability to access online resources effectively. Approximately 30-40% of their clients do not have access to a computer at home, primarily due to affordability and a lack of knowledge on how to use these devices.

Effective Local Digital Equity Initiatives

When asked about local digital equity initiatives that have been successful, Teresa could not immediately identify specific programs but acknowledged the importance of cross-sector collaborations. She emphasized that such partnerships can help address the digital divide by pooling resources and knowledge from various community organizations.

Role of Cross-Sector Collaborations

Jeffrey and Teresa discussed the role of collaborations in addressing digital equity. Teresa highlighted that working together with other agencies allows them to refer clients to appropriate resources and ensure their needs are met. She mentioned that collaborations with organizations like the YMHA and senior housing facilities could provide opportunities to hold classes and improve digital literacy among residents.

Questions from Participants

Bill Callahan asked about the typical needs of clients when they visit MyCap. Teresa explained that clients often seek assistance with utility bills, appliances, and sometimes furniture. Internet access frequently comes up, but without specific programs to help, they have few options to offer.

Potential for Enhanced Outreach and Assistance

The discussion also covered the potential for enhanced outreach and assistance if clients had better access to devices and internet. Teresa noted that with more devices and internet access, clients could submit applications online, reducing the need for in-person visits and allowing for more efficient service delivery.

Conclusion and Next Steps

The meeting concluded with Jeffrey thanking Teresa for her insights and offering to reach out for further information or clarification as needed. Teresa agreed to provide additional information via

email and expressed willingness to continue the conversation to find solutions for improving digital equity in Mahoning County.

Conclusion

The meeting highlighted the ongoing challenges of digital connectivity and affordability faced by marginalized communities in Mahoning County. MyCap's efforts to support these communities underscore the importance of cross-sector collaborations and continued advocacy for policies that enhance digital equity. The discussion also emphasized the need for better data collection on how clients access the internet and the potential benefits of increasing access to devices and digital literacy training.

Date:5/21/22

Attendees: Access Council :Lisa Smith, Bill Callahan, Kirsta Beniston, Anna DeAscentis, Jeff Whitman, Steve Kristian

Discussion:

Overview of Access Council and Fiber Network

Lisa Smith began the meeting by providing an overview of the Access Council, originally known as The Third Frontier Network. This organization provides internet connectivity and data services to schools, maintaining student and financial data, special education information, automated library systems, and more. They also offer services like Voice over IP (Internet Protocol), wireless services, and managed IP services.

In the late 1990s and early 2000s, the council evolved into a consortium and eventually into a council of governments (COG). This change allowed them to offer a variety of additional services. The council built and maintains a fiber plant spanning over 350 miles, connecting every school building and some libraries within Mahoning and Columbiana counties. This infrastructure includes redundant loops to ensure reliable connectivity.

Collaboration with Columbia County Port Authority

Lisa detailed a partnership with the Columbia County Port Authority. Initially, laws restricted economic development activities to K-12 and library sectors. However, changes in legislation now allow collaboration with municipalities and government entities. This partnership led to the purchase of 40 strands of fiber by the Port Authority for economic development. The council maintains ownership and offers some capacity to partners like Verizon and inVolta under specific agreements.

Impact of COVID-19

During the COVID-19 pandemic, the Access Council worked with vendors and school districts to expand wireless capacity. They partnered with Broadband Ohio and community organizations to extend fiber to underserved areas, like the Hanover region in Columbiana County. Despite challenges with permitting and utility issues, these efforts aimed to maintain educational continuity for students.

Infrastructure Gaps in Mahoning County

Jeffrey Whitman inquired about infrastructure gaps in Mahoning County. Lisa identified areas like Youngstown City Schools and Campbell Schools as regions with connectivity issues. Despite efforts to map student residences and assess available services, providers like Spectrum often

dominate the market, limiting options for these communities. However, partnerships with entities like Horizon and inVolta have helped expand fiber capacity.

Digital Equity and Capacity Sharing

The discussion shifted to digital equity. Lisa explained that digital equity involves ensuring that individuals have the means to connect for educational purposes and other activities. This includes infrastructure, resources, and service availability. She highlighted examples of areas where students lack connectivity due to insufficient infrastructure or service provider limitations.

Jeffrey asked about the possibility of leasing fiber capacity to ISPs. Lisa confirmed that, with legal approval, this could be done, emphasizing the council's capacity for maintenance and fiber refreshment through partnerships.

Utilization of Network Capacity

Jeffrey inquired about the utilization of the network. Lisa explained that the council periodically refreshes its network with partners like Horizon, ensuring ample capacity for current and future needs. The network includes both aerial and underground segments, maintained through collaborative agreements.

Partnerships and Legal Agreements

The conversation touched on the complexities of partnerships and legal agreements. Lisa elaborated on the historical and ongoing collaborations with entities like inVolta and the Port Authority. These partnerships facilitate economic development while ensuring the council retains ownership and maintenance responsibilities for the fiber network.

Challenges and Opportunities

Lisa discussed challenges, such as high costs for extending fiber to underserved areas like Salineville in Columbiana County. Despite being ineligible for many grants, the council seeks creative solutions to expand connectivity. She mentioned the importance of supporting community infrastructure through school connectivity, emphasizing that partnerships and innovative approaches are crucial for overcoming these barriers.

Closing Remarks and Future Goals

The meeting concluded with a discussion on the goals of achieving comprehensive service coverage and digital equity in Mahoning County. Anna DeAscentis clarified the project's objective to assess current conditions and prepare for future funding opportunities through grants like the Broadband Equity Access and Deployment (BEAD) program.

Lisa offered her assistance and resources, emphasizing the importance of continued collaboration to address digital equity and connectivity challenges in the region.

Conclusion

The interviews conducted with various organizations and stakeholders in Mahoning County reveal a complex and multifaceted challenge in achieving digital equity. Key issues such as the affordability of internet services, the lack of necessary devices, gaps in digital literacy, connectivity problems in rural areas, and the need for effective outreach and collaboration were consistently highlighted across the discussions. These challenges underscore the importance of a comprehensive and coordinated approach to bridging the digital divide.

Despite these challenges, the interviews also reveal a strong commitment from organizations like Family Tech Connect, Oak Hill Collaborative, Youngstown State University, MyCap, and the Access Council to address these issues. Each organization brings unique strengths and

perspectives to the table, offering a foundation for collaborative efforts to improve digital equity in the county. The focus on personalized support, community engagement, and strategic partnerships is essential to creating sustainable solutions that can adapt to the evolving digital landscape.

Next Steps

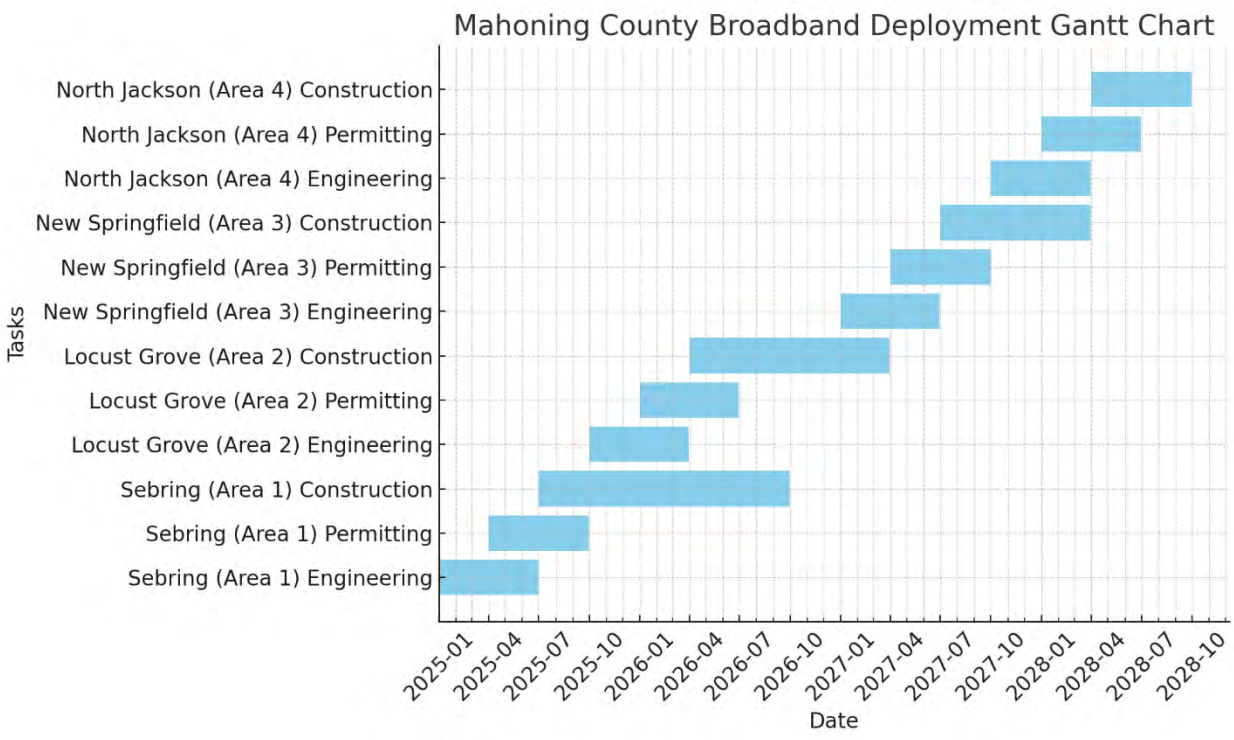
1. **Strengthen Collaborations:**
    - Foster stronger partnerships between organizations, such as schools, libraries, community centers, and local governments, to create a unified approach to digital equity.
    - Establish regular meetings and communication channels to coordinate efforts, share resources, and develop joint initiatives.
2. **Increase Awareness and Outreach:**
    - Develop targeted outreach campaigns using traditional media (TV, radio, newspapers) and community events to raise awareness about available digital equity resources.
    - Leverage community leaders and local organizations to disseminate information and reach underserved populations.
3. **Expand Device Access:**
    - Implement programs to provide affordable or free devices to low-income individuals and families, particularly targeting seniors and students.
    - Explore partnerships with tech companies and philanthropic organizations to secure donations of devices.
4. **Enhance Digital Literacy Training:**
    - Expand digital literacy training programs to cover basic to advanced skills, ensuring they are accessible to all demographics, including seniors, low-income families, and rural residents.
    - Use a variety of instructional methods, including in-person classes, online tutorials, and one-on-one coaching, to meet diverse learning needs.
5. **Improve Connectivity in Rural Areas:**
    - Advocate for government and private sector investment in broadband infrastructure to extend high-speed internet access to rural and underserved areas.
    - Explore innovative solutions like community WiFi hotspots and mobile internet units to provide interim connectivity.
6. **Monitor and Evaluate Progress:**
    - Conduct regular surveys and assessments to gather data on internet access, device availability, and digital literacy levels within the community.
    - Use this data to measure the impact of initiatives, identify gaps, and adjust strategies accordingly.
7. **Advocate for Policy Changes:**
    - Work with local, state, and federal policymakers to advocate for policies that support digital equity, such as subsidies for internet services, funding for digital literacy programs, and incentives for infrastructure development.

By addressing these next steps, Mahoning County can make significant progress towards ensuring that all residents have the digital tools and skills necessary to thrive in an increasingly

connected world. The collective efforts of all stakeholders would be crucial in overcoming the challenges and creating a more equitable digital landscape for everyone.

C. Technical Deployment Documentation

Mahoning County's broadband deployment project GNATT Chart (Example)
Mahoning County Broadband Deployment Gantt Chart



Here is the Gantt chart for Mahoning County's broadband deployment project. It visually represents the timeline for key tasks and milestones across the multi-year period, helping to track progress and ensure the project stays on schedule.
Narrative Description of the Gantt Chart
The Gantt chart includes tasks such as engineering, permitting, and construction for each area (Sebring, Locust Grove, New Springfield, and North Jackson). The chart is organized by quarter and year, with bars representing the duration of each task:

- Sebring (Area 1):
    - Engineering starts in Q1 2025 and ends in Q2 2025.
    - Permitting starts in Q2 2025 and ends in Q3 2025.
    - Construction starts in Q3 2025 and ends in Q3 2026.
- Locust Grove (Area 2):
    - Engineering starts in Q4 2025 and ends in Q1 2026.
    - Permitting starts in Q1 2026 and ends in Q2 2026.

    - Construction starts in Q3 2026 and ends in Q2 2027.
- New Springfield (Area 3):
    - Engineering starts in Q1 2027 and ends in Q2 2027.
    - Permitting starts in Q2 2027 and ends in Q3 2027.
    - Construction starts in Q3 2027 and ends in Q2 2028.
- North Jackson (Area 4):
    - Engineering starts in Q4 2027 and ends in Q1 2028.
    - Permitting starts in Q1 2028 and ends in Q2 2028.
    - Construction starts in Q2 2028 and ends in Q3 2028.

The chart provides a visual timeline of the project phases, highlighting critical tasks, dependencies, and completion dates. It is a comprehensive tool for tracking progress, identifying potential delays, and ensuring the project stays on schedule.

Measurement and Verification

- Site Inspections: Regular site inspections would verify the physical progress of engineering, permitting, and construction activities. Inspection reports would document compliance with project specifications and timelines.
- Progress Reports: Monthly progress reports would outline the status of each task, any encountered issues, and proposed solutions. These reports would be reviewed by the project management team.
- Key Performance Indicators (KPIs): Specific KPIs would measure the success of each milestone, including metrics such as the number of permits obtained, miles of fiber installed, and number of connections activated.
- Stakeholder Meetings: Regular meetings with key stakeholders, including community leaders, contractors, and funding agencies, would review progress, discuss challenges, and align on next steps.
- Quality Assurance (QA): A QA program would ensure all engineering and construction activities meet required standards. This includes testing and commissioning of the network infrastructure.
- Financial Audits: Periodic financial audits would track budget expenditures, ensuring funds are used efficiently and effectively.

By integrating these measurement and verification processes, Mahoning County aims to ensure the successful completion of each milestone, maintaining the project's timeline, budget, and quality standards. The detailed Gantt chart and accompanying narrative provide a clear roadmap for achieving the project's goals **and delivering high-speed broadband access to the county's underserved areas.**

References

1. **Data USA: Mahoning County, OH**
    - **Description:** Provides comprehensive data on Mahoning County's demographics, economy, health, and education.
    - **Relevance:** Used for obtaining demographic and economic profile data.
    - **Link:** Data USA
2. **Federal Reserve Bank of St. Louis (FRED)**

- **Description:** Offers extensive economic data including employment rates, income inequality, and economic mobility statistics.
- **Relevance:** Utilized for understanding economic factors and income inequality in Mahoning County.
- **Link:** Federal Reserve Economic Data

3. **U.S. Bureau of Labor Statistics (BLS)**
   - **Description:** Provides data on employment, unemployment, wages, and labor market conditions.
   - **Relevance:** Used for insights into the local labor market and employment statistics.
   - **Link:** Bureau of Labor Statistics
4. **Equitable Growth**
   - **Description:** Research and data on economic inequality and economic mobility.
   - **Relevance:** Provides context and data on income inequality and economic mobility.
   - **Link:** Washington Center for Equitable Growth
5. **Opportunity Insights**
   - **Description:** A research organization that provides data and insights on economic mobility and the impact of neighborhoods on economic success.
   - **Relevance:** Used for data on intergenerational mobility and economic disparities.
   - **Link:** Opportunity Insights
6. **Federal Communications Commission (FCC)**
   - **Description:** Offers comprehensive broadband data, including availability, speeds, and adoption rates.
   - **Relevance:** Critical for understanding the current state of broadband infrastructure and identifying underserved areas.
   - **Link:** FCC Broadband Data
7. **BroadbandNow**
   - **Description:** Provides information on internet service providers, service plans, and pricing across the United States.
   - **Relevance:** Used to analyze the availability, pricing, and competition among broadband providers in Mahoning County.
   - **Link:** BroadbandNow
8. **BroadbandSearch**
   - **Description:** An online database that helps users find and compare internet service providers in their area.
   - **Relevance:** Used for comparing broadband offerings and identifying coverage gaps.
   - **Link:** BroadbandSearch
9. **GeoTel Communications**
   - **Description:** Provides geospatial data on telecommunications infrastructure, including fiber networks.
   - **Relevance:** Essential for mapping existing fiber infrastructure and identifying gaps in broadband coverage.

- **Link:** GeoTel Communications

10. **Federal Reserve Bank of Dallas**
    - **Description:** Publishes research on economic issues, including frameworks for addressing the digital divide through the Community Reinvestment Act (CRA).
    - **Relevance:** Offers strategies and recommendations for leveraging CRA investments to improve broadband access.
    - **Link:** Closing the Digital Divide: A Framework for Meeting Community Reinvestment Act Requirements
11. **City of Youngstown Community Development Division**
    - **Description:** Manages community development programs and initiatives, including those related to broadband and digital equity.
    - **Relevance:** Provides local context and support programs for community development and digital equity.
    - **Link:** Youngstown CRA Program
12. **Mahoning County Economic Development**
    - **Description:** Focuses on economic development initiatives in Mahoning County, including support for broadband expansion.
    - **Relevance:** Relevant for understanding local economic development goals and initiatives.
    - **Link:** Mahoning County CRA Information
13. **Opportunity Insights**
    - **Description:** Provides research and data on economic mobility and the impact of educational and community interventions.
    - **Relevance:** Used for data on economic and educational disparities within Mahoning County.
    - **Link:** Mobility Report Cards
14. **U.S. Census Bureau**
    - **Description:** Offers comprehensive data on poverty rates, demographic profiles, and economic conditions across the U.S.
    - **Relevance:** Essential for analyzing persistent poverty and economic conditions in Mahoning County.
    - **Link:** Persistent Poverty in the United States
15. **Appalachian Regional Commission (ARC)**
    - **Description:** Provides economic development data and support for the Appalachian region, including Mahoning County.
    - **Relevance:** Used for understanding economic distress and development needs in the county.
    - **Link:** Economic Distress in Appalachian Counties
16. **Ohio Broadband Expansion Program**
    - **Description:** Manages state-level initiatives to expand broadband access across Ohio, including grants and infrastructure projects.
    - **Relevance:** Relevant for state-specific broadband initiatives and funding opportunities.
    - **Link:** BroadbandOhio

17. **National Digital Inclusion Alliance (NDIA)**
    - **Description:** Provides resources and data on digital inclusion programs and free or low-cost internet plans.
    - **Relevance:** Useful for identifying affordable internet plans and digital inclusion strategies.
    - **Link:** Free & Low-Cost Internet Plans
18. **American Community Survey (ACS)**
    - **Description:** Offers detailed demographic, social, economic, and housing statistics from the U.S. Census Bureau.
    - **Relevance:** Provides critical data on internet adoption, household demographics, and economic conditions.
    - **Link:** U.S. Census Bureau
19. **FCC Internet Access Services Reports**
    - **Description:** Annual reports that provide data on the deployment and adoption of broadband services across the U.S.
    - **Relevance:** Used to assess broadband adoption rates and service availability in Mahoning County.
    - **Link:** FCC Reports
20. **National Telecommunications and Information Administration (NTIA)**
    - **Description:** A government agency that advises on telecommunications policy and manages programs to expand broadband access.
    - **Relevance:** Provides guidelines and support for broadband infrastructure and digital inclusion projects.
    - **Link:** NTIA
21. **Family Tech Connect**
    - **Description:** Offers digital literacy training and support for families and seniors to help them navigate technology.
    - **Relevance:** Important for understanding community-based digital literacy initiatives.
    - **Link:** Family Tech Connect
22. **Oak Hill Collaborative**
    - **Description:** Provides technology education and support, including computer classes and device distribution programs.
    - **Relevance:** Key partner in digital literacy and device distribution efforts in Mahoning County.
    - **Link:** Oak Hill Collaborative
23. **Youngstown State University (YSU)**
    - **Description:** Offers educational programs and community outreach initiatives, including digital literacy and technology access.
    - **Relevance:** Collaborates on initiatives to improve digital equity and access to education.
    - **Link:** Youngstown State University
24. **Mahoning-Youngstown Community Action Partnership (MyCap)**

- **Description:** Provides services and support for low-income residents, including digital literacy and connectivity programs.
- **Relevance:** Important for understanding local efforts to support digital equity and affordability.
- **Link:** MyCap

25. **Eastgate Regional Council of Governments**
    - **Description:** Focuses on regional planning and development, including broadband infrastructure projects.
    - **Relevance:** Critical for planning and implementing regional broadband initiatives.
    - **Link:** Eastgate
26. **FCC Broadband Deployment Data**
    - **Description:** Detailed maps and data on broadband deployment, speeds, and availability across the U.S.
    - **Relevance:** Used to identify coverage gaps and plan for broadband expansion in Mahoning County.
    - **Link:** FCC Broadband Map