NORTH DAKOTA

Broadband Equity, Access, and Deployment (BEAD) Plan

NORTH Dakota | Information Technology
Be Legendary.

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Broadband for All, Broadband for Life℠

1 Executive Summary

> ***"North Dakota has established itself as a leader in broadband – We want to make sure the state is the right fit for businesses and jobseekers alike. Broadband access is key for this."***
>
> -Workforce Development Stakeholder

Background

North Dakota tells a uniquely promising story of connectivity among other rural states, with 97% of the state receiving access to broadband service.[1] With the establishment of the State Broadband Program Office within the North Dakota Information Technology (NDIT) Department, the State has made great strides in its commitment to facilitate the deployment of broadband infrastructure. The expansion of broadband infrastructure statewide has supported North Dakota's shared purpose to *Empower People, Improve Lives, and Inspire Success.*[2]

This story of broadband success does not extend to the remaining 3% of the state. Approximately ten thousand locations in North Dakota today still lack access to high-speed, reliable internet service. For these individuals, the repercussions of the digital divide extend far beyond the inability to browse the internet. Without reliable broadband access, impacted students are unable to complete online homework, participate in virtual educational opportunities, or pivot to remote learning in response to disruptions, like the most recent one imposed by the COVID-19 pandemic. Farms that lack connectivity are unable to embrace precision agriculture and increase soybean, corn, and wheat production, among other crops. These farmers and ranchers are also unable to quickly connect with buyers and sellers of crops and livestock across and outside of North Dakota. A resident of the Badlands region who lacks a personal device is unable to apply for and secure a remote employment opportunity with a large financial institution

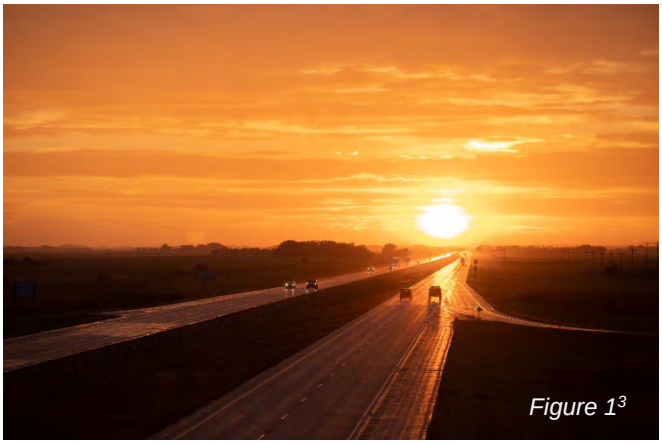

Figure 1[3]

[1] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022. *Note: This breaks down to 99% residential and 97% non-residential. Mixed-use locations are included in both residential and non-residential percentages.*

[2] North Dakota Office of the Governor (accessed on May 26, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.

[3] North Dakota Media Library (Accessed on July 13, 2023), Interstate at Sunset. Accessed at: Details of the image item DSC_4671.jpg | Asset Bank (nd.gov).

Figure 2[4]

in Fargo. For these North Dakotans, equitable access to broadband, devices, and digital skills remains the missing link. While the Broadband Equity, Access, and Deployment (BEAD) Program may not address all of these challenges, it will lay the foundation for North Dakota to support broadband expansion and digital equity efforts that allow for meaningful connectivity.

With the passage of the Infrastructure Investment and Jobs Act (IIJA), which authorized the BEAD Program, there is now widespread consensus that access to internet is not simply a luxury, but rather a necessity. It should be afforded to all North Dakotans alike, from the state's urban centers to its most remote, rural regions.

Where We Are

North Dakota has made significant progress in its broadband expansion efforts, reaching 97% coverage statewide. Part of this success can be attributed to the state's robust network of carriers and ISPs and federally funded broadband programs that have helped bring much of the state online.

Most states with large rural populations have relatively low broadband coverage given the high capital costs and lower return on investment associated with building out the required infrastructure. This is not the case in North Dakota, where the intention is to become the first state with 100% coverage. North Dakota's progress related to broadband expansion can also be attributed to recent broadband-related funding opportunities through various sources, such as the United States Department of Agriculture (USDA) ReConnect Grants, Connect America, Rural Digital Opportunity Fund, the Tribal Broadband Connectivity Program, and Capital Projects Fund (CPF).

In addition, North Dakota's robust network of cable companies such as Midco, internet service providers (ISPs), and carriers, many of which are members of the Dakota Carrier Network (DCN), have helped bring connectivity throughout North Dakota. In the past decade, DCN and its owner companies have invested more than $1.4 billion in fiber infrastructure and currently maintain over 65,000 miles of fiber statewide.[5] Through the collective power of these smaller providers, the state has succeeded in its efforts to extend coverage to its more costly service areas. However, these efforts will not stop here, as there are 9,846 unserved and underserved locations remaining according to the FCC National Broadband Maps.[6] Through existing partnerships and the impending BEAD funds, North Dakota is well-positioned to offer solutions for the following broadband needs and gaps:

[4] North Dakota Media Library (Accessed on July 13, 2023), Downtown Devils Lake. Accessed at: Details of the image item DJI_0833.JPG | Asset Bank (nd.gov).
[5] Dakota Carrier Network (accessed on May 16, 2023), Government Technology Solution. Accessed at: https://dakotacarrier.com/services/government/.
[6] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.

- **Unserved and underserved locations:** Despite North Dakota's recent progress in connecting offline locations and achieving 97% coverage, approximately 10,000[7] locations across the state still lack access to reliable, high-speed internet service. Many of these unserved and underserved locations are found in the northwestern part of the state. Nearly half of the state's unserved and underserved locations are found in just three counties – Williams, McKenzie, and Mountrail. As North Dakota seeks to connect the remaining locations, the broadband deployment efforts will not only consider broadband needs for North Dakota today, but also for generations to come. This will align with the *Smart, Efficient Infrastructure* pillar under Governor Burgum's *Main Street Initiative*, which emphasizes "examining the full costs and sustainability of growth patterns."[8]
- **Reduced participation in low-cost offerings:** Cost can be a significant barrier to broadband adoption for low-income households. Currently, the Affordable Connectivity Program (ACP) is one of the largest programs in North Dakota aimed at lowering the cost barrier to internet adoption. However, based on Education Superhighway estimates, the state's ACP participation rate of 11% is well below the national participation rate of 34%.[9] This renders internet service out of reach for many low-income individuals. Research suggests that a lack of awareness is the main barrier to participation in discount programs. Existing community hubs represent ideal avenues to spread awareness of low-cost offerings, simultaneously advancing the Governor's *Healthy, Vibrant Communities* pillar under the *Main Street Initiative*.
- **Broadband for workforce and economic development:** One of the most common barriers to meaningful connectivity in the state includes lack of basic digital skills. According to research conducted by the National Digital Inclusion Alliance, 33% of unemployed individuals lack foundational digital skills which are required for 73% of open jobs in the state.[10] In conjunction, lack of broadband infrastructure can hinder the growth of existing industry strengths (e.g., agriculture) and economic diversification. Deploying broadband infrastructure and connecting the more remote parts of the state will support North Dakota's traditional industry strengths, such as agriculture, mining, and natural resources, which represented over 25% of the state's GDP contribution in 2022.[11] This also presents a transformational opportunity to bolster tradable sectors, which can help attract outside investment and top talent to North Dakota, ultimately catalyzing economic diversification. This demonstrates that broadband deployment efforts do not exist in a vacuum, but rather advance many statewide priorities, including North Dakota's endeavor to "support a diverse economy within the state and around the world."[12]

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[7] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum.*

[8] State of North Dakota (accessed on July 25, 2023), Five Strategic Initiatives. Accessed at: https://www.nd.gov/living-nd/main-street-nd.

[9] Education SuperHighway (accessed on May 9, 2023), Affordable Connectivity Program Enrollment Dashboard. Accessed at: https://www.educationsuperhighway.org/no-home-left-offline/acp-data/.

[10] National Digital Inclusion Alliance (accessed on May 23, 2023), state Digital Equity Scorecard. Accessed at: https://state-scorecard.digitalinclusion.org/scorecard/by_state/ND.

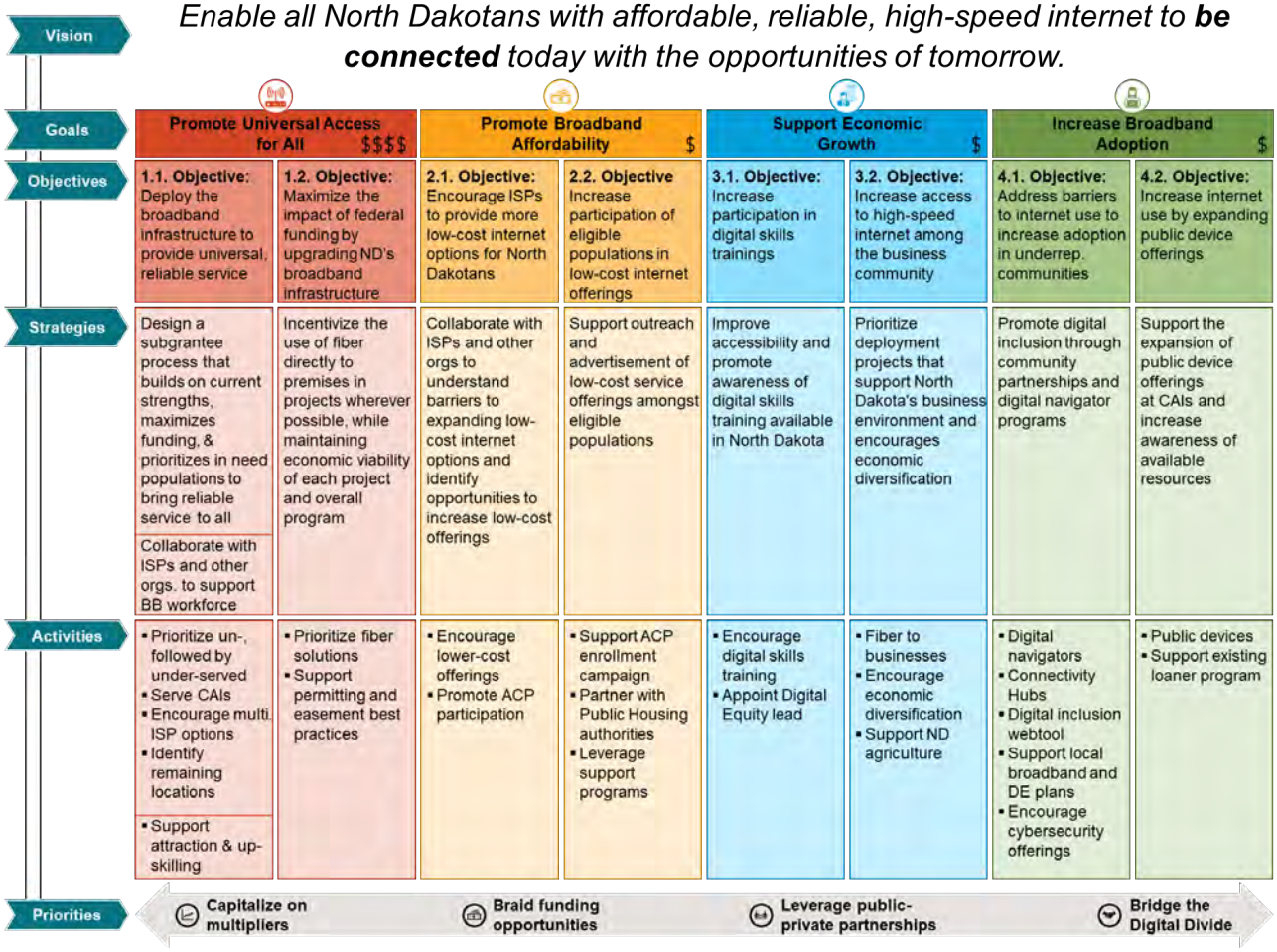
[11] Bureau of Economic Analysis, Accessed at: BEA Interactive Data Application

[12] State of North Dakota (accessed on July 25, 2023), Five Strategic Initiatives. Accessed at: https://www.nd.gov/living-nd/main-street-nd.

- **Low broadband adoption among covered populations:** 84% of households in North Dakota have a broadband subscription and 92% own a computer.[13] However, subscription rates vary by county and certain counties, especially ones with a large proportion of the population residing on Tribal Lands, such as Benson, Sioux, and Sheridan, have broadband subscription rates of less than 72%. Furthermore, counties with high percentages of covered populations[14], particularly low-income populations, correspond to counties with low broadband subscription rates. Through opportunities for continued collaboration between State government and the governments of Tribal Entities, the BEAD Plan will help advance Governor Burgum's *Tribal Engagement* Initiative.

Where We're Going

Figure 3: North Dakota Strategic Framework for BEAD



The strategic framework introduced in **Figure 3** summarizes North Dakota's plan to help achieve universal access to broadband. This model will help guide the State's decision-making related to

[13] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

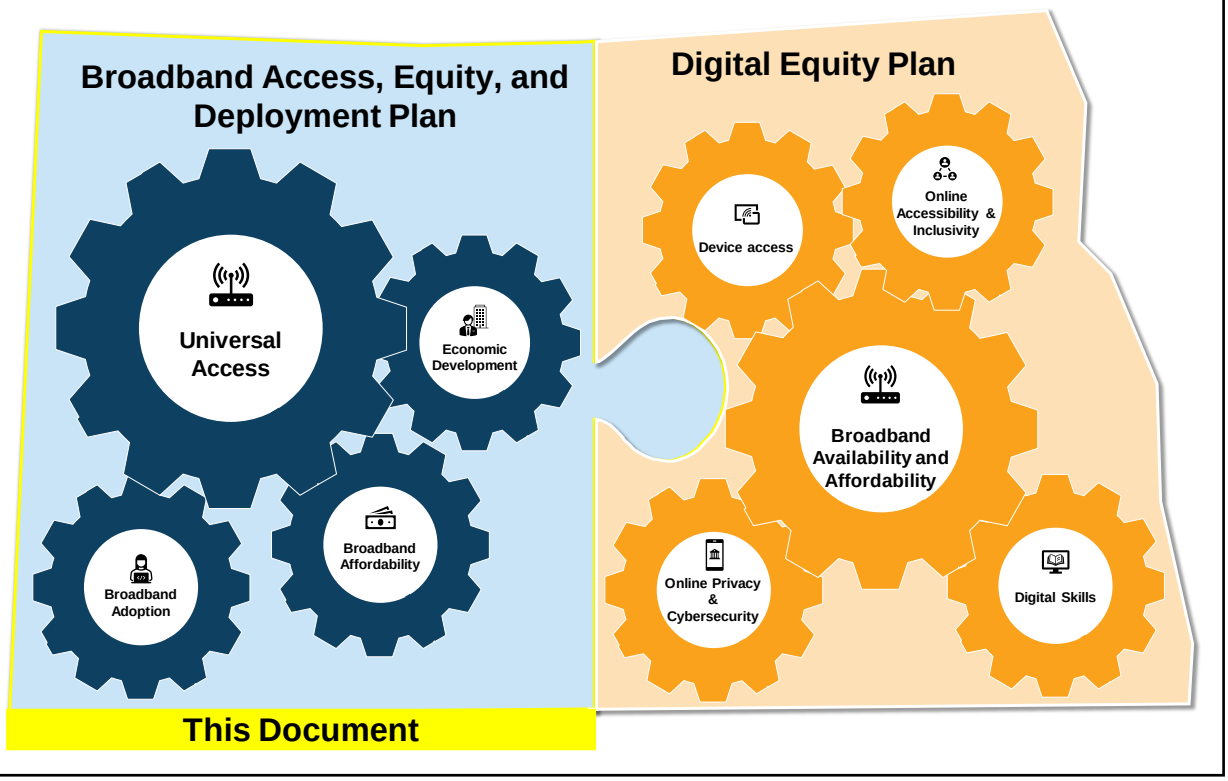
[14] *Covered populations include: 1. Individuals who live in covered households 2. Incarcerated individuals 3. Individuals with disabilities, 4. Individuals who are members of a racial or ethnic minority group, 5. Aging individuals, 6. Veterans, 7.* National Digital Inclusion Alliance (accessed on May 23, 2023), state Digital Equity Scorecard. Accessed at: https://state-scorecard.digitalinclusion.org/scorecard/by_state/ND.

the allocation of BEAD funds. The State's first-order priority will include broadband deployment projects, addressing unserved locations first followed by underserved locations. After serving all unserved and underserved locations, the State will promote 1 Gbps symmetrical speeds for identified Community Anchor Institutions (CAIs). Additional strategies will encompass efforts related to broadband affordability, economic growth, and broadband adoption, as detailed in **Figure 3**.

This Five-Year Action Plan outlines the roadmap to help connect the approximately 10,000[15] remaining locations and empower all of North Dakota with equitable, reliable, high-speed internet access. These efforts will also be complemented with the initiatives articulated within the State's Digital Equity (DE) Plan, which provides the framework to address the unique barriers that preclude underrepresented communities from participating in the digital economy. This alignment between the State's BEAD and DE Plans is depicted in **Figure 4** below.

North Dakota's Broadband Access, Equity, and Deployment Plan and **Digital Equity Plan** work in tandem to advance its goal of becoming the **first state to achieve 100% access**

Figure 4. Alignment Between North Dakota's BEAD and DE Plans



This important endeavor will not only allow North Dakotans to fully participate in today's digital economy, but also unlock the employment, health, social, and financial benefits of modern society. It is imperative that these opportunities be made available to all North Dakotans alike.

[15] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum*

Whether it is a student at North Dakota State University interviewing for a job in Bismarck over video chat, a business in Minot interacting with a supplier miles away in Fargo, or an entire classroom of students in Standing Rock connecting to an online learning resource – equitable access to broadband serves as the conduit for full participation in our digital society.

The State Broadband Program Office within NDIT will manage the funds made available through the IIJA to support the buildout of broadband infrastructure to the remaining unserved and underserved locations statewide. Through these efforts, the State Broadband Program Office will ensure all North Dakotans are aware of and connected to the opportunities of tomorrow.

A Call to Action

North Dakota's BEAD planning process is much like an orchestra: Diverse stakeholder groups each play a different role in cohesively advancing shared goals related to broadband deployment and digital equity. While the BEAD Program represents a transformational opportunity to close remaining connectivity gaps in North Dakota, an effort of this size and magnitude will necessitate close coordination among these stakeholder groups. Just as an orchestra requires cohesion among various instruments, the State's broadband deployment efforts will require harmonic coordination among various institutions: local, state, tribal, and municipal bodies, utilities, ISPs, workforce development organizations, among others. The State Broadband Program Office is excited to serve as the conductor for this important endeavor, bringing together diverse groups while simultaneously allowing for the congruence of broadband deployment efforts. This coordination will prove instrumental in North Dakota's pursuit to become the first state to achieve 100% coverage.

2 Overview of the Five-Year Action Plan

North Dakota's Vision for Broadband Equity, Access, and Deployment:

*Enable all North Dakotans with affordable, reliable, high-speed internet to **be connected** today with the opportunities of tomorrow.*

2.1 Vision

With the rapid digitalization of modern-day life, North Dakotans today are more reliant than ever on high-speed internet to access the opportunities of the 21st-century digital economy. The ability to rapidly connect with people and businesses creates new opportunities for those living in an expansive state. These opportunities range from connecting to medical experts in urban centers, to making critical purchases online, to limiting or eliminating the need to travel far distances to accomplish simple tasks. At its core, North Dakota's vision is to deploy the broadband infrastructure that will enable all individuals, businesses, and institutions to take advantage of these opportunities. North Dakota is determined to not only facilitate statewide access to high-speed internet, but also foster the skills necessary to take full advantage of it. With this comes the acknowledgment that access to broadband is more than a key service or utility – it is central to every-day life.

Vision

*Enable all North Dakotans with affordable, reliable, high-speed internet to **be connected** today with the opportunities of tomorrow.*

To achieve its vision for broadband, North Dakota must first ensure access to reliable, high-speed internet for all residences, businesses, and CAIs from the Red River Valley in the east to the Badlands in the west. Despite recent strides to promote broadband coverage across the state's 70,000 acres through a network of broadband carriers and ISPs, pockets of the state remain offline. As of June 2023, nearly 10,000[16] locations in the state do not have access to broadband speeds fast enough to be considered "served" by the National Telecommunications and Information Administration (NTIA).[17] To ensure ubiquitous coverage, North Dakota envisions a

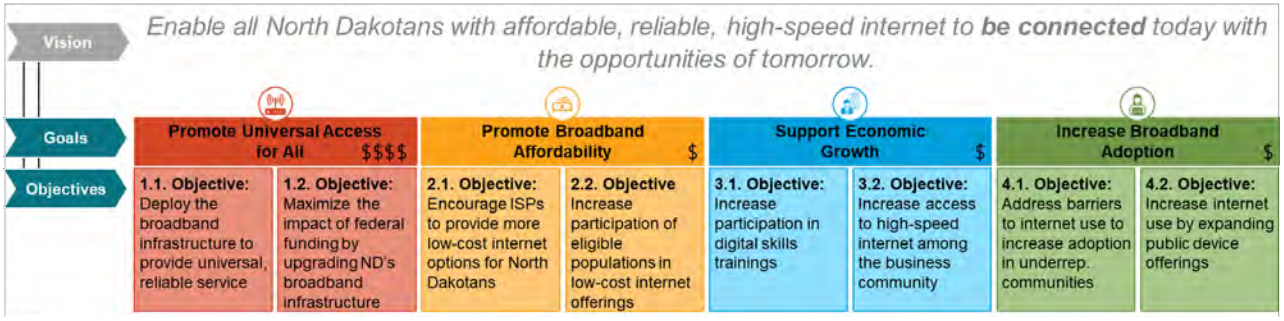
[16] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum*

[17] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022. *The NTIA considers a location "served" with broadband if speeds meet or exceed* 100 *Mbps downstream/20 Mbps upstream.*

future where all locations have access to broadband by 2028. The State is building a lasting broadband network today for the North Dakotans of tomorrow and for generations to come.

While access to affordable, reliable, and high-speed internet is the cornerstone of North Dakota's vision, there is also a need to empower North Dakotans with the skills required to unlock the full range of benefits created by a high-speed internet connection. These social, economic, employment, and health benefits should be made available to all North Dakotans alike, as the internet allows them to connect with friends and loved ones, businesses, jobs, and healthcare professionals. From students interviewing remotely to businesses interacting with distant suppliers – equitable access to broadband serves as the conduit for full participation in our digital society. For North Dakota, ensuring that broadband infrastructure is available to every address in the state is an integral component of achieving the State's purpose to *Empower People, Improve Lives, and Inspire Success*.[18]

2.2 Goals and Objectives



The following goals and objectives will guide the implementation of the BEAD Program. The goals will inform a multipronged strategy that not only extends service to the approximately 10,000[19] remaining unserved and underserved locations, but also empowers all North Dakotans to connect with the opportunities provided by high-speed internet. As such, these goals inform the strategies outlined in **Section 5.3**.

Goal 1 - Promote Universal Access for All: Deploy the broadband infrastructure to provide every business, resident, and institution with access to reliable, high-speed service by 2028.

Ensuring all individuals, businesses, and CAIs have access to reliable, high-speed internet is a critical step in North Dakota's Five-Year Action Plan. Nearly 10,000[20] locations remain unserved or underserved within the state. For North Dakota, it remains a priority to facilitate universal access to these locations. Additionally, the State aims to deploy technologies where possible to

[18] North Dakota Office of the Governor (accessed on May 26, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.

[19] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum*

[20] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum*

help ensure that end-to-end fiber projects are prioritized wherever feasible, in accordance with the BEAD Program's priorities.

Objectives and associated KPIs:

1. Deploy the broadband infrastructure to provide universal, reliable internet by serving 100% of locations at ≥100/20 Megabits per second (Mbps) and serving 100% of CAIs at ≥1 Gigabit per second (Gbps).

KPI	Percentage of locations with access to ≥100/20 Mbps download/upload speeds *(KPI also measured in the State Digital Equity Plan)*
Baseline	97.1%[21]
Short-term Target	99% within three years
Long-term Target	100% within five years[22]

KPI	Percentage of CAIs with access to 1 Gbps download/upload speeds
Baseline	72%[23]
Short-term Target	88% within three years
Long-term Target	100% within five years[24]

2. Maximize the impact of federal funding by upgrading North Dakota's broadband infrastructure.

KPI	Percentage of locations with access to fiber and/or cable
Baseline	95.3%[25, 26]
Short-term Target	98% within three years
Long-term Target	99% within five years

Goal 2 - Promote Broadband Affordability: Expand the availability of low-cost, high-speed internet options for cost-burdened users.

Increased internet access is less consequential if the cost to obtain the service is prohibitively expensive. Currently, the average low-cost service plan in North Dakota is close to 30% more expensive than the national average, while enrollment in discount programs lags the national

[21] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[22] *Note: 100% coverage only pertains to requested coverage as the state is limited by customer wants in some instances*
[23] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[24] *Note: 100% coverage only pertains to requested coverage as the state is limited by customer wants in some instances*
[25] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[26] *Note: Represents percentage of locations with access to fiber and/or cable based on FCC National Broadband Map*

average by 23%, according to Education SuperHighway.[27,28,29] Additionally, during the development of this Plan, several stakeholders noted that cost was a significant barrier to broadband adoption for covered populations such as low-income and aging populations. North Dakota is committed to expanding access to low-cost service offerings and increasing the participation of eligible households in discount programs.

Objectives and associated KPIs:

1. Encourage ISPs to provide more low-cost internet options for North Dakotans.

KPI	Percentage of locations with access to an ISP participating in discount service program (ACP) offering service ≥ 100/20 Mbps
Baseline	92.5%[30]
Short-term Target	97% within three years
Long-term Target	100% within five years

2. Increase participation of eligible populations in low-cost internet offerings.

KPI	Statewide participation in the Affordable Connectivity Program *(KPI also measured in the State Digital Equity Plan)*[31]
Baseline	11%[32]
Short-term Target	20% within three years
Long-term Target	35% within five years

Goal 3 - Support Economic Growth: Provide individuals and businesses with the resources needed to support employment growth and economic development.

For individuals to fully unlock the benefits of high-speed internet, they must be equipped with relevant digital skills. North Dakotans can access digital skills trainings that range from short videos on how to increase font size on devices to more complex trainings on computer programs. The State is committed to enabling and supporting all North Dakotans to gain digital skills and help them engage with the opportunities of tomorrow. Additionally, North Dakota aims to support the business community by ensuring that all business locations have access to high-speed and reliable broadband infrastructure.

Objectives and associated KPIs:

[27] *Statistic was derived by researching ISP websites and compiling data on the cost of the lowest tier internet plan offered.*
[28] USTelecom (published on June 29, 2022), 2022 Broadband Pricing Index. Accessed at: https://ustelecom.org/research/2022-bpi/.
[29] Education SuperHighway (accessed on May 9, 2023), Affordable Connectivity Program Enrollment Dashboard. Accessed at: https://www.educationsuperhighway.org/no-home-left-offline/acp-data/.
[30] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[31] *This KPI is contingent upon the continuation of the Affordable Connectivity Program. Should the program be discontinued, the KPI will be replaced.*
[32] Education SuperHighway (accessed on May 9, 2023), Affordable Connectivity Program Enrollment Dashboard. Accessed at: https://www.educationsuperhighway.org/no-home-left-offline/acp-data/.

1. Increase participation in digital skills trainings.

KPI	Number of digital skills and awareness programs specifically supporting each covered population in the state *(KPI also measured in the State Digital Equity Plan)*
Baseline	Identified digital skills and awareness programs for each covered population[33]: - Low-income individuals – 0 programs - Aging – 6 programs - Incarcerated – 1 program - Individuals with a disability – 5 programs - Veterans – 0 programs - Individuals with a language barrier or low literacy – 1 program - Racial or ethnic minorities – 1 program - Rural – 4 programs
Short-term Target	Provide at least one digital skills and awareness program to each covered population in the state within three years
Long-term Target	Provide a proportionate number of digital skills and awareness programs to each covered population in the state based on each population's size within five years

2. Increase access to high-speed internet among the business community.

KPI	Percentage of business locations with access to fiber and/or cable
Baseline	93.5%[34]
Short-term Target	97% within three years
Long-term Target	99% within five years

Goal 4 - Increase Broadband Adoption: Equip all North Dakotans with the necessary skills, resources, and training to adopt and utilize the internet.

Lastly, the State is committed to increasing overall broadband adoption across North Dakota. Although 97% of locations in the state have access to high-speed service, 84% of households have an internet subscription. This suggests that barriers beyond lack of access may prevent North Dakotans from utilizing the internet. A few of these challenges include a lack of affordability, limited awareness, and limited access to devices. [35, 36] Increased access to high-speed internet and more affordable options will likely raise this adoption rate. However, the State also recognizes the importance of a more targeted approach to communicate the advantages of using the internet amongst underrepresented communities.

[33] *Digital skills and awareness programs captured in the totals include only those that explicitly serve the covered population in question. They do not include those programs that generally serve the population as a whole.*
[34] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[35] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[36] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

Objectives and associated KPIs:

1. Address barriers to internet use to increase broadband adoption in underrepresented communities.[37]

KPI	Percentage of households with a broadband subscription *(KPI also measured in the State Digital Equity Plan)*
Baseline	84%[38]
Short-term Target	87% within three years
Long-term Target	90% within five years

2. Increase internet use by expanding public device offerings.

KPI	Percentage of state libraries with public device offerings
Baseline	47%[39]
Short-term Target	61% within three years
Long-term Target	70% within five years

[37] *The short-term target is based on the national broadband subscription rate identified using ACS data. The long-term target is based on the average of the top 10 states with the highest broadband subscription rates.*
[38] United States Census American Community Survey (published in 2021), Types of Computers and Internet Subscriptions 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=internet+subscription+band+computer+ownership&tid=ACSST5Y2021.S2801.
[39] *List of Public Libraries in ND offering Public Devices was created through compiling an inventory of all State Public Offerings and detailing the ones advertising public device offerings on their websites. A full list of Libraries and their offerings can be found in Section 3.2.5 of the state's Digital Equity Plan.*

3 Current State of Broadband and Digital Inclusion

To establish the current state of broadband and digital inclusion in North Dakota, the State has created an inventory of its programs, partnerships, physical assets, and intangible assets related to broadband deployment, adoption, affordability, and access.

Access to broadband remains a foundational building block for the state's broader economic, workforce, infrastructural, and social goals. For businesses and organizations, broadband is crucial for staying on the leading edge of innovation. For individuals, broadband helps connect people to key opportunities across healthcare, education, employment, entertainment, and much more. North Dakota is dedicated to continuing to build upon its inventory of existing broadband and digital inclusion assets to ensure all businesses, organizations, communities, and individuals have the knowledge and resources to access and utilize the internet.

This chapter details the following elements of the current state of broadband and digital inclusion:

- **3.1 Existing Programs** – Provides an overview of the current activities, employees, contractors, and funding supporting the State Broadband Program Office in North Dakota.
- **3.2 Partnerships** – Outlines new or existing partnerships North Dakota will leverage to expand broadband access in the state.
- **3.3 Asset Inventory** – Offers an overview of existing programs, partnerships, and assets related to broadband deployment, adoption, access, affordability, and digital inclusion.
- **3.4 Needs and Gaps Assessment** – Presents the gaps and needs related to the current state of broadband and digital inclusion.

This assessment of broadband and digital inclusion in North Dakota captures a point-in-time snapshot of needs and gaps. The State Broadband Program Office recognizes that broadband and digital skills sit at the center of a dynamic and constantly evolving landscape. Recently, questions have been raised about how advances in the field of artificial intelligence (AI) may affect and interact with broadband and digital inclusion efforts. The rapid rise of AI is creating an entirely new set of digital resources that may lead to a widening gap between those that have the internet connections, devices, and digital skills to capitalize on these advancements and those that do not. Therefore, AI can either serve as the limiting factor or catalyst to help close the digital divide. AI can help close the digital divide through innovative tools and resources that can connect North Dakotans with information and educational opportunities based on their specific needs. Personalized learning represents one of the most common applications of AI within education. Analyzing large volumes of data on AI-enabled tools allows institutions to deliver digital skills trainings that are tailored to the specific needs of each beneficiary. While proliferation of AI-enabled tools may contribute to the digital divide, AI also creates many new opportunities and the potential to address existing inequities. The State Broadband Program Office remains mindful of the impacts of AI while the landscape continues to evolve and grow.

3.1 Existing Programs

NDIT oversees the State Broadband Program Office, which focuses on broadband expansion activities across the state. **Table 1** lists the current broadband activities that are conducted through the State Broadband Program Office.

Recent efforts of the State Broadband Program Office – including those that were funded through CPF – have focused on improving the current understanding of broadband access and adoption

across the state. This has offered insight into the remaining pockets of unserved and underserved locations and highlighted gaps in both consumer and business service that prevent full participation in digital activities.

Table 1: Current Activities that the State Broadband Program Office Conducts

Activity Name	Description	Intended Outcome(s)
American Rescue Plan Act – Capital Projects Fund[40]	Deploy broadband to unserved and underserved locations across the state by awarding grants to internet service providers	Increase access to broadband across the state by deploying symmetrical 100 Mbps internet speeds
STAGEnet[41]	Bring 1 Gbps per second service to all anchor tenant institutions in the North Dakota: • All County Court Houses • All School Districts • All Higher Education Campuses • All State Government Buildings	Increase the availability of broadband across the state to promote employee productivity, supporting line of business applications and enabling citizens with digital capabilities
Broadband Survey[42]	Gather additional data on broadband connection and digital literacy using a state-wide elective survey with questions relating to connection speed, number of end users, etc.	Improve understanding of broadband access and needs of the population state-wide

The State Broadband Program Office has recently awarded broadband deployment grants through the State's CPF funds, which requires close coordination with ISPs. To build upon these efforts, the staff listed below in **Table 2** will support the planning and implementation of the BEAD Program and will identify any additional headcount required to further support broadband expansion in North Dakota.

[40] North Dakota Information Technology (accessed on May 15, 2023), American Rescue Plan Act. Accessed at: https://www.ndit.nd.gov/about-us/broadband/american-rescue-plan-act.
[41] North Dakota EduTech (accessed on May 15, 2023), STAGEnet. Accessed at: https://www.edutech.nd.gov/services/stagenet.
[42] North Dakota Information Technology (accessed on May 15, 2023), Broadband North Dakota. Accessed at: https://forms.office.com/Pages/ResponsePage.aspx?id=ZATqLVHaiEq64rPblLwMVOdgVu41-65KlwDILvQlzLtUOFJLSjIwTFYxVVFWT0dLSUxMMTROQ08xSyQlQCN0PWcu.

Table 2: Current and Planned Full-Time and Part-Time Employees

Current/ Planned	Full-Time/ Part-time	Position	Description of Role
Current	Full-Time	State Broadband Program Director	Oversees all activities associated with the planning and implementation of the BEAD Program. Manages other ongoing broadband expansion efforts, including stakeholder engagement and broadband coordination across the state.
Current	Full-time	Technical Program Manager Broadband Deployment	Offers day-to-day support and management of the State Broadband Program Office. This includes providing the technical expertise to establish a baseline understanding of broadband needs and help prioritize broadband expansion efforts.
Current	Part-time	Project Manager	Plans and manages the development and implementation of broadband programs, including coordination of staff and consultants in the design of programs.
Current	Part-time	Procurement Officer	Oversees the procurement process for all vendors related to the State Broadband Program Office.
Current	Part-time	Communications Coordinator	Leads internal and external communications.

The State Broadband Program Office contracted a consulting team, outlined in **Table 3,** to help document the current state of broadband, existing challenges, and potential opportunity areas informed by robust stakeholder and community engagement, desktop research, data analysis, and mapping. The consulting team is also supporting the development of an ongoing stakeholder engagement model that will ensure the Five-Year Action Plan is responsive to the needs and lived experiences of the communities across the state.

Table 3: Current and Planned Contractor Support

Current/ Planned	Time	Position	Description of Role
Current	Full-Time	Consulting Team	Supports stakeholder and community engagement efforts, provides industry knowledge, and offers a strategic perspective of existing and planned broadband efforts.

To date, organizations within North Dakota, the State Government, and Tribal Governments have received funding for broadband deployment, adoption, affordability, access, and digital inclusion purposes.

Most broadband-related grants awarded to entities in North Dakota have been focused on deployment projects. The State Broadband Program Office currently administers CPF – Broadband Infrastructure Projects funded by the American Rescue Plan Act for North Dakota. Using CPF funds, the State provides grants to ISPs to construct broadband infrastructure, delivering services that reliably meet or exceed symmetrical speeds of 100 Mbps. The remaining broadband deployment funds administered by federal agencies, such as the USDA ReConnect Grants, Connect America, Rural Digital Opportunity Fund and the Tribal Broadband Connectivity Program, flow directly to ISPs. The objective of these projects is to extend broadband access at varying service levels (at least above 25/3 Mbps) to households and CAIs, such as community health locations and educational facilities, across the state receiving no service or service at slower speeds.

Additionally, Tribal Entities and non-profit organizations have received funds for broadband adoption, affordability, access, and digital inclusion efforts. These grants include two ACP Outreach grants to help people across the state enroll in ACP discounts. In addition, the Connected Care Pilot funds help cover eligible costs to provide connected care services to the intended patient populations in North Dakota. Finally, E-Rate funds provide discounted internet to schools across the state.

The volume and breadth of funds in North Dakota that aim to increase broadband service necessitates meaningful coordination to maximize the impact of these funding opportunities. A key aspect of this coordination includes understanding the various speed requirements for ongoing projects, as these thresholds may not align with the speed requirements outlined for the BEAD Program.

Table 4: Broadband Funding

Source (Awardee)	Purpose	Total	Expended[43]	Available
Broadband Deployment Funding				
American Rescue Plan Act – Capital Projects Fund[44]	Fund critical broadband infrastructure projects that serve 3,965 people in unserved and underserved locations with symmetrical 100 Mbps speeds	$45,000,000	$45,000,000	-
Enabling Middle Mile Broadband Infrastructure Program (Dakota Carrier Network)	Add ~875 of middle mile fiber connecting Carrington to Bismarck, Jamestown, Devils Lake, and Fargo and connecting Alexander and Max. Also, upgrade electronics to support the increased network demand	$19,710,574	-	$19,710,574

[43] Data on expended amounts gathered from: USSpending.gov search platform (accessed on July 10, 2023) USspending.gov. Accessed at: https://www.usaspending.gov/search
[44] US Department of the Treasury (accessed on May 4, 2023), Capital Projects Fund Award Fact Sheet North Dakota. Accessed at: https://home.treasury.gov/system/files/136/state-Award-Fact-Sheet-ND-Aug-2022.pdf.

Tribal Broadband Connectivity Program (Standing Rock Telecommunications) [45]	Install fixed wireless to directly connect around 1,000 unserved households with 50 Mbps/10 Mbps fixed wireless service in Fort Yates	$8,637,952	-	$8,637,952
USDA ReConnect Grants 2019[46]	Connect 2,643 households to high-speed internet by deploying a fiber-to-the-premises network	$23,057,624	$23,057,624	-
USDA ReConnect Grants 2020[47]	Connect 1,230 household to high-speed internet by deploying a fiber-to-the-premises network including one project in in MT and ND	$15,665,334	$15,665,334	-
USDA ReConnect Grants 2022 [48]	Connect 6,973 household to high-speed internet by deploying a fiber-to-the-premises network including one project in in MT and ND	$65,954,594	$3,892,893	$62,061,701
Connect America 2018[49]	Deliver service to 1,603 locations across ND with 100 Mbps download speeds	$ 7,226,602	$ 7,226,602	-
Rural Digital Opportunity Fund 2020[50]	Build network to provide service to 2,780 locations with at least 100/20 Mbps speed	$20,824,521	$ 2,138,978	$18,685,543
Broadband Adoption Funding				
Affordable Connectivity Program (ACP) Outreach Grant	Increase ACP enrollment in the state	$800,000	N/A	N/A

[45] NTIA (accessed on May 5, 2023), Tribal Broadband Connectivity Program Award Recipients. Accessed at: https://broadbandusa.ntia.doc.gov/tribal-broadband-connectivity-program-awardees#S.
[46] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2019 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-one-awardees.
[47] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2020 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-two-awardees.
[48] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2022 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-three-awardees.
[49] Federal Communications Commission (published on August 28, 2018), FCC Connect America Fund Phase II Auction. Accessed at: https://docs.fcc.gov/public/attachments/DA-18-887A2.pdf.
[50] Federal Communications Commission (published on December 7, 2020), FCC Rural Digital Opportunity Fund Phase I Auction. Accessed at: https://docs.fcc.gov/public/attachments/DA-20-1422A2.pdf.

(Community Action Partnership of North Dakota & UND)[51]				
Broadband Affordability Funding				
E-Rate[52]	Provide discounts to 37 schools and school districts in the state to provide internet access, telecommunications services, and related equipment	$1,199,358	N/A	N/A
Broadband Access Funding				
Tribal Broadband Connectivity Program (Sisseton Wahpeton Oyate of the Lake Traverse Reservation)[53]	Provide broadband equipment, including computers, for distance learning for 750 students, purchase equipment for households and CAIs on Tribal Lands, and subsidize broadband service for approximately 700 Tribal members	$1,847,628	-	$1,847,628
Connected Care Pilot Program (Catholic Health Initiatives)[54]	Cover eligible costs of broadband connectivity, network equipment, and information services necessary to provide connected care services to the intended patient population in ND as well as AR, IA, KY, MN, and NE	$6,183,189	N/A	N/A
Emergency Connectivity Fund Program[55]	Offers assistance to schools and libraries to provide the tools and services their communities need for remote learning during	$4,265,249	N/A	N/A

[51] Federal Communications Commission (accessed on May 11, 2023), Consumer and Governmental Affairs Bureau Announces ACP Outreach Grant Program Target Funding. Accessed at: https://docs.fcc.gov/public/attachments/DA-23-194A1.pdf.
[52] Universal Service Administrative Co. (accessed on July 18, 2023), 2023 Commitments. Accessed at: https://opendata.usac.org/stories/s/jj4v-cm5x.
[53] NTIA (accessed on May 5, 2023), Tribal Broadband Connectivity Program Award Recipients. Accessed at: https://broadbandusa.ntia.doc.gov/tribal-broadband-connectivity-program-awardees#S.
[54] Federal Communications Commission (accessed on May 11, 2023), Connected Care Pilot Program Selection List. Accessed at: https://www.fcc.gov/sites/default/files/ccpp-selection-list_03.16.2022.pdf.
[55] Federal Communications Commission (accessed on July 13, 2023), Emergency Connectivity Fund. Accessed at: https://www.fcc.gov/emergency-connectivity-fund

	the COVID-19 emergency period			
Digital Equity Funding				
National Tribal Broadband Grant 2020 (Spirit Lake Nation (Tribal Entity))[56]	Study the feasibility of developing or extending broadband service in Tribal Lands	$50,000	$50,000	-
Tribally Controlled Postsecondary Career and Technical Institutions Program (United Tribes Technical College)[57]	Offer Career and Technical Education (CTE) training for 900 Native American and Alaska Native students in Welding and Heavy Equipment Operations as well as other programs	$7,100,000	-	$7,100,000

3.2 Partnerships

In North Dakota, several public and private organizations participate in formal and informal partnerships to help facilitate broadband deployment and adoption across the state. These stakeholders include State departments, advocacy groups, educational institutions, and ISPs. Key partners within internal State government departments include the North Dakota Department of Transportation (NDDOT), which supports the expansion of broadband assets across the state through coordination of capital projects, and the North Dakota Department of Public Utilities Commission, which regulates the utilities companies providing service in the state.

Additionally, the State maintains relationships with private partners such as DCN, the Broadband Association of North Dakota (BAND), and the Valley Prosperity Partnership. DCN, and its 13 owner companies, represent a valuable partner to the State and have helped North Dakota deploy fiber to 175 CAIs as a part of the STAGEnet network, including public safety entities, schools, and government agencies.[58, 59] Additionally, BAND, of which DCN and its owner companies are members, represents a majority of North Dakota's telephone industry and is a key partner for broadband expansion efforts in the state. Other service providers, such as Midco and Cable One in North Dakota also contribute to the state's strong coverage. These partnerships will serve as a valuable resource as the State prepares to execute upon this Five-Year Action Plan.

[56] US Department of Indian Affairs (published on August 13, 2020), Trump Administration Invests $1.2 Million in Tribal Broadband Grants. Accessed at: https://www.bia.gov/as-ia/opa/online-press-release/trump-administration-invests-12-million-tribal-broadband-grants.
[57] Department of Education (accessed on May 15, 2023), Perkins Collaborative Resource Network. Accessed at: https://cte.ed.gov/grants/tribally-controlled-postsecondary-career-and-technical-institutions-program.
[58] Dakota Carrier Network (published on March 22, 2018), DCN to upgrade North Dakota state Internet Network to 100Gigabit. Accessed at: https://dakotacarrier.com/2018/03/dcn-to-upgrade-north-dakota-state-internet-network-to-100-gigabit-2/.
[59] National Communications and Information Administration (accessed on May 16, 2023), DCN's CCI Broadband Project. Accessed at: https://www2.ntia.doc.gov/grantee/dakota-carrier-network-llc.

Table 5: Partners

Partners	Description of Current or Planned Role in Broadband Deployment and Adoption
Dakota Carrier Network (DCN)	NDIT has partnered with DCN since 2000 to execute on the goals outlined in the STAGEnet initiative. In the past decade, DCN and its owner companies have invested more than $1.4 billion in fiber infrastructure.[60]
Broadband Association of North Dakota (BAND)	BAND is a trade organization representing both cooperative and commercial telephone companies, including the 15 owner companies in DCN, serving rural North Dakota.[61]
North Dakota Department of Transportation (NDDOT)	NDDOT supports the expansion of broadband infrastructure in North Dakota by effectively facilitating multiple broadband utility entities within state right-of-way while reducing repeated excavations.[62]
North Dakota Public Utilities Division	The Public Utilities Division implements the Commission's statutory responsibilities concerning the regulation of telecommunications service in North Dakota. This authority is evolving while the industry transitions to a competitive market structure.[63]
Technology Council of North Dakota (TechND)	TechND represents tech-related software developers, telecommunications companies, internet providers and content developers, systems integrators, educational institutions, State agencies and manufacturers across North Dakota.[64]
Valley Prosperity Partnership	The Valley Prosperity Partnership identifies and advocates for the continued investment in critical infrastructure development including broadband communication improvements for both North Dakota and Minnesota stakeholders.[65]

3.3 Asset Inventory

Hard and soft assets facilitate the provision of broadband coverage to individuals and businesses. This section provides an inventory of the assets related to:

- **3.3.1 Broadband Deployment** – Assets that are or can be utilized to deliver high-speed internet
- **3.3.2 Broadband Adoption** – Assets and/or programs that increase to use of high-speed internet
- **3.3.3 Broadband Affordability** – Assets and/or programs that increase the affordability of high-speed internet

[60] Dakota Carrier Network (accessed on May 16, 2023), Government Technology Solution. Accessed at: https://dakotacarrier.com/services/government/.
[61] Broadband Association of North Dakota (accessed June 5, 2023), Supporting Membership. Accessed at: https://www.broadbandnd.com/our-members/supporting-membership/.
[62] North Dakota Department of Transportation (accessed on May 16, 2023), Broadband Utility Coordination. Accessed at: https://www.dot.nd.gov/broadband.htm.
[63] Public Service Commission (accessed on May 16, 2023), Jurisdiction: Telecommunications. Accessed at: https://psc.nd.gov/jurisdiction/telephone/index.php.
[64] Technology Council of North Dakota (accessed on May 16, 2023), About us. Accessed at: https://technd.org/.
[65] Valley Prosperity Partnership (accessed on May 16, 2023), Our Priorities. Accessed at: https://www.valleyprosperitypartnership.com/priorities.

- **3.3.4 Broadband Access** – Assets and/or programs that facilitate greater access to broadband
- **3.3.5 Digital Equity** – Assets and/or programs that promote equitable digital participation

3.3.1 Broadband Deployment

Broadband deployment assets refer to the infrastructure across the state that currently is or can be utilized to deliver high-speed internet to locations. This section details the existing assets, programs, agreements, and available workforce that can facilitate broadband deployment in the state.

To maximize existing digging and excavation efforts, North Dakota coordinates internally with various State departments, particularly as it relates to ongoing capital projects, as detailed in **Table 6**. The Department of Water Resources (DWR) and NDDOT both maintain lists of the various capital projects underway. DWR serves as a cost-sharing partner for large-scale water projects and NDDOT manages the State highway rights-of-way. Importantly, NDDOT coordinates broadband installations with highway construction to reduce public impacts; although the State does not have an official 'Dig Once'.[66]

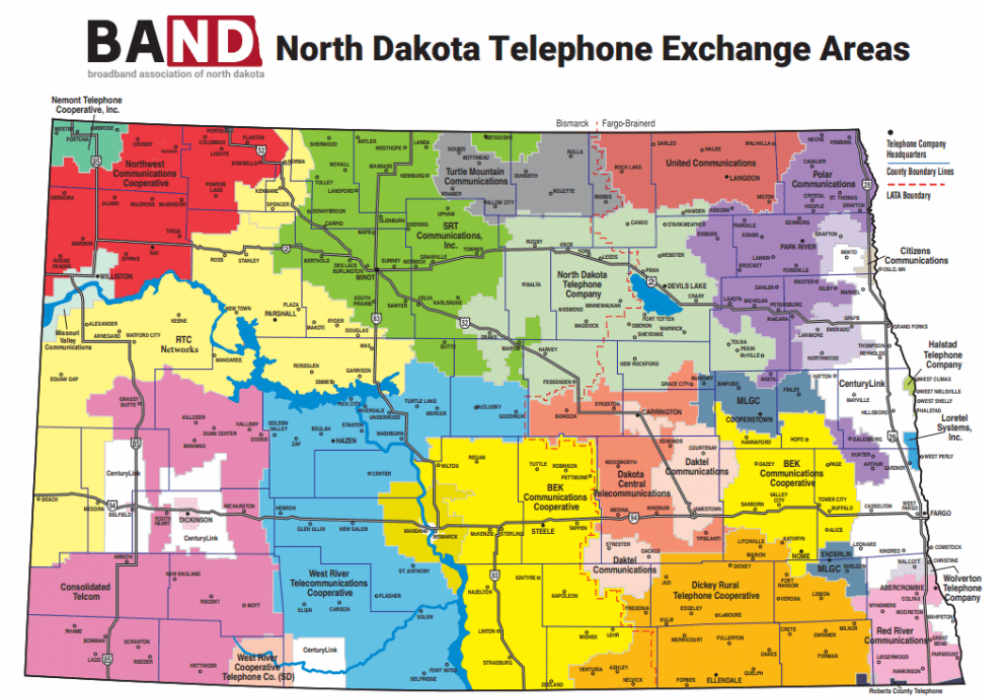
Table 6: Broadband Deployment Opportunities

Asset Type	Asset Description
Current Capital Projects	The ND Department of Water Resources serves as a cost-share partner for multiple large-scale water projects that are ongoing throughout the state that may provide an opportunity to deploy broadband assets (e.g., fiber).[67]
Public Rights of Way	The Department of Transportation (NDDOT) manages the State highway rights-of-ways. The NDDOT has adopted a Policy for Accommodation of Utilities on State Highway Right-of-Way, which created guidelines outlining safe and rational practices for accommodating utilities on public right-of-way.[68]
Current and Future Capital Projects	The NDDOT publishes statewide information detailing where current and future construction projects are located throughout the state.[69]

Across the state, private ISPs own and maintain the middle-mile fiber network. BAND and their 14 association member providers maintain over 65,000 miles of fiber. **Figure 5** shows the BAND member service areas.

[66] North Dakota Department of Transportation (accessed on May 15, 2023), NDDOT Utility Occupancy Application and Permit Information. Accessed at: https://www.dot.nd.gov/divisions/design/utilitypermits.htm.
[67] North Dakota Department of Water Resources (accessed on May 15, 2023), Other Water Development Projects. Accessed at: https://www.swc.nd.gov/project_development/other_projects.html.
[68] North Dakota Department of Transportation (accessed on May 15, 2023), NDDOT Utility Occupancy Application and Permit Information. Accessed at: https://www.dot.nd.gov/divisions/design/utilitypermits.htm.
[69] North Dakota Department of Transportation (accessed on May 15, 2023), statewide Construction and Project Information. Accessed at: https://www.dot.nd.gov/projects/.

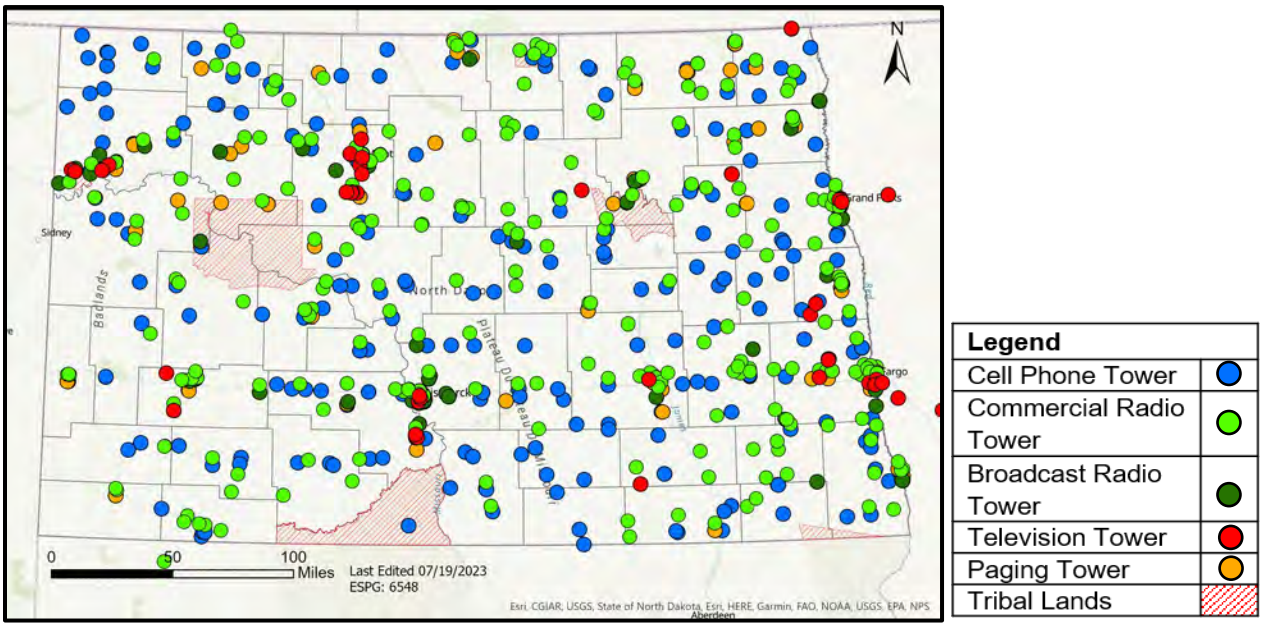
Figure 5. BAND Member Service Areas[70]



Vertical assets can help reduce broadband deployment costs, as the existing assets can be used to establish fixed wireless broadband infrastructure. While many vertical assets are dispersed across North Dakota, there is a lower density in the southern part of the state on Tribal Lands and in the western Badlands where there is a high concentration of unserved and underserved locations. This will make it challenging to utilize existing vertical assets to deploy low-cost broadband in these unserved and underserved areas.

[70] Broadband Association of North Dakota (accessed July 10, 2023) North Dakota Telephone Exchange Areas. Accessed at: https://www.broadbandnd.com/our-members/

Figure 6: Tower Locations[71]



The availability of a highly skilled and trained workforce is critical for broadband deployment. North Dakota's telecommunications workforce is detailed in **Table 7** below. Projected workforce deficits across key BEAD occupations are detailed in **Section 3.4.1**.

Table 7: Available Workforce for Broadband Deployment as of 2022[72]

Asset Type (*SOC codes*)	**Asset Description**
Computer Network Support Specialists *(151231)*	800 employees
Electronics Engineers, Except Computer *(172072)*	80 employees
Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel *(413091)*	1360 employees
Customer Service Representatives *(434051)*	5850 employees
Operating Engineers and Other Construction Equipment Operators *(472073)*	3,920 employees
Telecommunications Equipment Installers and Repairers, Except Line Installers *(492022)*	680 employees
Telecommunications Line Installers and Repairers *(499052)*	200 employees

3.3.2 Broadband Adoption

In the IIJA, Congress defined the "adoption of broadband" as the process by which an individual obtains daily access to the internet, provided that:

[71] North Dakota Information Technology (accessed June 5, 2023) Geographical Information Systems. Accessed at: https://gishubdata-ndgov.hub.arcgis.com/search?groupIds=dc8baa8e62b04a6ab1346eff55340ddc.
[72] Occupational Employment and Wage Statistics (OES) (published in May 2022), Labor Market Information Center, Job Service North Dakota. Accessed at: https://data.bls.gov/oes/#/home.

(1) The internet is accessible at a speed, quality, and capacity necessary for the individual to accomplish common tasks and qualifies as an advanced telecommunications capability;[73]

(2) The individual has the digital skills that are necessary for participation online; and

(3) The individual accesses the internet on a personal device and secure and convenient network.[74]

In North Dakota, 97% of all Broadband Serviceable Locations (BSLs)[75] have access to internet at speeds of at least 100/20 Mbps, based on data from the Federal Communications Commission.[76] This high level of broadband access, even in remote regions of the state, provides an imminent opportunity for promoting widespread broadband adoption.

According to data from the 2021 American Community Survey (ACS), 84% of households in North Dakota have a broadband subscription and 92% of households own a computer.[77] A closer look at the data reveals that broadband subscription rates vary by county and certain counties, especially ones with a large proportion of the population residing on Tribal Lands such as Benson, Sioux, and Sheridan, have broadband subscription rates of less than 72%. These counties rank 53rd, 51st, and 50th in the state for broadband adoption, respectively (see **Table 17** for a breakdown of broadband adoption rates by county).

Multiple organizations operating in North Dakota offer programs and services that aim to equip North Dakotans with essential digital skills and to promote broadband adoption. These programs and services, which are detailed in **Table 8** below, support the State's commitment to prepare individuals for success in today's digital world.

A closer examination of these programs and services reveals that most are focused on developing the digital skills necessary for the workforce. For those preparing to enter the workforce, North Dakota is equipping high school and college students through required computer science coursework. For adults, North Dakota is offering digital skills training at Adult Learning Centers or TrainND workforce training locations, as well as online through the North Dakota Citizens Skills for All program. Similar offerings also exist for members of the incarcerated population, including the Last Mile Program.

Further, the state's digital skills programs and services target basic digital skills beyond those needed to participate in the workforce. Some of the assets listed above, such as the coursework required at the high school and college levels, serve this purpose. Additionally, many assets are available through ND Assistive to assist individuals with disabilities and aging individuals in using assistive technology for computer and internet access.

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[73] *"Advanced telecommunications capability" is high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology, without regard to any transmission media or technology (47 U.S.C. §1302*).
[74] 47 U.S.C. §1721(1).
[75] *The FCC defines broadband serviceable locations as a business or residential location in the United States at which fixed broadband Internet access service is, or can be, installed.*
[76] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: https://broadbandmap.fcc.gov/data-download/nationwide-data?version=jun2022.
[77] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

Table 8: Digital Skills and Awareness Programs

Name	Organization	Description
Online inventory of free digital skills training	North Dakota Workforce Connection	This inventory includes links to multiple online learning resources that provide free digital skills training.[78]
Assistive technology training for individuals	ND Assistive (a non-profit organization that provides assistive technology devices for North Dakotans who need them)	This training focuses on instruction on how to use a specific assistive technology device; it includes training regarding utilizing assistive technology devices to use computers.[79]
In-person demonstrations of assistive technology	ND Assistive	This includes demonstrations of assistive technology equipment that can assist with computer access.[80]
Webinar on "smart home" technology[81]	ND Assistive	These webinars are part of a series of webinars[82] offered by ND Assistive that cover some of the most needed assistive technology devices based on requests at ND Assistive's demonstration centers.[83]
"How-to" video for using a large-print keyboard[84]	ND Assistive	This video is part of a series of "how-to" videos[85] that encompass the set-up, use, and troubleshooting of many common assistive technology devices.[86]
Microsoft Word Accessibility training	ND Assistive	This training consists of seven free modules that are interactive and self-paced; the module topics include "Intro to Accessible Documents," "Working with Styles," "Working with Colors," "Formatting with Columns, Hyperlinks, & Objects," "Working with Tables,"

[78] North Dakota Workforce Connection (accessed on May 4, 2023), Online Learning Resources. Accessed at: https://www.ndworkforceconnection.com/vosnet/Default.aspx, then click on "Services – For Individuals," then click on "More Education Services," then click on "Online Learning Resources."
[79] ND Assistive (accessed on May 10, 2023), Training. Accessed at: https://ndassistive.org/services-for-professionals/training/.
[80] ND Assistive (accessed on May 10, 2023), Equipment Demonstration. Accessed at: https://ndassistive.org/equipment-demonstration/.
[81] ND Assistive (accessed on May 30, 2023), North Dakota Assistive Webinar: Smart Home Basics. Accessed at: https://www.youtube.com/watch?v=y7na_2jkb7A&list=PLFdTAMKp6QmSdYdSF9nIxjumxp7fiF8Et&index=1.
[82] ND Assistive (accessed on May 30, 2023), North Dakota Assistive Webinars. Accessed at: https://www.youtube.com/playlist?list=PLFdTAMKp6QmSdYdSF9nIxjumxp7fiF8Et.
[83] ND Assistive (accessed on May 30, 2023), Assistive Technology Training Opportunities from ND Assistive. Accessed at: https://ndassistive.org/blog/assistive-technology-training-opportunities-from-nd-assistive/.
[84] ND Assistive (accessed on May 30, 2023), Assistive Technology Device Large Print Keyboard. Available at: https://www.youtube.com/watch?v=d8V-unSIbEo&list=PLFdTAMKp6QmTSztna5DwResvt9DFvhZbM&index=2.
[85] ND Assistive (accessed on May 30, 2023), Assistive Technology Instructional Videos. Available at: https://www.youtube.com/playlist?list=PLFdTAMKp6QmTSztna5DwResvt9DFvhZbM.
[86] ND Assistive (accessed on May 30, 2023), Assistive Technology Training Opportunities from ND Assistive. Accessed at: https://ndassistive.org/blog/assistive-technology-training-opportunities-from-nd-assistive/.

		"Documents Basics & Accessibility Tracker," and "Converting Word Documents to PDF."[87]
Cybersecurity and computer science curriculum requirements	North Dakota public schools	These requirements were enacted in House Bill 1398, which was signed into law on March 24th, 2023;[88] cybersecurity and computer science plans that schools can use to help create their courses will be developed by North Dakota Information Technology's (NDIT's) EduTech division.[89]
Policy to mandate coursework in digital literacy	North Dakota Board of Higher Education	This policy was adopted in April 2023; it applies to all North Dakota University System graduates.[90]
Cybersecurity educational training	Broadband Association of North Dakota (BAND)	This training is available for customers of BAND members; it promotes safe/smart broadband usage.[91]
Digital literacy skills services	North Dakota's Adult Learning Centers	These services are offered at each of the Adult Learning Centers throughout the state (the North Dakota Department of Public Instruction funds 9 Regional Adult Learning Centers and 3 affiliated Satellite Programs using federal funds received under the Workforce Innovation and Opportunities Act (WIOA)).[92]
Computer skills courses	TrainND Northwest, a division of Williston State College	These courses are offered as part of TrainND Northwest's workforce training.[93]
Computer skills courses	TrainND Northeast, a division of Lake Region State College	These courses include basic computer skills and computer application training courses; they are offered as part of TrainND Northeast's workforce training.[94]
Digital skills courses	TrainND Southwest, a division of	These courses are offered as part of TrainND Southwest's workforce training.[95]

[87] ND Assistive (accessed on May 10, 2023), Web & Document Accessibility Training. Accessed at: https://ndassistive.org/services-for-professionals/web-and-document-accessibility-training/.
[88] North Dakota Legislative Assembly (enrolled on March 20, 2023), House Bill No. 1398 (As Enrolled). Accessed at: https://www.ndlegis.gov/assembly/68-2023/regular/documents/23-0970-03000.pdf.
[89] North Dakota Department of Public Instruction (published on March 24, 2023), Burgum, Baesler applaud landmark North Dakota computer science, cybersecurity measure. Accessed at: https://www.nd.gov/dpi/news/burgum-baesler-applaud-landmark-north-dakota-computer-science-cybersecurity-measure.
[90] Grand Forks Herald (published on April 27, 2023), North Dakota Legislature passes 'record' funds for higher-ed system. Accessed at: https://www.grandforksherald.com/news/north-dakota/north-dakota-legislature-passes-record-funds-for-higher-ed-system.
[91] Broadband Association of North Dakota. Interview. May 9, 2023.
[92] North Dakota Department of Public Instruction (accessed on May 5, 2023), Adult Learning Centers (ALC). Accessed at: https://www.nd.gov/dpi/education-programs/adult-education-ged/adult-learning-centers-alc.
[93] TrainND Northwest – Williston State College (accessed on May 9, 2023), TrainND Northwest. Accessed at: https://willistonstate.augusoft.net/.
[94] TrainND Northeast – Lake Region State College (accessed on May 9, 2023), TrainND Northeast. Accessed at: https://www.lrsc.edu/discover-lrsc/business-community/trainnd-northeast.
[95] Bismarck State College (accessed on May 9, 2023), TrainND & Workforce Training. Accessed at: https://bismarckstate.edu/continuingeducation/business/.

	Bismarck State College	
Computer technology courses	TrainND Southeast, a division of the North Dakota State College of Science	These courses address basic skills related to common computer applications; they are offered as part of the TrainND Southeast's workforce training.[96]
The Last Mile Program	North Dakota State Penitentiary in partnership with Job Service North Dakota (JSND) and the North Dakota Department of Commerce	This is a national program that is designed to give felons employable skills as coders; it was launched at the North Dakota State Penitentiary during the 2019-2021 biennium.[97]
Cybersecurity courses	North Dakota Citizens Skills for All Initiative from Cisco Networking Academy	These courses are free, quality, self-paced online learning aligned to industry jobs; the courses include "Introduction to Cybersecurity," "Computer Hardware Basics," and "Operating System Basics."[98]
Web development continuing education courses	Universal Class (offered through the North Dakota State Library)	These courses are part of the over 500 courses in 30 areas of study offered online by Universal Class.[99]
Tutorials for accessing online library resources	North Dakota State Library	The tutorials are available on the State Library's YouTube channel.[100]
Cybersecurity Academy	Palo Alto Networks Education Services	This program offers free cybersecurity education courseware to qualified high schools and institutions of higher education;[101] 10 locations in North Dakota participate in this program.[102]
Digital Navigator program	Sitting Bull College	This program is offered to students pursuing a GED; it issues loaner devices, helps set up

[96] North Dakota State College of Science (accessed on May 9, 2023), TrainND. Accessed at: https://www.ndscs.edu/workforce-affairs/trainnd.
[97] North Dakota Department of Corrections and Rehabilitation (accessed on May 9, 2023), 2019-2021 Biennial Report. Accessed at: https://www.docr.nd.gov/sites/www/files/documents/Biennial%20Report%20Archive/2019-2021%20Biennium%20Report.pdf.
[98] North Dakota EduTech (accessed on May 17, 2023), North Dakota Citizens Skills for All. Accessed at: https://www.edutech.nd.gov/northdakotacitizensskillsforall.
[99] North Dakota State Library (accessed on May 17, 2023), Online Library Resource Guide – Universal Class. Accessed at: http://library.nd.gov/publications/universalclassguide.pdf.
[100] North Dakota State Library (accessed on May 17, 2023), Online Library Resource Guide – Universal Class. Accessed at: https://www.youtube.com/NDStateLibrary.
[101] Palo Alto Networks (accessed on June 15, 2023), Education Services. Accessed at: https://www.paloaltonetworks.com/services/education#:~:text=Palo%20Alto%20Networks%20Education%20Services%20offers%20free%20e-learning%20courses,learn%20at%20your%20.
[102] Palo Alto Networks (accessed on June 15, 2023), Cybersecurity Academy – Americas Region. Accessed at: https://www.paloaltonetworks.com/content/dam/pan/en_US/assets/pdf/education/americas-academy-list-june-2022.pdf.

		emails, and familiarizes students with software and online programs.[103]
Training on using internet and devices	Senior Planet/AARP	AARP is affiliated with Senior Planet;[104] this program licenses individuals to train on programming for how to use the internet and devices[105]

In many instances, the cost of broadband, devices, or both represent a significant hurdle to broadband adoption. North Dakota has multiple financial assistance programs that address this issue, as outlined in **Table 10** in **Section 3.3.3** below. These programs provide targeted financial assistance to multiple covered populations, including individuals who live in low-income households (those with incomes that are at or below 150% of the Federal Poverty Level), individuals living on Tribal Lands, individuals with disabilities, and aging individuals.

Another means of promoting broadband adoption is through public resources that provide access to the internet and devices. These assets help those experiencing financial and other hurdles related to obtaining digital devices and signing up for internet services take advantage of these offerings through public mechanisms.

Throughout the state, public libraries, institutions of higher education, K-12 public schools, and ND Assistive (a non-profit organization that offers assistive technology devices for North Dakotans who need them) all provide public access to broadband, devices, or both. These assets, listed in **Table 9**, promote broadband adoption for the public at large. They primarily target those individuals who cannot otherwise afford broadband or devices, individuals with disabilities, and aging individuals.

Table 9: Assets providing Public Access to Broadband and Devices

Name	Organization	Description
Public computer and wi-fi access	Adams County Public Library	The library has computers available for use and wi-fi access.[106]
Public computer and wi-fi access	Beulah Public Library	The library has computers available for use and wi-fi access.[107]
Public computer and wi-fi access	Bismarck Veterans Memorial Public Library	The library has computers available for use and wi-fi access.[108]
Public computer and wi-fi access	Bottineau County Public Library	The library has computers available for use and wi-fi access.[109]

[103] DigitalUS (accessed on May 5, 2023), Program Profiles – Sitting Bull College. Accessed at: https://digitalus.org/digital-navigator-playbook/program-profiles/.
[104] Senior Planet from AARP (accessed on July 28, 2023), Senior Planet. Accessed at: https://seniorplanet.org/.
[105] Stakeholder Interview. May 18, 2023.
[106] Adams County Library (accessed on June 15, 2023), Adams County Library. Accessed at: https://adamscountyndlibrary.com/.
[107] Beulah Public Library (accessed on June 15, 2023), Beulah Public Library. Accessed at: https://beulahndlibrary.com/.
[108] Bismarck Veterans Memorial Public Library (accessed on June 15, 2023), Information Services. Accessed at: https://bismarcklibrary.org/155/Information-Services.
[109] Bottineau County Public Library (accessed on June 15, 2023), Policies. Accessed at: https://bottineaucountyndlibrary.com/policies/.

Public computer and wi-fi access	Bowman Regional Public Library	The library has computers available for use and wi-fi access that is available 24/7.[110]
Public computer and wi-fi access	Cando Community Library	The library has 3 computer stations available for use and wi-fi access.[111]
Public computer access	Carnegie Regional Library	The library has computers available for use.[112]
Public computer access	Carrington City Library	The library has computers available for use.[113]
Public computer and wi-fi access	Casselton Public Library	The library has three computers available for use and wi-fi access.[114]
Public internet access	Cavalier County Library	The library has wi-fi access.[115]
Public computer access	Dickinson Area Public Library	The library has computers available for use for library card holders in good standing.[116]
Public computer access	Divide County Public Library	The library has computers available for use.[117]
Public computer and wi-fi access	Edgeley Public Library	The library has computers available for use and wi-fi access.[118]
Public computer access	Ellendale Public Library	The library has computers available for use.[119]
Public computer access	Enderlin Municipal Library	The library has 10 computers available for use.[120]
Public computer and wi-fi access	Fargo Public Library (Main Library)	The library has 40 computers available for use (31 for adults and 9 for children) and wi-fi access.[121]

[110] Bowman Regional Public Library (accessed on June 15, 2023), Library Services. Accessed at: https://www.bowmanlibrary.com/about/library-services/.
[111] Cando Community Library (accessed on June 15, 2023), Library Policies. Accessed at: https://www.candocommunitylibrary.com/library-policies.
[112] Carnegie Regional Library (accessed on June 15, 2023), Services. Accessed at: https://graftonndlibrary.com/services/.
[113] Carrington City Library (accessed on June 15, 2023), Services and Policies. Accessed at: https://carringtonlibrary.org/services/.
[114] Casselton Public Library (accessed on June 15, 2023), Services. Accessed at: https://casseltonndlibrary.com/about-2/services/.
[115] Cavalier County Library (accessed on June 20, 2023), Cavalier County Library. Accessed at: https://cavaliercountyndlibrary.com/. (This asset is not listed on the Library's website but was verified on its Facebook page.)
[116] Dickinson Area Public Library (accessed on June 15, 2023), Library Services Policy. Accessed at: http://www.dickinsonlibrary.org/library-services-policy-12358.
[117] Divide County Public Library (accessed on June 15, 2023), Divide County Library Computer Use Policy. Accessed at: https://dividecountyndlibrary.files.wordpress.com/2019/08/divide-county-library-computer-use-policy-1.doc.
[118] Edgerly Public Library (accessed on June 16, 2023), Library Services. Accessed at: https://edgeleylibrary.org/services.php.
[119] Ellendale Public Library (accessed on June 16, 2203), Ellendale Public Library. Accessed at: https://ellendalendlibrary.com/.
[120] Enderlin Municipal Library (accessed on June 16, 2023), Enderlin Municipal Library. Accessed at: http://enderlinnd.com/library.
[121] Fargo Public Library (accessed on June 16, 2023), Services and Equipment Available to the Public. Accessed at: https://fargond.gov/city-government/departments/library/services/printing-scanning-equipment-available.

Public computer and wi-fi access	Fargo Public Library (Dr. James Carlson Library)	The library has 22 computers available for use (15 for adults and 7 for children) and wi-fi access.[122]
Public computer and wi-fi access	Fargo Public Library (Northport Library)	The library has 9 computers available for use (5 for adults and 4 for children) and wi-fi access.[123]
Public computer and wi-fi access	Grand Forks Public Library	The library has computers available for use and wi-fi access.[124]
Public computer and wi-fi access	Griggs County Public Library	The library has computers available for use and wi-fi access.[125]
Public computer and wi-fi access	Harvey Public Library	The library has computers available for use and wi-fi access.[126]
Public computer and wi-fi access	Heart of America Public Library	The library has 4 computers available for use and wi-fi access.[127]
Public computer access	Iris Swedlund School & Public Library	The library has computers available for use.[128]
Public computer access	James River Valley Library System (Alfred Dickey Public Library)	The library has computers available for use.[129]
Public computer access	James River Valley Library System (Stutsman County Library)	The library has computers available for use.[130]
Public wi-fi access	Kindred Public Library	The library has wi-fi access.[131]
Public computer and wi-fi access	Lake Region Public Library	The library has 8 computers available for use and wi-fi access.[132]

[122] Fargo Public Library (accessed on June 16, 2023), Services and Equipment Available to the Public. Accessed at: https://fargond.gov/city-government/departments/library/services/printing-scanning-equipment-available.
[123] Fargo Public Library (accessed on June 16, 2023), Services and Equipment Available to the Public. Accessed at: https://fargond.gov/city-government/departments/library/services/printing-scanning-equipment-available.
[124] Grand Forks Public Library (accessed on June 16, 2023), Computer Services. Accessed at: https://www.gflibrary.com/95/Computer-Services.
[125] Griggs County Public Library (accessed on June 16, 2023), Internet Use Policy. Accessed at: https://griggscountypubliclibrary.com/internet-use-policy/.
[126] Harvey Public Library (accessed on June 16, 2023), Policies. Accessed at: https://harveyndlibrary.com/policies/.
[127] Heart of America Library (accessed on June 16, 2023), Library News May 3, 2023. Accessed at: https://rugbyndlibrary.com/2023/05/03/library-news-may-3-2023/.
[128] City of Velva North Dakota (accessed on June 23, 2023), Iris Swedlund School & Public Library. Accessed at: https://www.velvand.com/iris-swedlund-school-and-public-library.
[129] James River Valley Library System (accessed on June 16, 2023), Computer & Internet Access Policy. Accessed at: https://www.jrvls.org/_files/ugd/e61363_f2aa1b307951462f9c523a0c85317bc3.pdf.
[130] James River Valley Library System (accessed on June 16, 2023), Computer & Internet Access Policy. Accessed at: https://www.jrvls.org/_files/ugd/e61363_f2aa1b307951462f9c523a0c85317bc3.pdf.
[131] Kindred Public Library (accessed on June 16, 2023), Welcome to the Kindred Public Library! Accessed at: https://kindredndlibrary.org/.
[132] Lake Region Public Library (accessed on June 16, 2023), About Us. Accessed at: https://devilslakendlibrary.com/about-us/.

Public computer and wi-fi access	Leach Public Library	The library has computers available for use and wi-fi access.[133]
Public wi-fi access	Lidgerwood Public Library	The library has wi-fi access.[134]
Public computer access	Lisbon Public Library	The library has computers available for use.[135]
Public computer and wi-fi access	Max Community Library	The library has computers available for use and wi-fi access.[136]
Public computer and wi-fi access	McKenzie County Public Library	The library has computers available for use and wi-fi access.[137]
Public computer and wi-fi access	Minot Public Library	The library has computers available for use and wi-fi access.[138]
Public computer and wi-fi access	Morton Mandan Public Library	The library has computers available for use and wi-fi access.[139]
Public computer access	Mott Public Library	The library has computers available for use and wi-fi access.[140]
Public computer and wi-fi access	New Town City Library	The library has computers available for use and wi-fi access.[141]
Public computer and wi-fi access	Oakes Public Library & School	The library has 18 computers available for use and wi-fi access.[142]
Public computer and wi-fi access	Parshall Public Library	The library has computers available for use and, for those who already have an account with Reservation Telephone Cooperative, wi-fi access.[143]
Public computer and wi-fi access	Tioga Community Library	The library has computers available for use and wi-fi access.[144]

[133] Leach Public Library (accessed on June 16, 2023), Services. Accessed at: http://www.leachlibrarywahpeton.org/services.html.
[134] City of Lidgerwood North Dakota (accessed on June 16, 2023), Library. Accessed at: https://www.cityoflidgerwoodnd.com/?SEC=4B7CAB22-CBCE-4B42-8BE1-38BFCF2506CA.
[135] Lisbon Public Library (accessed on June 16, 2023), Computer Use Policy. Accessed at: https://www.lisbonpubliclibrary.com/.
[136] Max Community Library (accessed on June 16, 2023), Max Community Library Policy Manual. Accessed at: https://maxndlibrary.files.wordpress.com/2020/03/april-2020.pdf.
[137] McKenzie County Public Library (accessed on June 16, 2023), Policy Handbook. Accessed at: https://www.mckenziecountyndlibrary.com/usrfiles/cp/Policy_Handbook.pdf.
[138] Minot Public Library (accessed on June 16, 2023), Library Internet Guidelines. Accessed at: https://www.minotlibrary.org/wp-content/uploads/2021/07/Internet-Guidelines_2021_FINAL.pdf.
[139] Morton Mandan Public Library (accessed on June 16, 2023), Policy Manual. Accessed at: https://www.cityofmandan.com/vertical/sites/%7B38C3EFDC-F4D8-4D02-9E13-0987A081A7A4%7D/uploads/MMPL_Policy_Manual_2018(1).pdf.
[140] Mott Public Library (accessed on June 16, 2023), Our Services. Accessed at: https://mottndlibrary.com/our-services/.
[141] New Town City Library (accessed on June 16, 2023), About. Accessed at: https://newtownndlibrary.com/about-2/.
[142] Oakes Public Library & School (accessed on June 16, 2023), Public Library. Accessed at: https://oakesnd.com/library.
[143] Parshall Public Library (accessed on June 16, 2023), Parshall Public Library. Accessed at: https://parshallndlibrary.com/.
[144] Tioga Community Library (accessed on June 16, 2023), Internet Access Policy. Accessed at: https://tiogandlibrary.org/internet-access-policy/.

Public computer access	Turtle Lake Public Library	The library has a computer available for use.[145]
Public computer and wi-fi access	Underwood Public Library	The library has computers available for use and wi-fi access.[146]
Public computer and wi-fi access	Valley City Barnes County Public Library	The library has computers available for use and wi-fi access.[147]
Public computer access	Walhalla Public Library	The library has computers available for use.[148]
Public computer and wi-fi access	Ward County Public Library	The library has computers available for use and wi-fi access.[149]
Public computer and wi-fi access	Washburn Public Library	The library has computers available for use and wi-fi access.[150]
Public computer and wi-fi access	West Fargo Public Library	The library has 12 computers available for use and wi-fi access.[151]
Public computer access	Bismarck State College Library	The library offers public access to computers for internet and email.[152]
Public computer and wi-fi access	Chester Fritz Library, University of North Dakota	The library offers public access to its computer lab and wireless network.[153]
Public computer access	North Dakota Supreme Court Law Library	The library offers public access to its computers for legal research purposes.[154]
One-to-One Technology Initiative	Fargo Public Schools	The initiative assigns a personal learning device to each student in grades Pre-K through 12.[155]

[145] Turtle Lake Public Library (accessed on June 16, 2023), TLPL Policies. Accessed at: https://turtlelakendlibrary.com/tlpl-policies/.
[146] Underwood Public Library (accessed on June 16, 2023), Underwood Public Library. Accessed at: www.underwoodnd.org/city.
[147] Valley City Barnes County Public Library (accessed on June 16, 2023), Internet Access and Computer Use Policy. Accessed at: https://vcbclibrary.org/file_download/inline/d8367ddc-d33a-4396-a0ab-218d0edf61c0.
[148] Walhalla Public Library (accessed on June 16, 2023), Walhalla Public Library. Accessed at: https://walhallandlibrary.com/.
[149] Ward County (accessed on June 16, 2023), Library. Accessed at: https://www.co.ward.nd.us/161/Library.
[150] Washburn Public Library (accessed on June 16, 2023), Washburn Public Library. Accessed at: https://washburnndlibrary.com/.
[151] West Fargo Public Library (accessed on June 16, 2023), Equipment. Accessed at: https://westfargolibrary.org/765/Equipment.
[152] Bismarck State College, North Dakota's Polytechnic Institution (accessed on May 9, 2023), Library. Accessed at: https://bismarckstate.edu/community/communitysub/library/#:~:text=Visitors%20can%20use%20public%20computers,access%20to%20all%20state%20libraries.
[153] University of North Dakota (accessed on May 9, 2023), Computer and Network Access. Accessed at: https://library.und.edu/services/computers-network-access.html.
[154] North Dakota Supreme Court Law Library (accessed on May 5, 2023), Public Access Computer Use. Accessed at: https://www.ndcourts.gov/Media/Default/Legal%20Resources/law-library/NDSCLL%20Computer%20Use.pdf.
[155] Fargo Public Schools (accessed on May 16, 2023), One-to-One Technology Initiative. Accessed at: https://www.fargo.k12.nd.us/Page/178.

1:1 Chromebook Program	Bismarck Public Schools	The program assigns a Chromebook to each student in grades K-12.[156]
1:1 Chromebook Program	Dickinson Public Schools	The program assigns a Chromebook to each student in grades 2-12.[157]
North Dakota Assistive Technology For All database	ND Assistive	This is an equipment database for short- and long-term loans for assistive technology, including computers; ND Assistive also provides use of the database at no charge to individuals and non-profit, state, and school-based organizations to host their assistive technology inventories.[158]
Public laptops and hotspots	Grand Forks Public Library	These resources are available for checkout.[159]
Public iPads	Leach Public Library	This resource is available for checkout.[160]
Public children's tablets, iPads, and mobile wi-fi hotspots	West Fargo Public Library	These resources are available for checkout.[161]
Laptops and tablets for the university community	University Information Technology, University of North Dakota	These resources are available for checkout by students, faculty, and staff.[162]
Tablets available free to charge	North Dakota Department of Corrections and Rehabilitation (in partnership with Ashland University and SECURUS)	These tablets are provided to facility residents free to charge, but residents incur a cost for messaging and calls[163]
Free iPads for telehealth services	United States Department of Veterans Affairs	Veterans in need of health services receive free iPads to access telehealth services[164], [165]

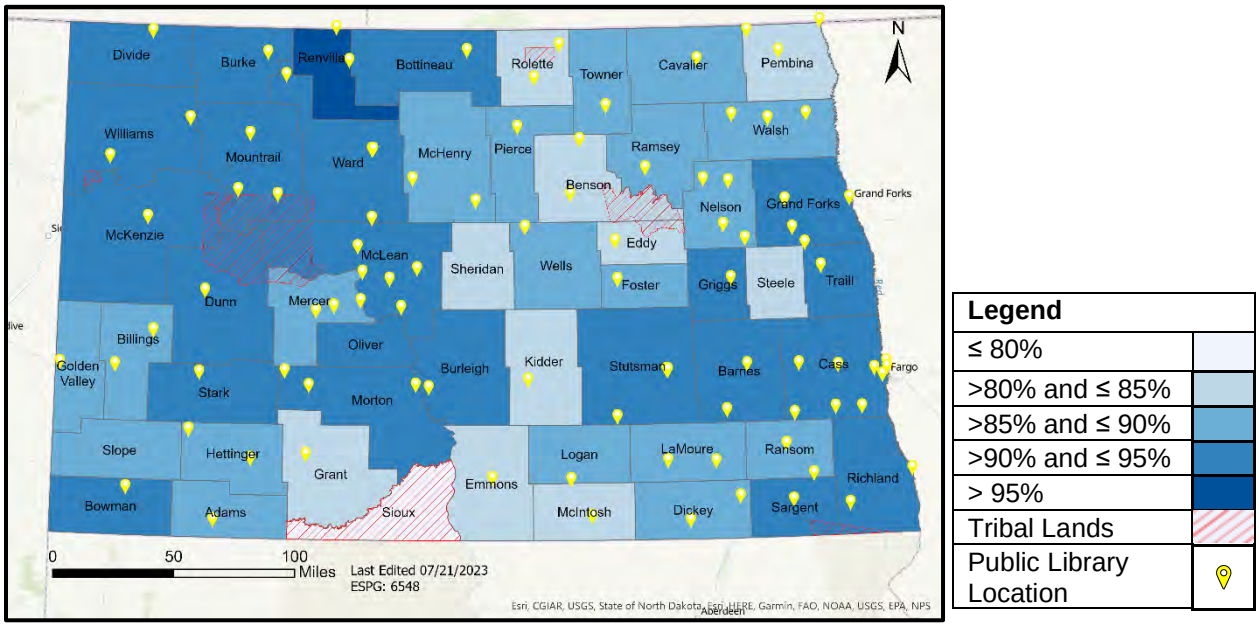
[156] Bismarck Public Schools (accessed on May 16, 2023), Parent Resources: Chromebook Information. Accessed at: https://www.bismarckschools.org/site/Default.aspx?PageID=3482.
[157] Dickinson Public Schools (accessed on May 18, 2023), Dickinson Public Schools 1:1 Chromebook Program. Accessed at: https://campussuite-storage.s3.amazonaws.com/prod/1559052/0c0088e8-2359-11eb-967e-0a78a2f94121/2578791/6906308e-d8af-11ed-87f8-0a426908bb6b/file/1to1-Agreement%20(002).pdf.
[158] ND Assistive (accessed on May 16, 2023), WELCOME TO North Dakota ASSISTIVE TECHNOLOGY FOR ALL!. Accessed at: https://nd.at4all.com/.
[159] Grand Forks Public Library (accessed on May 16, 2023), Computer Services. Accessed at: https://www.gflibrary.com/95/Computer-Services.
[160] Leach Public Library (accessed on June 16, 2023), Services. Accessed at: http://www.leachlibrarywahpeton.org/services.html.
[161] West Fargo Public Library (accessed on May 16, 2023), Equipment. Accessed at: https://www.westfargond.gov/765/Equipment#2a.
[162] University of North Dakota. Interview. May 11, 2023.
[163] Stakeholder Interview. May 15, 2023.
[164] Stakeholder Interview. May 18, 2023.
[165] VA News (published on September 15, 2020), VA expands Veteran access to telehealth with iPad services. Accessed at: https://news.va.gov/press-room/va-expands-veteran-access-to-telehealth-with-ipad-services/.

One measure for assessing broadband adoption is the number of households that access the internet on a secure personal device. In North Dakota, as many as 292,000 households (92%) own a computer, which is relatively consistent with the national computer ownership rate of 93%.[166] However, computer ownership is lower for certain counties, with eleven out of fifty-three counties in North Dakota having computer ownership rates of less than 85%. Notably, all of these counties are sparsely populated (with populations of less than 13,000 each), which indicates that rural regions are more likely to exhibit low levels of computer ownership.[167] Low levels of computer ownership in these counties also correspond with low levels of broadband adoption, as those same eleven counties have an average broadband subscription rate of 74% compared to an average of 84% for all counties (see **Table 16** in **Section 3.4.2** below).

Since public libraries provide free access to computers and internet connections and often offer digital skills training and technology-related workforce development programs,[168] they are important tools for promoting broadband adoption. This is particularly true for those counties in North Dakota with low computer ownership rates and low levels of broadband subscriptions.

Figure 7 below depicts the percentage of households in North Dakota with a computer by county and the location of North Dakota's public libraries.

Figure 7: Computer ownership and Public Library Locations[169]



[166] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=010XX00US&tid=ACSDP5Y2021.DP02.
[167] *The Digital Equity Act defines rural population as "the population living outside of cities and towns with more than 20,000 residents or living outside larger cities and towns with more than 50,000 residents and their surrounding urban areas."*
[168] Federal Communications Commission (published on June 24, 2021), The Role of Public Libraries and Community Partnerships in Promoting Digital Adoption. Accessed at: https://www.fcc.gov/sites/default/files/acdde-digital-empowerment-wg-digital-inclusion-report-06242021.pdf.
[169] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

3.3.3 Broadband Affordability

Research shows that cost can be a significant barrier to broadband adoption, especially for low-income households. According to a study by the NTIA, since 2001 cost has been the second most cited reason for internet non-use by offline households, with lack of interest being the first.[170] The relationship between cost and internet adoption has been well documented. A 2021 Pew Research Center study on internet use in the United States found that while only 8% of adults with annual household incomes of over $75,000 did not have a home broadband subscription, 43% of adults with annual household incomes below $30,000 did not have one.[171]

The distribution of low-income populations can help inform broadband affordability initiatives. Based on 2021 ACS data, 18% of North Dakota's population reports income levels that are 150% below the poverty level, which is 3 percentage points lower than the nation. However, certain counties have significantly higher percentages of low-income populations. Sioux, Benson, and Rolette counties, in particular, have relatively high percentages of low-income individuals, with 54%, 41%, and 40% of the population demonstrating income levels that are 150% below the poverty level, respectively.[172] While these three counties have high percentages of low-income individuals, the greatest number of low-income individuals can be found in the most populous counties in the state. In fact, 51% of North Dakota's total low-income population resides in just four counties: Cass, Grand Forks, Burleigh, and Ward.

Broadband-related and device-related affordability programs focus on lowering the cost barrier to broadband adoption for low-income individuals. Currently, the largest affordability programs operating in North Dakota are ACP and Lifeline. Both ACP and Lifeline are federal programs administered by the Universal Service Administrative Company (USAC) and are available to North Dakotans through participating ISPs. Additionally, ND Assistive offers programs and a grant to help with the purchase of assistive technology devices. **Table 10** below provides additional details about the broadband and device affordability programs operating in North Dakota.

Table 10: Financial Assistance Programs

Name	Organization	Description
Affordable Connectivity Program (ACP)	Federal Communications Commission (FCC)	83 internet service providers (ISPs) in North Dakota participate in ACP; the program provides a $30 per month discount for broadband services for eligible consumers and a $75 per month discount for broadband services for those living on qualifying Tribal Lands; it also provides a one-time device discount for eligible consumers of up to $100 for a laptop, desktop computer, or tablet

[170] National Telecommunications and Information Administration (accessed on May 8th 2023), Switched Off: Why Are One in Five U.S. Households Not Online? Accessed at: https://ntia.gov/blog/2022/switched-why-are-one-five-us-households-not-online

[171] Pew Research Center (published on April 7, 2021), Internet/Broadband Fact Sheet. Accessed at: https://www.pewresearch.org/internet/fact-sheet/internet-broadband/#panel-2ab2b0be-6364-4d3a-8db7-ae134dbc05cd.

[172] United States Census American Community Survey (published in 2021), Poverty Status in the Past 12 Months 5-Year Estimates. Accessed at: https://data.census.gov/table?q=poverty+characteristic+of+families&g=010XX00US_040XX00US38&tid=ACSST5Y2021.S1701.

		purchased through a participating provider with a consumer co-payment of more than $10 or less than $50; eligibility is determined based on household income or participation in certain government or Tribal assistance programs.[173] Based on data from the Education SuperHighway, a national nonprofit organization focused on closing the digital divide, North Dakota's ACP subscription rate is 11%; of the 114,650 eligible households, 12,438 are enrolled in ACP.[174]
Lifeline Program	Universal Service Administrative Company (USAC)[175]	The program provides a discount on phone service, broadband internet service, or bundled voice-broadband packages purchased from participating wireline or wireless providers for qualifying low-income consumers in every state, territory, and commonwealth and on Tribal Lands.[176] Based on data from the USAC, as of January 2023, North Dakota has 7,300 Lifeline subscribers and 69,433 eligible households, resulting in a participation rate of 11%.[177]
North Dakota Assistive Financial Loan Program	ND Assistive	The program assists individuals with disabilities with the purchase of assistive technologies (including computers and tablets) and training to use those technologies.[178]
Possibilities Grant	ND Assistive	This grant is for the purchase of assistive technologies, including computer access tools, for individuals with disabilities or aging individuals who have assistive technology needs and expenses that are above and beyond what insurance and other funding programs will cover.[179]

[173] Federal Communications Commission (accessed on May 9, 2023), ACP Enrollment and Claims Tracker. Accessed at: https://www.usac.org/about/affordable-connectivity-program/acp-enrollment-and-claims-tracker/.
[174] Education SuperHighway (accessed on May 9, 2023), Affordable Connectivity Program Enrollment Dashboard. Accessed at: https://www.educationsuperhighway.org/no-home-left-offline/acp-data/.
[175] Federal Communications Commission (accessed on May 5, 2023), Lifeline Program for Low-Income Consumers. Accessed at: fcc.gov/general/lifeline-program-low-income-consumers.
[176] Federal Communications Commission (accessed on May 17, 2023), Lifeline Support for Affordable Communications. Accessed at: https://www.fcc.gov/lifeline-consumers.
[177] Federal Communications Commission (accessed on May 5, 2023), Lifeline Program Data. Accessed at: https://www.usac.org/lifeline/resources/program-data/.
[178] ND Assistive (accessed on May 10, 2023), North Dakota Assistive Financial Loan Program. Accessed at: https://ndassistive.org/funding/at-financial-loan-program/.
[179] ND Assistive (accessed on May 10, 2023), Possibilities Grant. Accessed at: https://ndassistive.org/funding/possibilities-grant/.

iCanConnect (also known as the National Deaf-Blind Equipment Distribution Program)	ND Assistive	This program provides free communications equipment to individuals with both vision and hearing loss in low-income households (those within 400% of the Federal Poverty Guidelines).[180]

3.3.4 Broadband Access

The NTIA defines broadband access as the availability of high-speed, reliable internet and related equipment, including having Internet connections and technology at home or in community institutions (e.g., free public Wi-Fi).[181]

Access points and locations providing free internet are critical, particularly near locations that are unserved and underserved. These access points offer individuals the devices to connect to the internet (as outlined in **Table 11**) along with a stable connection, which they wouldn't otherwise have. North Dakota's STAGEnet initiative, outlined in **Table 11**, has been critical in building a network of public access points across the state. The effort provides 1 Gbps internet to many CAIs, including all schools, higher education institutions, and government buildings, allowing free internet access to the public.

Additionally, many public libraries, which are key CAIs, provide free Wi-Fi access to the public. Library staff have noted that libraries in North Dakota, like libraries across the country, provided crucial access to devices and the internet to students and families during the COVID-19 pandemic, while schools conducted remote learning.[182] While North Dakota continues its efforts to build out broadband infrastructure across the state and improve provision of affordable service, public access points will continue to supplement these offerings. Additionally, even as broadband coverage expands and becomes more affordable, public access points will continue to play an important role in providing alternatives and backup modes of connecting to the internet.

[180] ND Assistive (accessed on May 10, 2023), iCanConnect: Deaf-Blind Service. Accessed at: https://ndassistive.org/icanconnect/.
[181] BroadbandUSA (accessed May 16, 2023), What does Digital Inclusion Mean?. Accessed at: https://broadbandusa.ntia.doc.gov/about-us/frequently-asked-questions/what-does-digital-inclusion-mean.
[182] Interview with North Dakota state Library Officials

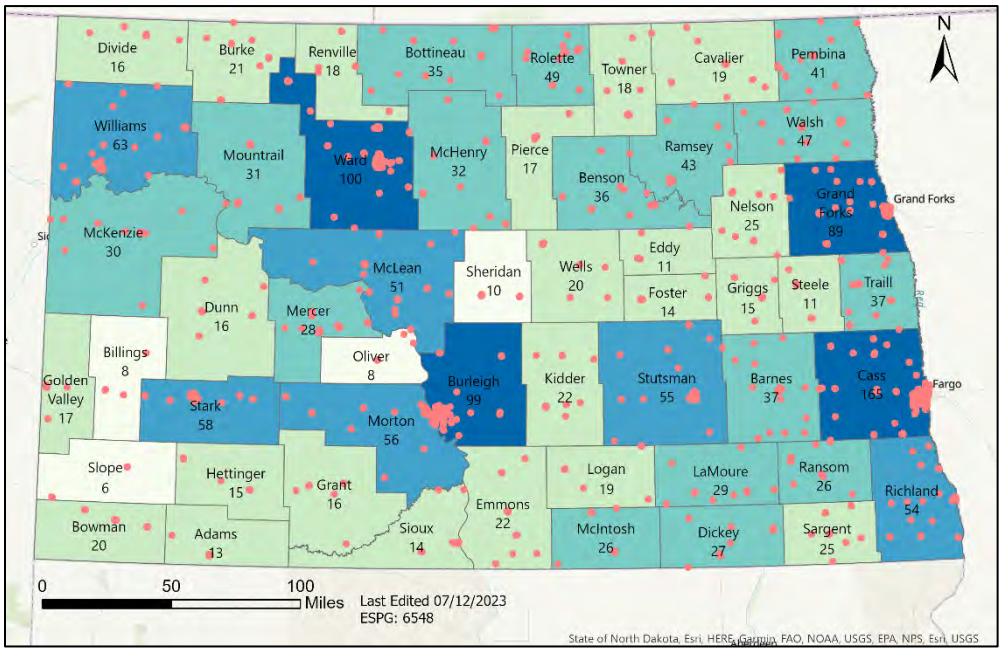
Table 11: Broadband Public Access Assets

Name	Organization	Description
Public Wi-Fi	North Dakota Public Libraries	North Dakota Public Libraries provide access to public Wi-Fi. There are 93 public libraries in the state, approximately a third of which (29 libraries) provide public Wi-Fi access. [183]
STAGEnet	North Dakota Department of Information	North Dakota Department of Information's STAGEnet program seeks to provide 1 Gbps service to all North Dakota: • K-12 schools, • Higher education institutions, and • Government buildings The network seeks to provide high quality internet service for all students, teachers, state employees and the public.[184]

North Dakota has identified over 1,700 CAIs, defined as a school, library, health clinic, health center, hospital or other medical provider, public safety entity, institution of higher education, public housing organization, state parks, or community support organization that facilitates greater use of broadband service by vulnerable populations, including, low-income individuals, unemployed individuals, children, the incarcerated, aging individuals, individuals with disabilities, and veterans. **Figure 8** shows the distribution of CAIs across North Dakota and the number of organizations within each county. Many of the organizations are in North Dakota's urban centers such as Fargo, Grand Forks, Minot, and Bismarck, with fewer based in rural, less populated counties. CAIs require access to high-speed internet to properly support communities with critical services. As such, North Dakota seeks to provide 1 Gbps symmetrical speeds to all CAIs to serve as a point of access in rural parts of the state.

[183] North Dakota State Library (accessed May 16, 2023), Library Directory. Access at: http://www.library.nd.gov/publications/publiclibrarydirectory.pdf.
[184] Dakota Carrier Network (published March 22, 2018), DCN to upgrade North Dakota state Internet Network to 100Gigabit. Accessed at: https://dakotacarrier.com/2018/03/dcn-to-upgrade-north-dakota-state-internet-network-to-100-gigabit-2/.

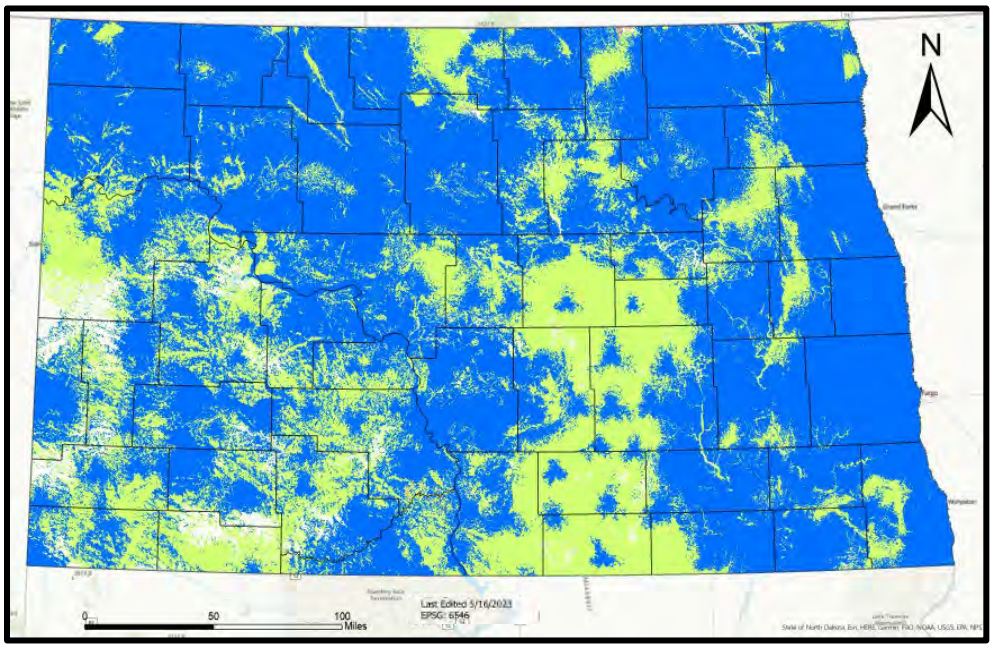
Figure 8: Community Anchor Institutions by County[185]



Although mobile broadband, in most instances, cannot serve as a sufficient substitute for wireline and fixed wireless broadband for all services, it can act as a backstop and a supplemental resource on the road and during service interruptions (e.g., network service/repairs). As illustrated in **Figure 9,** the majority of North Dakota is covered in at least 4G LTE Mobile Broadband, which provides a minimum download speed of at least 5 Mbps and upload speed of at least 1 Mbps.[186] Additionally, much of the state, especially urban areas, is covered by 5G-NR, which provides a minimum download speed of at least 7 Mbps and upload speed of at least 1 Mbps.[187]

[185] Community Anchor Institutions were identified using a variety of publicly available data sources.
[186] Federal Communications Commission (published on June 30, 2022), FCC Mobile Availability Data. Accessed at: Nationwide Data | FCC National Broadband Map.
[187] Broadband Data Collection Help Center (published June 21, 2022), Formatting Mobile Broadband Availability Coverage Maps. Accessed at: Formatting Mobile Broadband Availability Coverage Maps – BDC Help Center (fcc.gov).

Figure 9: Mobile Availability by Technology[188]



Legend	
5G-NR	
4G LTE	
3G	
No mobile availability	

3.3.5 Digital Equity

The National Digital Inclusion Alliance (NDIA) defines digital equity as "a condition in which all individuals and communities have the information technology capacity needed for full participation in our society, democracy, and economy." Further, NDIA details that while digital equity is the goal, digital inclusion is the work that is necessary for achieving the goal. Digital inclusion describes activities that promote access to Information and Communication Technologies for all individuals and encompasses these five elements:

1. Affordable, robust broadband internet service;
2. Internet-enabled devices that meet the needs of the user;
3. Access to digital skills training;
4. Quality technical support; and
5. Applications and online content designed to enable and encourage self-sufficiency, participation, and collaboration. [189]

For North Dakota, advancing digital skills is a fundamental step to promote digital equity. In 2021, 33% of unemployed individuals in North Dakota lacked the essential digital skills which were required by 73% of open jobs.[190] This data reveals that there is a gap between the digital skills of some job seekers and the technical requirements of North Dakota's job market. To help close the digital skills gap, North Dakota, led by Governor Burgum, joined the National Governors Association Workforce Innovation Network (NGA WIN). NGA WIN is a coalition of six states and focuses on helping states develop long-term plans to close the digital skills gap and build a more

[188] Federal Communications Commission (published on June 30, 2022), FCC Mobile Availability Data. Accessed at: Nationwide Data | FCC National Broadband Map.
[189] National Digital Inclusion Alliance (accessed on May 25, 2023), The Words Behind Our Work: The Source for Definitions of Digital Inclusion Terms. Accessed at: https://www.digitalinclusion.org/definitions/.
[190] National Digital Inclusion Alliance (accessed on May 23, 2023), state Digital Equity Scorecard. Accessed at: https://state-scorecard.digitalinclusion.org/scorecard/by_state/ND.

resilient workforce.[191] Through collaboration with NGA WIN, North Dakota released a report in August 2022 that conducted research about covered populations, internet access, digital skills, and the workforce.[192] Findings from the *North Dakota Foundational Literacy Research and Recommendations Report* have been included throughout this Five-Year Action Plan.

For North Dakota, improving the digital skills gap and building a resilient workforce will also aid in addressing the state's workforce shortage. According to the Bureau of Labor Statistics (BLS), the ratio of unemployed people per job opening in North Dakota was 0.3 in January 2023. [193] Reducing the digital skills gap will play a role in tackling this workforce shortage, as many occupations in the state require some level of digital skill. The Department of Commerce leveraged data from the Brookings Institute Report *Digitalization and the American Workforce* to measure the digital content for each occupation in North Dakota. The analysis revealed that the average digital score of all occupations in the state was 48.60 in 2016 (scores between 33 and 60 are classified as requiring medium levels of digital skills)[194]. Further, the average score for the top 100 "In-Demand Occupations"[195] was 55.45, indicating that in-demand occupations require higher levels of digital skills in the state. Given that jobs on average require a medium level of digital skill, North Dakota is investing in workforce development and digital skills training to ensure that job seekers are qualified for the job market. The State is focusing on training students to be career ready and college-prepared, as well as upskill and reskill adult workers so that they remain in the workforce for longer.[196]

There are various organizations in North Dakota that are helping students and job seekers become workforce ready. The largest of these organizations are the North Dakota Job Service, the North Dakota Department of Public Instructions and TrainND. The programs offered by these organizations focus on different aspects of digital skills training. The Adult Learning Centers, operated by the Department of Public Instruction, are open to the public and offer services related to basic computer skills. TrainND works with business and employers to provide assistance to employees who need basic training or hope to enhance their skills related to computer applications. Further, multiple organizations offer online courses related to digital skills such as cybersecurity, coding, and data science. **Table 12** below provides an overview of the various workforce training and technical assistance programs offered in North Dakota.

[191] National Governors Association (accessed on May 26, 2023), National Governors Association Workforce Innovation Network. Accessed at: https://www.nga.org/workforce-innovation-network/.
[192] North Dakota Department of Commerce (published in August 2022), North Dakota Foundational Digital Literacy Research And Recommendations. Accessed at: https://www.medialibrary.nd.gov/assetbank-nd/assetfile/121546.pdf.
[193] Bureau of Labor Statistics (published on March 30,2023), North Dakota Job Openings and Labor Turnover-January 2023. Accessed at: https://www.bls.gov/regions/midwest/news-release/jobopeningslaborturnover_north-dakota.htm.
[194] North Dakota Department of Commerce (published in August 2022), North Dakota Foundational Digital Literacy Research And Recommendations. Accessed at: https://www.medialibrary.nd.gov/assetbank-nd/assetfile/121546.pdf.
[195] North Dakota Job Service (accessed on June 5, 2023), In-Demand Occupations. Accessed at: https://www.jobsnd.com/job-seeker/demand-occupations
[196] National Governors Association (accessed on May 26, 2023), Planning To Advance Digital Skills For Equitable Economic Participation. Accessed at: https://www.nga.org/publications/lessons-learned-in-workforce-innovation-how-six-states-are-planning-to-advance-digital-skills-for-equitable-economic-participation/.

Table 12: Training and Technical Assistance Assets

Asset Type	Organization	Asset Description
Workforce Training	TrainND Northwest, a division of Williston State College	Computer skills courses offered as part of the workforce training program[197]
Workforce Training	TrainND Northeast, a division of Lake Region State College	Basic computer skills and computer application training courses offered as part of the workforce training program[198]
Workforce Training	TrainND Southwest, a division of Bismarck State College	Courses related to digital skills offered as part of the workforce training program[199]
Workforce Training	TrainND Southeast, a division of the North Dakota State College of Sciences	Courses regarding basic skills related to common computer applications offered as part of the workforce training program[200]
Workforce Training & Employment Services	North Dakota Department of Public Instruction Adult Learning Centers	Digital literacy skills services offered by 9 Regional Adult Learning Centers and 3 affiliated Satellite locations[201]
Last Mile Program	North Dakota State Penitentiary in partnership with Job Service North Dakota (JSND) and the North Dakota Department of Commerce	This is a national program that is designed to give felons employable skills as coders; it was launched at the North Dakota State Penitentiary during the 2019-2021 biennium[202]
Continuing Education Courses in Web Development	Universal Class through the North Dakota State Library	These courses are offered online as part of Universal Class's collection of courses in over 30 areas of study[203]
Workforce Training	Emerging Digital Academy	Free Intro to Python Coding Workshop offered in Fargo[204]

[197] TrainND Northwest – Williston state College (accessed on May 9, 2023), TrainND Northwest. Accessed at: https://willistonstate.augusoft.net/.
[198] TrainND Northeast – Lake Region state College (accessed on May 9, 2023), TrainND Northeast. Accessed at: https://www.lrsc.edu/discover-lrsc/business-community/trainnd-northeast.
[199] Bismarck state College (accessed on May 9, 2023), TrainND & Workforce Training. Accessed at: https://bismarckstate.edu/continuingeducation/business/.
[200] North Dakota state College of Science (accessed on May 9, 2023), TrainND. Accessed at: https://www.ndscs.edu/workforce-affairs/trainnd.
[201] North Dakota Department of Public Instruction (accessed on May 5, 2023), Adult Learning Centers (ALC). Accessed at: https://www.nd.gov/dpi/education-programs/adult-education-ged/adult-learning-centers-alc.
[202] North Dakota Department of Corrections and Rehabilitation (accessed on May 9, 2023), 2019-2021 Biennial Report. Accessed at: https://www.docr.nd.gov/sites/www/files/documents/Biennial%20Report%20Archive/2019-2021%20Biennium%20Report.pdf.
[203] North Dakota state Library (accessed on May 17, 2023), Online Library Resource Guide – Universal Class. Accessed at: http://library.nd.gov/publications/universalclassguide.pdf.
[204] Emerging Digital Academy (accessed on May 18, 2023), Events and Workshops. Accessed at: https://emergingacademy.org/events/

Courses for Careers in Technology	North Dakota Citizens Skills for All program (operated by EduTech)	Free, quality, and self-paced courses in Cybersecurity, Data Science, Digital Essentials, Programming Languages and Networking.[205]
Technical Assistance Training to Support Digital Inclusion	ND Assistive (a non-profit organization that provides assistive technology devices for North Dakotans who need them)	This training is one type of training offered by ND Assistive for individuals regarding utilizing assistive technology devices[206]
Equipment Demonstration to Support Digital Inclusion	ND Assistive	This demonstration of equipment and software is one of multiple types of in-person demonstrations of assistive technology equipment that are offered by ND Assistive[207]
Tutorials for accessing online library resources	North Dakota State Library	The tutorials are available on the State Library's YouTube channel[208]

Table 13: Organizational and Taskforce Assets

Asset Type	Name	Asset Description
Taskforce for promoting digital equity	National Governors Association Workforce Innovation Network	A coalition of 6 states that are gathering data about the digital skills gap and developing plans to increase digital equity[209]

3.4 Needs and Gaps Assessment

Developing a plan to achieve North Dakota's goals for broadband deployment and digital equity, required a comprehensive assessment of the state's needs and gaps between the current state and the desired future outcomes. This section details the needs and gaps related to:

- 3.4.1 Broadband Deployment
- 3.4.2 Broadband Adoption
- 3.4.3 Broadband Affordability
- 3.4.4 Broadband Access
- 3.4.5 Digital Equity

[205] North Dakota EduTech (accessed on May 17, 2023), North Dakota Citizens Skills for All. Accessed at: https://www.edutech.nd.gov/northdakotacitizensskillsforall.
[206] ND Assistive (accessed on May 10, 2023), Training. Accessed at: https://ndassistive.org/services-for-professionals/training/.
[207] ND Assistive (accessed on May 10, 2023), Equipment Demonstration. Accessed at: https://ndassistive.org/equipment-demonstration/.
[208] North Dakota state Library (accessed on May 17, 2023), Online Library Resource Guide – Universal Class. Accessed at: http://library.nd.gov/publications/universalclassguide.pdf.
[209] North Dakota Department of Commerce (published in August 2022), North Dakota Foundational Digital Literacy Research And Recommendations. Accessed at: https://www.medialibrary.nd.gov/assetbank-nd/assetfile/121546.pdf.

3.4.1 Broadband Deployment

Broadband deployment hinges on several factors, such as policy and regulatory measures, coordination among interested parties, and physical and labor requirements; all of these factors can impact the provision of reliable coverage and speeds to serviceable locations. The State utilizes the NTIA's definition of broadband service, which states that a location is "served" by broadband if one or more service provider offers internet speeds greater or equal to than 100 Mbps download and 20 Mbps upload. A location is "underserved" if one or more provider offers speeds less than 100 Mbps download and 20 Mbps upload but greater than or equal to 25/3 Mbps. Lastly, the NTIA defines any location with less than 25 Mbps download and 3 Mbps upload as "unserved."[210]

To offer a more complete picture of broadband needs, the analysis below identifies the counties with the highest proportion of unserved and underserved locations as well as counties with the largest number of unserved and underserved locations.

Counties with the highest proportion of unserved and underserved locations:

Much of the unserved locations in the state are concentrated in the Western regions, as shown in **Figure 10**. Billings, Divide, Burke, and Golden Valley counties are four of the five counties with the highest proportion of unserved locations with 44%, 20%, 16%, and 13% locations unserved, respectively. These counties are remote and are among the least populated in the state, creating difficulties to economically deploy broadband to these areas. McKenzie County has the second highest proportion of unserved locations in the state (18%), and while the county lies adjacent to the Williston Metropolitan Area and is home to Watford City, much of the county is rural. Additionally, McKenzie County is in the Badlands region and shares geographical features with counties that have high proportions of unserved locations (e.g., Golden Valley and Billings).

There are relatively fewer underserved than unserved BSLs in North Dakota. Billings County has the highest proportion, with 7% of locations in the county classified as underserved. However, this translates to only 58 total underserved locations. Like Billings, Dunn, Mountrail, and Barnes are rural counties and have relatively high proportions of underserved locations – 3%, 3%, and 2%, respectively. Similar to the unserved counties, the underserved counties are in the western regions of the state and in rural communities.

Counties with the greatest number of unserved and underserved locations:

When analyzing the total number of unserved and underserved locations today, the view of needs in the state changes slightly. **Table 14** presents a distribution of served, unserved, and underserved locations across all counties in North Dakota and offers a ranking by number of underserved and unserved locations.

When considering the number of unserved locations, the top five counties neighbor each other in the northwestern part of the state. The two counties with the largest number of unserved locations, Williams and McKenzie, are located in the Tri-County Region in the northwest. Both counties comprise the Williston Metropolitan area and account for approximately 39% of unserved

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[210] National Telecommunications and Information Administration (published on May 12, 2022) Notice of Funding Opportunity Broadband Equity, Access, and Deployment Program. Accessed at: https://broadbandusa.ntia.doc.gov/sites/default/files/2022-05/BEAD%20NOFO.pdf.
Note: NTIA defines unserved and underserved as locations as those receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum and latency less than or equal to 100 milliseconds

locations in the state. Between 2010 and 2020, Williams and McKenzie counties demonstrated the highest population growth in the state, with growth rates of 83% and 131%, respectively. Given the rapid growth of these counties, the relatively higher proportion of unserved locations may be explained by the lag between this rapid growth and broadband deployment.

According to the FCC National Broadband Maps, North Dakota has relatively fewer underserved than unserved locations.[211] Many of the underserved locations are also concentrated in the northwestern part of the state. Williams, Mountrail, and Ward counties account for approximately 36% of all underserved locations in North Dakota, with pockets of underserved locations around Williston and Minot. Similarly, there are pockets of underserved locations in between Cass and Barnes counties near Valley City. This area accounts for approximately 28% of underserved locations. Given the relatively lower number of underserved locations, the analysis of counties with the highest number of locations becomes more granular. There is a large swath of land between Cass and Barnes counties with locations that are underserved, with almost a third of all underserved locations in the state found in this region. Additionally, the state continues to investigate how performance and reliability vary across locations that are considered served. Currently, there may be locations that are considered served by the National Broadband Maps that may not consistently be receiving served speeds. The state will continue to investigate opportunities to extend reliable service these locations in order to achieve the state's goal of 100% coverage.

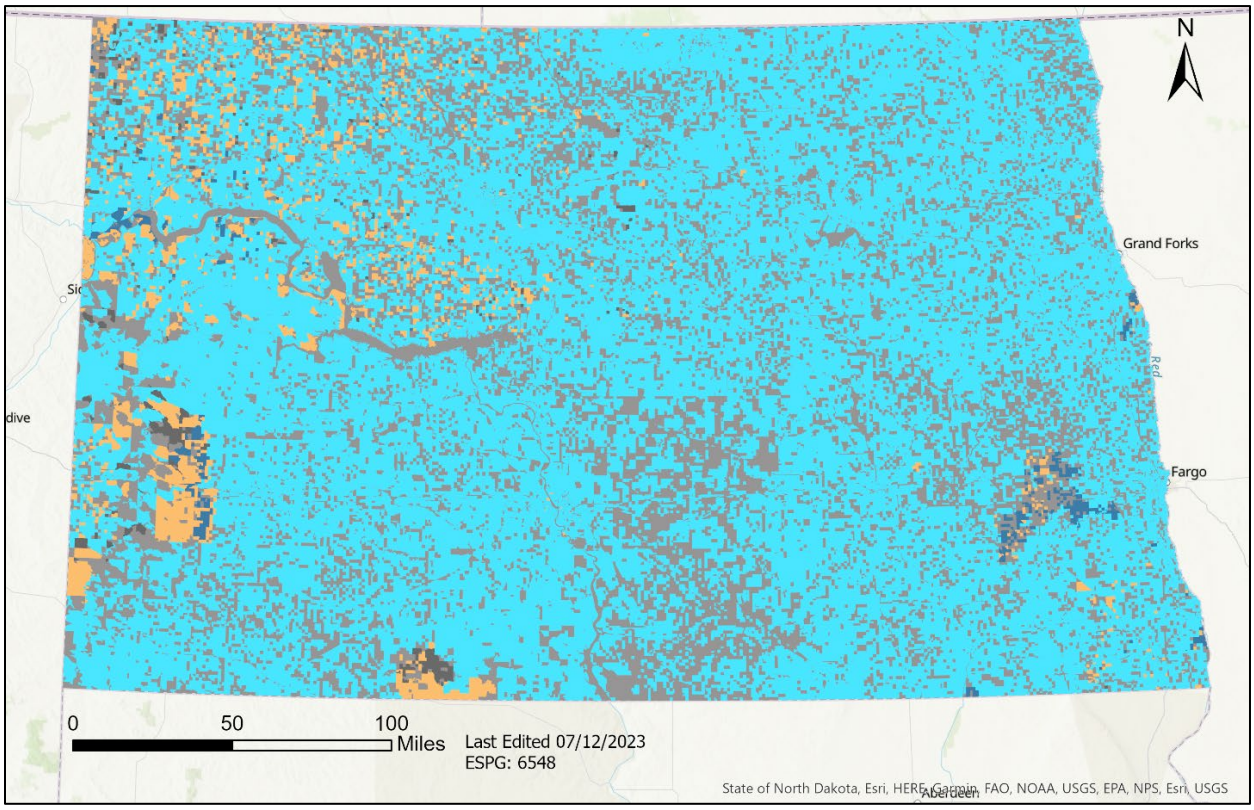
Community Anchor Institutions Lacking Gigabit-level Broadband Service

In addition to all broadband serviceable locations, specific consideration is required for CAIs, as they facilitate greater use of broadband service by vulnerable populations. The following analysis offers insight into which community anchor locations in the state do not have access to symmetrical 1 Gbps speeds.

According to the FCC National Broadband Maps, an estimated ~70% of North Dakota's over 1,700 CAIs have access to 1 Gbps broadband service, which is unsurprising given the state's extensive fiber and cable coverage, as seen in **Figure 13**. However, approximately 15% of the identified CAIs receive less than 1 Gbps service, mostly at speeds between 1 Gbps and 100/20 Mbps. Most of these locations are in urban areas, especially in Bismarck, Fargo, and Grand Forks. Additionally, at least 10% of CAI addresses do not match locations in the FCC National Broadband Maps. Therefore, it is possible that over 25% of CAIs in the state do not receive 1 Gbps speeds if the remaining locations without a match in the BDC database are found to receive <1 Gbps service. It will be important to validate whether these locations currently receive 1 Gbps service to better understand broadband needs in the state.

[211] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum.*

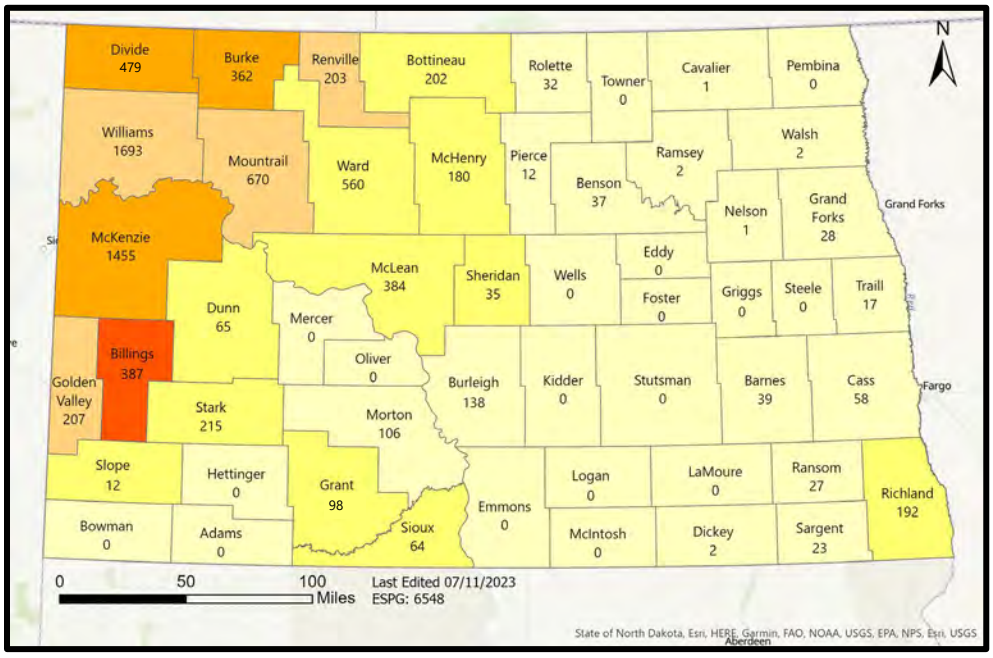
Figure 10: Maximum Speed Offering by Block[212]



Legend	
≥100/20 Mbps	
≥25/3 and <100/20 Mbps	
<25/3 Mbps	
Populated with no plans	
Unpopulated with no plans	

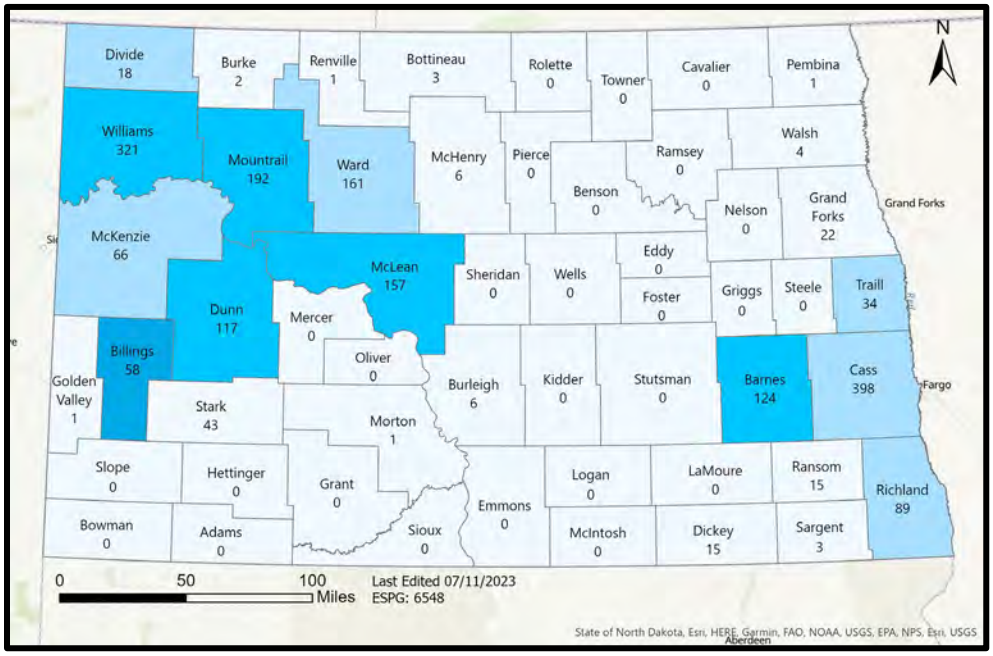
[212] Federal Communications Commission (published on December 31, 2022), FCC Mobile Availability Data. Accessed at: Nationwide Data | FCC National Broadband Map.

Figure 11: Percentage of Unserved Broadband Serviceable Location & Number of Unserved Locations[213]



Legend
≤ 1%
>1% and ≤ 5%
>5% and ≤ 15%
>15% and ≤ 25%
> 25%

Figure 12: Percentage of Underserved Broadband Serviceable Location & Number of Underserved Locations [214]



Legend
= 0%
>0% and ≤ 0.5%
>0.5% and ≤ 1%
>1% and ≤ 5%
> 5%

[213] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: Nationwide Data | FCC National Broadband Map.
[214] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: Nationwide Data | FCC National Broadband Map.

Table 14: North Dakota Served, Underserved, and Unserved Locations, by county[215]

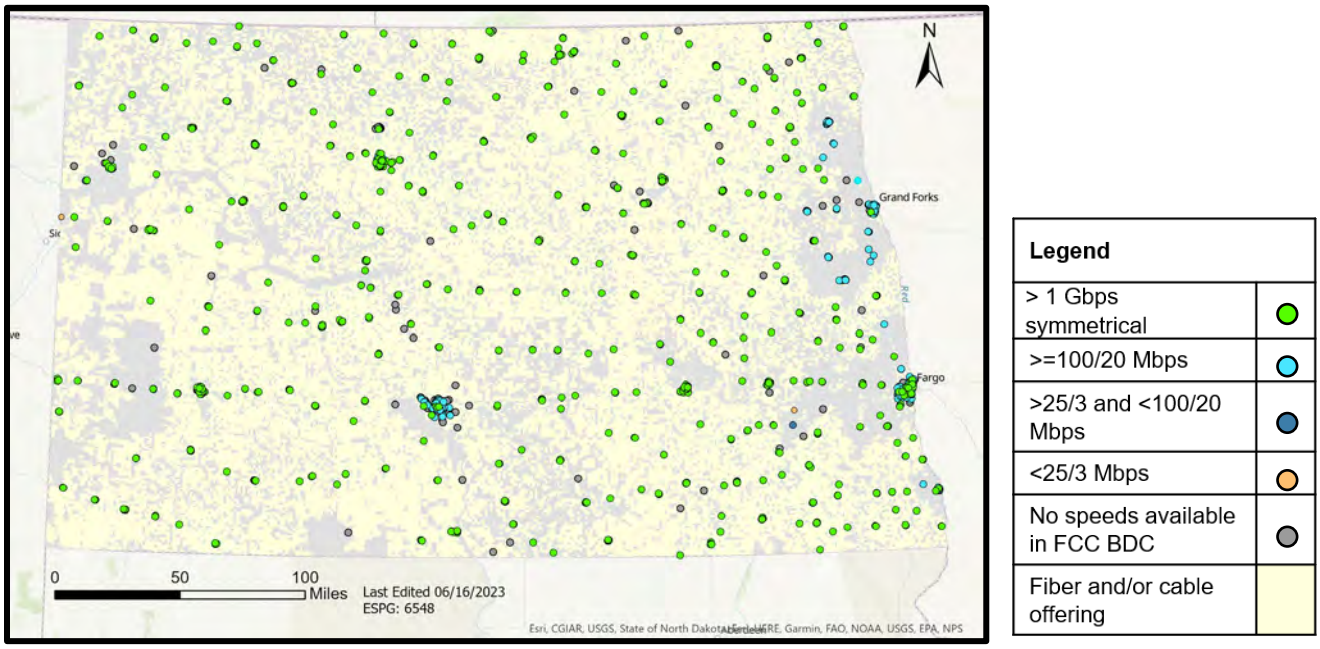
County	Unserved Locations	Underserved Locations	Served Locations	Estimated Enforceable Commitments[216]	Total Estimated Un(der)served	Rank
Williams	1,693 *10%*	321 *2%*	15,482 *88%*	268	1,746	1
McKenzie	1,455 *18%*	66 *1%*	6,514 *81%*	144	1,377	2
Mountrail	670 *10%*	192 *3%*	5,743 *87%*	0	862	3
Ward	560 *2%*	161 *1%*	24,962 *97%*	0	721	4
McLean	384 *5%*	157 *2%*	7,367 *93%*	0	541	5
Divide	479 *20%*	18 *1%*	1,942 *80%*	54	443	6
Burke	362 *16%*	2 *0%*	1,941 *84%*	25	339	7
Golden Valley	207 *13%*	1 *0%*	1,389 *87%*	0	208	8
Bottineau	202 *3%*	3 *0%*	5,584 *96%*	0	205	9
Renville	203 *10%*	1 *0%*	1,887 *90%*	0	204	10
McHenry	180 *4%*	6 *0%*	4,339 *96%*	0	186	11
Dunn	65 *2%*	117 *3%*	3,533 *95%*	0	182	12
Morton	106 *1%*	1 *0%*	13,678 *99%*	25	82	13
Burleigh	138 *0%*	6 *0%*	36,159 *100%*	81	63	14
Stark	215 *2%*	43 *0%*	13,271 *98%*	198	60	15
Benson	37 *1%*	0 *0%*	3,622 *99%*	0	37	16
Ransom	27 *1%*	15 *0%*	3,330 *99%*	5	37	16
Sheridan	35 *2%*	0 *0%*	1,444 *98%*	0	35	18
Sioux	64 *4%*	0 *0%*	1,407 *96%*	31	33	19
Rolette	32 *1%*	0 *0%*	4,930 *99%*	0	32	20
Sargent	23 *1%*	3 *0%*	2,674 *99%*	0	26	21

[215] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: Nationwide Data | FCC National Broadband Map.
[216] *Note: Estimated enforceable commitments vary from Section 5.6 slightly given differing methodologies*

Dickey	2 *0%*	15 *0%*	3,561 *100%*	0	17	22
Pierce	12 *0%*	0 *0%*	2,892 *100%*	0	12	23
Slope	12 *2%*	0 *0%*	724 *98%*	0	12	23
Billings	387 *44%*	58 *7%*	430 *49%*	434	11	25
Ramsey	2 *0%*	0 *0%*	6,521 *100%*	0	2	26
Cavalier	1 *0%*	0 *0%*	3,524 *100%*	0	1	27
Nelson	1 *0%*	0 *0%*	2,749 *100%*	0	1	27
Pembina	0 *0%*	1 *0%*	4,893 *100%*	0	1	27
Grant	98 *3%*	0 *0%*	2,660 *97%*	116	0	30
Adams	0 *0%*	0 *0%*	1,715 *100%*	0	0	30
Barnes	39 *1%*	124 *2%*	5,127 *97%*	194	0	30
Bowman	0 *0%*	0 *0%*	2,399 *100%*	0	0	30
Cass	58 *0%*	398 *1%*	51,799 *99%*	1,754	0	30
Eddy	0 *0%*	0 *0%*	1,714 *100%*	0	0	30
Emmons	0 *0%*	0 *0%*	2,247 *100%*	0	0	30
Foster	0 *0%*	0 *0%*	2,163 *100%*	0	0	30
Grand Forks	28 *0%*	22 *0%*	21,360 *100%*	270	0	30
Griggs	0 *0%*	0 *0%*	1,874 *100%*	218	0	30
Hettinger	0 *0%*	0 *0%*	2,261 *100%*	0	0	30
Kidder	0 *0%*	0 *0%*	1,879 *100%*	0	0	30
LaMoure	0 *0%*	0 *0%*	3,259 *100%*	0	0	30
Logan	0 *0%*	0 *0%*	1,498 *100%*	0	0	30
McIntosh	0 *0%*	0 *0%*	2,369 *100%*	0	0	30
Mercer	0 *0%*	0 *0%*	5,939 *100%*	0	0	30
Oliver	0 *0%*	0 *0%*	1,407 *100%*	0	0	30

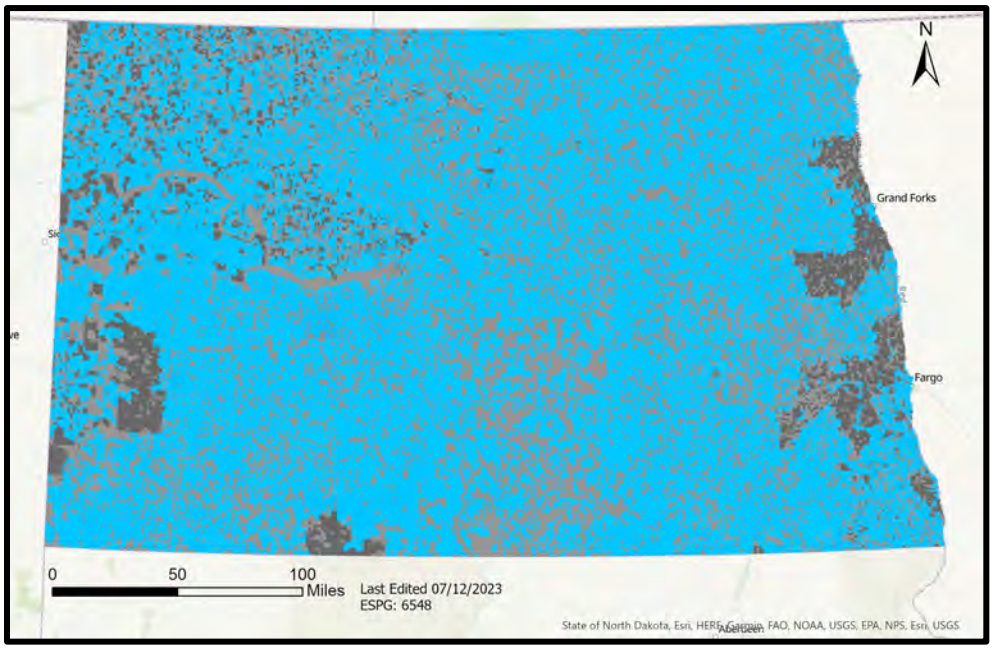
Richland	192 *2%*	89 *1%*	7,895 *97%*	1,076	0	30
Steele	0 *0%*	0 *0%*	1,590 *100%*	6	0	30
Stutsman	0 *0%*	0 *0%*	12,157 *100%*	0	0	30
Towner	0 *0%*	0 *0%*	1,972 *100%*	0	0	30
Traill	17 *0%*	34 *1%*	4,344 *99%*	366	0	30
Walsh	2 *0%*	4 *0%*	7,152 *100%*	94	0	30
Wells	0 *0%*	0 *0%*	3,286 *100%*	0	0	30
Total	**7,988**	**1,858**	**336,558**	**5,305**	**7,517**	**NA**

Figure 13: Maximum Speed Offering to Community Anchor Institutions and Blocks Served by Fiber/Cable [217]



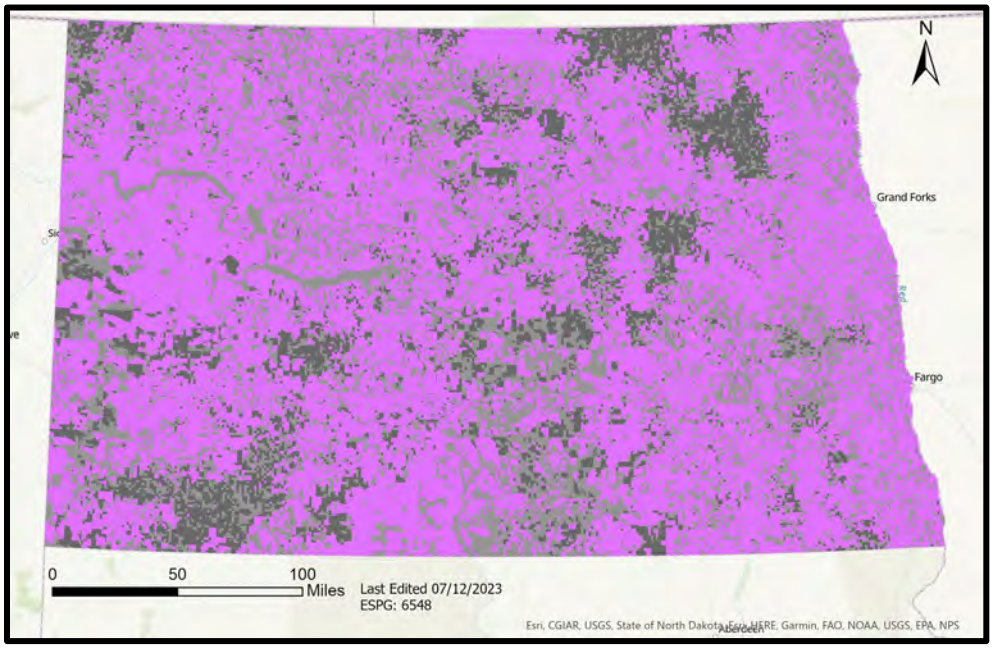
[217] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: Nationwide Data | FCC National Broadband Map.

Figure 14: Blocks served by Fiber and/or Cable



Legend	
Fiber and/or cable coverage	
Populated with no fiber and/or cable plans	
Unpopulated with no plans	

Figure 15: Blocks served by Entirely or Hybrid Licensed Fixed Wireless



Legend	
Entirely or hybrid licensed fixed wireless coverage	
Populated without entirely or hybrid licensed fixed wireless plans	
Unpopulated with no plans	

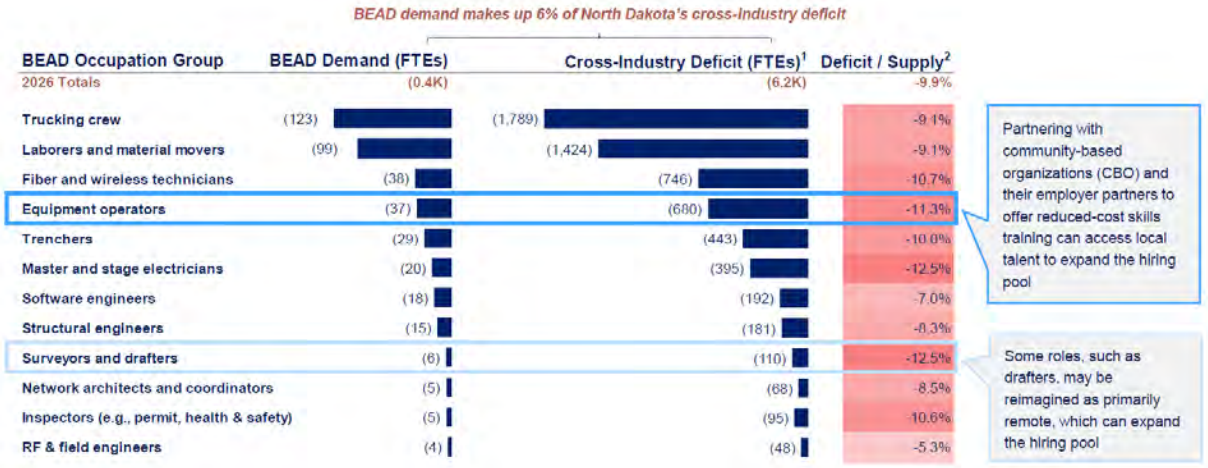
By maintaining close coordination with ISPs, the State can identify and compile existing deployment projects. The State would benefit from a centralized coordination effort to track existing and planned enforceable agreements for deployment projects and the associated locations.

Table 15: Broadband Infrastructure Working Group

Group	Description
Broadband Infrastructure Working Group	In Section 5.1, the State outlines a proposed Broadband Infrastructure Working Group that will aim to help identify and provide proposed solutions to implementation challenges related to broadband deployment projects. The group's proposed membership is ISPs, local departments of transportation, statewide information network operators and other organizations critical to broadband deployment.

Supporting a skilled and ready workforce for broadband deployment projects will be instrumental to avoid delays and reduce employment gaps. Based on the workforce analysis conducted by the NTIA, BEAD demand makes up 6% (0.4/6.2K) of North Dakota's cross-industry deficits for key occupations (**Figure 16**). The State demonstrates the greatest absolute cross-industry employment deficit across Trucking crew, Laborers and materials movers, and Fiber and wireless technicians occupation groups. In contrast the occupation groups with the largest percent deficit compared to the existing workforce include Master and stage electricians (-12.5%), Surveyors and drafters (-12.5%) and equipment operators (-11.3%). The State will need to equip North Dakotans with the requisite formal and informal credentials and training requirements to reduce this deficit as it prepares to implement the Five-Year Action Plan.

Figure 16: North Dakota Workforce Deficits Across Key BEAD Occupation Groups[218]



Most of the key BEAD occupations where North Dakota demonstrates a deficit in full-time employees (FTEs) coincide with more informal training requirements. As shown in **Table 16** below, only two (Network architects and coordinators and RF and field engineers) of the twelve key occupation groups require a bachelor's degree, according to the BLS Occupational Outlook Handbook.[219] Most of the remaining occupations require the pursuit of a high school diploma, various licenses, and on-the-job training. This is true for the three occupation groups (Master and stage electricians, Surveyors and drafters, and equipment operators) with the largest percent deficit compared to the workforce supply, which require a high-school diploma and typically

[218] State Workforce Research Findings: North Dakota, National Telecommunications and Information Administration
[219] Bureau of Labor Statistics, Occupational Outlook Handbook. Accessed at: https://www.bls.gov/ooh/a-z-index.htm.

include apprenticeship and / or on-the-job training. As the State prepares to fill workforce gaps, it will need to coordinate with higher education institutions to market existing GED offerings and employers to encourage participation in apprenticeship programs and provision of on-the-job training.

Table 16: Key BEAD Occupation Group Educational Requirements[220]

Occupation Group	BEAD Demand	Educational Requirements		
		Required	Typical	Helpful
Trucking crew	(123)	• High school diploma • Commercial driver's license	• Professional truck driving school	• N/A
Laborers and material movers	(99)	• N/A	• 1 month of on-the-job training • Commercial driver's license	• N/A
Fiber and wireless technicians	(38)	• Postsecondary education in electronics, telecommunications, or computer networking	• Associate's degree in telecom. • On-the-job training	• N/A
Equipment operators	(37)	• High school diploma • Commercial driver's license	• Vocational training • 3 or 4-year apprenticeship	• N/A
Trenchers	(29)	• On-the-job training • Laborer's International Union of North America certifications (varies)	• High school diploma • 2-4 year apprenticeship	• N/A
Master and stage electricians	(20)	• High school diploma • Licenses (varies)	• 4-5 year apprenticeship • On-the-job training	• N/A
Software engineers	(18)	• N/A	• Bachelor's degree in computer and information technology or a related field, such as engineering or mathematics	• N/A

[220] Bureau of Labor Statistics, Occupational Outlook Handbook. Accessed at: https://www.bls.gov/ooh/a-z-index.htm.

Structural engineers	(15)	• Licensures (varies)	• Bachelor's degree in civil engineering	• Professional engineer license • Certifications from American Society of Civil Engineers
Surveyors and drafters	(6)	• High school diploma	• Associate of applied science in drafting or a related degree	• American Design Drafting Association's certifications
Network architects and coordinators	(5)	• Bachelor's degree in computer and information technology or a related field, such as engineering	• N/A	• Certifications (varies)
Inspectors	(5)	• High school diploma	• On-the-job training	• Bachelor's degree in engineering or architecture or who have another postsecondary credential
RF and field engineers	(4)	• Bachelors in electrical engineering, electronics engineering, or a related engineering field	• N/A	• N/A

3.4.2 Broadband Adoption

In North Dakota, around 267,000 households (84%) reported having a broadband subscription, according to 2021 ACS estimates. However, the broadband subscription rate is not uniform across the state and a closer examination of broadband subscription by county reveals substantial disparities. This section will focus on understanding where the disparities in broadband adoption exist in the state and whether any underlying patterns and trends exist. The purpose of this analysis is to understand the broadband adoption needs in the state, especially as they relate to the different covered populations.

As mentioned above, North Dakota's statewide broadband subscription rate is 84%, which is 3 percentage points lower than the national broadband subscription rate of 87%. This positions North Dakota as 41st in the nation in terms of broadband subscription rates.[221] **Table 17** and **Figure 17** below illustrate the percentage of households with broadband subscriptions in North Dakota by county along with the number of households without a broadband subscription.

Table 17: Broadband Subscription Rates by County (from lowest to highest)[222]

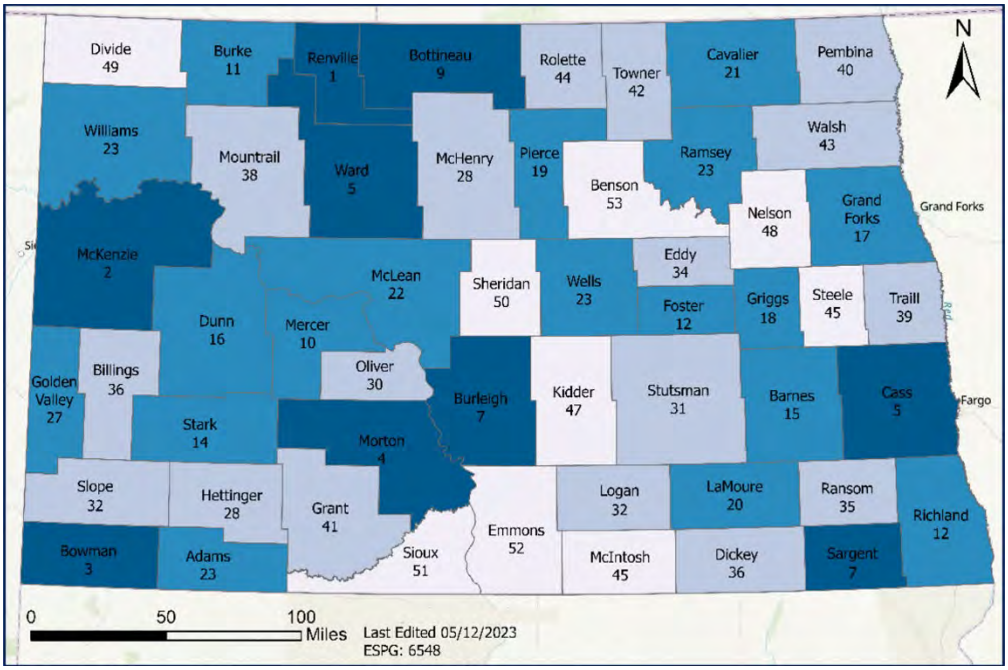
[221] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp02&g=010XX00US_040XX00US38&tid=ACSDP5Y2021.DP02. *The ranking was derived using the Selected Social Characteristics ACS table.*

[222] *Notes regarding Table 11:*

County	Broadband Subscription Rate	Number of Households without Broadband	County	Broadband Subscription Rate	Number of Households without Broadband
Benson	68.8	592	Adams	81.1	189
Emmons	70.3	447	Ramsey	81.1	929
Sioux	70.7	311	Wells	81.1	344
Sheridan	71.8	176	Williams	81.1	2,884
Divide	71.9	256	McLean	81.3	768
Nelson	72.9	357	Cavalier	81.5	288
Kidder	73.1	280	LaMoure	81.9	313
McIntosh	74.9	307	Pierce	82.4	294
Steele	74.9	195	Griggs	82.8	159
Rolette	75.5	905	Grand Forks	83	5,249
Walsh	76	1,085	Dunn	83.3	247
Towner	76.1	234	Barnes	83.7	788
Grant	76.8	245	Stark	84.1	2,083
Pembina	77	677	Foster	84.3	229
Traill	77.5	736	Richland	84.3	1,047
Mountrail	77.9	768	Burke	84.4	141
Billings	78	67	Mercer	84.5	546
Dickey	78	427	Bottineau	85.5	376
Ransom	78.1	505	Burleigh	86.3	5,389
Eddy	78.8	223	Sargent	86.3	244
Logan	79	162	Cass	87.7	9,611
Slope	79	67	Ward	87.7	3,446
Stutsman	79.2	1,886	Morton	87.8	1,613
Oliver	79.3	142	Bowman	88.1	142
Hettinger	79.8	209	McKenzie	88.2	580
McHenry	79.8	471	Renville	89.8	87
Golden Valley	80.3	142	**North Dakota**	**84.2**	**49,858**

1. Data is sourced from the United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.
2. *The ACS data classifies households as having a broadband subscription if the survey respondent answers yes when asked if "any member of the household [has] accessed the Internet by paying a cell phone company or Internet service provider."*

Figure 17: Percentage of Households with a Broadband Subscription and Ranking by County[223]



The following discussion delves deeper into the ACS data presented in **Table 17** and **Figure 17** above and highlights potential drivers of inequities in broadband adoption based on the relationship between covered populations, broadband availability, and broadband subscription rates.

In North Dakota, close to 50,000 households do not have a broadband subscription.[224] Cass, Burleigh, and Grand Forks counties contain 41% of the total number of households without a broadband subscription, which is expected given the high population density of these counties compared to the rest of the state.

A county-level analysis of the percentage of households without broadband subscription uncovers important insights about the potential drivers of low broadband adoption in North Dakota. Benson, Emmons, and Sioux counties have the lowest percentage of households with a broadband subscription, with rates that are 15, 14, and 13 percentage points lower than the statewide rate of 84%, respectively. Even though Emmons and Sioux counties have low broadband subscription rates, they both have relatively high levels of broadband availability. The percentage of residential BSLs served at 100/20 Mbps in Emmons and Sioux counties is 100% and 95%, respectively (see **Table 18** below). On the other hand, Benson County has the lowest broadband subscription rate in the state, as well as low levels of broadband availability— with only 75% of residential BSLs served at 100/20 Mbps. **Table 18** below compares broadband subscription rates with the level of broadband availability for the five counties with highest broadband subscription rates and the five counties with the lowest broadband subscription rates.

[223] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.
[224] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

Table 18: Broadband Subscription Rates vs. Broadband Availability[225]

County	% of Households with Broadband Subscription	Rank of % Households with a Broadband Subscription	% Residential BSLs Served at 100/20	Population per Square Mile
Renville	89.8%	1	90.24%	2.7
McKenzie	88.2%	2	81.11%	5.0
Bowman	88.1%	3	100.00%	2.6
Morton	87.8%	4	99.22%	17.1
Ward	87.7%	5	97.18%	34.6
Divide	71.9%	49	79.66%	1.7
Sheridan	71.8%	50	94.32%	1.4
Sioux	70.7%	51	95.65%	3.7
Emmons	70.3%	52	100.00%	2.2
Benson	68.8%	53	75.10%	4.4

To better understand the link between broadband subscription and broadband availability, average broadband subscription rates of counties with high and low percentages of served BSLs were analyzed. The analysis reveals that there is a very small difference in average broadband subscription rates between counties with high percentages of served residential BSLs and counties with low percentages of served BSLs. For instance, counties with 90% or less of all residential BSL's served at 100/20 Mbps had average broadband subscription rates of 78.99%. Comparatively, counties with 100% of residential BSL's served had on average broadband subscription rates of 79.26%— a less than 1-percentage point difference. This analysis suggests that while broadband subscription rates are slightly higher on average in counties with high broadband availability, broadband adoption is not strongly tied to broadband availability in North Dakota. Although North Dakotans have access to quality broadband infrastructure, there appear to be other factors prohibiting people from adopting high-speed internet in the state.

A more comprehensive analysis of the potential drivers of inequalities in broadband adoption revealed that counties with high percentages of covered populations[226], particularly low-income populations, correspond to counties with low broadband subscription rates.

3.4.3 Broadband Affordability

As discussed in **Section 3.3.3**, cost can be a significant barrier to broadband adoption for low-income households. Currently, ACP is one of the largest programs in North Dakota aimed at lowering the cost barrier to internet adoption among low-income households. The discussion below provides an analysis of the current state of ACP participation in North Dakota.

Based on data from the Education SuperHighway, a national nonprofit organization focused on closing the digital divide, North Dakota's ACP participation rate is 11% (compared to the national

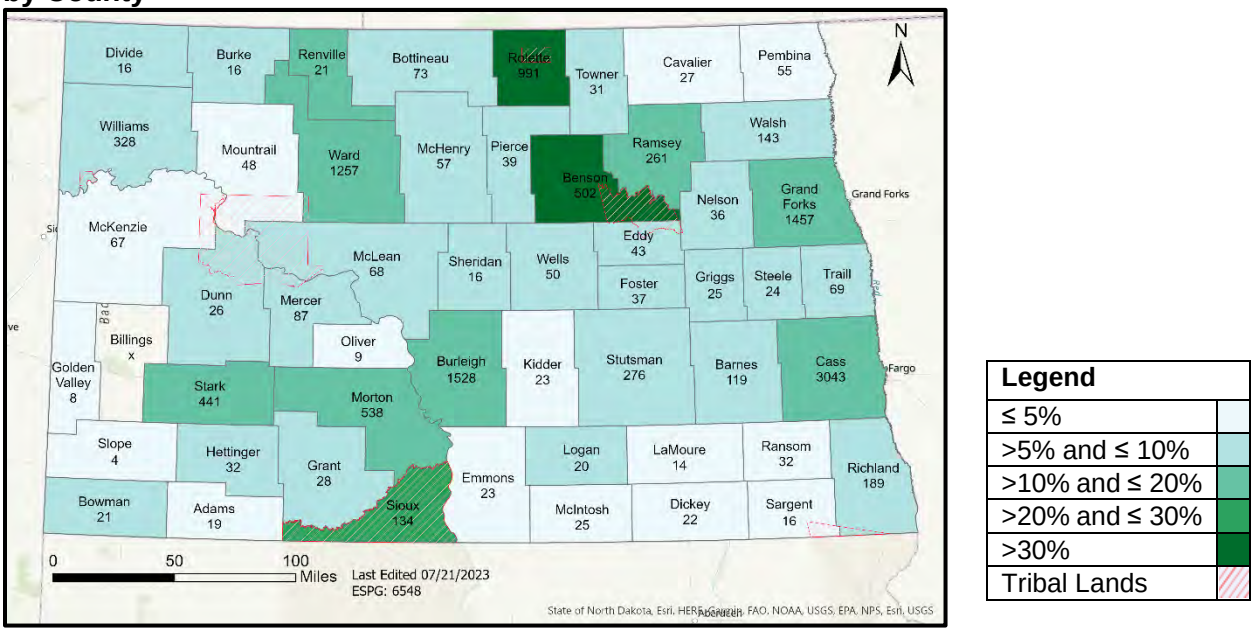
[225] *Data for Table 19 was sourced from Version 2 of the FCC BDC Map and 2021 ACS 5-year estimates.*
[226] *Covered populations include: 1. Individuals who live in covered households 2. Incarcerated individuals 3. Individuals with disabilities, 4. Individuals who are members of a racial or ethnic minority group, 5. Aging individuals, 6. Veterans, 7. Individuals with a language barrier, 8. Individuals who primarily reside in a rural area.*

participation rate of 34%). Of the 114,650 ACP eligible households in North Dakota, 12,438 are enrolled in ACP.[227]

In North Dakota, ACP participation is not uniform throughout the state. A 55-percentage point gap exists between the county with the lowest participation rate and the county with the highest participation rate.

Figure 18 below illustrates ACP participation for all counties in North Dakota and details the estimated number of households enrolled in ACP. Eight counties in the state have ACP participation rates of less than 5%, including LaMoure (2.4%), Dicky (3.1%), and Emmons (3.4%) counties. The total number of households enrolled in ACP in these three counties is just below 60. On the other hand, Rolette, Benson, and Sioux counties have the highest ACP participation rates in the state at 57%, 55%, and 22%, respectively. These three counties also rank in the top three for counties with the highest percentages of low-income individuals, suggesting that high ACP participation corresponds with higher percentages of low-income populations in counties. Furthermore, these counties are home to Tribal Entities, which are eligible for a higher $75 dollar discount through ACP, as compared to the typical $30 discount. Given that 75% of counties in North Dakota have an ACP participation rate of less than 10%, a need exists to increase awareness about the program.

Figure 18: ACP Participation Rate and Estimated Number of Households Enrolled in ACP by County[228]



[227] Education SuperHighway (accessed on May 9, 2023), Affordable Connectivity Program Enrollment Dashboard. Accessed at: https://www.educationsuperhighway.org/no-home-left-offline/acp-data/.

[228] *Notes about ACP Participation by County:*

1. *Data regarding the participation rate for ACP by county is not made available by the USAC. For the county level analysis, ACS 2021 5-Year estimates (table S1901) were used to estimate the number of households eligible for ACP.*
2. *The ACS does not provide an estimate for the number of households with incomes less than 200% of the federal poverty level. To derive the number of households below 200% of the poverty level, the average household size in ND, 2.37, was identified. Based on this, the poverty threshold for a 2-person household, $39,440, was used as the income benchmark.*

According to a 2023 survey issued by the Benson Institute, half of ACP eligible households in the United States are still unaware that the program exists.[229] Importantly, two thirds of the households that were not aware of ACP indicated that they would likely apply for ACP if they were given more information. This finding suggests that increasing outreach to ACP eligible households can be an effective tool for increasing participation.

The importance of ACP awareness offers a potential explanation for the concurrence of high ACP participation rates and high numbers of low-income individuals across counties. The top three counties based on ACP participation rates are also the top three counties in terms of percentage of low-income individuals. Five of the next six counties based on ACP participation rates have urban centers with large numbers of low-income individuals. Given the large proportion and number of low-income individuals, these counties offer additional services and programs aimed at supporting and assisting these vulnerable populations. The greater number of program offerings may coincide with increased awareness of the benefits of ACP. Conversely, in rural areas it is more difficult to distribute information given the lower concentration of eligible individuals and populations more generally. Limited awareness of ACP given the rural nature of the state offers a potential explanation for the lower participation rate compared to the national average, as estimated by Education Superhighway.

ISPs also play an important role in ACP participation as they are often the main organization educating the public on who qualifies and how to enroll. Based on a 2023 survey that was issued to BAND members, ISPs in North Dakota stated that one of their primary reasons for participating in ACP was to meet their customers' needs and offer more affordable prices. As such, according to FCC data, 83 ISPs are participating in ACP in North Dakota.[230] Of the 83 total ISPs, 40 are offering fixed broadband, fixed and mobile broadband, or both. To better understand the cost barrier to broadband adoption in North Dakota, the prices of the lowest tier broadband plans offered by ACP participating ISPs were analyzed. For ISPs that have price points listed on their websites, the average cost of the lowest-tier internet plan was $60 per month.[231] This is significantly higher than the national average of $46 per month.[232] It is important to note that this analysis of internet plan prices includes some "underserved" plans with speeds below 100/20 Mbps but above or equal to 25/3 Mbps. Additionally, speed levels for the lowest-tier plans differed widely among ISPs.

Given that the average cost for a broadband subscription is around $60 per month in North Dakota, the ACP discount of $30 will not completely subsidize the cost of internet for many low-

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3. *ACP eligible households using the income-only criteria was divided by the total ACP enrollment by county data from USAC. However, research from USC found that using income alone as a criterion for ACP eligibility will overestimate ACP participation rate. To account for this, a 1.30 ratio was used to adjust the participation rate. For a full explanation on the methodology, access this report:https://arnicusc.org/wp-content/uploads/2022/10/Policy-Brief-2-ACP-eligibility-final.pdf.*
4. *Note that Billings County is unshaded in the map because ACP enrollment data was not available through the USAC.*

[229] Benson Institute for Broadband & Society (published on March 17, 2023) Half of ACP-Eligible Households Still Unaware of the Program. Accessed at: https://www.benton.org/blog/half-acp-eligible-households-still-unaware-program?utm_campaign=Newsletters&utm_source=sendgrid&utm_medium=email

[230] Federal Communications Commission (accessed on May 9, 2023), Affordable Connectivity Program Providers. Accessed at: https://www.fcc.gov/affordable-connectivity-program-providers.

[231] *Statistic was derived by researching ISP websites and compiling data on the cost of the lowest tier internet plan offered.*

[232] USTelecom (published on June 29, 2022), 2022 Broadband Pricing Index. Accessed at: https://ustelecom.org/research/2022-bpi/.

income households. This finding is consistent with the results from the Benson Institute survey, which found that a majority of ACP enrolled households stated that the ACP subsidy does not completely cover their cost of internet coverage. [233] NTIA research has found that 3 out of 4 offline households were not willing to pay any amount for internet. Among the offline households that were willing to pay, the average willingness to pay for internet was $10 per month.[234] Overall, this analysis indicates that while increasing ACP participation is an important effort for the state, many low-income households who are unwilling or unable to pay for internet coverage may need additional financial assistance. Therefore, awareness efforts alone may not be enough to address affordability concerns and increase adoption and additional measures may be necessary.

3.4.4 Broadband Access

Public access assets, such as public Wi-Fi and mobile broadband, allow North Dakotans to connect to high-speed internet outside of their homes and business. While public libraries facilitate broadband access by providing free Wi-Fi, a lack of outreach efforts to publicize broadband-related offerings reduces the public's awareness and, therefore, utilization of these resources. Mobile broadband also facilitates broadband access across the state; however, gaps in coverage can prevent people from connecting to crucial broadband services when not connected to fixed broadband.

Figure 7 shows how libraries are distributed across the state. While some of these libraries provide public Wi-Fi and device-sharing programs to many communities, two thirds do not communicate access to public Wi-Fi on their website. In addition, pockets of North Dakota lack coverage to mobile broadband, especially in rural areas in the central and western regions, as seen in **Figure 9**. To facilitate greater awareness of the resources promoting broadband access, the state may benefit from creating a centralized and up-to-date inventory that stores information regarding the location of public access points and types of resources offered. An up-to-date database will help individuals navigate and identify the locations that will address their broadband accessibility needs (e.g., public Wi-Fi, public-use computers, and mobile devices).

3.4.5 Digital Equity

Promoting digital inclusion in the state requires an understanding of the needs and barriers faced by North Dakotans. This section summarizes the digital skills needs of the state and explores broadband adoption among the most vulnerable populations to understand the drivers of digital inequity in the state.

To understand North Dakota's needs related to digital inclusion, the North Dakota Department of Commerce surveyed close to 100 employees from Job Service North Dakota Workforce Centers and Adult Education Centers. [235] While results from the survey are not a direct quantitative measure of digital skills, they still provide useful insights into the digital inclusion needs of North Dakotans. A key finding from the survey was that there is overwhelming consensus among staff, from both centers, that the students they support lacked digital skills. In fact, over 70% of staff agreed that there is a widening gap between the digital skills of job seekers and those required

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[233] Benson Institute for Broadband & Society (published on March 17, 2023) Half of ACP-Eligible Households Still Unaware of the Program. Accessed at: https://www.benton.org/blog/half-acp-eligible-households-still-unaware-program?utm_campaign=Newsletters&utm_source=sendgrid&utm_medium=email

[234] National Telecommunications and Information Administration (accessed on June 6th, 2023), New Analysis Shows Offline Households Are Willing to Pay $10-a-Month on Average for Home Internet Service, Though Three in Four Say Any Cost is Too Much. Accessed at: https://ntia.gov/blog/2022/new-analysis-shows-offline-households-are-willing-pay-10-month-average-home-internet

[235] North Dakota, Department of Commerce (published on August 2022), North Dakota Fundamental Digital Literacy Research and Recommendations. Accessed at: https://www.medialibrary.nd.gov/assetbank-nd/assetfile/121546.pdf

by the job market in North Dakota. Overall, the survey is consistent with the data indicating that there is a digital skills gap in the state (see **Section 3.3.5**).

The survey also collected responses from workforce center staff regarding what needs to be done to have a workforce that is digitally skilled and ready for the workplace. Key insights from the staff have been summarized below:

1. Offer more basic computer skills classes that teach email etiquette, typing and basic Microsoft Office usage.
2. Increase the amount of training programs offered at low costs.
3. Make digital skills trainings easily accessible to all job seekers.
4. Integrate digital-skill training into all levels of education.
5. Offer training for occupation-specific technology uses.
6. Encourage employers to offer job-specific technology trainings to new hires.

One of the overarching themes from the survey was that North Dakota needs to offer more trainings related to basic hardware and software skills. Some survey respondents emphasized that the trainings need to be accessible to all populations, including rural North Dakotans, and should be advertised as requiring no prior technology skills. A second theme from the survey was to integrate digital skills, both basic and advanced, into the K-12 curriculum and to encourage digital skills training from a young age.

To address the digital skills gap and promote digital inclusion, North Dakota will need to encourage digital participation among traditionally underrepresented communities, also defined as "covered populations" by The Digital Equity Act.[236] Adopting broadband is a fundamental step for covered populations to participate in the digital economy, as it creates opportunities to apply for jobs online, pursue remote work opportunities and participate in online training courses, and much more. The following discussion delves deeper into the distribution of covered populations and its relationship with broadband adoption.

Rural Covered Population Group

Research suggests that a disparity in home broadband adoption exists between individuals living in rural and urban areas.[237] A similar trend exists in North Dakota where, on average, less populated counties have lower broadband subscription rates compared to more densely populated counties. The average broadband subscription rate for counties with populations of less than 3,000 was 79%, compared to 83% for counties with populations greater than 10,000[238]. However, it is important to highlight that there are certain rural counties that are leading the state in terms of broadband adoption. For instance, Renville County, despite having a population of only 2,283, has the highest broadband subscription rate, at 90%. Similarly, Bowman and Sargent counties rank in the top six for highest broadband subscription rates but have populations of less than 4,000. This may be explained by the relatively low numbers of other covered populations within these counties.

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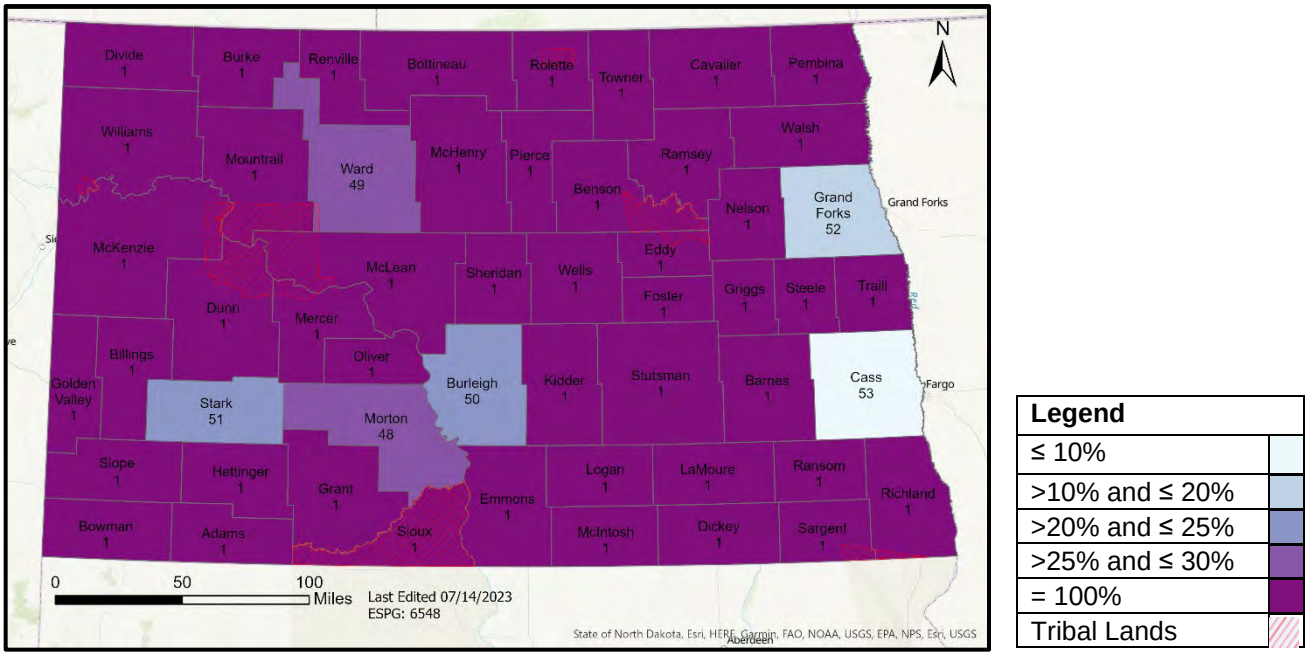
[236] *Covered populations include: 1. Individuals who live in covered households 2. Incarcerated individuals 3. Individuals with disabilities, 4. Individuals who are members of a racial or ethnic minority group, 5. Aging individuals, 6. Veterans, 7. Individuals with a language barrier, 8. Individuals who primarily reside in a rural area.*

[237] United States Department of Agriculture (published in 2021), Rural America at a Glance. Accessed at: https://www.ers.usda.gov/webdocs/publications/102576/eib-230.pdf?v=8149.8.

[238] *Note: Based on FCC BDC data as of July 12, 2023, the estimate utilizes the NTIA definition of unserved and underserved as locations receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum*

Figure 19: Percentage of Rural Population by County[239]



Low-Income Covered Population Group

In North Dakota, 30% of households with incomes below $20,000 do not have a broadband subscription, compared to only 5% for households with incomes of $75,000 or higher. **Table 19** below illustrates this disparity in broadband subscription rates based on income.

Table 19: Broadband Subscription rates by Household Income[240]

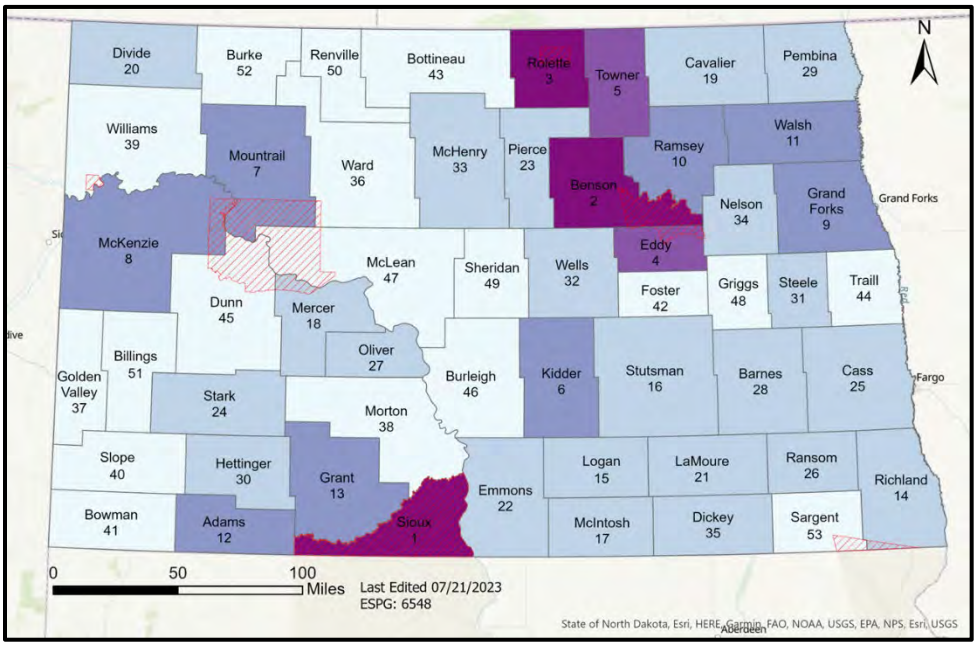
Household Income	Total Households	Households with Broadband Subscription	Percent
Less than $20,000	42,683	30,407	71.2
$20,000 to $74,999	136,281	117,130	85.9
$75,000 or more	143,547	136,454	95.1

Furthermore, analysis of the percentage of low-income individuals by county reveals that high percentages of low-income populations coincide with low broadband subscription rates. **Figure 20** below illustrates the percentage of individuals with incomes below 150% of the poverty level by county. Sioux, Benson, and Rolette Counties have the highest percentages of low-income

[239] United States Census Bureau (published in 2021), Total population by county. Accessed at: Census Bureau Tables.
[240] United States Census Bureau (published in 2021), Types of Computers and Internet Subscriptions 2021 5-Year estimates. Accessed at: https://data.census.gov/table?q=internet+subscription+&g=040XX00US38&tid=ACSST1Y2021.S2801.

individuals in the state with 54%, 41%, and 40% low-income individuals, respectively. Furthermore, Sioux, Benson, and Rolette Counties rank 53rd, 51st, and 44th for broadband subscription rates, respectively. This observation suggests that there is a relationship between broadband adoption and percentage of low-income population. To further investigate this relationship an analysis was conducted which found that counties with 15% or less low-income populations had an average broadband subscription rate of 83%. In contrast, for counties with 30% or more low-income populations the average broadband subscription rate was 72%— an 11-percentage point difference.

Figure 20: Percentage of Low-Income Individuals by County[241]

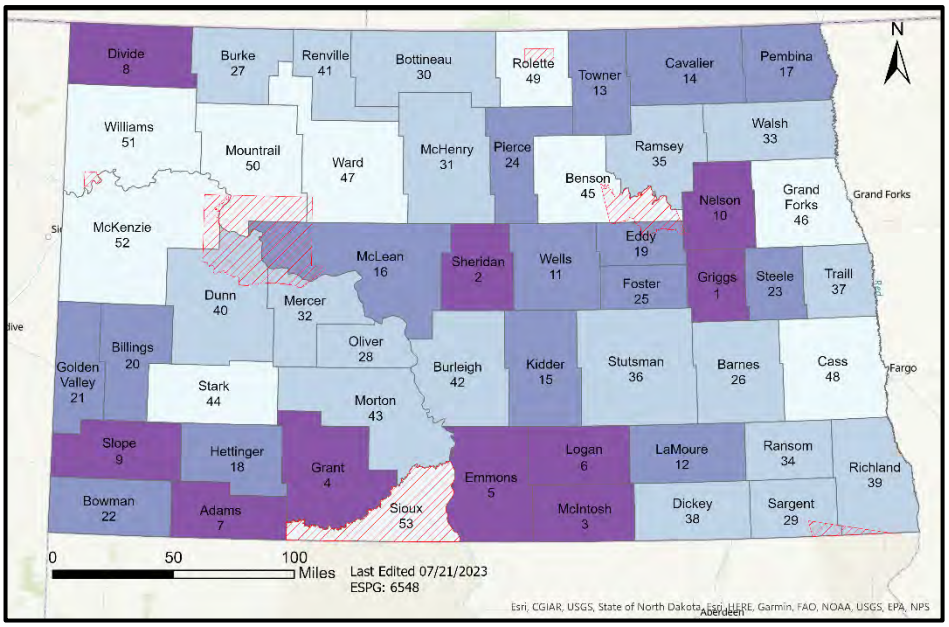


Aging Individuals Population Group

Aging individuals are the second largest covered population in North Dakota and represent another group that is vulnerable to disparities in broadband adoption. **Figure 21** below illustrates the aging population (individuals 60 and over) by county. Griggs, Sheridan, and McIntosh counties have the largest aging population in the state with approximately 40% of their population including individuals who are 60 and above. Additionally, Sheridan and McIntosh rank 50th and 45th in the state for broadband subscription rates. This suggests that counties with large aging populations correspond with low broadband adoption rates.

[241] United States Census American Community Survey (published in 2021), Poverty Status in The Past 12 Months 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=poverty+characteristic+of+families&g=040XX00US38,38$0500000&tid=ACSST5Y2021.S1701.

Figure 21: Percentage of Individuals Aged 60 and Above[242]



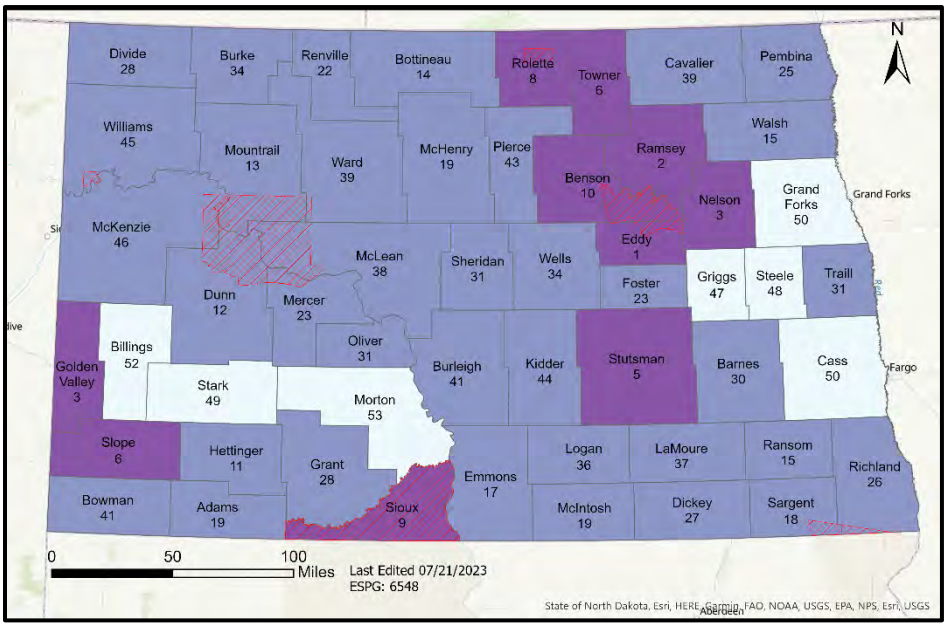
Legend	
≤ 20%	
>20% and ≤ 30%	
>30% and ≤ 35%	
>35%	
Tribal Lands	

Individuals with Disabilities Population Group

In total, individuals with disabilities account for 11% of North Dakota's population. Counties with the highest percentages of these individuals are Eddy (20%), Ramsey (19%) and Golden Valley (18%) as seen in **Figure 22** below. Additionally, these three counties rank 34th, 23rd, and 27th in terms of broadband subscription rates. As mentioned above, a correlation analysis between broadband subscription and the percentage of the population that represents individuals with disabilities yielded a correlation coefficient of -0.34, indicating that a statistically significant negative relationship exists between the two variables. This relationship is supported by research conducted by the Department of Labor, which found that Americans with disabilities are less likely to have an internet subscription at home compared to the rest of the population.[243] Additionally, even when individuals with disabilities have access to broadband at home, they are less likely than those without a disability to use the internet for a variety of reasons. **Section 3.3.5** further explores the barriers to broadband adoption faced by this population in North Dakota.

[242] United States Census American Community Survey (published in 2021), ACS Demographic and Housing Estimates 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp05&g=040XX00US38,38$0500000&tid=ACSDP5Y2021.DP05.
[243] Department of Labor (published in June 2022), Disability and the Digital Divide: Internet Subscriptions, Internet Use and Employment Outcomes. Accessed at: https://www.dol.gov/sites/dolgov/files/ODEP/pdf/disability-digital-divide-brief.pdf.

Figure 22: Percentage of Individuals with Disabilities by County[244]



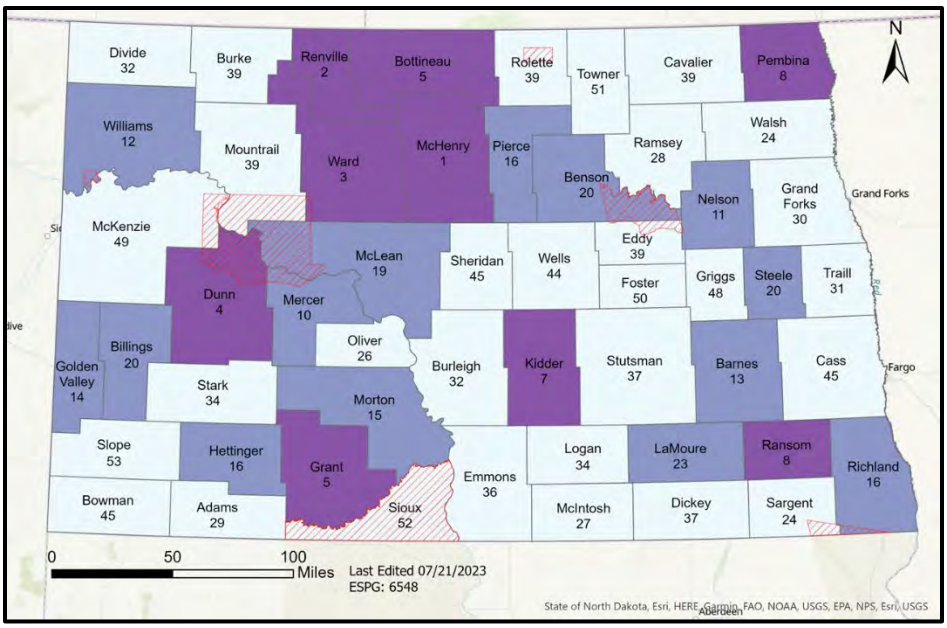
Legend	
≤ 10%	
>10% and ≤ 15%	
>15%	
Tribal Lands	

Veteran Population Group

The total veteran population in North Dakota is close to 8%. Figure 11 below demonstrates that the counties with the largest veteran populations include McHenry (12.5%), Renville (12.2%) and Ward (11.7%). These three counties rank 28th, 1st, and 5th in terms of broadband subscription rates.

[244] United States Census American Community Survey (published in 2021), ACS Demographic and Housing Estimates 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp05&g=040XX00US38,38$0500000&tid=ACSDP5Y2021.DP05.

Figure 23: Percentage of Veterans by County[245]



Racial or Ethnic

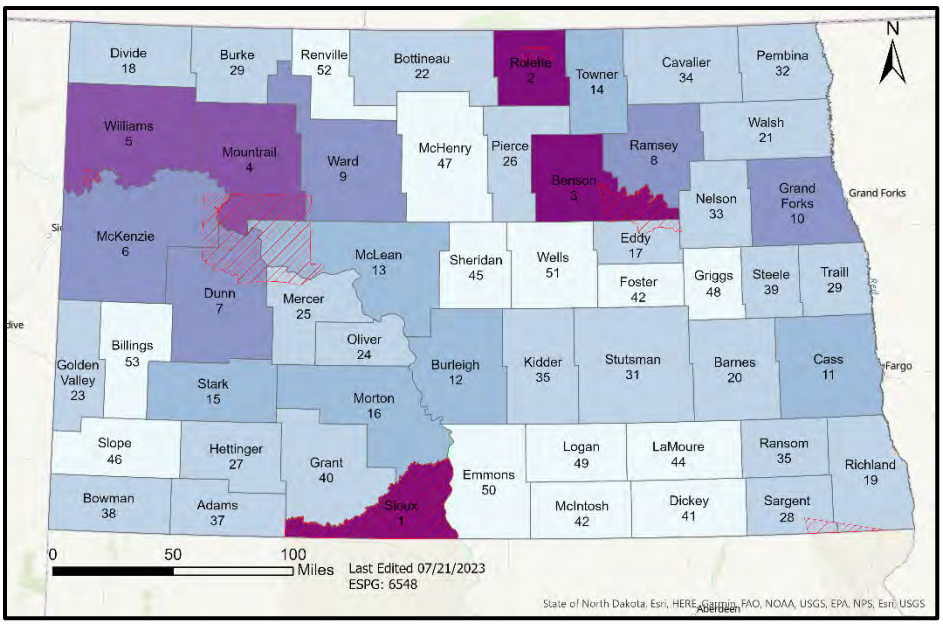
Legend	
≤ 8%	
>8% and ≤ 10%	
>10%	
Tribal Lands	

Minority Population Group

In total, 15% of North Dakota's population is part of the racial or ethnic minority covered population group as seen in **Figure 25** below. While the majority of counties in North Dakota have racial and ethnic minority populations of less than 10%, a few counties in the state have higher percentages. Specifically, Sioux, Rolette, and Benson counties have the highest percentages of racial or ethnic minorities at 89%, 83%, and 62%, respectively and rank 53rd, 51st, and 44th in terms of broadband subscription rates. A correlation analysis indicates a statistically significant correlation coefficient of -0.30, indicating a weak negative relationship between this covered population and subscription rates.

[245] United States Census American Community Survey (published in 2021), ACS Demographic and Housing Estimates 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp05&g=040XX00US38,38$0500000&tid=ACSDP5Y2021.DP05.

Figure 24: Percentage of Racial or Ethnic Minority by County[246]



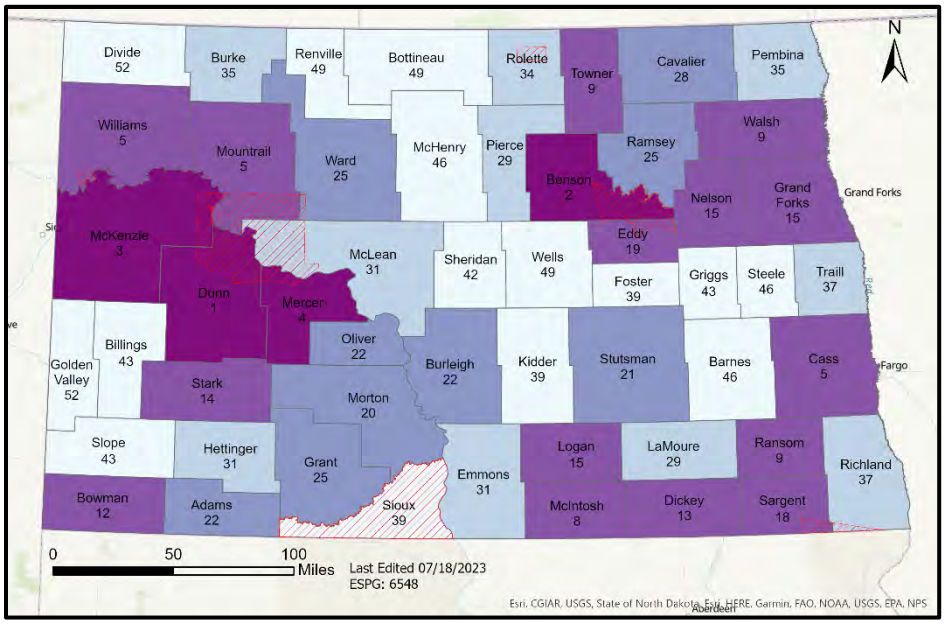
Legend	
≤ 5%	
>5% and ≤ 10%	
>10% and ≤ 15%	
>15% and ≤ 20%	
>20% and ≤ 50%	
>50%	
Tribal Lands	

Individuals with a Language Barrier Population Group

As shown in **Figure 26** below, in North Dakota, 1.9% of the population speak another language at home and speak English less than "very well." Five counties have a population of English learners that is greater than 3%, and each of these counties have below state average broadband subscription rates. Pembina has the highest percentage of English learners in the state and ranks 40th, and the next four counties with the highest percentage, McHenry, Mountrail, Billings, and Kidder, rank 28th, 38th, 36th, and 47th, respectively.

[246] United States Census American Community Survey (published in 2021), ACS Demographic and Housing Estimates 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp05&g=040XX00US38,38$0500000&tid=ACSDP5Y2021.DP05.

Figure 25: Percentage of Population with a Language Barrier: English Learners by County[247]



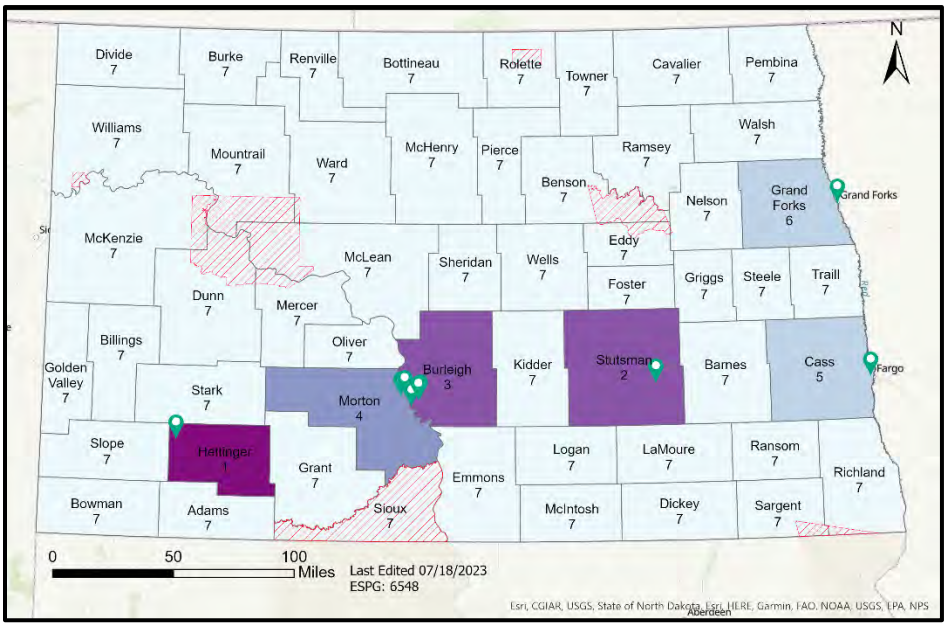
Legend	
≤ 0.5%	
>0.5% and ≤ 1%	
>1% and ≤ 1.5%	
>1.5% and ≤ 3%	
>3%	
Tribal Lands	

Incarcerated Population Group

North Dakota's nine correctional facilities are located in seven counties with five facilities located in the Bismarck-Mandan metro area (see **Figure 26** below). Given only 0.2% of the state is currently incarcerated, limited connections can be made between broadband subscription rates and the presence of incarcerated individuals. However, the more rural counties where correctional facilities are located, Hettinger and Stutsman, rank in the bottom half of broadband subscription rates with 80% and 79% adoption respectively.

[247] United States Census American Community Survey (published in 2019), ACS Demographic and Housing Estimates 2019 5-Year Estimates. Accessed at: https://data.census.gov/table?q=dp05&g=040XX00US38,38$0500000&tid=ACSDP5Y2021.DP05

Figure 26: Percentage of Incarcerated Population by County[248]



Legend	
= 0%	
>0% and ≤ 0.1%	
>0.1% and ≤ 1%	
>1% and ≤ 5%	
>5%	
Tribal Lands	
Facility Location	

North Dakota's broadband needs span across deployment, access, adoption, affordability, and digital inclusion. Today, North Dakota has extensive broadband coverage with 97% of locations receiving broadband service at ≥ 100/20 Mbps download/upload speeds. Additionally, even with leading broadband access, North Dakota's broadband subscription rate of 84% lags the national average by three percentage points.[249] One contributing factor to this relatively low adoption rate includes challenges associated with broadband affordability, as North Dakota's average low-cost plan costs ~30% more than the national average.[250] Lastly, these broadband gaps in North Dakota, like many places in the country, disproportionately affect traditionally underrepresented communities especially low-income and aging populations. As the State prepares to address its broadband and digital equity gaps, it will need to first address the obstacles that may impede the implementation of this Plan.

[248] North Dakota Department of Corrections and Rehabilitation (accessed on July 18, 2023), DOCR Adult Services Prison Population Information. Accessed at: https://www.docr.nd.gov/sites/www/files/documents/statistics/factsheets/2022%2012%2031%20FACT%20SHEET.pdf
[249] United States Census American Community Survey (published in 2021), Types of Computers and Internet Subscriptions 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=internet+subscription+band+computer+ownership&tid=ACSST5Y2021.S2801.
[250] USTelecom (published on June 29, 2022), 2022 Broadband Pricing Index. Accessed at: https://ustelecom.org/research/2022-bpi/.

4 Obstacles or Barriers

North Dakota's implementation plan seeks to address the needs and gaps for broadband deployment, adoption, affordability, access, and digital equity in the state. Critical to the execution of the implementation plan is understanding the obstacles and barriers that currently exist or may arise during the execution of the Plan. This section outlines potential obstacles and explores their effects on the timeline and cost associated with implementation.

Table 20: Potential Barriers to Implementing the BEAD Plan

Category	Barrier	Definition	Broadband Deployment	Broadband Adoption	Broadband Affordability	Broadband Access	Digital Equity
Regulatory	Permitting & easements	Permitting challenges may cause delays in project rollout	x				
Physical limitations	Materials availability	Scarcity and prohibitive price of materials needed to deploy broadband projects	x				
Physical limitations	Topography	Difficulties deploying broadband given terrain	x				
Inclusion & adoption	Affordability	Low levels of ACP adoption in the state causing limitations in broadband affordability		x	x		x
Inclusion & adoption	Digital literacy & lack of awareness	Underrepresented populations untrained/unable to navigate digital domain		x		x	x
Physical limitations	Labor shortages	Employment deficits across key BEAD occupations	x				
Inclusion & adoption	Data limitations	Potential data deficiencies related to the identification of unserved and underserved locations	x				
Regulatory	Letter of credit requirement	Additional burden on smaller businesses due to letter of credit requirement	x				

Potential Barrier #1: Permitting & Easements

When relaying broadband assets across large areas, projects often must cross land features that require additional permitting and easements. These regulatory hurdles can create delays in broadband deployment. Various stakeholders have noted that challenges receiving pole agreements, crucial to aerial fiber deployment, have served as a barrier to extending broadband service to unserved and underserved areas. They have noted that pole agreements have become increasingly cost-prohibitive, and the permitting timelines have become a longer process. There is a need to preemptively address the construction delays due to permitting and easement challenges to facilitate the efficient and timely completion of broadband projects.

When broadband projects must cross or enter private land, the cost of easements can cause additional barriers to deployment in North Dakota. Stakeholders have noted that landowners in the state have started to require greater compensation to sign easement agreements, comparing broadband easements to other land use agreements that offer higher sums. Increasing easement costs means that the State will need to allocate a greater portion of funds to permitting and regulatory costs, which may detract from the number of unserved and underserved locations addressed.

Potential Barrier #2: Materials Availability

North Dakota may face challenges procuring the materials required for broadband projects across the state. Stakeholders have highlighted two factors that may cause shortages in required materials; 1) purchasing restrictions associated with federal funds and 2) supply constraints given the magnitude of funded projects planned for the same time.

The Infrastructure Act dictates that BEAD funds must comply with the Build America, Buy America Act requiring that all raw and construction materials used in the project or other eligible activities be produced in the United States (unless a waiver is granted). Stakeholders are concerned that this requirement might hinder the State's ability to efficiently and expediently provide coverage to all unserved and underserved locations in the state.

Additionally, stakeholders in North Dakota are concerned that the $42.5B created through the BEAD Program to fund broadband projects nationwide will impose materials shortages and impact the cost and timeline of potential projects. Lengthened project timelines and increased costs may limit the total number of locations served and may decrease the potential impact of the BEAD funds.

Potential Barrier #3: Affordability

A key factor that facilitates broadband adoption includes greater broadband affordability. While ACP offers discounts to qualifying households, these households are still required to enroll in the program to capitalize on these benefits. Based on Education Superhighway estimates, North Dakota's ACP enrollment rate of 11% is well below the national average (34%). While the exact causes of the low subscription rate in the state are unclear, it can partially be attributed to limited awareness of the program and/or the perception that the discounted cost still exceeds the value of broadband access. To counteract these limitations, the FCC has created outreach grants to help educate and encourage people to enroll in ACP discounts. Community Action Partnership of North Dakota and the University of North Dakota received ACP outreach funding in March 2023. However, low enrollment may remain an obstacle for broadband adoption.

Potential Barrier #4: Topography

When evaluating the cost of deploying broadband, it is crucial to consider the geography and topography of the land the assets need to transverse. Wireline broadband either needs to be buried or hung and wireless broadband signals needs to propagate with limited obstructions.

Given the expansive and rolling nature of the Red River Valley and the Great Plateau regions, topography is not a major barrier for deployment in the immediate area. However, in the hilly Badlands regions to the west, topography becomes a greater consideration and obstacle for broadband deployment. Stakeholders in the state noted that the remaining unserved and underserved locations in the Western Badlands region may be difficult to serve given this constraint.

Potential Barrier #5: Digital Skills

In North Dakota, digital skills present a barrier to achieving widespread broadband adoption. While the State has made significant strides expanding broadband infrastructure, it remains crucial to ensure individuals – especially covered populations – possess the requisite skills to effectively use and benefit from broadband services. Limited digital skills can hinder broadband adoption by impeding individuals' understanding of technology, causing hesitancy and lack of confidence using digital tools, and restricting access to and utilization of critical online resources (e.g., education, ecommerce, telehealth). Stakeholders within the state noted the digital skills gap is particularly pronounced within Tribal Lands and veteran and aging populations.[251] For example, as noted in **Section 3.4.2**, while Emmons and Sioux counties have high levels of broadband access (88% and 93% respectively), they have low levels of adoption with only 70% and 71% households possessing broadband subscriptions.[252]

The lack of cybersecurity training and awareness presents another barrier to achieving digital equity in North Dakota. As technology becomes increasingly integrated into various aspects of daily life, individuals are often untrained in cybersecurity practices and may face heightened risks and vulnerabilities. Without proper cybersecurity training, individuals may fall prey to online scams, phishing attacks, identity theft, or other cyber threats. Additionally, lack of awareness about safe online practices and the importance of securing personal information can lead to a reluctance to engage in digital activities, hindering access to critical online resources and services.

A critical aspect of digital skills is an awareness of the benefits that come with broadband adoption. Some underrepresented populations remain unaware of the benefits and opportunities that high-speed internet access can offer. Limited awareness can prevent individuals from understanding the positive impact broadband can have on communication, civic engagement, education, healthcare, and economic opportunities. Without a clear understanding of these advantages, some individuals have not prioritized adopting broadband or remain unmotivated to seek out available options.

Potential Barrier #6: Labor Shortages

In addition to the supply chain disruptions that may cause deployment delays, labor shortages represent a key constraint to the implementation of the Five-Year Action Plan. As demonstrated in **Figure 16,** BEAD demand represents 6% of North Dakota's cross-industry deficit. Many of these key occupations where North Dakota exhibits a labor shortage require or typically constitute more informal training, such as apprenticeship programs and on-the-job training. However, these apprenticeships and training requirements can often extend over multiple years, necessitating a proactive approach to prepare the workforce in advance of implementation. The immediate workforce needs as a function of BEAD-funded projects will put additional constraints on North Dakota's existing labor force gaps. The State will need to consider both immediate and long-term

[251] Preliminary takeaways from AARP of North Dakota and North Dakota Health and Human Services
[252] United States Census American Community Survey (published in 2021), Selected Social Characteristics 2021 5-Year Estimates. Accessed at: https://data.census.gov/table?q=DP02&g=040XX00US38&tid=ACSDP5Y2021.DP02.

workforce development solutions to ensure that the state has a skilled workforce that is not only ready for immediate deployment projects, but also prepared for the longer-term maintenance associated with this infrastructure. When considering immediate workforce development solutions, North Dakota also faces barriers. Given the shortened construction window in the state due to the construction difficulties during the winter, the state has issues retaining a contract workforce. Contracted works tend to prefer working in state that have year-round construction windows, which further constrains the North Dakota workforce.

The successful implementation of North Dakota's Five-Year Action Plan hinges on the State's ability to address the identified barriers outlined in this section. Challenges related to permitting and easements as well as the availability of materials pose potential delays to projects and increased costs that could limit the state's effective and timely development of broadband assets. In addition, the geographic characteristics in the western regions of the state may create similar challenges for deploying broadband. In addition to barriers to broadband deployment, the State has identified potential challenges for digital adoption and inclusion goals, such as affordability concerns. While the State's implementation plan will seek to address these barriers, other challenges may become apparent to the State as it begins to execute the Plan.

Potential Barrier #7: Data Limitations

To successfully connect every location in North Dakota to high-speed, reliable internet, the state must know the addresses of all unserved and underserved locations. Currently, the State relies on the FCC National Broadband Maps to determine whether a location is served, underserved, or unserved. As the BEAD Program outlines, download and upload speeds are the primary measures of determining if a location is served, underserved, or unserved. During conversations with community members and ISPs, stakeholders raised concerns regarding the potential for certain locations to be excluded from the Broadband Maps and potential inconsistencies in reported speeds. This reliability concern remains particularly true for locations that are currently served with fixed wireless technologies.

These data limitations create a barrier for the State to identify and serve all unserved and underserved locations. Through ongoing conversations with ISPs and other community members, the State plans to fill in potential data gaps and refine its understanding of which locations still lack reliable broadband service. However, without perfect data, there still remains the potential for certain unserved and underserved locations to remain unknown.

Potential Barrier #8: Letter of Credit Requirement

The BEAD Program requires grant applicants to submit a letter of credit from a qualified bank to demonstrate the ability to meet program requirements throughout the construction period. Given the 25% match requirement, the Program's guidance dictates that awardees must submit a letter of credit for 25% of the project's costs. In order to receive this letter of credit, potential grant recipients must provide collateral to the issuing bank. This will disproportionately impact minority and woman-owned businesses, smaller businesses, and nonprofits, as these organizations may not have the necessary capital to meet this requirement. Consequently, this can potentially limit the pool of providers that can participate in BEAD, particularly smaller ISPs.

5 Implementation Plan

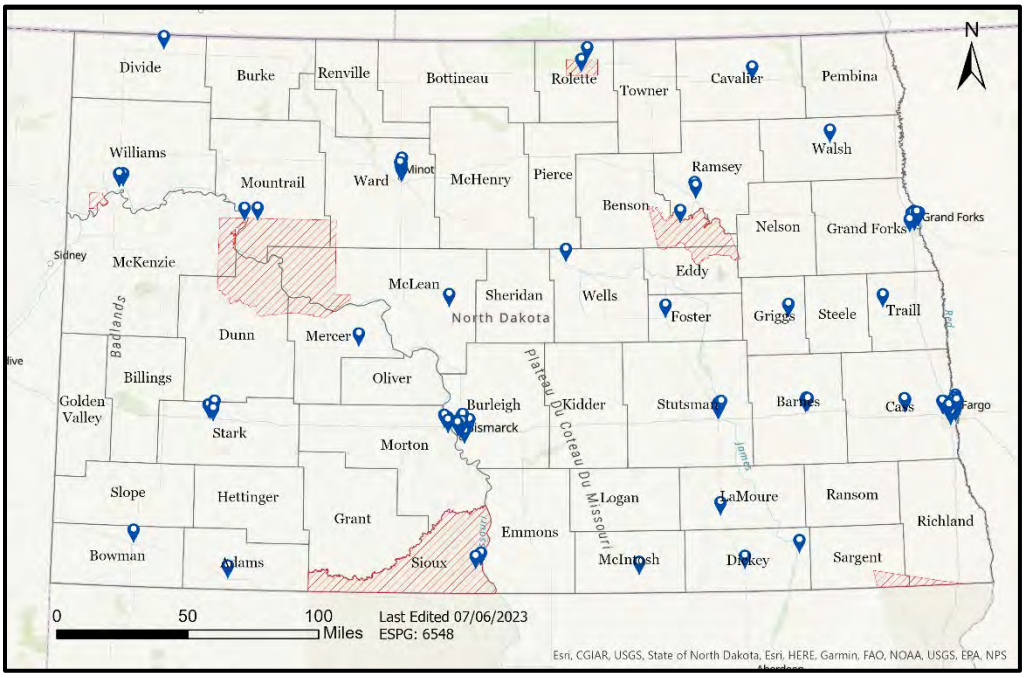
5.1 Stakeholder Engagement Process

To support the development of this Five-Year Action Plan and North Dakota's BEAD Five-Year Action Plan, a significant amount of stakeholder and public engagement was initiated by North Dakota and its partners.

Stakeholder Identification

To ensure the inclusion of diverse stakeholder groups throughout the BEAD Program, the State has developed a comprehensive stakeholder list with a wide range of organizations, including tribal governments, state agencies, associations of county and municipal governments, institutions of higher education, agencies responsible for implementing workforce development programs, economic development organizations, community action institutions, labor unions, ISPs, and nonprofit organizations, particularly those supporting the covered populations as defined by NTIA's Digital Equity Act programs.

Figure 27: Geographic Map of Engaged Stakeholders to Date[253]



Legend	
Stakeholder group	
Tribal Lands	

The stakeholder engagement process aims to maximize statewide geographic coverage of stakeholder groups through various strategies. Organizations and state agencies providing statewide services or representing statewide populations have been prioritized for inclusion and ongoing engagement. North Dakota's current stakeholder list was designed to be comprehensive, including organizations representing the diverse needs and interests within North Dakota, such as both urban and rural agricultural communities. To encourage participation from stakeholders in areas with the most unserved and underserved locations, the State overlaid FCC broadband data with the geography of North Dakota's eight economic development regions, as shown in

[253] *Twenty-four of the stakeholders engaged are not captured in Figure 13 due to lack of address data.*

Figure 28, as identified by the North Dakota Department of Commerce. The four regions with the lowest broadband accessibility and adoption rates were targeted for additional public outreach events.

Figure 28: Economic Development Regions of North Dakota[254]

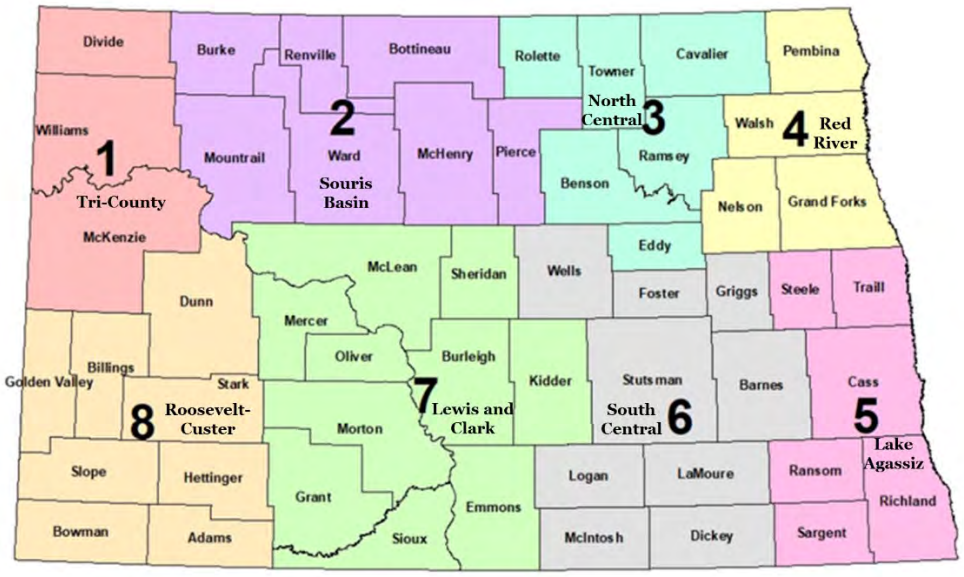


Table 21: Priority Regions for Public Outreach Events

Region	Counties Included
1	Divide, McKenzie, Williams
3	Benson, Cavalier, Eddy, Ramsey, Rolette, Towner
6	Barnes, Dickey, Foster, Griggs, LaMoure, Logan, McIntosh, Stutsman, Wells
8	Adams, Billings, Bowman, Dunn, Golden Valley, Hettinger, Stark, Slope

Stakeholder Engagement Strategies

North Dakota's stakeholder engagement includes three primary engagement methods: interviews, focus groups, and public outreach events. For each stakeholder identified to date, a preferred method of engagement has been determined based on the objectives of engagement and expected impact and influence the stakeholder has over BEAD planning. As new stakeholders are identified, the State will determine an appropriate engagement method and frequency. For example, interviews are used when gathering direct input on current broadband assets and digital equity needs. Stakeholders are included in focus groups when they can provide insights on challenges with digital inclusion, especially for covered populations as identified by the NTIA Digital Equity Program. Public outreach events aim to boost awareness and obtain

[254] North Dakota Department of Commerce (accessed on July 12, 2023), Regional Councils. Accessed at: https://www.commerce.nd.gov/community-services/community-development/community-development-block-grant-cdbg/regional-councils.

feedback from people in the most underserved areas. The State has designed the overall stakeholder engagement strategy to obtain the most meaningful feedback from each stakeholder.

In addition to these three primary engagement methods, the State solicited stakeholder feedback through formal Tribal Consultations, online surveys, and other local events and conferences. Completed stakeholder engagement activities as of July 28, 2023, are detailed below:

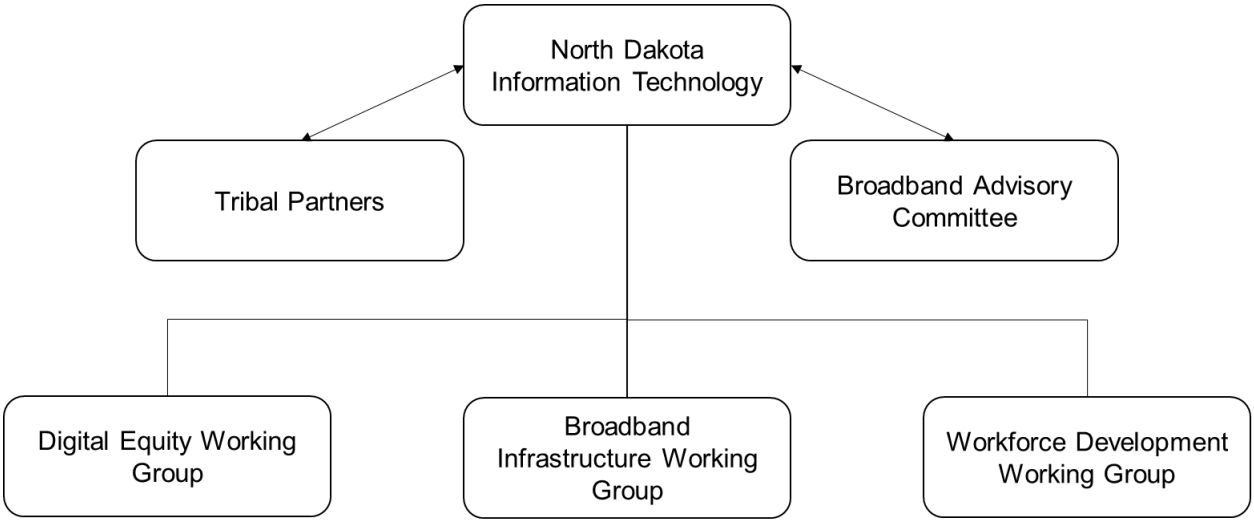
- **Interviews with 26 internal State agency and department leaders.** During these interviews, State leaders were asked about the current state of broadband from their department or agency's perspective, barriers and initiatives for digital opportunity, and planning for the future in relation to workforce and broadband access. When applicable, interview questions were customized for a deeper dive into a specific agency's unique operations and programming – particularly when the agency served at least one covered population.
- **Interviews with 12 external stakeholders.** During these interviews, organizations were asked about the current state of broadband for the populations they serve, barriers and initiatives for digital opportunity, and planning for the future in relation to workforce and broadband access. Specific interview questions were designed to obtain more information on each organization's services and programming.
- **Tribal Consultations with federally recognized Tribal Entities.** The State has conducted consultations with two of the five federally recognized Tribes in North Dakota and is working to schedule the remaining three consultations. During the initial consultations, the State has provided a general overview of current broadband programs and the planning process. Discussion aims to focus on recommendations from Tribal Entities regarding current broadband gaps and barriers, community needs, key opportunities, areas for investment, desired future state, and strategies for implementation. The State is currently working to schedule the final three Tribal Consultations with the remaining federally recognized Tribes in the state.
- **Seven targeted focus groups**. Focus group discussions were wide-ranging and meant to highlight key barriers, digital equity recommendations, and future goals for each group. Focus groups were organized by the following topic areas: Senior Services, Veterans, Tribal Colleges, Low-Income Populations, Rural Economic Development, Workforce Development, Disability Services
- Online **surveys** were distributed through select stakeholders to their members. The surveys focused on identifying geographical service gaps and digital equity needs. As part of this effort, surveys were circulated to the members of:
    - BAND whose members are local telecommunications companies and ISPs
    - North Dakota League of Cities whose members are city governments of all sizes across the state
- **Public outreach events** were attended by the State to spread awareness and gather feedback for the planning process in four priority regions with the lowest broadband accessibility and adoption rates. The following public events were part of this effort:
    - Food truck rodeo – Watford City; June 9, 2023
    - Lake Region Arts Festival – Devils Lake; June 10, 2023
    - West River Community Center Pool Party – Dickinson; July 13, 2023
    - Jamestown Arts Market – Jamestown; July 13, 2023

- Attendance at **conferences** to promote awareness of planning efforts and boost collaboration among government partners and Tribal Entities as well as among local telecommunications companies. Representatives presented information at:
    - Government to Government Conference
    - BAND Conference

Planned Ongoing Collaboration

As the State prepares to implement the BEAD Program, it will continue to collaborate with key internal and external stakeholders to help advance broadband deployment and digital inclusion efforts, particularly in communities that demonstrate the greatest need. With this in mind, the State envisions a planned partnership approach that consists of touchpoints with Tribal Governments, the establishment of a Broadband Advisory Committee, and engagement with three partner categories – the Digital Equity Working Group, the Broadband Infrastructure Working Group, and the Workforce Development Working Group. This approach is depicted in **Figure 29** and the specific engagement tactics are described below.

Figure 29: Planned Partnership Structure



- **Tribal Engagement touchpoints** to support an open dialogue about the broadband infrastructure and digital equity needs of North Dakota's Tribal Entities. These touchpoints will offer insight into the specific digital inclusion needs of each Tribal Entity. **Membership:** Each of the five federally recognized Tribal Entities in North Dakota – Sisseton Wahpeton Oyate Nation, Spirit Lake Nation, Standing Rock Sioux Tribe, Three Affiliated – MHA Nation, and Turtle Mountain Band of Chippewa. **Meeting frequency:** quarterly, or at a cadence requested by each Tribal Entity.
- **Broadband Advisory Committee** to support internal government coordination and alignment. The Broadband Advisory Committee will help the State implement on proposed activities that require coordination among internal players and will recommend best practices for broadband-ready communities throughout the state. **Membership:** State of North Dakota department and agency representatives, particularly those that provide services to covered populations. This group would also include representation from NDIT leadership. **Meeting frequency:** quarterly.

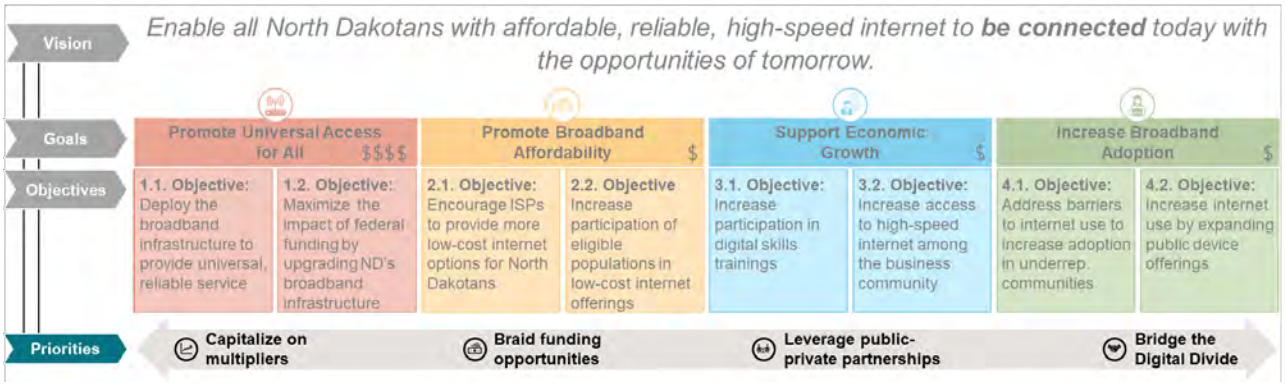
- **Working Groups** to further explore barriers and gaps and to recommend solutions to address or resolve these issues. Focus areas for these groups are:
    - **Digital Equity Working Group** to help identify and prioritize digital inclusion needs across North Dakota. Members will represent various covered populations and help bring to light the unique barriers they face related to broadband adoption, access, and affordability. The Digital Equity Working Group will also identify opportunities to address statewide digital inclusion challenges and those specific to vulnerable communities. **Membership:** Organizations representing unserved/underserved individuals and geographies and organizations providing support and/or services to covered populations. This includes but is not limited to: city/county officials, CAIs, libraries, public housing authorities, regional councils, veteran support agencies, senior service providers, disability service providers, representatives of the agricultural community, rural businesses or chambers of commerce, organizations representing incarcerated individuals, nonprofit organizations. **Meeting frequency:** monthly.
    - **Broadband Infrastructure Working Group** to represent the statewide broadband deployment and infrastructure needs. This group will primarily help identify and provide proposed solutions to implementation challenges related to broadband deployment projects. This may include the identification of policy, funding, topographic, and other constraints to help the State deliver on its commitment to provide universal access to high-speed, reliable internet. This group will also explore the feasibility of developing partnerships, especially public-private partnerships, to amplify the effects of state and federal grant funding for broadband deployment. **Membership:** ISPs, owners/operators of adjacent infrastructure and roadways, local departments of transportation, statewide information network operators, users of broadband in rural and remote areas, county and municipal governments – all with a particular representation of geographic areas that remain unserved and/or underserved. **Meeting frequency:** monthly.
    - **Workforce Development Working Group** to be tasked with supporting a skilled and ready workforce that is prepared to deliver on broadband deployment projects. This group will provide recommendations to help reconcile any discrepancies between the skills required by companies that will be charged with deployment responsibilities and those possessed by the workforce. This group will also identify the longer-term workforce needs to help support the sustainability and maintenance of buildouts. **Membership:** Workforce training agencies, administrators of adult education and literacy programs, state/local workforce boards, labor organizations, community organizations, institutions of higher learning. **Meeting frequency:** monthly.

Opportunities for Public Input

The State Broadband Program Office is committed to maintaining transparency throughout the finalization of the BEAD Five-Year Action Plan and its subsequent implementation. The State recognizes the importance of developing a BEAD Five-Year Action Plan that is representative of the lived experiences of North Dakotans. As such, the State intends to provide regular updates to the general public and simultaneously solicit their feedback on the Plan. This information will be consolidated and ultimately shared at https://broadband.nd.gov. North Dakota's BEAD Five-Year Action Plan will be posted for public comment at https://www.ndit.nd.gov/about-us/publications. The State Broadband Program Office will employ a multipronged communications approach that may encompass a combination of print

and digital channels to publicize opportunities for the public to provide input on the Plan. Comments will be documented, reviewed, and leveraged to inform revisions and finalization of this Five-Year Action Plan.

5.2 Priorities

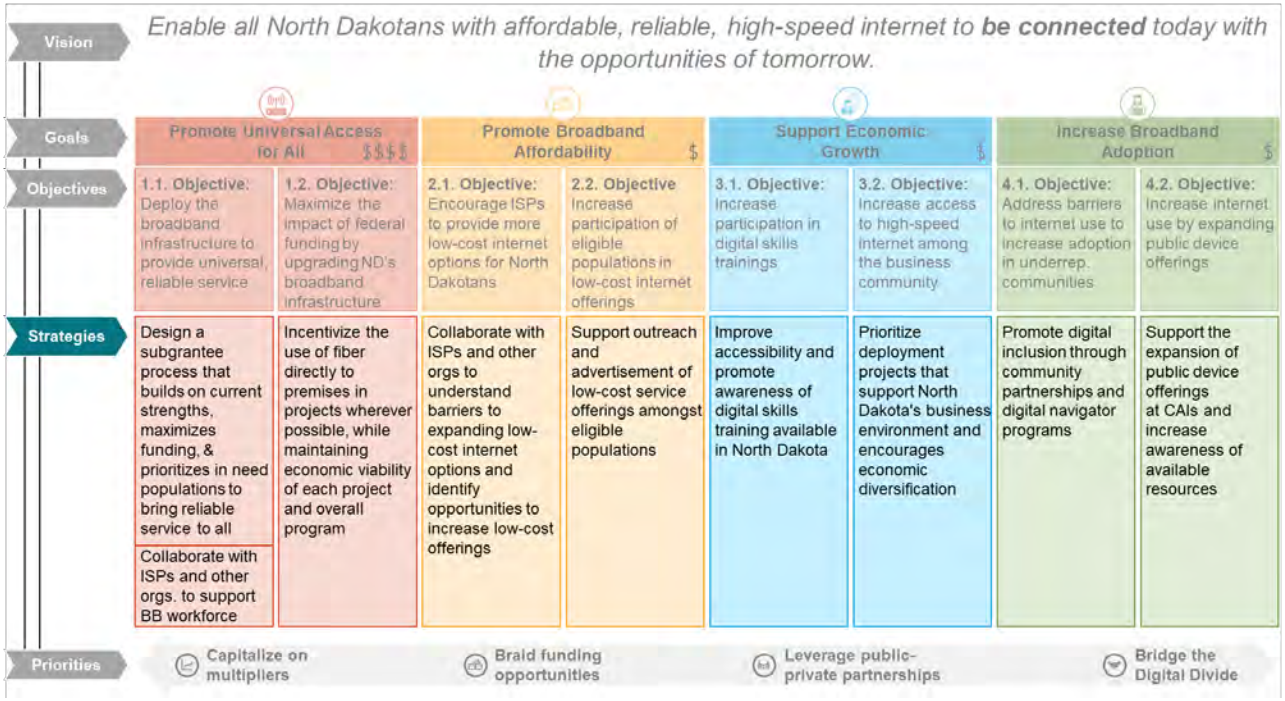


The State Broadband Program Office has established priorities to support the development and implementation of North Dakota's Five-Year Action Plan. These priorities serve as guiding principles to help the State make the decisions necessary to achieve its vision to enable all North Dakotans with affordable, reliable, high-speed internet to be connected today with the opportunities of tomorrow.

Table 22: Priorities for Broadband Deployment and Digital Equity

Priority	Description
Capitalize on multipliers	Increased access to high-speed internet and broadband adoption will serve to amplify broader goals and initiatives in North Dakota
Braid funding opportunities	A multipronged funding approach for broadband and digital inclusion will maximize federal support for North Dakota's vision
Leverage public-private partnerships	Partnerships with businesses and organizations will continue to help the State access the expertise needed to achieve its broadband goals
Bridge the Digital Divide	High-speed internet access and the devices and skills to benefit from these resources will help connect all North Dakotans to the opportunities of tomorrow

5.3 Key Execution Strategies



North Dakota developed the following strategies to further outline its approach to deliver upon its long-term vision for broadband deployment and digital equity. The strategies are informed by the State's goals and articulate it plans to accomplish stated objectives. In conjunction with the activities outlined in **Section 5.4**, the strategies will help inform the State's Initial and Final Proposals.

Strategy 1 - Design a subgrantee process that builds on current broadband strengths, maximizes federal funding, and prioritizes populations that demonstrate the greatest need to bring reliable service to all North Dakotans.

Today, 97% of North Dakota's BSLs have access to internet speeds at or above 100/20 Mbps. While the existing coverage is extensive, the State's goal is for all businesses, individuals, and institutions to have access to reliable, high-speed internet by 2028. To achieve this, the State plans to employ a phased strategy when deploying broadband assets. The first priority will be to deploy broadband to the remaining unserved locations in an economically viable manner. This phase will require the most time and resources given that most qualifying locations, ~80%[255], are unserved and high build out costs have prevented ISPs from deploying infrastructure to date. After serving all unserved locations, the State plans to prioritize upgrading the infrastructure for underserved locations to provide speeds of at least 100/20 Mbps. After deploying and upgrading broadband infrastructure for all businesses, individuals, and institutions, the State plans to promote 1 Gbps symmetrical speeds for all CAIs in North Dakota. Given there is overlap in the regions with high proportions of unserved and underserved locations, the State will prioritize projects that are focused on serving unserved locations that are able to cost effectively address underserved locations as well.

[255] Federal Communications Commission (published on December 31, 2022), FCC National Broadband Map. Accessed at: Nationwide Data | FCC National Broadband Map.

Strategy 2 - Collaborate with ISPs, labor organizations and other institutions to attract, support, and retain a highly skilled workforce for broadband deployment.

For North Dakota to achieve its broadband deployment goals, providers in the state will require a skilled telecommunications workforce prepared for the construction, maintenance, and ongoing operations of the broadband projects. North Dakota plans to attract, support, and retain the requisite workforce through close collaboration with ISPs, labor organizations, and educational and training institutions. Through close partnerships with ISPs, the State will offer insight into the gaps between the skills required by businesses and those possessed by the existing workforce. Meanwhile, collaboration with labor organizations and training institutions will highlight upskilling and training opportunities to prepare North Dakota's workforce.

Strategy 3 - Incentivize the use of fiber directly to premises in deployment projects wherever possible, while maintaining economic viability of the individual projects and overall program.

To achieve its goal of upgrading broadband infrastructure, North Dakota will prioritize projects that adhere to high technology standards and maximize reliability and scalability. While adhering to BEAD requirements, the State will demonstrate a preference for fiber deployment, where feasible, even if less expensive solutions such as fixed wireless are available. This approach will maximize the longevity and reliability of North Dakota's broadband network.

Strategy 4 - Collaborate with ISPs and other organizations to understand barriers to expanding low-cost internet options and identify opportunities to increase lower-cost offerings.

The State's intention to increase low-cost internet offerings is critical to North Dakota's goal of fostering broadband affordability. By collaborating with ISPs and other organizations to deepen the understanding of current affordability obstacles, the State will identify opportunities to increase low-cost offerings. Currently, the federal government promotes the availability of low-cost offerings through ACP. If ACP funding is extended, North Dakota plans to augment the program's uptake to increase broadband affordability in the state.

Strategy 5 - Support outreach and advertisement of low-cost service offerings amongst eligible populations.

To complement its strategy of increasing low-cost offerings, North Dakota aims to foster broadband affordability by boosting awareness of low-cost programs amongst eligible populations. An important aspect of North Dakota's affordability strategy is to focus on those in the state that are eligible for discounts and demonstrate the greatest need. The State will partner with agencies and organizations most connected to eligible populations to facilitate a targeted outreach approach. Increased awareness of low-cost plans will facilitate a more transparent and accessible process to help unlock more affordable internet options.

Strategy 6 - Improve accessibility and promote awareness of digital skills trainings available in North Dakota.

To further the State's goal of supporting economic growth through broadband deployment and digital inclusion, North Dakota plans to increase participation in training offerings that aim to reduce the digital skills gap in the state. The State intends to partner with digital skills training providers to raise awareness of their resources and encourage an increase in course offerings, class sizes, and geographic reach of programs. The State's network of CAIs will be critical to increasing awareness of skills trainings.

Strategy 7 - Prioritize deployment projects that support North Dakota's business environment – cultivating existing competitive advantages and encouraging economic diversification.

Encouraging access and full utilization of broadband infrastructure in the business community is an essential strategy to drive statewide economic growth. North Dakota plans to prioritize deployment projects that enable businesses to take advantage of cutting-edge technology. Investing in North Dakota's business environment through the lens of broadband infrastructure will support business retention, attraction, and growth efforts. These efforts will aim to not only uphold existing industry strengths, such as agriculture, but also emphasize economic diversification.

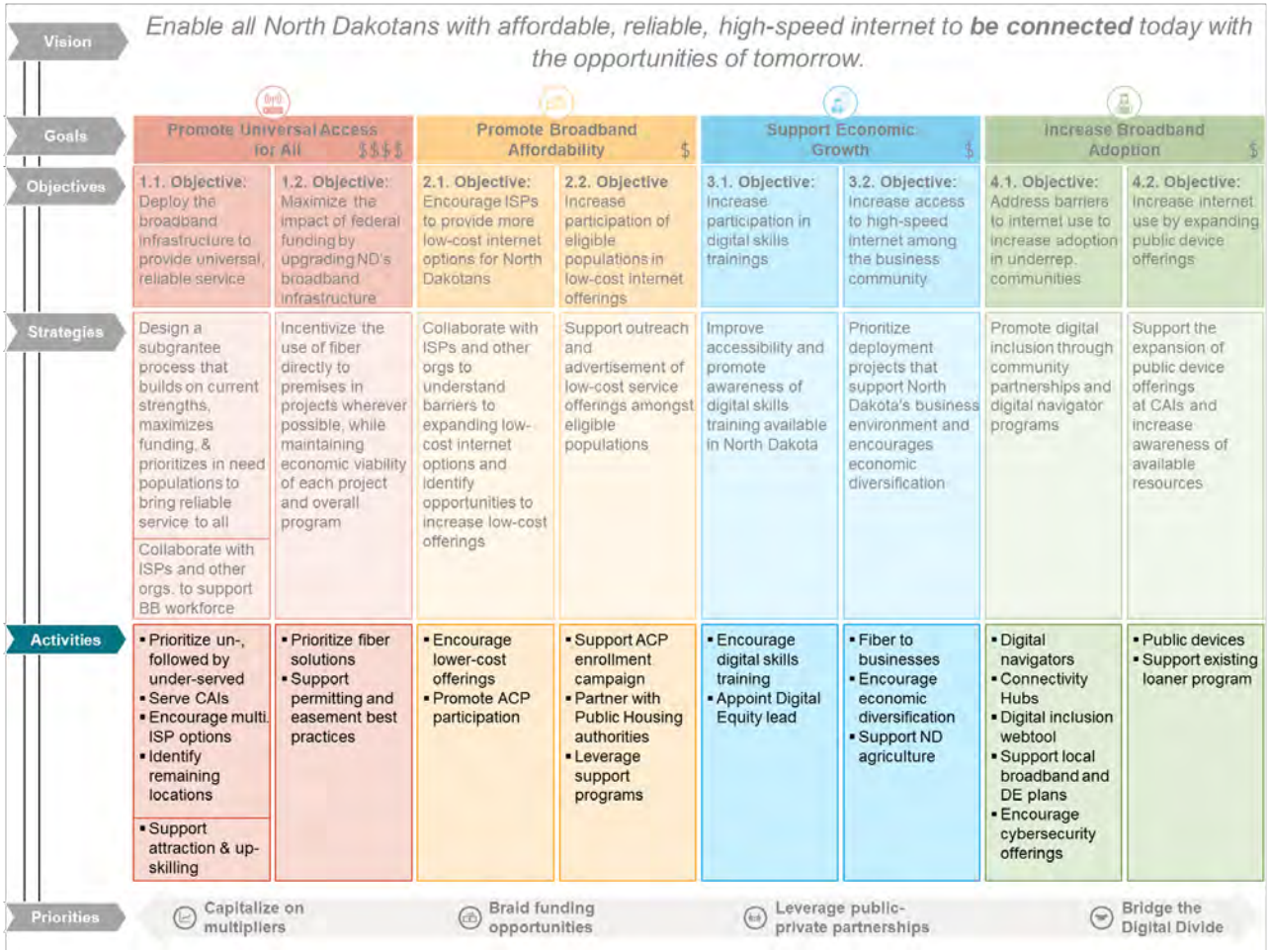
Strategy 8 - Promote digital inclusion through community partnerships and digital navigator programs.

North Dakota will promote digital inclusion through community partnerships and digital navigator programs to increase broadband adoption in the state. Awareness of the benefits of high-speed internet and the opportunities it unlocks is critical to increasing broadband adoption. Partners across the state, including the state's network of CAIs, will be critical to increasing awareness through localized messaging within underrepresented communities.

Strategy 9 – Support the expansion of public device offerings at CAIs and increase awareness of available resources.

North Dakota will aim to expand public device offerings at CAIs to increase broadband adoption in the state. Public devices allow more people to cost-effectively access high-speed internet. To facilitate increased public access to these critical resources, the State plans to grow the device offerings through its network of libraries, schools, and other CAIs. This will be coupled with efforts to increase awareness of these resources, particularly among covered populations.

5.4 Planned Activities



North Dakota developed activities for each strategy outlined in **Section 5.3** that detail the steps the State Broadband Program Office plans to take in pursuit of its vision for broadband deployment and digital inclusion. This section discusses these planned actions, key players, funding sources, and the expected outcomes.

The key below denotes the differences in the activities that will be discussed in this section. Activities with a defined outline have overlap with activities that will also be included in North Dakota's Digital Equity Plan. Activities without the outline are unique to North Dakota's BEAD Five-Year Action Plan

Activities unique to the BEAD Five-Year Action Plan	**Activities with overlap between the Digital Equity Plan and BEAD Five-Year Action Plan**

Strategy 1 - Design a subgrantee process that builds on current broadband strengths, maximizes federal funding, and prioritizes populations that demonstrate the greatest need to bring reliable service to all North Dakotans.

A successful subgrantee process is critical to executing North Dakota's strategy of deploying broadband to the remaining unserved, underserved, and eligible CAIs. A successful subgrantee selection process will align the tactical scoring criteria to the overall vision and goals of the State. The State plans to deliver upon this by funding deployment projects that provide ≥ 100/20 Mbps speeds to unserved and underserved locations. The State will then prioritize deployment projects that serve CAIs with 1 Gbps symmetrical speeds. Additionally, the State plans to improve its understanding of broadband needs by continuing to identify locations and CAIs that do not have sufficient speeds. Lastly, to increase localized planning efforts and community-level strategies, North Dakota will make available resources to help local governments and Tribal Governments create broadband plans.

Funding source: CPF, BEAD

Activity	Potential players	Expected outcomes
Prioritize unserved, followed by underserved: Prioritize first projects that deploy broadband infrastructure to the unserved locations, and subsequently projects that deploy or upgrade infrastructure for the underserved locations.	ISPs	All identified unserved and underserved locations in the state have access to ≥ 100/20 Mbps download/upload speeds by 2028
Serve CAIs: Fund projects that extend 1 Gbps symmetrical speeds to identified Community Anchor Institutions (CAIs).	CAIs, ISPs	200+ identified CAIs without sufficient speeds including K-12 schools, community support organizations, and medical providers have access to 1 Gbps symmetrical speeds
Encourage multiple ISP options: Prioritize deployment projects that enable additional ISPs to provide coverage to areas with only one service provider.	ISPs	Increased reliability of broadband networks and more competitive pricing
Identify remaining locations: Continue to identify all unserved and underserved locations as well as CAIs not receiving 1 Gbps symmetrical speeds	State Broadband Program Office, NDDOT, ISPs	Increased understanding of the broadband needs and gaps of the state

Strategy 2 - Collaborate with ISPs, labor organizations and other institutions to attract, support, and retain a highly skilled workforce for broadband deployment.

The planned activities that support the broadband workforce strategy focus on collaborating with the companies that employ individuals and training providers that upskill them. The Workforce Development Working Group members will help bridge the gap between the current state of North Dakota's broadband workforce and its future needs as a function of the BEAD Program.

Funding source: BEAD

Activity	Potential players	Expected outcomes

Support workforce attraction: Engage with the Workforce Development Working Group, ISPs, labor unions, and other State agencies, to support the attraction and retention of a workforce capable to meet the labor demands of broadband projects.	ISPs, labor unions	Fewer construction delays and total project costs due to labor shortages
Encourage workforce up-skilling: Help upskill and credential North Dakota's existing workforce through ongoing collaboration with institutions of higher education and technical schools.	Institutions of Higher Education, Technical schools	Qualified and credentialed broadband workforce prepared to deploy and maintain the State's broadband network

Strategy 3 - Incentivize the use of fiber directly to premises in deployment projects wherever possible, while maintaining economic viability of the individual projects and overall program.

In addition to building out broadband infrastructure to unserved and underserved locations, the State will incentivize upgrades to existing infrastructure. This will encourage the longer-term sustainability of broadband offerings. Per the NOFO, these upgrades will emphasize the use of fiber-optic technology, where feasible. Additionally, to reduce the costs and delays associated with deploying fiber, the State plans to support best practices related to obtaining permits and easements.

Funding source: CPF, BEAD

Activity	Potential players	Expected outcomes
Prioritize fiber solutions: Encourage deployment projects that upgrade existing infrastructure and per the NOFO, prioritize fiber-optic technology.	ISPs, NTIA	Increased broadband infrastructure projects enabling an upgraded broadband network
Support permitting and easement best practices: Support best practices for permitting and alternative strategies for deploying assets when easements would cause substantial delays.	NTIA, ISPs, NDDOT, NDDA	Fewer project delays and reduced project costs by streamlining permitting processes

Strategy 4 - Collaborate with ISPs and other organizations to understand barriers to expanding low-cost internet options and identify opportunities to increase lower-cost offerings.

North Dakota plans to work with service providers to encourage more low and mid-range offerings at served speeds. While many federal funding programs stipulate participation in ACP to receive funds, some providers in the state do not offer ACP discounts. To encourage greater access to the subsidy program, North Dakota plans to collaborate with BAND and other service providers such as Midco and Cable One to address the barriers to adoption. The promotion of ACP adoption among ISPs is contingent upon the continuation of the subsidy program.

Funding source: BEAD

Activity	Potential players	Expected outcomes
Encourage lower-cost offerings: Collaborate with ISPs to encourage the provision of internet service plans at both low and mid-range price points.	ISPs	Increased access to additional low-cost internet offerings in the state
Promote ACP participation: Coordinate with ISPs to promote participation in ACP	ISPs	Increased number of providers offering internet discounts through ACP

Strategy 5 - Support outreach and advertisement of low-cost service offerings amongst eligible populations.

North Dakota plans to increase awareness of low-cost offerings among eligible populations by working with organizations that already serve these communities. Public housing organizations that have established communication channels with low-income individuals represent potential partners for the State to advertise low-cost offerings and subsidy programs. Similarly, the State can leverage public school networks to increase awareness among the covered populations they serve. Lastly, the State plans to leverage and amplify the efforts of organizations already performing ACP outreach. It is important to note that these activities are dependent on the continuation of ACP.

Funding source: BEAD, DE

Activity	Potential players	Expected outcomes
Support ACP enrollment campaign: Partner with State agencies and/or community support organizations to support a statewide ACP enrollment campaign. As part of the campaign, develop targeted ACP outreach materials to engage covered populations.	University of North Dakota, Community Action Partnership of North Dakota, Governor's Office	Increased utilization of ACP discounts
Partner with Public Housing Authorities: Work with Public Housing Authorities to advertise and promote ACP and other low-cost offerings among low-income individuals. Additionally, engage with relevant organizations (e.g., North Dakota Housing Finance Agency) to discuss potential incentives for developers to educate individuals on low-cost internet offerings within the Low-Income Housing Tax-Credit Allocation Plan.	Public Housing Authorities, North Dakota Housing Finance Agency	Increased utilization of ACP discounts and increased broadband subscription rates among low-income individuals
Leverage support programs: Coordinate with organizations overseeing government assistance programs within North Dakota to	ND Department of Public Instruction, ND School Districts, ND	Increased utilization of ACP discounts and increased broadband subscription rates among

target ACP/low-cost offering awareness efforts to households in need of support.	Department of Human Services	vulnerable populations in the state

Strategy 6 - Improve accessibility and promote awareness of digital skills trainings available in North Dakota.

North Dakota plans to help training providers both expand the number of locations offering trainings and grow the number of classes offered at these locations. Additionally, by appointing a Digital Equity Lead, the State plans to increase transparency and coordination of the State's programs and resources.

Funding source: BEAD, DE

Activity	Potential players	Expected outcomes
Encourage digital skills training: Partner with State agencies and/or other training providers to increase the number and frequency of digital skills training offered in their centers. Additionally, increase awareness of these offerings by conducting outreach to regional organizations.	ND League of Cities, ND Association of Counties, Institutions of Higher Education and Tribal Colleges, Job Service North Dakota, Adult Education Centers, TrainND	Increased enrollment in digital skills trainings and increased digital literacy amongst covered populations
Appoint Digital Equity lead: Appoint an individual responsible for overseeing the State's digital equity efforts, aligning partners, and informing strategic decisions.	State Broadband Program Office	Increased coordination amongst digital equity stakeholders and greater transparency into digital equity offerings

Strategy 7 - Prioritize deployment projects that support North Dakota's business environment – cultivating existing competitive advantages and encouraging economic diversification.

North Dakota plans to prioritize the best available technology for businesses during the design and implementation of the subgrantee selection process. During the subgrantee selection process, the State also plans to encourage projects that support the state-leading agricultural sector. Additionally, deployment efforts will aim to encourage projects that further economic diversification in the state.

Funding source: BEAD

Activity	Potential players	Expected outcomes
Fiber to businesses: Prioritize projects that deploy the best available technology to businesses, favoring those that deploy fiber.	ISPs	Increased percentage of business locations utilizing a fiber internet connection
Encourage economic diversification: Encourage and prioritize infrastructure projects that support business retention, attraction, and growth, with a focus on economic diversification.	ISPs	Greater number of broadband infrastructure projects supporting target industries
Support ND agriculture: Prioritize infrastructure projects that support North Dakota's agriculture sector, including those that that help connect North Dakota's farms and / or work with organizations to understand and address industry needs.	ISPs, NDDA	Improved connectivity within North Dakota's agriculture sector

Strategy 8 - Promote digital inclusion through community partnerships and digital navigator programs.

The State plans to support the development of a digital navigator program to provide holistic digital inclusion support, ranging from individualized assistance, digital skills training, device assistance, and more. These navigators will be embedded within communities and will have the ability to train more local navigators. To embed additional digital skills resources and expertise locally, the State plans to support CAIs serving a high volume of covered populations consolidate and centralize digital skills resources. The State also aims to publish a digital inclusion webtool to provide individuals with a platform that centralizes the State's offerings. This may include telehealth FAQs and a list of public computer lab locations. Lastly, to increase localized planning efforts and community-level strategies, North Dakota will make available resources to help local governments and Tribal Governments create digital equity plans alongside State broadband plans.

Funding source: BEAD & CPF

Activity	Potential players	Expected outcomes
Digital navigators: Help establish a statewide Digital Navigator Program that will assist individuals with adopting broadband, using digital devices, and solving technical issues. The program structure will involve one set of digital navigators that will report directly to their respective State agencies that may utilize additional navigators in organizations.	State Broadband Program Office, Governor's Office, Job Centers, Adult Education Centers, Institutions of Higher Education, Schools	Increased qualifications of digital skills training providers
Connectivity Hubs: Promote Connectivity Hubs that consolidate telehealth, digital skills, and workforce offerings at existing CAIs in regions with large covered populations and unserved and underserved locations	ND State Libraries, Schools, other CAIs	Increased access to telehealth, training, digital skills, and educational offerings
Digital inclusion webtool: Support the development of a comprehensive and interactive webtool and an accompanying physical resource that consolidates all digital inclusion assets. This may include digital skills training courses, device assistance programs, educational resources, and public computer access points.	State Broadband Program Office, ND Assistive, Adult Learning Centers, ND State Libraries and Schools, TrainND, EduTech	Improved ability to locate and access digital inclusion resources and trainings from various State organizations
Support local broadband and DE plans: Make available resources to local governments and Tribal Governments for the development of local broadband and digital equity plans that identify the specific needs and gaps of their communities.	Local & Tribal Governments	Increased localized planning efforts and community level strategies
Encourage cybersecurity offerings: Encourage all internet service providers (ISPs) in North Dakota to create a trusted source certification program to offer important cybersecurity services, such as providing parental control features, educating customers about cyber risks, and spreading awareness about existing resources in the state.	ISPs	Increased share of ISPs compliant with NIST cybersecurity measures

Strategy 9 – Support the expansion of public device offerings at CAIs and increase awareness of available resources.

To increase the provision of public devices, the State will partner with libraries to expand public computer labs. In addition, a State device loaner program will allow North Dakotans to take

devices home from State libraries, schools, and other institutions. The State plans to support the advertisement of these programs by including these offerings within the digital inclusion webtool.

Funding source: BEAD, DE

Activity	Potential players	Expected outcomes
Public devices: Encourage the expansion of public device offerings at the 48 State Libraries that currently lack public computer labs and advertise these offerings on library websites.[256]	ND State Libraries	New public device programs at remaining 48 libraries
Support existing loaner program: Encourage the expansion of a device loaner programs to give North Dakotans the ability to rent devices from State Libraries, higher education institutions, and other State agencies.	ND State Libraries, Institutions of Higher Education, North Dakota State Agencies	Greater access to no- and low-cost loaner devices increasing high-speed internet adoption

5.5 Estimated Timeline for Universal Service

North Dakota plans to follow the timeline below to bring Universal Service to the state by 2028. According to the FCC, universal service is the principle that all consumers have "access to high-speed Internet at just, reasonable and affordable rates."[257] As outlined in **Chapter 4**, there are obstacles that may lead to the delay of deployment, including supply chain and materials issues and labor shortages. Therefore, to best position the State to mitigate these obstacles, North Dakota plans to collaborate closely with ISPs and other organizations during the subgrantee process.

Table 23: Estimated Timeline for Universal Service

Year	Activities / Milestones
***2023** – Initial Planning*	▪ Finalize Five-Year Action Plan ▪ Identify each unserved and underserved location ▪ Identify all CAIs without 1 Gbps symmetrical speeds ▪ Finalize Initial Proposal Volume 1: Plan for Challenge Process ▪ Post Initial Proposal Volume 1 for Public Comment ▪ Submit Initial Proposal Volume 1 to NTIA ▪ Set extremely high-cost threshold ▪ Finalize Initial Proposal Volume 2 ▪ Post Initial Proposal Volume 2 for Public Comment ▪ Submit Initial Proposal Volume 2 to NTIA

[256] *Note: Computer labs were identified using public information on library websites. Identified libraries may have computer labs not advertised.*
[257] Federal Communications Commission (accessed July 5, 2023), Universal Service. Accessed at: https://www.fcc.gov/general/universal-service.

	▪ Conduct challenge process ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA
2024 – *Subgrantee Selection Process & Final Proposal*	▪ Submit successful challenges to the NTIA ▪ Initiate the Subgrantee Selection Process ▪ Determine and address unmet needs from selection process ▪ Complete Subgrantee Selection Portion of the Final Proposal ▪ Complete Final Proposal Draft ▪ Conduct stakeholder and community engagement to refine Final Proposal ▪ Submit Final Proposal to NTIA ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA
2025 – *Initial Funding Disbursements*	▪ Fund prioritized projects with initial BEAD funds ▪ Begin funding projects with remaining funds ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA
2026 – *Ongoing Deployment*	▪ Continue construction and upgrading broadband network ▪ Collect semi-annual reports for subgrantees ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA
2027 – *Ongoing Deployment*	▪ Continue construction and upgrading broadband network ▪ Collect semi-annual reports for subgrantees ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA
2028 – *Estimated Year of Universal Service*	▪ Complete final deployment projects ▪ Submit requisite semi-annual reporting documentation and performance report to NTIA ▪ Final report to (2029 – 12 months after funds expended)

5.6 Estimated Cost for Universal Service

The cost estimates introduced in this section are meant to provide a preliminary projection for the funding needed to help achieve universal service. The range of estimates will continue to be refined as the State develops a better understanding of the precise number and locations of unserved and underserved points in North Dakota and as it begins to solicit and review proposals from potential subgrantees. The estimates below are based on two distinct methodologies – one that utilizes a density cost model and one that leverages recent projects funded with North Dakota's CPF funds. The CPF-derived costing methodology uses information on projects bringing fiber to remaining unserved and underserved locations in North Dakota, providing a close analog to the types of projects funded by the BEAD program.

As mentioned above, one approach for estimating the cost for universal service included a density cost model. The following steps were used to derive this estimate:

1. **Identify the number of unserved and underserved locations based on the FCC National Broadband Map, after removing locations that overlap with already funded projects.**
2. **Analyze at the census block level on a housing density basis (Living Units / Sq. Mile) and apply an appropriate build cost per density threshold. Build costs will be determined from market data and previously awarded grant projects.**
3. **Group analysis by county and aggregate**.

Identifying and Filtering Points

Two different data sets were utilized for this estimate. The first set used was V2 Fabric BSL Points, which was downloaded in December of 2022. The second data set used was BDC Data which was downloaded on 07/21/2023. For the State of North Dakota, cable, copper, fiber, licensed wireless and licensed-by-rule fixed wireless were included when filtering points/locations. Unlicensed wireless was excluded when filtering points/locations. Address points for residential and commercial were included when filtering points/locations.

BSL address points were merged with BDC data, which contains information on whether a point/location is marked as served, underserved, or unserved. Merging the two data sets resulted in the identification of 7,988 unserved points and 1,858 underserved points, bringing the total of unserved and underserved points for the State of North Dakota to 9,846.

This data was then linked to Hex codes to determine the cost per passing. Hexagons were made using a geospatial system that divided the state into hexagonal cells, effectively forming a hexagonal grid system. The resolution or size used for this study was resolution 7, which equates to roughly 2.00 square miles. Density was then calculated by taking the served/unserved/underserved living unit counts that fell within the area of a hexagon which provided a measurement in terms of living units per square mile.

The density of a particular unserved/underserved point was then applied to an equation that calculated the cost per passing of any unserved or underserved point based on the density range.

Accounting for Previously Funded Programs

Previously funded programs, including Rural Digital Opportunity Fun – RDOF (182) and Project ReConnect – (1,791), and CPF (468) helped inform the estimate.

The exact locations for these points were known, therefore these points were filtered out of the unserved and underserved data in GIS. Additionally, there were Connect America Fund Phase II – CAF II (46 funded sites) in the State of North Dakota. However, these sites do not meet BEAD requirements for upload and download speeds. Therefore, costs and points for CAF II funded sites were not subtracted from the BDC data and were not included in the cost analysis. Also, there were no Community Connect or Broadband Infrastructure Program funded sites found within the State of North Dakota.

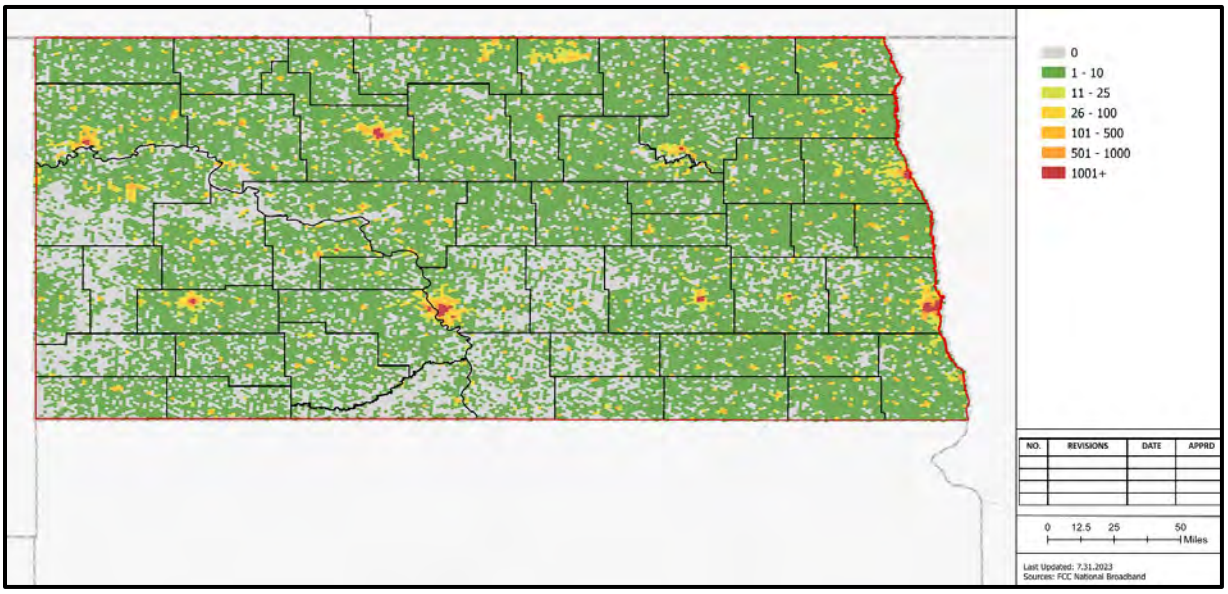
After subtracting for RDOF, ReConnect, and CPF, the number of unserved and underserved locations is 7,405, which is summarized in **Table 24**.

Table 24: Unserved and underserved locations and breakdown of previously funded projects[258]

[258] Federal Communications Commission (published on December 31, 2022), FCC Mobile Availability Data. Accessed at: Nationwide Data | FCC National Broadband Map.

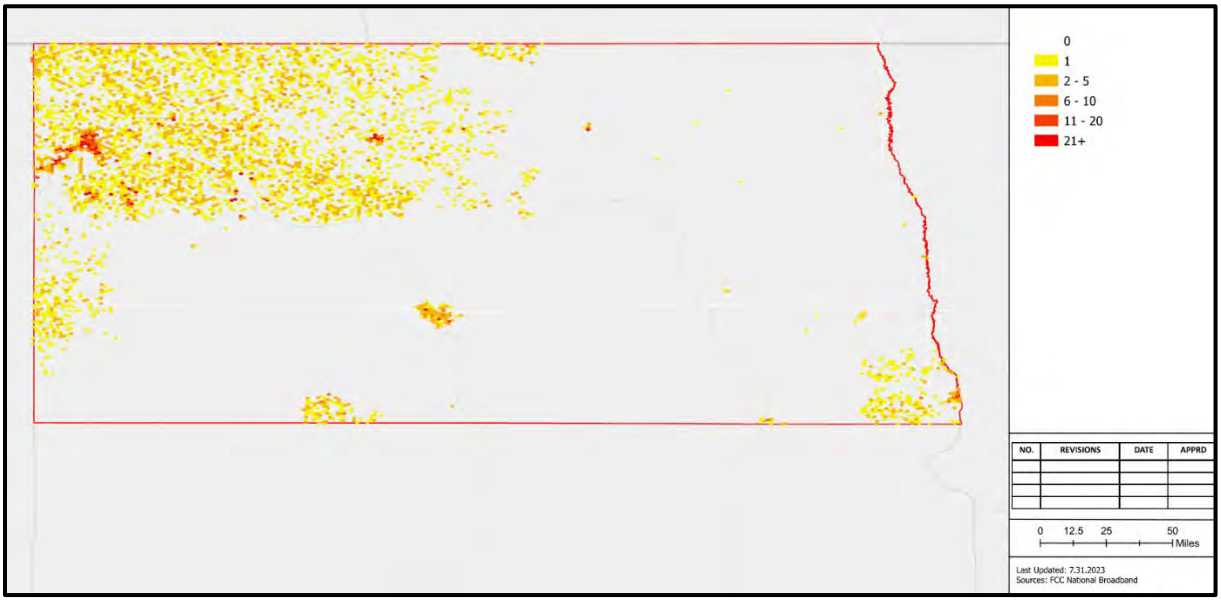
Original Totals	Number of BSLs
Served	336,558
Unserved	7,988
Underserved	1,858
Original Unserved / Underserved	**9,846**
Previously Funded	
Rural Digital Opportunity Fund	182
Project ReConnect	1,791
CPF	468
Estimated Enforceable Commitments	**2,441**
Total Unserved / Underserved BSLs	**7,405**

Figure 30: Density Map of Broadband Serviceable Locations[259]



[259] Costquest (published January 31, 2023) FCC Broadband Serviceable Location Fabric Resources

Figure 31: Density Map of Unserved and Underserved Broadband Serviceable Locations



Cost Modeling and Cost Calibrations

Data was analyzed based on the hexagons (2.00 square mile hexagon areas) included within the BDC data on a housing density basis (Living Units / Sq Mile) and the application of an appropriate build cost per density threshold. Build costs were originally evaluated using studies and cost data from across the United States. In general, costs per passing are lower in dense urban areas where there is greater access to existing infrastructure. Costs per living unit are higher in rural areas where the number of living units per square mile is less, houses are further apart, and the distance to infrastructure is greater. The costs from the previous research were adjusted and calibrated using data from recently awarded grant projects through ReConnect projects in North Dakota.

Data is representative of 2023 construction dollars and accounts for inflation impacts. Costs range from $1,190 per living unit in high-density areas (i.e.,1,075 living units per square mile and above) to approximately $30,000 per living unit in low-density areas (i.e., 0.84 living units per square mile and below).

Model for Density Range of 7.5 to 1,075 living units/mi^2

Costs were initially calculated using a model from a Cartesian Study that was prepared for the Fiber Broadband Association in June of 2019. From this study, cost per passing was modeled using the following equation: ***Cost = (Cpass) = $7,549 - $2,161 * log10(Density)***. After further analysis, it was found that this model was most accurate for calculating costs between the 50 and 1,075 living units per square mile density range. Since this study was published in June of 2019, an inflation factor of 19% was used to align 2019 costs with present-day costs.

Model for Density Range of 1,075 living units/mi^2 and above

This model was not accurate for calculating costs over a density of 1,075, due to a lack of sufficient information on previously funded projects. Upon further research, it was found that the average costs per passing in more dense, residential/urban areas are around $1,000. Again, an inflation factor of 19% was utilized to calculate the cost per passing in present-day dollars, at a total of $1,190. Once this high-density threshold is reached, costs per passing generally won't go any

lower. The equation used to model cost per passing for densities over 1,075 living units per square mile is ***Cost = (Cpass) = $1,190***.

Model for Density Range of 0.84 to 7.5 living units/mi^2

The Cartesian model was also found to be less accurate in predicting cost per passings for densities of 7.5 living units per square mile and below. The Cartesian model has a maximum cost of $7,549 per passing at a density of 1 living unit per square mile, which through further research was found to be undervalued. Using data from North Dakota's Project ReConnect, cost per passing versus density of living units per square mile was graphed to obtain the following equation; ***Cost = (Cpass) = $28,140 - $10,565 * ln (Density)***. This data was then used to develop a best-fit line and establish the range of densities of use, which was between 0.84 and 7.5 living units per square mile. Since the funding years for these points ranged from 2019 to 2022, with most being more current, an inflation factor was not used for this range given the potential for over-inflating the cost per passing.

Model for Density Range of 0.84 living units/mi^2 and below

Limited data points from previous funding in North Dakota were available for points below a density of 5 living units per square mile. Based on the best fit line for points between 0.84 to 7.5 living units per square mile, a cost per passing of $30,000 was identified for a density range of 0.84 living units per square mile. Given the limited information for a density at or below 1, $30,000 was established as the upper threshold for cost per passing within the model. The equation used for a density at or below 0.84 living units per square mile is ***Cost = (Cpass) = $30,000***. Since the funding years for these points ranged from 2019 to 2023, an inflation factor was not considered.

Summary of Costs

Combining models for the four density regions to service the 7,405 underserved/unserved points, the Gross Cost estimate for the State of North Dakota is $121.7 million. This equates to an average cost per passing of $16,438 in 2023 dollars. This information is summarized in **Table 25**.

Figure 32: Range of Cost per Passing by County[260]

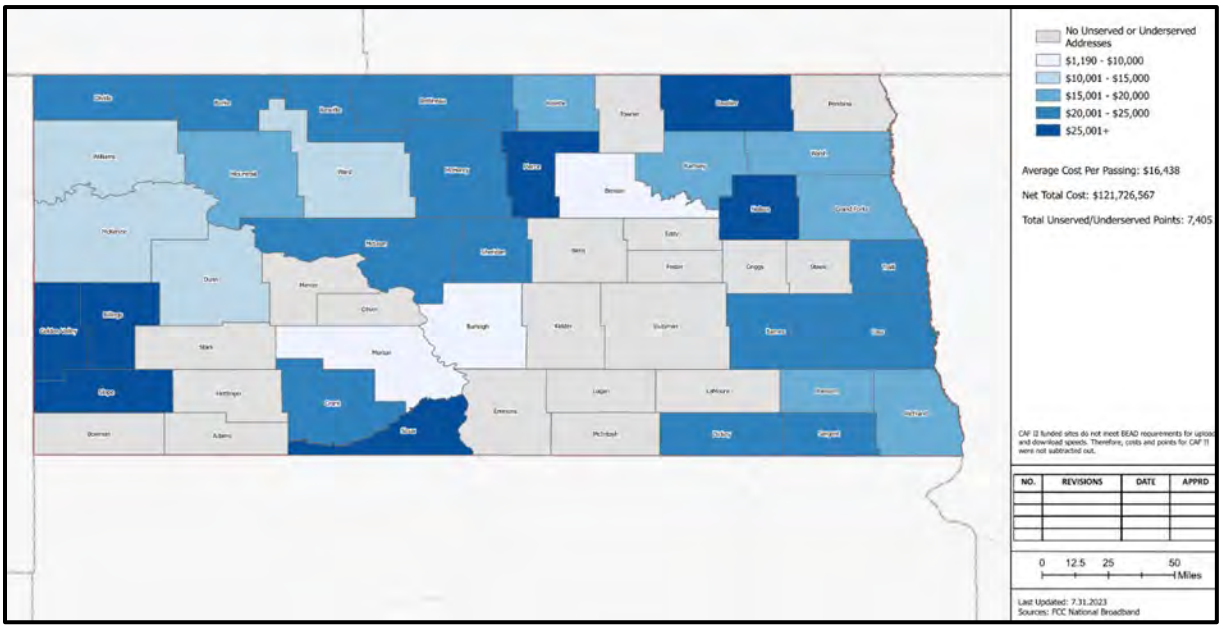


Table 25: Summary of Cost for North Dakota[261]

Total Unserved / Underserved BSLs	Average Cost Per Passing	Total Cost
7,405	$16,438	$121,726,567

To provide a range of potential cost estimates for universal service, an additional estimate was developed using the recent projects funded with North Dakota's CPF funds. This estimate represents the higher end of the two cost estimates to deploy fiber to the remaining unserved and underserved locations in the state. The estimates were developed using the methodology outlined below:

1. **Identify the unserved and underserved locations, after removing locations that overlap with already funded projects.**
2. **Analyze at the census tract level the BSL density (BSL / Sq. Mile) to develop an average BSL density for each county based on the tracts within the county.**
3. **Analyze CPF projects at the census tract level to approximate the BSL density and develop a baseline cost per passing based on the total project costs and the number of BSLs served.**
4. **Refine the baseline cost by removing projects that served less than one hundred BSLs given the increased variance caused by projects more sensitive to individual locations.**
5. **Apply the equation to the average tract density by county and multiply by the number of unserved and underserved locations minus enforceable commitments**.

[260] *Note: This chart does not account for CPF funding, which was subtracted out later as described in the paragraph above.*
[261] *Note: Assumes a rate of inflation of 19% between June 2019 and June 2023*

This methodology results in an estimated cost of $194M to achieve universal service in North Dakota. This projection represents the upper end of the possible cost estimate, as it is based on projects that aim to deliver fiber service to the remaining locations in the state, which are typically more challenging to serve. This estimate is intended to supplement the density cost model outlined above and provide the potential high-cost tail of the estimate.

Figure 33: Range of Cost Estimates

As the first step in both cost models, the State created a list of the unserved and underserved locations. The State applied the BEAD Program's definition of unserved and underserved and utilized speed data from the FCC National Broadband Maps as the basis for this list.[262] As stated in Chapter 4, the stakeholder engagement process brought to light the potential that certain serviceable locations are likely excluded from the Broadband Maps and that there may be inconsistencies in reported speeds. In particular, concerns surrounding the reliability of fixed wireless service introduces the potential for the aforementioned cost estimates to be substantially deflated. The State continues to explore opportunities to address potential data gaps and refine its understanding of the unserved and underserved locations in the state. During this process, the total number of locations lacking quality broadband speeds may increase, and in turn, the estimated cost of universal service may increase.

5.7 Alignment

In comprehensively addressing the needs of North Dakotans for accessing and using the internet through this Plan, North Dakota will also impact the State's efforts in multiple policy areas. The following discussion details how the Five-Year Action Plan will impact and interact with the State's broader goals and efforts.

5.7.1 Alignment with the State Digital Equity Plan

Universal broadband access alone will not be enough to ensure that North Dakotans can meaningfully participate in the digital economy. Rather, individuals also need access to the skills, resources, and devices to unlock the opportunities available through the internet. North Dakota's BEAD Five-Year Action Plan recognizes the intricate interdependence and interactions between broadband access, affordability, digital skills, and device access required to help bridge the digital

[262] *Note: NTIA defines unserved and underserved as locations as those receiving service at speeds less than 100 Mbps download speeds and 20 Mbps upload speeds via (i) fiber-optic technology; (ii) Cable Modem/ Hybrid fiber-coaxial technology; (iii) digital subscriber line (DSL) technology; or (iv) terrestrial fixed wireless technology utilizing entirely licensed spectrum or using a hybrid of licensed and unlicensed spectrum and latency less than or equal to 100 milliseconds*

divide and address the needs of specific underrepresented communities. As such, the BEAD Five-Year Action Plan includes activities and strategies that will not only further the State's goal of becoming the first to achieve 100% coverage, but also ensure that all individuals are able to benefit from this advancement. Beyond universal access, these activities encompass thematic areas of broadband affordability, adoption, and equitable economic growth. This multipronged approach aims to address the digital equity needs identified through the needs assessment in **Section 3.4.5.** The strategies outlined in this Plan that primarily aim to address the identified digital equity needs in the state include the following:

- **Strategy 4** - Collaborate with ISPs and other organizations to understand barriers to expanding low-cost internet options and identify opportunities to increase lower-cost offerings.
- **Strategy 5** - Support outreach and advertisement of low-cost service offerings amongst eligible populations.
- **Strategy 6** - Improve accessibility and promote awareness of digital skills trainings available in North Dakota.
- **Strategy 8** - Promote digital inclusion through community partnerships and digital navigator programs.
- **Strategy 9** - Support the expansion of public device offerings at CAIs and increase awareness of available resources.

Many of these strategies will also demonstrate alignment with those that will be included in North Dakota's Digital Equity Plan, which is currently in development. A combined stakeholder engagement process informed the objectives, findings, priorities, strategies, and planned activities articulated within both the Five-Year Action Plan and the Digital Equity Plan. While the BEAD Program's principal focus is to deploy broadband service to unserved and underserved locations and gigabit connections to CAIs, these efforts are complemented and augmented by digital equity priorities. Although both Plans demonstrate a commitment to promoting digital opportunity by equalizing access to the necessary infrastructure and resources, the Digital Equity Plan will offer a deeper dive into the State's plans to equip individuals with the knowledge and skills to take advantage of these offerings. Together, these Plans will ensure that North Dakotans not only have access to the necessary infrastructure and resources to participate in the digital economy, but also are acutely aware of how to navigate these opportunities and the potential benefits.

5.7.2 Alignment with State's Priorities

There is widespread agreement that broadband is closely intertwined with multiple facets of modern life, ranging from remote employment opportunities to telehealth appointments to society's most basic functions such as shopping or banking. North Dakota's plans to expand broadband coverage statewide, which are articulated in this document, will therefore support the State's broader efforts in multiple policy areas. This alignment extends to statewide priorities related to economic and workforce development, education, health outcomes, civic and social engagement, and delivery of other essential services.

Economic and workforce development

Figure 34: Governor Burgum's Main Street Initiative[263]

North Dakota has four major urban areas in the state (Bismarck, Dickinson, Fargo, and Grand Forks), but the vast majority of its municipalities are located in rural communities. Through Governor Burgum's Main Street initiative, the State is promoting economic growth in these communities by helping them capitalize on their unique characteristics. This initiative has four pillars:

- Healthy, Vibrant Communities – creating "21st-century cities with vibrant cores to help attract and retain talent;"[264]
- 21st Century Workforce – developing skills relevant to today's economy, including industries such as biotech and cybersecurity;[265]
- Smart, Efficient Infrastructure – creating "mixed-use city centers and neighborhoods" in order to maximize existing infrastructure;[266]
- Economic Diversification – supporting a diverse North Dakota economy through each community's "unique benefits and existing infrastructure."[267]

The Five-Year Action Plan upholds these pillars by providing the critical infrastructure necessary to support business attraction, retention, and growth and increase access to remote employment opportunities. The Plan includes a goal to explicitly "Support Economic Growth" with associated objectives that emphasize the importance of connecting the business community and expanding digital skills statewide. This aligns with and bolsters all four of the outlined pillars that undergird the State's economic and workforce development priorities.

Building broadband infrastructure and connecting the more remote parts of the state will help support North Dakota's traditional industry strengths. These existing industry strengths include agriculture, mining, and natural resources, which represented over 25% of the state's GDP contribution in 2025.[268] However, this also presents a transformational opportunity to bolster tradable sectors, which can help attract outside investment and to the state, ultimately supporting economic diversification.

Educational outcomes

[263] State of North Dakota (accessed on July 10, 2023), Five Strategic Initiatives. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[264] State of North Dakota (accessed on June 20, 2023), Healthy, Vibrant Communities. Accessed at: https://www.nd.gov/living-nd/main-street-nd/healthy-vibrant-communities.
[265] State of North Dakota (accessed on June 20, 2023), 21st Century Workforce. Accessed at: https://www.nd.gov/doing-business-nd/21st-century-workforce.
[266] State of North Dakota (accessed on June 20, 2023), Smart Efficient Infrastructure. Accessed at: https://www.nd.gov/living-nd/main-street-nd/smart-efficient-infrastructure.
[267] State of North Dakota (accessed on June 20, 2023), Economic Diversification. Accessed at: https://www.nd.gov/living-nd/main-street-nd/economic-diversification.
[268] Bureau of Economic Analysis, Accessed at: BEA Interactive Data Application

Figure 35: Governor Burgum's Transforming Education Initiative[269]

Through Governor Burgum's Transforming Education initiative, the State is equipping its students with the "skills and mindsets they need to be creative problem solvers, effective communicators and informed, responsible citizens who are strong collaborators." Thus far, through this initiative, the State has undertaken the following efforts:

- Made recommendations on how to ensure the State's education system excels in the 21st century;
- Hosted a statewide Hour of Code event to encourage the development of computer science among North Dakota's students;
- Announced a planned 100-gigabit upgrade to the State network.[270]

These goals for educational outcomes align with and are supported by strategies and activities outlined within this Five-Year Action Plan. Namely, the strategy to ensure universal, reliable service is undergirded by an activity to serve CAIs with 1 Gbps symmetrical speeds. This activity will support the planned upgrade to the State network. Furthermore, this will equip the educational system with the infrastructure required to provide students with advanced digital learning opportunities of the 21st century.

Health outcomes

Figure 36: Governor Burgum's Behavioral Health and Addiction Initiative[271]

North Dakota is particularly focused on the behavioral health of individuals throughout the State. Governor Burgum, in partnership with the North Dakota Department of Human Services' Behavioral Health Division, is pursuing the following key strategies as part of his Behavioral Health and Addiction Initiative:

- Supporting the full continuum of care;
- Embedding services close to home and people's natural supports to keep families together;

[269] State of North Dakota (accessed on July 10, 2023), Five Strategic Initiatives. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[270] State of North Dakota (accessed on June 20, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[271] State of North Dakota (accessed on July 10, 2023), Five Strategic Initiatives. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.

- Stopping criminal behavior and diverting criminal justice involvement.[272]

Facilitating easier access to basic health services is not only instrumental to improving health outcomes and reducing the burden on the health care system, but also key to advancing the strategies outlined above. The Five-Year Action Plan can help catalyze these strategies through its plans to extend high-speed internet access to unserved and underserved locations and CAIs, which include hospitals and health care centers. By extending service to unserved and underserved locations, the State will improve rural patients' healthcare options by giving them access to doctors around the world with the click of a few buttons. As such, this increased optionality will support the full continuum of care and increase the convenience of receiving quality, health care support. By ensuring that all health care facilities are connected with reliable, high-speed internet, North Dakota can ensure that these institutions are equipped with the resources to send electronic files, support patient portals, and complete telehealth visits, and much more.[273]

Civic and social engagement

Figure 37: Governor Burgum's Reinventing Government Initiative[274]

Under Governor Burgum's leadership, North Dakota has undertaken two initiatives that strive to promote greater civic and social engagement. First, through the Governor's Reinventing Government initiative, the State is examining how North Dakotans interact with State government and prioritizing embracing technology to make needed changes, including using technology to embrace government transparency.[275]

Figure 38: Governor Burgum's Tribal Engagement Initiative[276]

Additionally, the State is identifying opportunities for collaboration between State government and the governments of Tribal Entities located in North Dakota through the Governor's Tribal Engagement initiative.[277]

As outlined in this Plan, the State intends to encourage collaboration between state, municipal, and Tribal Governments by making resources available for the development of local digital

[272] State of North Dakota (accessed on June 20, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[273] Rural Health Information Hub (access on July 2, 2023) https://www.ruralhealthinfo.org/rural-monitor/broadband/
[274] State of North Dakota (accessed on July 10, 2023), Five Strategic Initiatives. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[275] State of North Dakota (accessed on June 20, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[276] State of North Dakota (accessed on July 10, 2023), Five Strategic Initiatives. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.
[277] State of North Dakota (accessed on June 20, 2023), Five Strategic Initiatives for North Dakota. Accessed at: https://www.governor.nd.gov/five-strategic-initiatives-north-dakota.

inclusion plans. This will ensure that the State understands the unique digital inclusion needs of each community and can work with local governments to address these gaps.

5.8 Technical Assistance

As North Dakota prepares to implement the Five-Year Action Plan, it could benefit from technical assistance related to the topic areas identified below:

- Support with development of Initial and Final Proposals
- Guidance surrounding establishment of Extremely High-Cost Threshold
- Assistance with development and execution of a robust challenge process
- Guidance related to compliance and reporting requirements
- Details surrounding subgrantee monitoring
- Assistance assessing project progress and understanding success
- Support with data collection, particularly as it relates to the FCC Broadband Map and identification of unserved and underserved locations

6 Conclusion

The Five-Year Action Plan outlines North Dakota's priorities, goals, objectives, strategies, and activities to help the State achieve universal coverage and bridge the digital divide. This Plan will be complemented by the Digital Equity Plan, which delves deeper into the opportunities to address digital inclusion challenges, particularly as they relate to the eight "covered populations," who are more vulnerable to digital exclusion. Both of these Plans were informed by robust stakeholder engagement with State agencies, external organizations, Tribal Entities, and community members. At its core, this Plan serves as roadmap for the State; it outlines the current context of broadband access, adoption, affordability, and digital equity in North Dakota, identifies its desired future outcomes, and provides an actionable roadmap for getting there.

North Dakota's plans for broadband deployment and digital inclusion are summarized by its four goals to:

1. Promote Universal Access
2. Foster Broadband Affordability
3. Support Economic Growth
4. Increase Broadband Adoption

To deliver on this, the State will prioritize broadband deployment projects for unserved, underserved, and CAIs and encourage upgrading its broadband infrastructure. To help bridge the digital divide, the State intends to address challenges related to affordability and digital skills training and increase awareness of the benefits of these resources and the internet.

Looking ahead, the impact of providing universal coverage and bridging the digital divide will extend far beyond equipping North Dakotans with the resources, skills, and knowledge to access and utilize the internet. By executing upon the Five-Year Action Plan and Digital Equity Plan, North Dakota will provide the "missing link" to facilitate access to the economic, social, financial, health, employment, and educational opportunities of modern society. This is encapsulated by North Dakota's commitment to secure "Broadband for All, Broadband for Life℠" Through this Plan, the State will continue to make progress in providing every address in North Dakota the service it needs to thrive in the 21st century and beyond.

7 Appendices

Table 26: Broadband Funding including Awardees

Source (Awardee)	Purpose	Total	Expended[278]	Available
Broadband Deployment Funding				
American Rescue Plan Act – Capital Projects Fund[279]	Fund critical broadband infrastructure projects that serve 3,965 people in unserved and underserved locations with symmetrical 100 Mbps speeds	$37,251,986	$37,251,986	-
Enabling Middle Mile Broadband Infrastructure Program (Dakota Carrier Network)	Add ~875 of middle mile fiber connecting Carrington to Bismarck, Jamestown, Devils Lake, and Fargo and connecting Alexander and Max. Also, upgrade electronics to support the increased network demand	$19,710,574 ($43,801,276)	-	$19,710,574
Tribal Broadband Connectivity Program (Standing Rock Telecommunications)[280]	Install fixed wireless to directly connect around 1,000 unserved households with 50 Mbps/10 Mbps fixed wireless service in Fort Yates	$8,637,952	-	$8,637,952

[278] Data on expended amounts gathered from: USSpending.gov search platform (accessed on July 10, 2023) USspending.gov. Accessed at: https://www.usaspending.gov/search
[279] US Department of the Treasury (accessed on May 4, 2023), Capital Projects Fund Award Fact Sheet North Dakota. Accessed at: https://home.treasury.gov/system/files/136/state-Award-Fact-Sheet-ND-Aug-2022.pdf.
[280] NTIA (accessed on May 5, 2023), Tribal Broadband Connectivity Program Award Recipients. Accessed at: https://broadbandusa.ntia.doc.gov/tribal-broadband-connectivity-program-awardees#S.

USDA ReConnect Grants[281, 282, 283]	FY 2019 50/50 Loan Grant (Daktel Communications, LLC)	Connect 406 households to high-speed internet by deploying a fiber-to-the-premises network in Jamestown, ND with symmetrical 1 Gbps speeds	$1,809,290 ($3,668,580 total)	$1,809,290	-
	FY 2019 50/50 Loan Grant (Polar Communications Mutual Aid Corp)	Connect 2,237 household to high-speed internet by deploying a fiber-to-the-premises network	$21,248,334	$21,248,334	-
	FY 2020 50/50 Loan Grant (Halstad Telephone Company)	Connect 458 households to high-speed internet by deploying a fiber-to-the-premises network	$4,761,764	$4,761,764	-
	FY 2020 100% Grant (Reservation Telephone Cooperative)	Connect 563 households to high-speed internet by deploying a fiber-to-the-premises network in Montana and North Dakota	$6,959,459	$6,959,459	-
	FY 2020 100% Grant (Polar Communications Mutual Aid Corporation)	Connect 209 households to high-speed internet by deploying a fiber-to-the-premises network	$3,944,111	$3,944,111	-
	FY 2022 100% Loan (Griggs County Telephone Co.)	Connect 2,943 people to high-speed internet by deploying a fiber-to-the-premises network	$16,880,472	$3,892,893	$12,987,579
	FY 2022 100% Grant (Halstad Telephone Co.)	Connect 532 people to high-speed internet by deploying a fiber-to-the-premises network	$2,815,462	-	$2,815,462
	FY 2022 100% Grant (Consolidated Enterprises Inc.)	Connect 851 people to high-speed internet by deploying a fiber-to-the-premises network	$13,814,768	-	$13,814,768
	FY 2022 100% Grant	Connect 1,496 people to high-speed internet	$13,942,351	-	$13,942,351

[281] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2019 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-one-awardees.
[282] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2020 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-two-awardees.
[283] US Department of Agriculture (accessed on May 11, 2023), ReConnect Program FY 2022 Funding Opportunity Announcement Awardees. Accessed at: https://www.usda.gov/reconnect/round-three-awardees.

	(BEK Communications Cooperative)	by deploying a fiber-to-the-premises network			
	FY 2022 100% Grant (Reservation Telephone Cooperative)	Connect 1,151 people to high-speed internet by deploying a fiber-to-the-premises network in Montana and North Dakota	$18,501,541	-	$18,501,541
Connect America 2018[284, 13]	(BEK Communications Cooperative)	Deliver service to 534 locations across ND with 100 Mbps download speeds	$ 1,182,155	$ 1,182,155	-
	(Midcontinent Communications)	Deliver service to 1,069 locations across ND with 100 Mbps download speeds	$ 6,044,447	$ 6,044,447	-
Rural Digital Opportunity Fund 2020[285]	(BEK Communications Cooperative)	Build network to provide service to 337 locations with at least 100/20 Mbps speed	$ 2,157,719	$ 1,607,084	$ 550,635
	(Daktel Communications, LLC)	Build network to provide service to 66 locations with at least 100/20 Mbps speed	$ 531,894	$ 531,894	-
	(Great Plains Consortium)	Build network to provide service to 3 locations with at least 100/20 Mbps speed	$ 15,582	-	$ 15,582
	(Halstad Telephone Company)	Build network to provide service to 1,217 locations with at least 100/20 Mbps speed	$ 9,023,062	-	$ 9,023,062
	(LTD Broadband LLC)	Build network to provide service to 831 locations with at least 100/20 Mbps speed	$ 8,574,318	-	$ 8,574,318
	(Midcontinent Communications)	Build network to provide service to 206 locations with at least 100/20 Mbps speed	$ 184,168	-	$ 184,168
	(Reservation Telephone Cooperative)	Build network to provide service to 73 locations with at least 100/20 Mbps speed	$ 337,080	-	$ 337,080

[284] Federal Communications Commission (published on August 28, 2018), FCC Connect America Fund Phase II Auction. Accessed at: https://docs.fcc.gov/public/attachments/DA-18-887A2.pdf.
[285] Federal Communications Commission (published on December 7, 2020), FCC Rural Digital Opportunity Fund Phase I Auction. Accessed at: https://docs.fcc.gov/public/attachments/DA-20-1422A2.pdf.

	(Wisper-CABO 904 Consortium)	Build network to provide service to 47 locations with at least 100/20 Mbps speed	$ 698	-	$ 698
Broadband Adoption Funding					
ACP Outreach Grant[286]	(Community Action Partnership of North Dakota)	Increase ACP enrollment in the state	$500,000	NA	NA
	(University of North Dakota)	Increase ACP enrollment in the state	$300,000	NA	NA
Broadband Affordability Funding					
E-Rate[287]		Provide discounts to 37 schools and school districts in the state to provide internet access, telecommunications services, and related equipment	$1,199,358	NA	NA
Broadband Access Funding					
Tribal Broadband Connectivity Program (Sisseton Wahpeton Oyate of the Lake Traverse Reservation)[288]		Provide broadband equipment, incl. computers, for distance learning for 750 students, purchase equipment for households and CAIs on Tribal Lands, and subsidize broadband service for approx. 700 Tribal members	$1,847,628	-	$1,847,628
Connected Care Pilot Program (Catholic Health Initiatives)[289]		Cover eligible costs of broadband connectivity, network equipment, and information services necessary to provide connected care	$6,183,189	NA	NA

[286] Federal Communications Commission (accessed on May 11, 2023), Consumer and Governmental Affairs Bureau Announces ACP Outreach Grant Program Target Funding. Accessed at: https://docs.fcc.gov/public/attachments/DA-23-194A1.pdf.
[287] Universal Service Administrative Co. (accessed on July 18, 2023) 2023 Commitments. Accessed at: https://opendata.usac.org/stories/s/jj4v-cm5x.
[288] NTIA (accessed on May 5, 2023), Tribal Broadband Connectivity Program Award Recipients. Accessed at: https://broadbandusa.ntia.doc.gov/tribal-broadband-connectivity-program-awardees#S.
[289] Federal Communications Commission (accessed on May 11, 2023), Connected Care Pilot Program Selection List. Accessed at: https://www.fcc.gov/sites/default/files/ccpp-selection-list_03.16.2022.pdf.

	services to the intended patient population in ND as well as AR, IA, KY, MN, and NE			
Emergency Connectivity Fund Program	Offers assistance to schools and libraries to provide the tools and services their communities need for remote learning during the COVID-19 emergency period	$4,265,249	NA	NA
Digital Equity Funding				
National Tribal Broadband Grant 2020 (Spirit Lake Nation (Tribal Entity))[290]	Study the feasibility of developing or extending broadband service in Tribal Lands	$50,000	$50,000	-
Tribally Controlled Postsecondary Career and Technical Institutions Program (United Tribes Technical College)[291]	Offer Career and Technical Education (CTE) training for 900 Native American and Alaska Native students in Welding and Heavy Equipment Operations as well as other programs	$7,100,000	-	$7,100,000

[290] US Department of Indian Affairs (published on August 13, 2020), Trump Administration Invests $1.2 Million in Tribal Broadband Grants. Accessed at: https://www.bia.gov/as-ia/opa/online-press-release/trump-administration-invests-12-million-tribal-broadband-grants.
[291] Department of Education (accessed on May 15, 2023), Perkins Collaborative Resource Network. Accessed at: https://cte.ed.gov/grants/tribally-controlled-postsecondary-career-and-technical-institutions-program.