This is a **draft report**. It does not contain final formatting, copyediting, or graphic design work.

Governor's Task Force on Broadband

Draft Report

Public comment will be accepted through October 26, 2021. Written comment can be submitted to tyler.sachtleben@alaska.gov.

A public comment hearing will be held on October 26 at 1 p.m. via Zoom and telephone. Meeting details, the public comment docket, and all task force files can be found at gov.alaska.gov/broadband.

Special thanks to Connected Nation for their assistance in the drafting of this report.

Table of Contents

Letter from the Chair **4**
Introduction **5**
Summary of Recommendations **8**
1. Needs Assessment & Gaps **9**
Unserved Communities 11
A. End-user Broadband Service Level (speed & capacity) 13
B. Middle-Mile Infrastructure (speed/capacity) 14
C. Affordability 17
D. Workforce Development 18
E. Evolving Capability 19
2. Hurdles to Investment & Deployment **21**
Government Funding Support is Needed 21
A. Capital Expenditure ("CapEx") Costs 21
B. Operational Expenditure ("OpEx") Costs 23
C. Recommendations 24
Permitting & Rights of Way (ROW) 25
3. Evaluation of Broadband Technologies **27**
Middle-Mile Technologies 27
A. Fiber-Optic Cables 28
B. Microwave Wireless 29
C. Geosynchronous Satellites (GEO) 30
D. Low-Earth Orbit Satellites (LEO) 31
Summary: Middle-Mile Technologies 32
Last-Mile Technologies 33
A. Fiber-to-the-Premises (FTTP) 33
B. Digital Subscriber Line (DSL) 34
C. Coaxial Cable 34
D. Fixed Wireless 35
E. Low-Earth Orbit Satellites (LEO) 36
Summary: Last-Mile Technologies 36
4. State Broadband Office **38**
State Broadband Offices across the United States 38
Establishing the Alaska Office of Broadband Deployment 39
Establishing the State Broadband Advisory Board 41
Regional Broadband Planning Committees 42
Equitable Access to Broadband 43

Partnership with Alaskans 44

5. State Participation 45

State Broadband Policy Guidelines 45
Broadband Parity Adjustment 46
Government-Wide Policy Objectives 48

6. Equitable Use of State Funding 50

Broadband Investment Strategy 50
Public-Private Partnerships 51
Funding Sources & Sustainable Revenue Considerations 53
Engaging Alaskans 54

7. Buildout Plan 55

A Roadmap to Success 55

Appendix A: Middle-Mile Networks in Alaska 58
Appendix B: Public Mapping Resources 59
Appendix C: Report Contributors 60
Appendix D: Recommendations List 61
Appendix E: Community Service Levels by Census-Designated Place 70

Letter from the Chair

[This section is intentionally left blank in the draft report]

Introduction

Improving quality of life, reducing costs, and facilitating fair and competitive markets are key goals in developing and advancing Alaska's economy and making our state a great place to raise a family or operate a business. Deploying and operating broadband networks that can deliver high-speed, reliable, and affordable communications services to Alaska's residents and businesses is an integral part of that effort.

In August 2014, Alaska's first broadband task force highlighted the critical needs and demands for broadband connectivity, as well as some of the challenges to deploying networks in Alaska.[1] Those included difficulties in building and maintaining network facilities in Alaska's geography and climate, the need to obtain State authorization in a timely manner, environmental permits and utilization of rights of way, and the challenging economics of constructing and operating networks in rural and remote areas of the state. The task force's report was refreshed by the Denali Commission, with support from nonprofit Connected Nation, in December 2019.[2]

The COVID-19 pandemic has emphasized the urgent need for reliable, high-speed connectivity for all Alaskans. Closing Alaska's digital divide is now more important than ever to meet an exponentially growing demand for bandwidth to support basic government and domestic functions including commerce, healthcare, education, economic development, innovation, and addressing quality of life issues for Alaskans.

On May 6, 2021, Governor Mike Dunleavy issued Administrative Order No. 322,[3] which created Alaska's second task force on broadband. Task force members were subsequently appointed by the governor on June 25, and the task force convened for the first time on July 19. At the first meeting, the task force divided itself into two working subgroups—one focused on the state's technical issues related to broadband infrastructure deployment, and one focused on the public policies needed to support a robust statewide broadband ecosystem. Governor Dunleavy charged the task force and its subgroups to review and provide recommendations regarding broadband goals and policies, guidelines for state involvement in broadband infrastructure development, and equitable use of state funds to assist in the buildout of broadband networks.

---

[1] *See https://www.alaska.edu/files/oit/bbtaskforce/2013-08-AK-Broadband-Task-Force-Report%7CA-Blueprint-for-Alaska%27s-Broadband-Future.pdf*

[2] *See https://connectednation.org/wp-content/uploads/2020/03/CN_ALASKA_BB_PLAN_12-2019_07_FINAL-1.pdf*

[3] *See https://gov.alaska.gov/wp-content/uploads/sites/2/07.19.2021-AO-322.pdf*

Governor Dunleavy assigned the following scope of work to the task force, which will follow as chapters:

1. **Needs Assessment & Gaps:** Identify and complete a needs assessment of the "gaps" in the current broadband network deployment. Identify communities most in need of upgraded or new infrastructure.
2. **Buildout Plan:** Provide recommendations for a buildout plan to close remaining gaps and bring high-speed broadband to all Alaskans.
3. **Evaluation of Broadband Technologies:** Evaluate all technologies that are used to provision broadband, identify and assess the pros and cons of each as they pertain to connecting all Alaskans with high-speed connectivity.
4. **Hurdles to Investment & Deployment:** Assess the hurdles to broadband investment and deployment. Make recommendations on how the State can play a role to eliminate them.
5. **Broadband Office:** Provide recommendations for a state repository of broadband information and expertise that does not increase the state budget.
6. **State Participation:** Identify and lay out recommendations of policies and guidelines for state participation in broadband infrastructure development and ongoing operations.
7. **Funding Prioritization:** Recommend program-based guidelines or rules for equitable use of state funding in broadband infrastructure development.

The task force's findings and recommendations are compiled in this report, organized by chapters associated with each of the seven assigned tasks.

The task force consists of 12 voting members. They are:

- **Hallie Bissett**, Chair, representative of Alaska Natives
- **Gerad Godfrey,** Vice Chair, a representative of the general public
- **Julie Anderson**, Commissioner of the Department of Commerce, Community and Economic Development
- **Nils Andreassen**, representative of the Alaska Municipal League
- **Kati Capozzi**, Alaska Chamber of Commerce, representative of a statewide organization representing business communities throughout Alaska
- **Stewart Ferguson**, Alaska Native Tribal Health Consortium, a representative of rural healthcare interests
- **Gerad Godfrey,** a representative of the general public
- **John Handeland**, Nome, the mayor of a community off the road system
- **Michael Johnson**, Commissioner of the Department of Education and Early Development
- **Steve Noonkesser**, Southwest Region School District, a representative of a rural Alaska school district

- **Christine O'Connor**, representative of the telecommunications industry
- **Allen Todd**, representative of regional rural interests
- **Bryce Ward**, Fairbanks - North Star Borough, the mayor of a community on the road system

In addition, the following ex-officio members were appointed by the Alaska House of Representatives and Senate:

- **State Rep. Grier Hopkins**, Fairbanks
- **State Sen. Shelley Hughes**, Palmer

Summary of Recommendations

[This section is intentionally left blank in the draft report]

1. Needs Assessment & Gaps

Task: Identify and complete a needs assessment of the "gaps" in the current broadband network deployment. Identify communities most in need of upgraded or new infrastructure.

Of all U.S. states, Alaska is, by almost any measure, the most challenging place to ensure the ubiquitous delivery of high-quality broadband services. This is true both in the assessment of broadband needs and the closure of coverage gaps once those needs are identified. Because of Alaska's status as the largest U.S. state by area—comprising more area than Texas, California, and Montana combined—the challenge of extending robust broadband infrastructure to every community is substantial.

Geographically, vast distances separate communities in Alaska, with much of the land in between being controlled by the USDA Forest Service, the Department of the Interior's Bureau of Land Management, the U.S. Department of Defense, and state entities that include the Alaska Department of Transportation, the Alaska Department of Natural Resources, and the Alaska Railroad Corporation.

Such significant government ownership and control yields a complex compliance environment that can challenge service providers when obtaining the proper permits necessary for construction. The hardest-to-serve communities are located "off the road system," meaning they are only accessible by boat or aircraft with no roads in or out. Mountainous terrain, harsh winter weather, permafrost, a very short construction season, and limited-to-no daylight hours in winter months represent significant additional hurdles to overcome, not just for the deployment of broadband infrastructure, but for its ongoing maintenance and operation.

Beyond geography, Alaska's status as the third least-populous U.S. state means that telecommunication companies face extreme economic hurdles in justifying the expenditure of private capital on broadband infrastructure to many areas. Alaska's low population and distance between communities outside the larger cities of Anchorage, Fairbanks, and Juneau translates into an environment where there may be no viable means of cost recovery without significant government support. Business customers that serve as anchor customers and improve the economics of deployment elsewhere are limited in number or nonexistent in communities that exist off the road system.

While all these factors make broadband extremely challenging to deploy, it is also true that no state is more in need of robust broadband infrastructure than Alaska. The same geographic and economic factors that make broadband difficult to deploy are the same issues that inhibit the effective delivery of healthcare, government, and education services—services that can be efficiently delivered over broadband. So, while the cost to deploy may be high, the cost of inaction is likely even higher.

While working to define the extent of Alaska's broadband needs, the task force determined that complete data on broadband infrastructure and services is not available at this time. The state of Alaska does not currently maintain a map of broadband service availability. The Federal Communications Commission (FCC) and National Telecommunications and Information Administration (NTIA) compile and maintain maps of broadband service availability, but they are not comprehensive and are widely criticized as flawed and unreliable.

Collected via what is known as "Form 477," the FCC receives and analyzes service availability data by census block as reported by broadband service providers semi-annually. If one household in a census block is served, then a service provider will report to the FCC that the entire census block is served. This is a problematic means of measuring service availability, particularly in sparsely populated states, given that census blocks may range in size from 0.1 square miles in urban areas to more than 5,000 square miles in rural areas. Given that the largest census blocks in the country are in Alaska, service availability is likely the most overstated and unreliable here.

According to the FCC's 14th Broadband Deployment Report,[4] issued January 19, 2021, 85.2% of Alaskans now have access to fixed terrestrial broadband at speeds of at least 25 Mbps downstream and 3 Mbps upstream—an increase of 3.39 percentage points since 2019. However, according to the same report, only 63.7% of Alaskans living in rural areas have such access. Given the inherent overstatement of coverage for the reasons described above, the state's actual coverage is likely even less extensive.

Fortunately, the FCC is in the process of implementing the Broadband DATA Act (Public Law No. 116-30),[5] passed by the 116th Congress and signed into law in March 2020, creating what the FCC calls its "Broadband Data Collection (BDC)" program. The law requires the FCC to create a new national broadband map that depicts service availability on a location-specific, structure-by-structure basis across the entire United States—a vast improvement over the current Form 477 reporting regime. Still, it is estimated that the new map will not be available to guide policymaking or direct the investment of state or federal funds toward broadband buildout until late 2022 or early 2023.

Beyond the lack of reliable service availability data, the state of broadband network construction is also quite fluid due to recent infusions of federal funding made available by Congress through programs like USDA's ReConnect and Community Connect Programs, NTIA's Tribal Broadband Grant Program, the U.S. Treasury's American Rescue Plan Act (ARPA) funding programs, and others. The FCC's BDC program will track these and other future broadband investments as network infrastructure is built out, but real-

---

[4] *See https://docs.fcc.gov/public/attachments/FCC-21-18A1.pdf*
[5] *See https://www.congress.gov/bill/116th-congress/senate-bill/1822/text*

time information on buildout progress is not currently available for the task force to assess.

Unserved Communities

The task force was able to gather "snapshot" data that is accurate as of the summer of 2021. The list below shows census-designated places (CDPs)[6] that lack 25 Mbps download and 3 Mpbs upload speeds with latency suitable for real-time applications. The task force considers these locations unserved.

Additional CDP data, including areas that lack 10/1 and 100/20 Mbps speeds can be found in Appendix E.

Census-Designated Place	Population
Adak	298
Akhiok	69
Akiachak	724
Akiak	420
Akutan	990
Alakanuk	704
Alatna	19
Alcan Border	29
Aleknagik	243
Aleneva	8
Allakaket	160
Ambler	263
Anaktuvuk Pass	365
Andreafsky	93
Aniak	477
Anvik	77
Arctic Village	193
Atka	50
Atmautluak	338
Atqasuk	269
Auke Bay	5,373
Beaver	69
Beluga	20
Bethel	6,259
Bettles	7
Big Delta	476

Census-Designated Place	Population
Big Salt	25
Birch Creek	28
Brevig Mission	451
Buckland	509
Central	87
Chalkyitsik	79
Chase	28
Chefornak	457
Chenega	61
Chevak	1,014
Chicken	6
Chignik	95
Chignik Lagoon	81
Chignik Lake	57
Chiniak	45
Chisana	3
Chuathbaluk	100
Circle	85
Clam Gulch	216
Clark's Point	69
Coffman Cove	174
Cold Bay	60
Coldfoot	14
Crooked Creek	80
Deering	166
Delta Junction	1,157

Census-Designated Place	Population
Dillingham	2,327
Diomede	97
Dry Creek	82
Eagle	75
Eagle Village	64
Edna Bay	47
Eek	349
Egegik	85
Ekuk	2
Ekwok	100
Elfin Cove	16
Elim	351
Emmonak	836
Evansville	8
Excursion Inlet	16
Eyak	135
False Pass	42
Fort Yukon	525
Four Mile Road	30
Fox	416
Galena	445
Gambell	667
Game Creek	17
Georgetown	2
Glennallen	449
Gold Sand Acres	70

[6] *See https://dcra-cdo-dcced.opendata.arcgis.com*

Census-Designated Place	Population
Golovin	150
Goodnews Bay	284
Grayling	190
Gustavus	537
Healy Lake	27
Hobart Bay	1
Holy Cross	158
Hoonah	782
Hooper Bay	1,239
Hope	215
Hughes	93
Huslia	293
Hyder	78
Igiugig	56
Iliamna	109
Ivanof Bay	7
Kake	570
Kaktovik	235
Kaltag	159
Karluk	27
Kasaan	85
Kasigluk	627
Kiana	409
King Cove	919
King Salmon	301
Kipnuk	700
Kivalina	427
Klawock	761
Klawock Lake	31
Kobuk	143
Kodiak Station	1,304
Kokhanok	157
Koliganek	195
Kongiganak	544
Kotlik	649
Kotzebue	3,112
Koyuk	348
Koyukuk	95
Kupreanof	32
Kwethluk	814
Kwigillingok	374

Census-Designated Place	Population
Lake Minchumina	9
Larsen Bay	73
Levelock	70
Lime Village	15
Livengood	9
Loring	2
Lower Kalskag	288
Manley Hot Springs	104
Manokotak	483
Marshall	471
McGrath	321
Mekoryuk	206
Minto	170
Mosquito Lake	268
Mountain Village	808
Nabesna	3
Naknek	488
Nanwalek	280
Napaimute	2
Napakiak	351
Napaskiak	440
Noatak	583
Nelson Lagoon	30
Nenana	362
New Stuyahok	476
Newhalen	211
Newtok	339
Nightmute	286
Nikolai	87
Nikolski	17
Noatak	555
Nondalton	126
Northway	60
Northway Junction	57
Northway Village	84
Norvik	651
Nulato	228
Nunam Iqua	213
Nunapitchuk	560
Old Harbor	203

Census-Designated Place	Population
Oscarville	74
Ouzinkie	142
Paxson	35
Pedro Bay	36
Pelican	69
Perryville	97
Petersville	8
Pilot Point	81
Pilot Station	606
Pitkas Point	116
Platinum	48
Pleasant Valley	714
Point Baker	26
Point Lay	299
Point Possession	42
Pope-VanNy Landing	5
Port Alexander	57
Port Alsworth	226
Port Graham	180
Port Heiden	105
Port Lions	177
Port Protection	29
Quinhagak	716
Rampart	97
Red Devil	16
Red Dog Mine	309
Ruby	149
Russian Mission	350
Saint George	59
Saint Mary's	555
Saint Michael	394
Saint Paul	385
Sand Point	897
Savoonga	735
Scammon Bay	593
Selawik	832
Shageluk	91
Shaktoolik	272
Shishmaref	577
Shungnak	253

Census-Designated Place	Population
Skwentna	30
Slana	134
Sleetmute	95
South Naknek	80
South Van Horn	538
Stebbins	618
Stevens Village	44
Stony River	39
Sunrise	14
Takotna	80
Tanana	216
Telida	2
Teller	235

Census-Designated Place	Population
Tenakee Springs	140
Thorne Bay	562
Togiak	873
Toksook Bay	667
Tuluksak	361
Tuntutuliak	464
Tununak	376
Twin Hills	89
Two Rivers	645
Ugashik	12
Unalakleet	721
Unalaska	4,592
Upper Kalskag	220

Census-Designated Place	Population
Venetie	164
Wales	150
Whale Pass	57
White Mountain	201
Whitestone	144
Wiseman	11
Womens Bay	765
Yakutat	540

Armed with this information, and as part of its work to define the state's needs and coverage gaps, the task force identified five (5) important elements which constitute a "gap" in the state's broadband landscape. Those are:

A. End-user broadband service level
B. Middle-mile availability
C. Affordability
D. Workforce development
E. Evolving capability

These five elements, and associated recommendations, are described in further detail below.

A. End-user Broadband Service Level (speed & capacity)

To determine what level of broadband service should be available to residential end-users and small businesses across Alaska, the task force established that such service must, at a minimum, be capable of supporting the most critical functions that end-users need for the delivery of remote health care, education, and participation in commerce.

The task force determined that quality of service (QoS) for end-user connectivity should be assessed using four criteria:

- **Speed** (alternatively called throughput capacity) is defined as the rate at which data can be transmitted to or from an end-user (usually stated as download/upload). End-user broadband speeds today are typically measured in megabits per second (Mbps) or gigabits per second (Gbps).

- **Latency** refers to the amount of time required for a data packet to travel to its destination and back. The measurement of latency quantifies the delay that an end-user experiences between initiating an action and seeing a result. Latency is typically measured in milliseconds (ms).

- **Data Usage Allowance** refers to the amount of data, usually measured in megabytes (MB) or gigabytes (GB), that an end-user is allowed to transmit or receive over a given period of time (usually monthly).

- **Reliability** is often defined as the "uptime" percentage of broadband service. For example, 99.99% uptime allows for 52 minutes of downtime each year. Increased reliability will support more business functions and consumer services that require highly reliable connectivity. Robust designs and equipment that operate for long periods of time and rapid responses to network problems will be required.

The task force also determined that service levels should be equitable across Alaska, and that policymakers should focus on the quality and affordability of service delivered, not on the broadband technology used to deliver it. It is important that in determining these benchmarks, accessibility be considered such that localized solutions meet that goal.

RECOMMENDATION 1.1: Define the Gaps
The following benchmarks should be used to determine if any location has access to end-user and last-mile broadband infrastructure or if a gap exists: **1) Unserved Area:** an area that does not have access to broadband speeds of at least 25 Mbps (downstream) and 3 Mbps (upstream) **2) Underserved Area:** an area that does not have access to broadband speeds of at least 100 Mbps (downstream) and 20 Mbps (upstream) **3) Latency:** must be sufficient for real-time applications such as telemedicine and distance education (less than 100ms) **4) Data Usage Allowance:** must be comparable to broadband packages offered in urban Alaska markets (Anchorage/Fairbanks) **5) Reliability:** must be available 24/7 with minimal downtime and be resistant to single points of failure.

B. Middle-Mile Infrastructure (speed/capacity)

1. Middle-mile connectivity, which is sometimes called "transport" or "backhaul," is defined as high-capacity network infrastructure (generally, but not always, fiber optic cable) that links a network operator's core network to its last-mile distribution network. All middle mile infrastructure in Alaska must connect to peering points in the Lower 48 to be functional. It is therefore critical to have

robust middle-mile connections both within Alaska and connecting Alaska to the Lower 48.

Examples in Alaska include Matanuska Telephone Association's terrestrial fiber, which connects Alaska to the Lower 48 via Canada, and KPU Telecom's undersea fiber which connects Ketchikan to the Lower 48 through Canada. Other examples include Alaska Power & Telephone's microwave network in southeast Alaska and GCI's TERRA microwave network in Southwest Alaska, as well as satellite networks that connect remote Alaska villages to an earth station in Seward and the terrestrial fiber network operators that backhaul traffic from there.

The task force determined that the state's middle-mile infrastructure must be capable of supporting end-user broadband service required in a community. Insufficient middle-mile capacity will ultimately result in degraded last-mile capacity, and thus, poor end-user experiences online, inhibiting commerce and the delivery of healthcare, education, and government services.

RECOMMENDATION 1.2: Identify Middle-Mile Needs
Broadband policy and program analyses should include data-gathering and research to identify where additional middle-mile capacity is needed to meet established or potential last-mile service availability speed targets, recognizing that any established standards will need to evolve with the growing demands of technology and consumer usage over time.

2. The task force also determined that a statewide fiber-optic backbone is needed, as many communities off the road system are currently backhauled via microwave or satellite. Such an investment would provide scalable middle-mile capacity and significantly lower latency to those communities, allowing for the evolution of services within Alaska and making such services more resilient and reliable.

RECOMMENDATION 1.3: Analyze High-Priority Routes & Hubs
Broadband analyses should identify routes and hub locations from which fiber-optic backbone infrastructure should be extended in order to support higher capacity, more resilient services across Alaska.

3. In the wake of the COVID-19 pandemic, Congress has appropriated an unprecedented amount of funding to support broadband infrastructure buildout in 2021. H.R. 1319, the *American Rescue Plan Act* (ARPA), was signed into law on March 11 and made last-mile broadband infrastructure one of many eligible expenses under the U.S. Treasury's "Coronavirus State and Local Fiscal Recovery Funds"—a combined $350 billion program that allocated money to state and local governments throughout the U.S. for the purpose of pandemic recovery.

   ARPA also established the Coronavirus Capital Projects Fund (CCPF)—a separate $10 billion program that is focused on broadband connectivity but also may be spent on other infrastructure projects that allow Alaskans to find work, increase their education levels, and monitor their health. Alaska's CCPF allocation is $111,803,893, and the State has until September 24, 2022 to identify qualifying projects and seek Treasury's approval for them.

   Beyond those programs, the bipartisan federal infrastructure bill known as the Infrastructure Investment and Jobs Act (H.R. 3684) is expected to be signed into law in late 2021. It contains an additional $65 billion for broadband infrastructure and related programming, including $42.5 billion for broadband deployment and $1 billion for middle-mile construction.

   These programs represent a generational infusion of resources to deploy broadband infrastructure across the United States. Alaska's needs are arguably more significant than in any other state, and given the level of resources now available, the task force believes the threshold of where it is possible to deploy robust terrestrial broadband networks has changed, making it possible to build terrestrial middle and last-mile capacity to places never before considered as feasible.

RECOMMENDATION 1.4: Target the Unserved & Underserved
Robust broadband services should be available to all Alaskans; policymakers should expand buildout objectives to deploy infrastructure to meet the needs of unserved and underserved locations across Alaska.

4. The task force also recognizes that broadband infrastructure gaps—both middle-mile and last-mile—exist in less remote areas of Alaska. Even areas that are near urban centers may not have robust broadband infrastructure. Although reliable mapping is not currently available to pinpoint infrastructure gaps, anecdotal experience among the task force members suggests that the line between relatively well-served, urban Alaska and unserved or underserved Alaska may not be far outside urban centers.

RECOMMENDATION 1.5: Ensure Accurate Maps to Locate Rural & Urban Gaps
Accurate, granular broadband availability and infrastructure maps should define where unserved and underserved areas exist due to gaps in broadband infrastructure, regardless of whether those areas have physical proximity to urban centers. The state's broadband deployment and program management should be data-driven to respond to all unserved and underserved areas.

C. Affordability

As discussed previously in this chapter, Alaska's geographic size, terrain, and climate, along with the physical isolation of many communities across the state, contribute to an operational environment that creates extremely high costs, not only to deploy broadband infrastructure, but to operate and maintain it. These high costs are generally passed along to end users in the form of higher monthly service bills and surcharges for data usage beyond monthly plan allowances. While empirical data on monthly service costs is not available statewide, anecdotal costs derived from service provider marketing materials show that Alaskans generally pay higher costs for service than do subscribers in the Lower 48, with communities off the road system generally paying significantly higher rates and experiencing data consumption limitations.

The task force has identified that affordability, not just physical access to deployed infrastructure, is an important consideration in determining where broadband gaps exist. In some cases, broadband infrastructure may be deployed, but because of the heavy level of private investment required, the cost of the resulting service may remain largely unaffordable to the average home in a community. Fortunately, increased support from new federal programs may make it possible for services to be deployed at rates similar to those offered in areas with greater economies of scale and more private investment.

Lack of affordability increases the transactional costs to Alaskans; high rates increase the costs of doing business, providing healthcare and education, limit the efficacy of Alaska's workforce, and even contribute to poorer quality of life standards. To the extent that broadband deployment will take time to fully meet the needs of Alaskans, the State may consider ways in which to otherwise offset those costs.

RECOMMENDATION 1.6: Recognize That Affordability Creates Gaps
Policymakers should recognize that affordability is an important element in defining where gaps in broadband infrastructure exist. Policymakers should also recognize that affordability is driven by underlying costs associated with Alaska's unique operational environment, and that partnerships between service providers and state and federal programs are important in achieving affordable service delivery to end-users.

D. Workforce Development

The ability to deploy, operate, maintain, and repair broadband infrastructure depends on having a skilled workforce in place and the ongoing development and support of that workforce locally. In a letter written to President Biden on January 27, 2021,[7] 11 telecommunications industry trade associations highlighted a serious concern: that America does not currently have the necessary workforce to support the needed expansion and operations of new broadband infrastructure. The trade associations stated their concerns clearly:

> "The U.S. currently faces a shortfall of skilled workers needed to deploy broadband across the country, to win the race to 5G, and to ensure robust fiber, mobile, and fixed wireless networks. Needed investments in broadband infrastructure will increase demand on a labor force already in short supply. To improve the efficiency of federal funding, a corresponding initiative is needed to develop a workforce properly trained with the skills to deploy next generation wired and wireless networks."

Alaska is certainly not immune to these challenges, as attracting and maintaining a skilled workforce, particularly in the field of telecommunications, is a difficult obstacle to overcome. Yet it is an incredibly important problem to solve. A local workforce reduces service disruptions and increases the quality of the service provided, particularly in a state like Alaska where extreme weather and distance can challenge maintenance and operations.

The task force wishes to emphasize that workforce development is an important and necessary element to consider in future broadband deployment projects. Alaska's public education and university system provide valuable platforms to develop and strengthen broadband workforce development.

[7] *See https://wia.org/wp-content/uploads/workforce-letter-jan-2021_biden_final.pdf*

RECOMMENDATION 1.7: Prioritize Local Workforce Development
Additional priority should be given to broadband infrastructure projects that include support for local workforce development. Beyond on the job training opportunities, the State should partner with existing workforce development programs offered through the university system, technical schools, or apprenticeships. **Opportunities to partner with broadband companies to develop job-shadowing programs or other types of training should be pursued.**

E. Evolving Capability

1. First quantified in 1998 by researcher Dr. Jakob Nielsen, Nielsen's Law of Internet Bandwidth[8] has been used by the broadband service provider industry to plan broadband network growth needs. The law states that a high-end user's connection speed will need to grow by 50% each year, doubling every 21 months. Since Nielsen first published his model, the law has largely held true, showing exponential growth from 1982 to 2019 that is consistent with Nielsen's predictions.

   While recent research indicates that such exponential growth is unsustainable and is indeed slowing, demand for increased bandwidth will continue—albeit at a slower pace—to an annual increase of just 6% by the year 2030.[9] At the same time, it is still too early to fully understand whether the COVID-19 pandemic will have a long-term effect on bandwidth consumption trends. For instance, will the use of applications like Zoom to facilitate two-way video communication as a replacement for in-person work and travel continue at the same level that it is employed today?

   Expanding access to broadband allows communities to share information more easily with the public and create tools and partnerships to benefit members of the community. The main goal of such efforts is to create "smart cities" or "smart communities" that optimize government operations, promote economic growth, and improve the quality of life for all citizens. Communities can attract skilled professionals who desire to live in the beautiful state that is Alaska while leveraging broadband for skills training and workforce development. Citizens can make better decisions and gain faster access to healthcare and distance education. Presently, Alaska lags behind other states and countries in creating these types of communities.

---

[8] *See https://www.nngroup.com/articles/law-of-bandwidth/*

[9] *See https://www.telecompetitor.com/bandwidth-demand-forecast-300-mbps-will-be-enough-for-most-households-to-2031/*

The emerging "Alaska Smart Communities Forum" is one effort to change this. Based in the Mat-Su Borough and Municipality of Anchorage, it seeks to bring together government, businesses, and non-profits to learn about the opportunities and options. While broadband access is only one aspect of this effort, it is a prerequisite to building smart communities in Alaska.

While it may not be possible to determine whether Nielsen's Law will continue to accurately predict bandwidth growth, it is undeniable that such growth will continue at some pace. Therefore, any future broadband infrastructure that is deployed must be capable of evolving to keep pace with technology and the future needs of Alaskans. When planning for broadband infrastructure, policymakers should, "throw the ball forward and work to it."

RECOMMENDATION 1.8: Don't Let Progress Widen the Digital Divide
When developing requirements for project development, policymakers should recognize that broadband service needs will continually evolve, and bandwidth demand will continue to increase at a rapid pace. **Policymakers should also recognize the importance of minimizing the disparity in access to broadband service that may develop because of fast-paced technological evolution and strive to ensure that equitable development continues to occur.**

2. According to research conducted by Pew Charitable Trusts,[10] 26 states have dedicated broadband program offices, with the states of Hawaii, Michigan, Montana, Nevada, South Carolina, Tennessee, Texas, and Wyoming having added offices recently, bringing the total to at least 34. The creation of an Alaska broadband office is explored further in chapter 5 of this report. This office will be a necessary and essential component of evolving the state's broadband capabilities, and will lead coordination between policymakers, state and federal agencies, and the various broadband funding programs in order to maximize resources available to expand broadband to all Alaskans.

RECOMMENDATION 1.9: Maximize Federal Partnerships
An Alaska broadband office must work closely with state and federal agencies and other policymakers to maximize resources available for broadband expansion in Alaska.

[10] *See https://www.pewtrusts.org/en/research-and-analysis/articles/2021/06/28/which-states-have-dedicated-broadband-offices-task-forces-agencies-or-funds*

2. Hurdles to Investment & Deployment

Task: Assess the hurdles to broadband investment and deployment. Make recommendations on how the State can play a role to eliminate them.

Alaska's sheer size and distant populations outside of its main urban areas are the most significant hurdles that inhibit broadband infrastructure investment and deployment. Comprising over 600,000 square miles, Alaska is larger than the states of Texas, California, and Montana combined. It is 2,261 miles wide at its broadest point (roughly the distance from New York City to Las Vegas) and 1,420 miles long from north to south (roughly the distance from Miami, Florida to Augusta, Maine). According to 2020 census data, the cities of Anchorage and Juneau, along with the Matanuska-Susitna Borough and Fairbanks North Star Borough, comprise 526,238 of the state's 733,391 people (or 71.75%).[11]

The distances that must be traversed to extend broadband infrastructure, and the challenging economics of a relatively small customer base that is spread across a vast and rugged landscape, make the initial deployment of broadband infrastructure as well as the ongoing operations and maintenance costs impossible to sustain without government programs.

Beyond these concerns, other significant hurdles include unnecessary delays and costs associated with permitting and securing rights-of-way to extend service to new areas. The state of Alaska can take important steps to address these hurdles

Government Funding Support is Needed

A. Capital Expenditure ("CapEx") Costs

Extending terrestrial middle-mile and last-mile infrastructure to new areas within Alaska requires significant capital expenditures that typically extend well beyond what could ever be recovered from future recurring customer revenue. Depending on the technology, distance, and terrain involved, projects can range from tens of millions to hundreds of millions of dollars. When GCI built out its TERRA network in western Alaska between 2010 and 2017, total costs exceeded $300 million[12] to serve 45,000 Alaskans across 84 villages.

Currently, these federal agencies administer programs that provide funding for broadband-related CapEx costs: the Federal Communications Commission (FCC), the U.S. Department of Agriculture (USDA) Rural Utilities Service, the National Telecommunications & Information Administration (NTIA), and the U.S. Treasury's Office of Recovery Programs.

---

[11] *See https://www.adn.com/alaska-news/2021/08/12/alaska-is-becoming-more-ethnically-diverse-and-less-white-census-data-indicates/*

[12] *See https://gov.alaska.gov/wp-content/uploads/sites/2/GCI-MICROWAVE_CLEAN.pdf at slide 7*

The following are examples of CapEx costs for several recent middle-mile and last-mile projects.

Middle-Mile Project CapEx Costs

- **Alaska Power & Telephone SEALink Project** *(total cost: $28,500,000 of which $21,500,00 is a USDA ReConnect Grant)* – The SEALink Project will create a 214-mile subsea fiber optic cable from Prince of Wales Island to Juneau, with an overland crossing on Mitkof Island through the community of Petersburg. The project also involves terrestrial network build-outs in the communities of Coffman Cove and Kasaan, which currently lack broadband service. To minimize project impacts, AP&T Wireless is constructing terrestrial features on existing utility poles and within existing ROW wherever feasible.

- **GCI Aleutians Fiber Project** *(total cost: $58,000,000, of which $25,000,000 is a USDA ReConnect Grant)* – By late 2022, GCI will deploy an 860-mile subsea fiber system running from Kodiak to Larsen Bay, and then along the south side of the Alaska Peninsula and the Aleutian Islands to Unalaska. The project will deliver urban-level gigabit speeds, service, and reliability for the first time to the communities of Unalaska, King Cove, Sand Point, Akutan, Chignik Bay, and Larsen Bay, which had previously only been connected via geosynchronous satellite links.

- **Nushagak Electric & Telephone Cooperative (NETC) "Broadband for North Bristol Bay" Project** *(total cost: $24,000,000, of which $16,783,726 is a USDA ReConnect Grant)* – By April 2023, NETC will deploy a hybrid fiber and microwave network extending from Levelock to Alegnik, enabling 100+ Mbps broadband service in the communities of Ekwok, Alekgnik, Clark's Point, and Manokotak.

Last-Mile Project CapEx Costs

- **Matanuska Telephone Association for two neighborhoods in Caswell, Alaska** *(total cost:* $2,619,173, of which $1,964,308 is a USDA ReConnect Grant and $654,793 are matching funds*)* – The proposed project will place fiber-to-the-premises, also known as FTTP, using GPON technology to serve two neighborhoods in Caswell, Alaska. The two neighborhoods, Eagle Nest at Kashwitna and Preserve at Sheep Creek, currently have no land-line network. This project will build FTTP to 325 lots that currently contain 203 households. Speeds of up to 1 Gbps will be available to these customers.
- **Fixed Wireless Tower** *(total cost: $750,000)* – This project includes one fixed wireless tower and all customer premise equipment to provide broadband service to 200 subscribers in an area with access to Alaska's road system.

B. Operational Expenditure ("OpEx") Costs

Even when government grants are secured to cover most or all of the initial cost of construction, operations and maintenance costs can be extreme in rural Alaska. Projects typically requiring some combination of consistent funding through recurring customer revenue and government program support through programs such as the Universal Service Fund (USF). The state's rural population, both in terms of low population count and large distances between communities, combined with Alaska's small economic base, are significant factors affecting companies' ability to operate and maintain broadband networks on recurring revenue alone.

On top of those factors, high maintenance costs make profitability challenging. Consider GCI's TERRA microwave wireless network in western Alaska. Each of the network's 100+ tower sites are powered by a diesel generator and refueling nearly every site requires fuel to be brought in by helicopter. No other state in the country has such extreme OpEx costs in the delivery of broadband service.

The federal Universal Service Fund (USF) administered by Universal Service Administrative Company (USAC) consists of four programs, one of which is specifically tailored to supporting network operational costs in high-cost areas. These programs provide more than $100 million in annual subsidies for healthcare organizations in Alaska, but the program's future is uncertain. The Connect America Fund – Alaska Plan, ACAM, and CAF II provide $1.5 billion in funding over 10 years and allocates that money to maintain, extend, and upgrade both fixed and mobile broadband service across remote areas of Alaska.

At the state level, AS 42.05.840 authorized the creation of an Alaska Universal Service Fund (AUSF) by the Regulatory Commission of Alaska (RCA). The fund, originally created in 1999, is "to be used to ensure the provision of long-distance telephone service at reasonable rates throughout the state and to otherwise preserve universal service." The AUSF disbursed $13.3 million in support to Alaska telecommunications companies in 2020.[13]

The following are examples of OpEx costs for several Alaska providers.

Example OpEx Costs

Southeast Alaska Microwave Network (SAMN pronounced Salmon) – Alaska Power & Telephone (AP&T) completed construction of this microwave middle-mile network in 2009. It includes 18 mountain-top sites, each exposed to extreme weather common in southeast Alaska. Issues arising from weather include:

- Crushed Antenna (rime ice can crush an antenna)

[13] *See http://www.ausac.org/2020%20AUSF%20Annual%20Summary.xls*

- Shredded Antenna covers (also a result of rime ice and wind)
- Damage waveguides (rime ice and wind)
- Ice removal (trained techs are slung from a helicopter to break ice free)
- Crushed roofs and building from falling ice (the ice that falls from melting or removal can crush buildings)
- Timely site access (failure to access a site can mean a network outage and many false starts occur in accessing sites)

Aside from the weather, there are normal maintenance duties at these microwave sites, including:

- Generator maintenance
- Structure maintenance
- Fueling

Pricing of capacity in the Lower 48 is either at or lower on a per MB basis than costs to simply fuel the sites, disregarding other operating costs. In 2020, total operating costs for the SAMN network were $5.6 million.

OPEX EXAMPLE #2 –

[This space intentionally left empty pending data from ATA]

C. Recommendations

The task force makes the following recommendations to ensure that Alaska's broadband providers have the necessary resources to build out infrastructure and properly maintain it over time:

RECOMMENDATION 2.1: Support the Alaska Universal Service Fund
The long-term stability of the Alaska Universal Service Fund is needed to ensure the sustainability of telecommunication operations in Alaska.

RECOMMENDATION 2.2: Establish a Federal Grant-Matching Fund
Establish a state matching fund to support broadband providers who require matching funds in order to apply for federal broadband grant programs such as the USDA ReConnect Grant Program.

RECOMMENDATION 2.3: Support End-User Monthly Costs
Establish a state program to help support end-user monthly costs, similar to the federal Emergency Broadband Benefit (EBB) Program.

Permitting & Rights of Way (ROW)

While there are many geographic, demographic, and economic factors that make Alaska a challenging place to deliver robust broadband services, there are also hurdles that artificially impact the costliness and expediency of construction. For instance, in even the most basic project, it can take months for broadband service providers to navigate the complicated web of federal, state, and local permitting rules to secure authorization for a project to begin. If a project traverses state and federal land, or has a subsea component to it, the permitting process is likely to extend 12 to 18 months (or even longer in some cases). For many middle-mile projects, service providers will need to assemble an entire team of consultants and attorneys to complete required environmental, historical, and cultural reviews.

Additionally, the Alaska Railroad Corporation (ARRC) has implemented a strategy to increase revenue by imposing increased fees charged to utilities to access railroad rights-of-way. ARRC maintains an exclusive "safety zone," which is typically 200 feet wide and centered on its tracks. According to its website, the ARRC asserts the right to "exclusive use" of the ROW for transportation, communication, and transmission purposes. ARRC may, at its sole discretion, issue a permit for the crossing or use of the ROW where it is reasonable, necessary, does not affect the safe operation of trains or create any other safety hazard, and allows for future ARRC use and development. ROW and temporary construction permit applications typically require a minimum of eight weeks to review, but they can be "rushed" for an additional fee of $10,000.

The State of Alaska can play a role in prohibiting new and increased fees and surcharges that are charged by state agencies related to broadband projects. One positive example is the Alaska Department of Transportation (DOT)'s simple, streamlined permitting structure, which is relatively quick and easy to navigate, with fees capped at $10k per project.

Unfortunately, the other extreme is the Alaska Department of Natural Resources (DNR). DNR regulations set a 25% floor on revenue from space & power agreement sub-leases, with no set ceiling, instead requiring the utility and DNR to *negotiate* an agreement. This situation is creating extended project delays, and DNR regulations are being interpreted by DNR staff in increasingly expansive and intrusive ways, adding unnecessary burden on broadband service providers and their projects—projects in which both CapEx and OpEx costs are already extreme.

RECOMMENDATION 2.4: Streamline State Permitting
Policymakers should take steps to reduce the lengthy and costly state permitting burden on broadband projects and eliminate or reduce fees that state agencies charge for such projects. A broadband project coordinator or permitting official that can streamline or accomplish intergovernmental and interdepartmental permitting processes may be necessary.

Finally, state officials can take an active role in supporting the work of Alaska's congressional delegation to secure additional federal permitting relief for broadband projects. The task force would like to commend the work that U.S. Senators Lisa Murkowski and Dan Sullivan, as well as Congressman Don Young, have already done to support Alaska's service providers and promote broadband expansion across the state.

RECOMMENDATION 2.5: Advocate for Improved Federal Permitting
State officials should actively support Alaska's federal congressional delegation in their efforts to reduce federal permitting burdens for broadband infrastructure projects.

3. Evaluation of Broadband Technologies

Task: Evaluate all technologies that are used to provision broadband, identify and assess the pros and cons of each as they pertain to connecting all Alaskans with high-speed connectivity.

Some of the key characteristics that make Alaska a wonderful and unique place to work and live also make it a challenging place to deliver robust broadband connectivity—namely, the state's mountainous, rugged terrain, geographic isolation, wide-open spaces, and beautiful, yet harsh winter weather. Alaska's telecommunications companies must oftentimes strike a delicate balance in selecting which technology to deploy in which location, taking into consideration performance, reliability, scalability, and cost. Making a wrong decision is more costly and consequential in Alaska than perhaps in any other state due to the distances that must be traversed and the capital outlay required.

In considering the range of technologies deployed throughout Alaska to connect end-users and networks to one another, the task force urges policymakers as well as key decisionmakers at Alaska's telecommunications companies to prioritize the deployment of technologies, when feasible, that meet the state's present-day objectives AND those 10 or more years from now.

The task force urges the adoption of technologies that maximize throughput capacity and future scalability to meet the critical needs of healthcare (including electronic health records, telehealth, analytics, artificial Intelligence, and cloud-based solutions), real-time two-way video and audio communications, immersive educational service delivery, and all types of commerce—from supporting remote-based work, to shipping and logistics, to online sales and marketing.

In this chapter, the task force explores the various technologies deployed to deliver broadband service throughout Alaska. Each technology may be useful in certain situations but cost-prohibitive or limiting in others. Context is key, as is capacity and cost.

Middle-Mile Technologies

As discussed in chapter 1, middle-mile infrastructure, which may also be called "transport" or "backhaul," is defined as high-capacity network infrastructure that links a network operator's core network to its last-mile distribution network. Middle-mile infrastructure may also connect disparate networks to one another or link a network to the nearest Internet Exchange Point (which, in the case of Alaska, is in Seattle or Portland), allowing traffic to be routed to all points globally and exchanged with other networks, including cloud and content delivery networks. Currently, four companies—GCI, Alaska Communications, MTA, and KPU Telecom—offer backhaul capacity between Alaska and the Lower 48.

There are currently three primary types of middle-mile connectivity in use today: **fiber-optic cables, microwave wireless, and geosynchronous satellites.** Low-Earth orbit satellites are expected to begin providing middle-mile connectivity in the fourth quarter of 2021.

Middle-mile infrastructure does not serve individual homes and businesses directly, but the capacity and latency limitations of a middle-mile network will always have a limiting effect on downstream last-mile infrastructure that is connected to it. For example, every home on Saint Paul Island is connected via fiber-optic cable to service provider TDX's last-mile network, but there is currently no terrestrial middle-mile connectivity to the island. Alaska Communications leases capacity on Eutelsat's 115 West B satellite to provide middle-mile connectivity linking TDX's network on the island to Alaska Communications' core network and the global internet.

Some networks operate exclusively as middle-mile providers, leasing capacity to last-mile ISPs and private network operators, such as the oil and gas companies operating on the North Slope. This is the case with companies like Quintillion, which in December 2017 completed a 1,180-mile subsea fiber middle-mile network that connects last-mile ISPs in Nome, Kotzebue, Point Hope, Wainwright, and Utqiagvik to Prudhoe Bay and down the oil pipeline to Fairbanks, with 10 terabits of system capacity over three fiber pairs. Previously, last-mile ISPs in those coastal communities had to lease backhaul capacity over antiquated and very costly satellite connections to reach the global internet.

Another example of significant middle-mile infrastructure deployment is GCI's TERRA microwave network which was completed in 2018. The network spans 84 villages and reaches more than 45,000 Alaskans across southwest, central, and northwest Alaska. It consists of more than 100 towers and delivers a total system capacity of 10 gigabits to those communities at significantly reduced costs as compared with satellite backhaul, which was the only option available to those villages prior to TERRA's completion.

A. Fiber-Optic Cables

In general terms, fiber-optic cables consist of individual strands of glass, which may be as small as a human hair, that are wrapped in cladding encased in protective jacket. Fiber-optic cables allow for the transmission of data using rapid pulses of light that are generated by equipment installed at each end of the fiber. Fiber-optic cables offer extremely high transmissions speeds—by far the highest capacity and lowest latency of any broadband technology type, and are preferred by network operators for that reason. The exact capacity is dependent upon the lighting equipment installed and the number of fiber strands (or "fiber pair") contained within the cable.

Lighting equipment and glass technologies are evolving constantly, but it is now possible to transmit multiple terabits per second (Tbps) over a single strand of fiber. 1 Tbps is

equivalent to 1,000 Gbps. The more strands a cable contains, the higher capacity of the cable. Generally, fiber-optic cables require light regeneration approximately every 60 miles. Ultra-high-capacity fiber-optic cables form the global internet backbone and are used to connect networks to one another.

Fiber-optic cables offer extremely high reliability and are relatively easy to maintain once deployed, but the cost to deploy them initially can be quite high over long distances or rugged terrain.

Pros:

- Offers the highest capacity and lowest latency of any middle-mile technology type
- Offers symmetrical speeds (downstream/upstream), enabling better real-time application performance, including high-definition two-way video communication for healthcare and education applications
- The most "future-proof" technology; 30+ year operational lifespan
- Extreme reliability and network up-time
- Scalability to upgrade capacity as lighting equipment technology improves over time
- In subsea installations, power for in-line light regeneration can be fed from one or both ends of the cable, allowing the cable to traverse thousands of miles without the need for powered equipment along the route

Cons:

- In most cases, the highest construction cost of any middle-mile technology, although when cost per Mbps is considered, fiber deployment is often less expensive than technologies with lower capacity.
- Permitting requirements may be extensive, particularly over federally protected lands or in subsea installations
- Risk of damage in subsea installations (ship anchors in coastal waters, commercial fishing) with high cost of repair and potentially long downtime

B. Microwave Wireless

Microwave wireless installations offer an alternative to fiber-optic cables where the latter is not practical or feasible due to costs, terrain, distance, or a combination of those reasons. A typical microwave wireless installation in a new area involves the construction of lattice-type tower and the installation of large drum-like antennae that are aimed at corresponding antennae far away. Line-of-sight is typically required for microwave installations, so the positioning of the tower at the correct elevation is an important consideration to ensure that there are no obstructions between towers.

For instance, Alaska Power & Telephone's microwave network in Southeast Alaska and GCI's TERRA network in Southwest Alaska both required towers to be installed at

mountaintop locations in many areas. In addition to towers and antennas, remote installations where there is no power source require the installation of diesel power generation and a tank to store the diesel fuel.

Microwave wireless speeds will vary depending on the equipment installed, wireless spectrum band(s) in use, distance between towers, and environmental conditions. Typical system capacity can be in the 10 Gbps range.

Pros:

- Overall lower cost of construction over extreme distances
- Easier permitting, as compared to fiber installations
- Higher capacity than satellite
- Lower cost and latency than geosynchronous satellite

Cons:

- Limited capacity as compared to fiber
- Risk of damage in severe weather (due to icing)
- High operating costs (diesel refueling which must be done via helicopter in remote areas)
- Available wireless spectrum may be limited

C. Geosynchronous Satellites (GEO)

Geosynchronous satellites have historically provided middle-mile links to Alaska communities where terrestrial middle-mile solutions could not reach. Geosynchronous satellites serve Alaska from a fixed position in space. As the earth rotates, geosynchronous satellites maintain the same orbital position over the earth's surface at high altitude (a distance in the range of ~22, 000 miles). The satellite essentially serves as a bridge, linking what are called "earth stations" on the ground in remote communities to purpose-built gateways on the ground that are fed by fiber-optic cable(s), enabling connectivity to the global internet. The Seward, Alaska teleport facility is an example of such a gateway, which connects satellites to fiber-optic networks operated by TelAlaska and Alaska Communications.

Current geosynchronous satellites that can serve Alaska have limited capacity at a very high cost, and because signals to and from geosynchronous satellites in high-earth orbit must traverse such significant distances, those connections are inherently very high latency, regardless of throughput capacity. Two-way video communications, and real-time applications such as gaming may not operate well over connections that are served by geosynchronous satellite middle mile.

Pros:

- Can serve locations that do not have access to terrestrial middle-mile infrastructure

- No permitting required, beyond what may be required for earth station/gateway construction

Cons:

- Limited throughput capacity as compared with other middle-mile technologies
- Highest cost per megabit
- Availability of leasable capacity is currently limited for Alaska
- Current satellites operate at an orbital plane that requires line-of-sight low on the horizon
- Inherent high latency makes real-time applications such as two-way video communication challenging to impossible
- Sunspot activity causes disruptions in service

D. Low-Earth Orbit Satellites (LEO)

LEO satellites operate at an altitude in the range of approximately 750 miles above the Earth's surface, making low-latency connections of 50ms or less possible. LEO satellites are not geosynchronous, meaning they do not operate from a fixed position, but are rather launched as part of a constellation of hundreds or even thousands of satellites that are constantly in motion, forming a grid above the earth that allows for multiple satellites to be in view from any single point on the ground once sufficient orbital density is achieved.

Several companies, most notably SpaceX Starlink, OneWeb, and Telesat, have either launched, or have announced plans to launch LEO satellite constellations that will serve Alaska.

As of September 1, 2021, OneWeb has launched 288 of its planned 648 satellites for its initial constellation—offering up to 375 Gbps of capacity over the Arctic, including Alaska. The company reports that it will achieve 24/7 coverage over Alaska by November 2021. OneWeb's gateway in Alaska is located at the Talkeetna, Alaska Teleport. OneWeb is primarily focused on providing middle-mile connectivity to serve local ISPs, large corporations, and government entities.

SpaceX Starlink, as of September 2021, has launched more than 1,700 LEO satellites, 1,657 of which are currently operational and 10 of which are polar orbiting. Unlike OneWeb, Starlink is primarily focused on providing end-user connectivity. But its robust network is capable of providing high-capacity middle-mile connectivity for local ISPs and large corporate customers as well. Starlink is pioneering satellite-to-satellite laser communication to enable more efficient traffic routing and the need for fewer Earth gateways. Of the satellites that SpaceX has launched to-date, approximately 51 are capable of intersatellite communication.

Telesat, has announced plans to launch a global constellation of 298 LEO satellites that, by the 4th Quarter of 2024, will be capable of providing 320 Gbps of capacity over Alaska.

Pros:

- Higher capacity than most geosynchronous satellite solutions
- Low-latency solution that enables many real-time applications, including two-way video communication
- Can serve locations that do not have access to terrestrial middle-mile infrastructure
- No permitting required, beyond what may be required for earth station/gateway construction

Cons:

- Limited throughput capacity as compared with fiber; can only serve a limited set of users in an area, depending on population density
- Higher projected costs than fiber and microwave middle-mile solutions
- New technology with more unknowns that proven legacy technologies
- Requires significant line of sight to sky, with no trees, mountains, or buildings blocking the view

Summary: Middle-Mile Technologies

Fiber-optic cables are considered by the task force to be the "gold standard" middle-mile solution. As such, it should be deployed wherever feasible. Fiber offers unparalleled capacity and is scalable and upgradable to meet future demands. It also provides the lowest-latency connections over long distances, is the most reliable, and has the lowest operational and maintenance costs over time.

Microwave wireless is also a solid option where the costs of fiber-optic deployment are prohibitive. It can be used to extend networks beyond the reach of deployed fiber. Satellite-based solutions are options where lack of funding or technical feasibility limits the reach of fiber or microwave solutions. Satellite middle-mile solutions continue to evolve, and new technologies—particularly LEOs—may offer a competitive option to microwave wireless once LEO constellations are fully operational over Alaska.

RECOMMENDATION 3.1: Give Preference to Fiber Middle Mile
Due to its unparalleled capacity, upgradeability, and reliability, fiber-optic cables should be deployed wherever feasible and practical to facilitate middle-mile connections.

Last-Mile Technologies

Last-mile technologies are deployed by local internet service providers (ISPs) to serve individual homes and businesses. As with middle-mile technologies, each type of last-mile technology offers benefits and drawbacks, and the context of the deployment will determine which solution is best in each area.

Last-mile services consist primarily of four service delivery technologies: **fiber-to-the-premises (FTTP)**, **digital subscriber line (DSL)**, **coaxial cable,** and **fixed wireless**. Additionally, at least one **low-earth orbit (LEO) satellite** operator—SpaceX Starlink—expects to begin providing last-mile services directly to end-user customers in Alaska in 2022.

A. Fiber-to-the-Premises (FTTP)

In much the same way that fiber-optic cables offer significant advantages as a middle-mile solution, fiber that is deployed *within* communities to individual homes and businesses (i.e., "premises") also offers the unparalleled benefits of very high-speed connections (exceeding 1 Gbps) and reliability. However, this assumes that the local FTTP network is connected to the global internet via a reliable, high-capacity middle-mile solution. FTTP networks are either deployed aerially by attaching fiber-optic cables to power or telephone poles or deployed underground, either through installed conduit or in micro-trenches that are created by a machine that is purpose-built for burying fiber.

Many telephone companies across the United States are gradually replacing their legacy copper telephone lines with fiber-optic cables, enabling FTTP as an internet service option for their customers. FTTP installations require the installation of a specialized modem within the customer's premises. A battery backup is typically required to keep the modem online during a power failure—an important consideration to ensure access to 911 emergency services remains available.

Pros:

- Offers the highest capacity of any last-mile solution
- Offers symmetrical speeds (downstream/upstream) that can exceed 1 Gbps, enabling better real-time application performance, including high-definition two-way video communication for healthcare and education applications
- The most "future-proof" technology that is scalable/upgradeable over time; 30+ year operational lifespan
- Extreme reliability and network up-time
- Lowest overall maintenance cost
- Can be deployed incrementally, starting with fiber-to-the-node in a given neighborhood and then eventually all the way to each premises.

Cons:

- Except in the case of entirely new builds, requires "brownfield" deployment to overbuild legacy copper infrastructure, which can be costly
- Requires battery backup systems at the customer premises to ensure the ability to dial 911 and reach emergency services in case of a power outage (legacy copper networks were powered by the lines themselves; no additional power source was required)

B. Digital Subscriber Line (DSL)

DSL is a family of technologies used to transmit data over legacy copper telephone lines. DSL is usually asymmetric, meaning that download speeds are usually significantly higher than upload speeds. DSL usually requires the installation of a modem in the customer's premises, which communicates with another piece of equipment called a digital subscriber line access multiplexer (DSLAM), typically located in the ISP's telephone exchange facility.

DSL service performance degrades as the distance between the customer's modem and the DSLAM increases, extending as much as 12,000 to 18,000 line-feet away before the service becomes unusable. With significant upgrades to copper plant and replacement of legacy systems, downstream speeds can reach as high as 200 Mbps over distances of about 1,000 line-feet using "bonding" technology that allows multiple copper pairs to be bonded together to achieve higher speeds. Upstream speeds are generally limited to no more than 20 Mbps. The potential to upgrade copper plant to provide higher speeds must be measured against the long-term, higher capabilities of fiber last mile.

Pros:

- Widely deployed today over legacy copper telephone lines; can be good interim technology until fiber-optic technology is deployed
- Bonding technology can be employed to increase copper's efficiency
- Can deliver speeds of up to 200 Mbps if copper lines are maintained and the distance between the customer and the DSLAM is shortened

Cons:

- Limited speeds in both directions, with upload speeds extremely limited
- Can be very unreliable if copper lines have not been adequately maintained over time

C. Coaxial Cable

Coaxial cable was first deployed by cable television operators as a means of delivering television services to customer homes and businesses in the 1980s and 1990s. Cable television operators gradually entered the residential broadband business in the early 2000s as demand for internet services increased.

Coaxial cables consist of a copper wire core, wrapped in dielectric insulation and an outer metal sheath, and followed by a plastic outer jacket for protection. As in FTTP and DSL installations, a modem is required in the customer premises to connect to the cable company's network.

Cable operators have gradually upgraded their equipment to be able to deliver faster and faster speeds to end-users. Typical cable installations offer speeds in excess of 300 Mbps downstream and greater than 100 Mbps upstream. But the latest technology under ideal conditions can now achieve gigabit speeds in each direction. As with other last-mile technologies, coaxial cable networks are limited by the capacity delivered to a community by middle-mile networks. Local coaxial cable networks are also vulnerable to congestion and service degradation if shared network infrastructure in the community is oversubscribed. Coaxial cable deployments are most economically viable in communities where homes and businesses are densely located.

Pros:

- Widely deployed today in areas where the home and business structure density is high
- Can deliver fast downstream speeds of up to 1 Gbps in ideal conditions; 300 Mbps to 400 Mbps under typical conditions

Cons:

- Vulnerable to network congestion when shared network infrastructure is oversubscribed
- Deployments are economically viable only in areas where structure density is high; not a solution for rural areas where homes and businesses are spread far apart

D. Fixed Wireless

Fixed Wireless is a generic term that refers to a family of wireless technologies that can deliver last-mile broadband service to homes and businesses where it is impractical or too costly to extend wireline services like FTTP, DSL, or coaxial cable.

As the name implies, a fixed wireless installation is one in which the transmitting and receiving equipment is fixed in position. Fixed wireless services can be deployed over licensed or unlicensed spectrum, and usually involve the installation of an antenna or dish upon the customer's roof, ideally in a location that gives it line-of-sight to the nearest tower.

Speeds delivered over fixed wireless can vary greatly and are dependent upon a variety of factors, including the spectrum being used, the distance between the customer and the tower and whether line-of-sight between the antenna and tower is possible. Inclement weather can also have a negative effect upon the service and icing of equipment is of particular concern in Alaska.

Pros:

- Can be deployed to deliver new service or replace aging copper infrastructure at a much lower cost than wireline technologies
- Can deliver speeds of up to 1 Gbps under ideal conditions
- Deployment time is typically much quicker than other last-mile solutions

Cons:

- Actual speeds and service reliability are dependent upon a variety of factors, including the type of spectrum being utilized (licensed or unlicensed), distance between the customer and tower, whether line-of-sight to the tower is achievable, and weather conditions
- Deployments using unlicensed spectrum may experience interference
- Licensed spectrum requires acquisition from the FCC or via a lease from an existing license holder

E. Low-Earth Orbit Satellites (LEO)

Soon, LEO satellite solutions that offer service directly to homes and businesses may also be a viable alternative as companies like SpaceX Starlink, OneWeb, and Telsat bring their systems into commercial operation.

More information on the pros and cons of this technology can be found in the previous section on middle-mile technology.

Summary: Last-Mile Technologies

As with middle-mile technologies, fiber-to-the-premises is the ideal solution for last-mile service delivery where feasible and practical, given its ability to deliver very fast, reliable service that is scalable and upgradable as technology improves and as the demand for greater bandwidth increases over time. Telephone companies will likely shift away from DSL service that is provided over legacy twisted-pair copper as maintenance and upgrade costs make the deployment of other solutions, such as FTTP or fixed wireless service, more sensible as a means of delivering higher speeds. Coaxial cable remains a fast, reliable solution for high-speed connectivity in densely populated communities.

It is important for policymakers to keep in mind that any terrestrial last-mile solution will always be limited by the middle-mile connectivity that serves it—so an equitable focus on upgrading and extending last-mile AND middle-mile technologies is important, particularly in a state like Alaska.

RECOMMENDATION 3.2: Balance Last-Mile & Middle-Mile Upgrades
Policymakers should maintain a balanced focus on upgrading and extending last-mile AND middle-mile technologies, given rural Alaska's unique challenges and needs.

4. State Broadband Office

Task: Provide recommendations for a state repository of broadband information and expertise that does not increase the state budget.

State Broadband Offices across the United States

According to information collected by the Pew Charitable Trusts[14] and the National Telecommunications and Information Administration (NTIA),[15] Alaska is one of 16 states that has not established a dedicated state agency tasked with expanding access to broadband services. The states of Hawaii, Michigan, Montana, Nevada, South Carolina, Tennessee, Texas, and Wyoming have created offices recently, either by legislation or through executive action.

Each of the 34 active state broadband offices have a slightly different set of roles and responsibilities based on the priorities assigned to it by the state's governor or legislature. Some offices are focused solely on access and infrastructure issues, while others are engaged in projects that promote digital equity and inclusion. To some degree, all offices either administer a state broadband infrastructure grant program or provide coordination and support to prospective applicants that are seeking federal broadband grants or loans.

The location of state broadband offices inside the hierarchy of state government varies significantly from state to state. Many offices are housed within the state agency charged with economic development or commerce, such as in Arizona, Hawaii, Illinois, and Minnesota. Others are attached to the state regulatory agency, such as in South Carolina. In Iowa, the state enterprise IT agency, headed by the state CIO, runs the broadband office and grant program. In Texas, the state comptroller's office was given the responsibility by the state legislature. Still others are attached directly to the governor's office itself, such as in Nevada.

Most state broadband offices administer some form of broadband mapping program to track service availability and pinpoint gaps in coverage. This is done to guide state grant program investments and minimize the risk of wasting taxpayer funds in areas that already have sufficient coverage. The maps are generally produced at a more granular level of detail than what is currently available from the FCC or NTIA, with varying degrees of accuracy. States that have forged a working relationship with the broadband provider community, such as Minnesota and Iowa, have generally been more successful at producing accurate, granular maps through the cooperative exchange of data, followed by a public feedback and challenge process.

---

[14] *See https://www.pewtrusts.org/en/research-and-analysis/articles/2021/06/28/which-states-have-dedicated-broadband-offices-task-forces-agencies-or-funds*

[15] *See https://broadbandusa.ntia.doc.gov/resources/states*

Some states have attempted, unsuccessfully, to produce maps without service provider participation by "crowd-sourcing" availability information through a publicly promoted speed-testing campaign. Those efforts have not yielded a sufficient quantity of tests to accurately identify gaps in coverage, particularly outside densely populated areas.

RECOMMENDATION 4.1: Prioritize Accurate Data; Efficiently Obtained
The Office of Broadband Deployment should commit to the utilization of world-class broadband data and mapping analytics, leveraging available data sources to avoid a duplication of efforts.

Some states, like Minnesota,[16] have permanent or semi-permanent broadband task forces or councils that play an ongoing advisory role to the broadband office, while others have formed temporary bodies for the sole purpose of drafting a guiding policy document such as a state broadband plan. The State of Hawaii has formed an ongoing, informal broadband advisory body, called the "Broadband Hui" (i.e., council or group), that meets weekly. Participation is voluntary and anyone with an interest in broadband issues is welcome to attend, ask questions, and voice concerns. Other states have formed broadband planning groups at the regional or local level in lieu of a statewide task force or board.

Historically, funding for the ongoing operations of state broadband offices has been appropriated by each state's legislature as part of that state's budget. Federal funding for such offices has not been available, except for a limited period between 2010 and 2014 when the NTIA provided State Broadband Initiative (SBI) grants to support such offices. Fortunately, new federal programs that have been created in response to the COVID-19 pandemic, such as U.S. Treasury's Capital Projects Fund, have made broadband program administration funding available to states. Similar provisions are included in the pending federal infrastructure bill. It is therefore likely, at least in the short term, that the state of Alaska could establish a state broadband office without impacting the state's budget.

Establishing the Alaska Office of Broadband Deployment

The task force recommends that an Alaska Office of Broadband Deployment should be established to provide leadership and direction to the state's efforts to ensure the expansion of broadband access and digital equity for all Alaskans. The office should be charged with the delivery of outcomes that are consistent with the goals and recommendations contained within this report, and should be adequately enabled to carry out the following responsibilities:

[16] *See https://mn.gov/deed/programs-services/broadband/task-force/*

- Develop and maintain a state broadband map that provides clear location-specific intelligence on broadband availability, speeds, and rates for the purpose of identifying served, unserved, and underserved areas (but without duplication of federal broadband data that may soon yield similar intelligence)
- Collaborate with the State Broadband Advisory Board (SBAB)
- Collaborate with the Regional Broadband Planning Committees (RBPC) as it relates to local planning
- Administer a state broadband grant program, should one be established
- Advance regional priorities through the coordination of federal grant applications or issuance of requests for proposals, as appropriate, to engage companies that are interested in pursuing broadband projects
- Coordinate with the SBAB and RBPCs to review project proposals
- Review and provide analyses of available speeds, rates, and other data on broadband access at the state or federal level
- Evaluate ways in which broadband deployment can lower costs of state services and critical infrastructure
- Develop a Statewide Broadband Project Plan that ranks projects according to highest need, which may be used by the State Legislature to fund priority projects from available fund sources
- Assist stakeholders in expediting right of way access or navigating the permitting process in support of broadband network construction projects
- Manage the Broadband Parity Adjustment for residents and community facilities
- Produce an annual report to Alaskans and the Legislature on the state's progress toward achieving the recommendations and goals of the task force
- Coordinate with the Denali Commission, Alaska's congressional delegation, and other potential state and federal partners to further the goals of the office
- Identify best practices employed by other state broadband program offices that can maximize the effectiveness of the office in carrying out its responsibilities
- Engage qualified contractor(s), as may be necessary, to support the work of the office

The Office of Broadband Deployment should be led by a qualified director, who will execute within the scope of the responsibilities listed above and deliver outcomes consistent with state goals.

RECOMMENDATION 4.2: Establish an Office of Broadband Deployment
An Alaska Office of Broadband Deployment should be established to provide leadership and direction to the state's efforts to ensure the expansion of broadband access and digital equity for all Alaskans.

Establishing the State Broadband Advisory Board
The task force also recommends that the governor establish a permanent State Broadband Advisory Board (SBAB) to provide guidance to the Office of Broadband Deployment. The SBAB will provide input, recommendations, and advice on the following:

- State broadband policy, goals, and objectives
- Project proposal processes and recommended criteria for project selection
- Mapping and data collection and sharing efforts, and provide guidance
- Recommendations of the task force, including to reflect on progress made

Members of the SBAB should be appointed by the governor, and, at minimum, should include the following representatives who reflect Alaska's diversity and depth of knowledge:

- A representative of local government
- A representative of an Alaska Native corporation
- A representative of tribal government
- A representative of a school district
- A representative of the healthcare community
- A representative of the business community
- A representative of the broadband provider industry
- An at-large representative of the general public, representing consumers
- A representative of the Department of Education
- A representative of the Department of Health and Social Services
- A representative of the Department of Commerce, Community, and Economic Development

The Alaska broadband industry should form a technical subcommittee to advise the SBAB. The chair of this subcommittee should hold the broadband provider industry seat on the SBAB and represent the subcommittee's interests.

The SBAB should form additional subcommittees as it sees fit.

RECOMMENDATION 4.3: Establish a State Broadband Advisory Board
The State should establish a permanent State Broadband Advisory Board (SBAB) to provide guidance and direction to the Office of Broadband Deployment, representing local, Native, school, health, business, and the general public's interests.

Regional Broadband Planning Committees

Regional Broadband Planning Committees (RBPCs) should be established as regional planning bodies to formalize the engagement of local government, native leaders, and the general public in the advancement of broadband connectivity and digital equity in a given region. Their purpose will be to identify local broadband connectivity needs, conduct planning efforts, provide assistance to local government and native leaders, and integrate into the statewide broadband planning process administered by the SBAB. RBPCs may coordinate with state agencies and partner organizations, at the direction of and coordinated by the Office of Broadband Deployment.

When it comes to the organization of the RBPCs, the task force suggests that the State consider adapting the Regional Transportation Planning Organization (RTPO)[17] or Metropolitan Planning Organization (MPO)[18] frameworks established by the U.S. Department of Transportation for the purpose of effective broadband planning and the allocation of available funds, including federal infrastructure investments when available.

RBPCs may carry out the following planning tasks:

1. Review federal and state broadband maps to ensure service availability (including connectivity types and speeds) are accurately represented
2. Adopt strategic goals and objectives designed to drive investment into key areas identified by the committee
3. Utilize available mapping to develop regional long-range broadband deployment plans to achieve the connectivity goals and objectives in Recommendation #1 of this report
4. Coordinate with local governments and native leaders within the region regarding funding opportunities and projects and provide technical assistance when needed
5. Provide feedback to the Office of Broadband Deployment on service area needs
6. Work with the Office of Broadband Deployment to secure available funds for vetted and prioritized projects, as well as be available to consult with project proponents
7. Evaluate local planning or regulatory processes to identify and remove barriers or burdens that inhibit progress toward meeting state broadband goals

RBPCs should be constituted as multi-jurisdictional, intergovernmental committees that includes local government, tribal government, regional and village Alaska Native corporations, and state agency representatives. A majority of members should be local and tribal officials, and should include, as appropriate, representatives from private

---

[17] *See https://www.planning.dot.gov/documents/RTPO_factsheet_master.pdf*

[18] *See https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/metropolitan-planning-organization-mpo*

business, economic development practitioners, educational institutions, libraries, health clinics and hospitals, and representatives of the general public in a given region.

The State may provide federal monies or other funding streams to regional and local planning efforts through the RBPCs.

RECOMMENDATION 4.4: Establish Regional Broadband Planning Committees
Regional Broadband Planning Committees (RBPCs) should be established as regional planning bodies to formalize the engagement of local government, native leaders, and the general public in the advancement of broadband connectivity and digital equity in a given region. **Their purpose will be to identify local broadband connectivity needs, conduct planning efforts, provide assistance to local government and native leaders, and integrate into the statewide broadband planning process in collaboration with the SBAB and the Office of Broadband Deployment.**

The area represented by each RBPC should be based on broadband development planning areas as defined by the Office Broadband Deployment. The areas should synergize with federal definitions and adhere to borough and census area boundaries to the greatest extent possible.

RECOMMENDATION 4.5: Create Broadband Development Planning Areas
RBPCs should be formed in accordance with broadband development planning areas, the boundaries of which are to be defined by the Office of Broadband Deployment. These boundaries should be consistent with federal definitions, following established borough or census area boundaries or some combination thereof.

Broadband planning areas may be further defined by development zones, according to priorities established by a given RBPC, focusing on high-need, high-impact projects.

Equitable Access to Broadband

The Office of Broadband Deployment should develop a durable digital equity plan that thoroughly assesses needs across jurisdictions; the plan could include the gathering and analysis of speed test data, accurate pricing data, and physical network gap information, along with the identification of locations to improve broadband equity.

Likewise, the office should identify and support local efforts to expand broadband access, workforce development, and digital inclusion and literacy programming with a

focus on equity. Similar efforts by libraries, chambers of commerce, colleges and universities, and other entities should be supported wherever possible.

As technology rapidly evolves, it is important that the office works to address broadband needs by increasing broadband equity. The office should constantly monitor the digital divide and establish guidelines for funding accountability to ensure the efficient and expeditious disbursement of funds wherever they are needed most.

RECOMMENDATION 4.6: Write an Equity Plan
The Office of Broadband Deployment should prioritize the creation of a durable digital equity plan that includes speed test comparisons, pricing data, and physical network gap details broken down by location. The report should indicate locations to improve broadband equity.

Partnership with Alaskans

As the Office of Broadband Deployment works to support the deployment of services to every Alaskan, community-level engagement and partnerships should be prioritized. The public can provide valuable assistance when it comes to local speed-testing and other data collection projects as a means of validating provider-reported data.

RECOMMENDATION 4.7: Partner with Alaskans
Community-level engagement should be a priority when it comes to data collection efforts, including local speed-testing and the validation of provider-reported data.

5. State Participation

Task: Identify and lay out recommendations of policies and guidelines for state participation in broadband infrastructure development and ongoing operations.

State Broadband Policy Guidelines

It is our vision for every Alaskan to participate and be competitive in the global community**.** Broadband connectivity is the bridge that makes such participation possible. It should be the state's goal to extend the full benefits of broadband to every Alaskan by facilitating improved service and lower costs throughout the state, consistent with state broadband policy.

RECOMMENDATION 5.1: Establish a Vision for State Broadband Policy
The state's vision is to make it possible for every Alaskan to participate and be competitive in the global community by facilitating access to the full benefits of broadband with improved quality of service and lower costs.

To that end, the task force recommends the following guiding principles for broadband deployment, which should serve as the framework for state broadband policy:

- **Accessibility**: All Alaskans should have improved access to high-speed broadband; state policy should identify baseline service attributes and set goals for improvement over time
- **Affordability**: Lowering the cost of broadband increases the opportunity for business development, increased healthcare, and educational achievement, and promotes improved quality of life for all Alaskans
- **Scalability**: Tomorrow's needs may be met with new and different technologies, and today's infrastructure should be capable of evolving to meet tomorrow's needs
- **Partnership**: Effective broadband deployment will involve intergovernmental cooperation, public-private partnerships, and industry collaboration
- **Impact**: The State should prioritize investments that make the most difference; the State should employ a combination of quick but scalable action to address the immediate needs of unserved and underserved communities with long-term planning that further develops critical infrastructure and lowers costs for all Alaskans
- **Equity**: Needs should be evaluated at a regional level; investments should occur relative to reducing inequities and establishing better balance of access and costs across Alaska's regions; solutions should not lock any community into a new, future-deficient status quo
- **Neutrality:** The State should focus state policy on the achievement of identified goals for broadband service, rather than identifying particular technologies.

- **Maximize Local Impact**: The State should encourage local hiring and local investment, develop local training opportunities, and strengthen Alaska's overall internal technical capacity

With these guiding principles in mind, the task force recommends the establishment of long-term goals by which the State, and the Office of Broadband Deployment specifically, should measure its progress.

RECOMMENDATION 5.2: Set Long-Term Goals
The State of Alaska should adopt the following long-term goals for broadband access: (1) By no later than 2030, all Alaska homes and businesses shall have access to broadband service that provides minimum download speeds of at least 25 megabits per second and minimum upload speeds of at least three megabits per second; (2) By no later than 2035, all Alaska homes and businesses shall have access to broadband service that provides minimum download speeds of at least 100 megabits per second and minimum upload speeds of at least 20 megabits per second; and (3) Rates for consumer broadband service should be transparent and offset, or otherwise adjusted, to ensure equitable affordability for all Alaskans.

Broadband Parity Adjustment

Structured similarly to Power Cost Equalization[19] or the FCC's Emergency Broadband Benefit program,[20] the task force recommends the creation of a "Broadband Parity Adjustment" to equalize broadband costs across Alaska's rural and remote areas as compared with those in the state's urban centers.

While there is unprecedented potential for the State to make great strides in broadband deployment in the coming years, the State also has an opportunity and responsibility to reduce the cost of living and cost of doing business in Alaska until such time that it has met all its broadband policy goals. The state's objective should be to build out infrastructure that obviates the need for the subsidy, reducing it over time.

As a potential path forward for further analysis, the State could establish a standard baseline level of service for the delivery of broadband. From the baseline, an adjustment could be made available to consumers in communities that do not have that level of

[19] *See http://www.akenergyauthority.org/What-We-Do/Power-Cost-Equalization*
[20] *See https://www.fcc.gov/broadbandbenefit*

access or rate. The amount would then be adjusted upwards or downwards based on the speed that is available, with credits applied to consumer accounts.

Beneficiaries should include residents, businesses, nonprofits, local governments, and native entities. Schools, libraries, and hospitals already receive federal subsidies for connectivity, and thus, they should be excluded from receiving the adjustment. Analyses shall be conducted to ensure that existing subsidies to those entities are not indirectly and negatively impacted by the Broadband Parity Adjustment.

While the adjustment would not equalize speeds or costs themselves, it would recognize that the differences between communities can be addressed relative to their condition.

One option for consideration is a rate adjustment that may accrue to a project developer in an unserved or underserved community for the first three years after project implementation, based on the average rate of the prior three years, thereby encouraging project development.

The State should consider ways in which such an adjustment could be funded, including changes within current fee structures, the establishment of an endowment from a portion of available federal funds, pooled funds received by the State and tribes respectively from federal sources, or other mechanisms that may be identified by the State.

RECOMMENDATION 5.3: Establish a Broadband Parity Adjustment
In recognition of the scale of the investment necessary to bring adequate broadband infrastructure into every Alaska community, policymakers should create a Broadband Parity Adjustment that supports equitable broadband costs across Alaska's high-rate areas as compared with those in low-rate communities. The program could be structured similarly to Alaska's Power Cost Equalization program or the FCC's Emergency Broadband Benefit program.

Government-Wide Policy Objectives

While the State's primary focus should remain on closing the digital divide, the task force recommends several additional ways the State can improve the lives of Alaskans through better technology-related policies:

A. Public Safety & Cybersecurity

- Enhance federal, state, and local public safety and emergency services access to broadband networks to facilitate better emergency communications among entities and with the state's Emergency Operations Center
- Expand current capabilities to support disaster preparedness and post-disaster recovery for broadband infrastructure (along with other public utilities)
- Ensure broadband planning is done in collaboration with the federal FirstNet Authority (regarding its public safety broadband network), as well as with state and local providers, to maximize efficiencies in deployment
- Encourage Alaskans to take necessary precautions against cyberattacks
- Include cybersecurity considerations as an important element of projects that seek to expand broadband infrastructure and service

RECOMMENDATION 5.4: Enhance Public Safety & Cybersecurity
The State should work to enhance broadband services for first responders, coordinate with the FirstNet Network Authority, develop plans for broadband infrastructure recovery in the event of a disaster, and include cybersecurity considerations during project development.

B. Infrastructure Development

- Implement smart policies and practices, including:
    - "dig once" policies that enable broadband infrastructure, such as conduit, to be installed concurrently with other infrastructure projects as a means of reducing deployment costs; and
    - the designation of "rights of way" as a public asset that may be utilized to support broadband expansion
- Streamline the permitting process for broadband deployment projects to improve project financial viability and shorten broadband deployment timelines
- Support partnerships where appropriate with Canadian telecom networks at key cross border points where such partnerships could enhance network diversity and resiliency

RECOMMENDATION 5.5: Improve Infrastructure Processes
Streamlined permitting processes, smart policies like "dig once" and the designation of rights of way as public assets, and partnerships with Canadian telecom networks along Alaska's border should be pursued in order to reduce broadband deployment times.

C. Workforce Needs

- Ensure that the state's vocational training institutions provide Alaskans with the necessary skills to build, repair, maintain, and operate Alaska's broadband networks

RECOMMENDATION 5.6: Strengthen Alaska's Broadband Capacity & Competency
Create or augment existing training programs for Alaska's students and workforce through the Department of Education and Early Development, University of Alaska, and the Alaska Department of Labor and Workforce Development that provide the skills needed to build, repair, maintain, and operate Alaska's broadband networks.

6. Equitable Use of State Funding

Task: Recommend program-based guidelines or rules for equitable use of state funding in broadband infrastructure development.

Broadband Investment Strategy

The investment necessary to move Alaska from "now to next" is challenging in scale, requiring billions of dollars in federal funds and private capital. This effort must begin in Alaska's unserved and underserved communities where high broadband costs and insufficient service quality and speed most severely impact the lives of Alaskans.

RECOMMENDATION 6.1: Prioritize the Unserved & Underserved
The State should prioritize broadband deployment that lowers costs and increases the speed and quality of broadband services in unserved and underserved communities, basing decisions on a variety of factors determined by the Office of Broadband Deployment with input from the State Broadband Advisory Board and Regional Broadband Planning Committees.

Federal and private capital will be the lynchpin to a successful broadband deployment campaign in Alaska. If federal funds are reduced, or if state funding is needed to attain its broadband goals, state policymakers should explore ways to achieve more sustainable funding streams that support planning and deployment efforts, including through partnerships with local and tribal governments.

Ultimately, establishing the statewide broadband backbone that Alaska needs (i.e., closing the middle-mile infrastructure gap) will require significant federal investment. The outcome of such investment will be parity with other states in terms of basic infrastructure, even as quality is improved over time by private and other investments.

State policymakers should consider a balanced approach to closing last-mile and middle-mile infrastructure gaps, meeting established policy goals for broadband service, while increasing network resiliency and quality. The State should encourage collaborative planning and administration of middle-mile infrastructure as a reflection of the public investment that will be required.

RECOMMENDATION 6.2: Balance Middle & Last-Mile Investment
Broadband investment should be balanced between establishing a robust fiber backbone to serve all parts of Alaska and the utilization of appropriate technologies for improved last-mile service delivery.

The sheer magnitude of federal funding that is currently or imminently available presents a once-in-a-generation opportunity for Alaska to address many of its broadband needs. It is an opportunity for which a focused, strategic approach should be employed to ensure the most effective use of funds. In Alaska, this means the State must be careful and methodical regarding where the funding is directed from each funding source.

RECOMMENDATION 6.3: Develop a Cohesive Investment Strategy
The Office of Broadband Deployment, the State Broadband Advisory Board, and the Regional Broadband Planning Committees should carefully and methodically consider eligibility rules and limitations for federal broadband funding programs to ensure that adequate funding is directed appropriately toward both middle-mile and last-mile infrastructure needs. ***A focused, strategic approach should be employed to ensure the most effective use of these funds.***

Public-Private Partnerships

Public-private partnerships are invaluable in supporting the most effective use of funding. Partnerships combine the expertise, efficiency, and resources of private industry with the resources and policy guidance of public entities to support projects which neither could accomplish alone. Flexibility should be retained for limited exceptions where provider or community size do not make private investment feasible.

RECOMMENDATION 6.4: Prioritize Public-Private Partnerships
Grant programs should be structured to incentivize providers to invest private capital.

Grant Application Process

The Office of Broadband Deployment should establish a grant application process in which broadband service providers and other eligible entities may submit project proposals to expand the state's middle-mile infrastructure or close last-mile coverage gaps in unserved and underserved areas. The office should work in consultation with the State Broadband Advisory Committee and Regional Broadband Planning Committees. Established criteria must be in compliance with federal funding program guidelines and restrictions, which will vary from program to program.

Applicants should only propose project deliverables that can be achieved within five years (or sooner if federal program rules require it) and should maximize the impact of available funding. Applicants should demonstrate a project's ability to meet established

state and federal criteria and demonstrate a willingness to work in collaboration with other providers and/or community stakeholders as necessary.

Evaluation of Applications

Applicants should clearly demonstrate how a proposed project would improve middle-mile infrastructure or deliver new broadband service to unserved and underserved locations. Applications should contain the following elements:

- **Partnerships** – applicants should describe any partnerships with tribes, Alaska Native Corporations, local governments, and/or other service providers, as applicable
- **Technology** – applicants should describe how the proposed broadband technology is scalable or can be upgraded to meet future needs
- **Infrastructure** – applicants should provide detailed deployment plans, describing whether the proposed project would leverage existing or establishing new infrastructure
- **Private capital** – applicants should detail how private capital would be applied toward the project as a match
- **Equity** – applicants should describe how the project addresses the state's priorities and goals regarding equitable service delivery and costs
- **Operations & Maintenance** – applicants should present a plan that outlines projected long-term operations maintenance costs and how those costs will be covered

In evaluating applications, the Office of Broadband Deployment should consider the following:

- **Time to Completion** – applications should propose timely and realistic construction schedules, with defined milestones/phases
- **Resiliency & Expandability** – middle-mile project applications should articulate how they may contribute to the expansion and resiliency of the state's backbone infrastructure
- **Business Sustainability** – each applicant should demonstrate a proven track record in telecommunications infrastructure deployment and provide a comprehensive business plan that demonstrates the long-term sustainability of the project
- **Public Infrastructure** – each project proposal should describe what public infrastructure (e.g., public rights-of-way) is needed to successfully complete the project
- **Broadband Service Costs & Quality of Service** – proposed projects should lower broadband service costs and/or improve the quality of service

As part of the evaluation process, the Office of Broadband Deployment should develop the internal capacity to evaluate and compare proposed infrastructure deployment

costs and rates with established norms for Alaska. The application process should yield relevant and useful data to evaluate overall project impact and ensure that available funding is maximized in the pursuit of the state's goals.

RECOMMENDATION 6.5: Create a Fair Grant Application Process
The Office of Broadband Deployment should establish a grant application process in which broadband service providers and other eligible entities may submit project proposals to expand the state's middle-mile or last-mile infrastructure in unserved and underserved areas. The Office of Deployment should work in consultation with the Regional Broadband Planning Committees and the State Broadband Advisory Board.

Funding Sources & Sustainable Revenue Considerations
The task force recommends that, if necessary and feasible, the Legislature should provide adequate funding to the Office of Broadband Deployment for:

- its own operations
- the implementation of a grant program to fund last-mile and middle-mile infrastructure projects that are identified under the statewide broadband planning process
- the establishment of the Broadband Parity Adjustment program

The State may source funding from federal broadband programs that allow a set-aside for program administrative costs, such as the U.S. Treasury's Capital Projects Fund. The task force believes that policymakers should review the need for a broadband office every five years, or alternatively, set a defined sunset date that may be reevaluated as the date approaches.

The task force acknowledges that there are many challenges associated with enabling state mechanism(s) for funding broadband infrastructure deployment and parity, and that solutions to those challenges are outside the scope of the task force's work. The State may take into account federal restrictions on revenues from broadband and consider establishing sustainable revenues that fit within that which is possible as established by the federal government and consistent with the needs of the state.

In general, state policymakers should note that the task force has identified a multitude of needs that will likely require sustained, focused funding to adequately address. These investments have the potential to not only result in substantial infrastructure buildout, but to save the State money in other ways over time. The Office of Broadband Deployment can assist the Legislature in exploring these potential offsets as well as other potential options for how to appropriately fund the effort as a whole.

RECOMMENDATION 6.6: Ensure Ongoing Funding
The task force recommends that, if necessary and feasible, the Legislature should provide adequate funding to the Office of Broadband Deployment for its own operations, the implementation of a grant program to fund priority infrastructure projects, and for the establishment of the Broadband Parity Adjustment program.

Engaging Alaskans

Public engagement will be critical to the success of the state's broadband initiatives. The task force believes that a key function of the Office of Broadband Deployment will be to engage citizens, business owners, local elected officials, tribal leaders, Native corporations, state legislators, broadband service providers, and others in the process of identifying needs and viable projects to address them.

Beyond direct engagement with the Regional Broadband Planning Committee members, the office should develop a website, actively use various social media channels, and engage traditional media outlets to seek public input and clearly communicate how state and federal funding investments are improving the state's connectivity landscape. Consumer engagement will ensure that every remaining gap in coverage is properly identified and addressed.

RECOMMENDATION 6.7: Engage Alaskans
The Office of Broadband Deployment should make a concerted effort to engage all Alaskans in its work, from the identification of needs to the pursuit of viable projects to address them. The office should establish a website that is updated frequently and incorporate the use of social and traditional media to seek input and communicate progress toward achieving universal, affordable access across Alaska.

7. Buildout Plan

Task: Provide recommendations for a buildout plan to close remaining gaps and bring high-speed broadband to all Alaskans.

A Roadmap to Success

The following matrix of short-term, intermediate, and long-term goals is intended to provide future policymakers with a roadmap toward providing high-quality broadband for every Alaskan.

Short-Term Action

Closing the Needs Gap	Evaluate and prioritize unserved and underserved communities Establish speed benchmark or standard of service Establish cost/rate benchmark Identify current and needed workforce needs
Technology Solutions	Consider the roles for fiber, microwave, LEO and GEO Host technology education sessions Consider last mile improvements Explore increased wireless technologies
Overcoming Hurdles	Identify project capital needs and public investment necessary Establish a broadband permitting coordinator Identify ways in which operating expenses can be reduced
Alaska Broadband Policy	Establish State goals for broadband deployment Develop criteria to help the State prioritize investment Deploy federal funding to meet short and long-term needs
Equitable Funding Strategy	Identify buckets into which available funding may be available Develop draft grants process for consideration by SBAB and RBPCs Encourage stabilization of Alaska Universal Service Fund Evaluate metrics and functionality of Parity Adjustment
Office of Broadband Deployment	Establish Office with authority allowed by Executive Order Establish Broadband Advisory Board Establish Regional Broadband Planning Committees

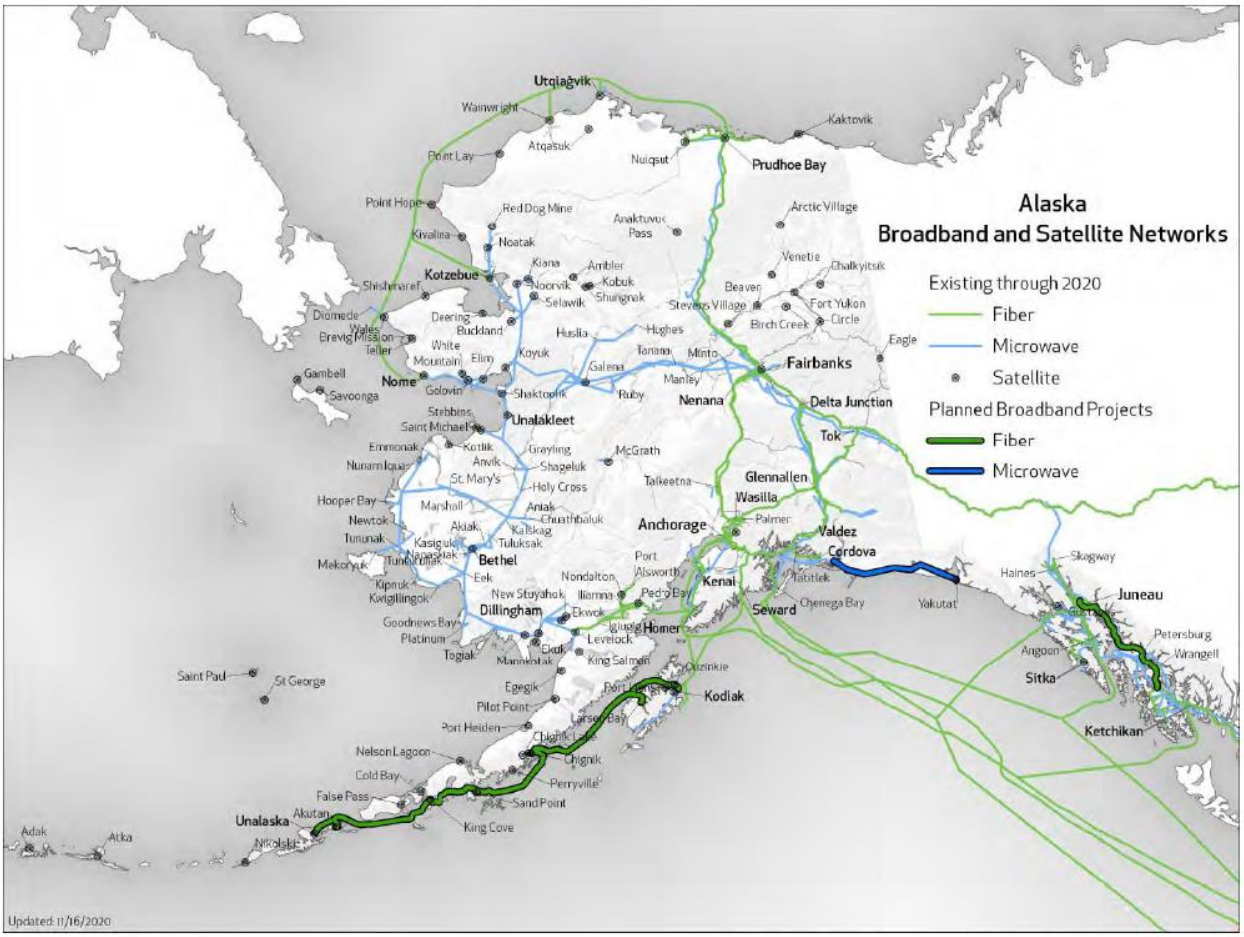
Intermediate Goals

Closing the Needs Gap	Regional planning may produce strategies for meeting needs Develop plans for meeting speed, latency, usage, reliability goals Develop capacity to evaluate costs of infrastructure deployment and rates Strengthen (local) workforce development programs
Technology Solutions	Develop a "backbone" plan and futures mapping Regional or individual community approaches and role of partners Support consumers and utilities in improving last mile technology Support "smart cities" for public services and infrastructure
Overcoming Hurdles	Ensure state match available for federal opportunities! Streamline state permitting process and remove barriers Consider collaborative management strategy for operations
Alaska Broadband Policy	Consider potential legislation to establish State broadband policy Establish process for prioritization and deployment Provide consumer relief while infrastructure is under development
Equitable Funding Strategy	Ensure equitable distribution of funds by need, region, and impact Issue regional grant opportunities for broadband buildout Maximize federal funding to address unserved and underserved needs Pass legislation on the Broadband Parity Adjustment
Office of Broadband Deployment	Pass legislation that further empowers the Office, SBAB, and RBPCs Initiate mapping, planning, and relationships efforts Develop the internal controls for project management

Long-Term Goals

Closing the Needs Gap	Statewide Broadband Project Plan will evaluate and address needs Report on need improvement annually Evaluate and report on equity and parity across communities Coordinate University and other workforce partnerships for long-term success
Technology Solutions	Maintain situational awareness of emerging technologies and landscape Produce annual, accurate map and plan that demonstrates coverage and cost Evaluate redundancy and resiliency of the network, including beyond borders Meet policy of equitable future proofing of technology
Overcoming Hurdles	Match public investment with private capital Request primacy for permitting of broadband projects on federal lands Ensure private-public partnerships are in place throughout
Alaska Broadband Policy	Adhere to State policy and goals, principles, and objectives Produce review of how State efforts are meeting principles Review and address additional recommendations for agency/partner efforts
Equitable Funding Strategy	Meet short and long-term goals with State investment Vet and score projects for Statewide Broadband Project Plan Consider sustainability of State investment in broadband Implement Parity Adjustment to reduce high consumer costs
Office of Broadband Deployment	Fully resource the Office to ensure capacity, competency, and capabilities Produce annual evaluation of goals and objectives met or progress made Respond to all federal planning and funding opportunities

Appendix A: Middle-Mile Networks in Alaska



[High-quality version to be included in the final report]

Appendix B: Public Mapping Resources

Mapping Resource
NTIA National Broadband Availability Map and Indicators of Broadband Need https://broadbandusa.ntia.doc.gov/resources/data-and-mapping
FCC Fixed Broadband Deployment Map https://broadbandmap.fcc.gov/
FCC Broadband Data Collection https://www.fcc.gov/BroadbandData
USAC Connect America Fund Map https://data.usac.org/publicreports/caf-map/
OOKLA Speed Testing https://www.ookla.com/ookla-for-good/open-data#broadband-mobile-maps
Broadband Now https://broadbandnow.com

Appendix C: Report Contributors

The task force would like to thank the following entities for contributing to this report through presentations to the task force.[21]

Entity
Alaska Communications
Alaska Department of Commerce, Community, and Economic Development
Alaska Department of Education & Early Development
Alaska Native Tribal Health Consortium
Alaska Power & Telephone
Alaska Telecom Association
Alaska Tribal Spectrum
Alaska Office of Management & Budget
Alex Hills, Carnegie Mellon University
Arctic Slope Telephone Association Cooperative
Connected Nation
ConnectMaine
Connecticut Office of Consumer Counsel
Denali Commission
DOWL
Eutelsat
Federal Communications Commission
GCI
Intelsat
Matanuska Telephone Association
Microcom
Minnesota Office of Broadband Development
National Telecommunications & Information Administration
Nushagak Electric & Telephone Cooperative
Pacific Dataport, Inc.
Quintillion
R Street Institute
SPITwSPOTS
Strategies 360
Telesat
United States Department of Agriculture
University of Alaska
Wind Talker Innovations

[21] *Please note that the appearance of entities in this list does not imply endorsement of this report.*

Appendix D: Recommendations List

This appendix contains every task force recommendation provided in this report in one centralized location.

Needs Assessment & Gaps

RECOMMENDATION 1.1: Define the Gaps
The following benchmarks should be used to determine if any location has access to end-user and last-mile broadband infrastructure or if a gap exists: 6) **Unserved Area:** an area that does not have access to broadband speeds of at least 25 Mbps (downstream) and 3 Mbps (upstream) 7) **Underserved Area:** an area that does not have access to broadband speeds of at least 100 Mbps (downstream) and 20 Mbps (upstream) 8) **Latency:** must be sufficient for real-time applications such as telemedicine and distance education (less than 100ms) 9) **Data Usage Allowance:** must be comparable to broadband packages offered in urban Alaska markets (Anchorage/Fairbanks) 10) **Reliability:** must be available 24/7 with minimal downtime and be resistant to single points of failure.

RECOMMENDATION 1.2: Identify Middle-Mile Needs
Broadband policy and program analyses should include data-gathering and research to identify where additional middle-mile capacity is needed to meet established or potential last-mile service availability speed targets, recognizing that any established standards will need to evolve with the growing demands of technology and consumer usage over time.

RECOMMENDATION 1.3: Analyze High-Priority Routes & Hubs
Broadband analyses should identify routes and hub locations from which fiber-optic backbone infrastructure should be extended in order to support higher capacity, more resilient services across Alaska.

RECOMMENDATION 1.4: Target the Unserved & Underserved
Robust broadband services should be available to all Alaskans; policymakers should expand buildout objectives to deploy infrastructure to meet the needs of unserved and underserved locations across Alaska.

RECOMMENDATION 1.5: Ensure Accurate Maps to Locate Rural & Urban Gaps
Accurate, granular broadband availability and infrastructure maps should define where unserved and underserved areas exist due to gaps in broadband infrastructure, regardless of whether those areas have physical proximity to urban centers. The state's broadband deployment and program management should be data-driven to respond to all unserved and underserved areas.

RECOMMENDATION 1.6: Recognize That Affordability Creates Gaps
Policymakers should recognize that affordability is an important element in defining where gaps in broadband infrastructure exist. Policymakers should also recognize that affordability is driven by underlying costs associated with Alaska's unique operational environment, and that partnerships between service providers and state and federal programs are important in achieving affordable service delivery to end-users.

RECOMMENDATION 1.7: Prioritize Local Workforce Development
Additional priority should be given to broadband infrastructure projects that include support for local workforce development. Beyond on the job training opportunities, the State should partner with existing workforce development programs offered through the university system, technical schools, or apprenticeships. **Opportunities to partner with broadband companies to develop job-shadowing programs or other types of training should be pursued.**

RECOMMENDATION 1.8: Don't Let Progress Widen the Digital Divide
When developing requirements for project development, policymakers should recognize that broadband service needs will continually evolve, and bandwidth demand will continue to increase at a rapid pace. **Policymakers should also recognize the importance of minimizing the disparity in access to broadband service that may develop because of fast-paced technological evolution and strive to ensure that equitable development continues to occur.**

RECOMMENDATION 1.9: Maximize Federal Partnerships
An Alaska broadband office must work closely with state and federal agencies and other policymakers to maximize resources available for broadband expansion in Alaska.

Hurdles to Investment & Deployment

RECOMMENDATION 2.1: Support the Alaska Universal Service Fund
The long-term stability of the Alaska Universal Service Fund is needed to ensure the sustainability of telecommunication operations in Alaska.

RECOMMENDATION 2.2: Establish a Federal Grant-Matching Fund
Establish a state matching fund to support broadband providers who require matching funds in order to apply for federal broadband grant programs such as the USDA ReConnect Grant Program.

RECOMMENDATION 2.3: Support End-User Monthly Costs
Establish a state program to help support end-user monthly costs, similar to the federal Emergency Broadband Benefit (EBB) Program.

RECOMMENDATION 2.4: Streamline State Permitting
Policymakers should take steps to reduce the lengthy and costly state permitting burden on broadband projects and eliminate or reduce fees that state agencies charge for such projects. A broadband project coordinator or permitting official that can streamline or accomplish intergovernmental and interdepartmental permitting processes may be necessary.

RECOMMENDATION 2.5: Advocate for Improved Federal Permitting
State officials should actively support Alaska's federal congressional delegation in their efforts to reduce federal permitting burdens for broadband infrastructure projects.

Evaluation of Broadband Technologies

RECOMMENDATION 3.1: Give Preference to Fiber Middle Mile
Due to its unparalleled capacity, upgradeability, and reliability, fiber-optic cables should be deployed wherever feasible and practical to facilitate middle-mile connections.

RECOMMENDATION 3.2: Balance Last-Mile & Middle-Mile Upgrades
Policymakers should maintain a balanced focus on upgrading and extending last-mile AND middle-mile technologies, given rural Alaska's unique challenges and needs.

State Broadband Office

RECOMMENDATION 4.1: Prioritize Accurate Data; Efficiently Obtained
The Office of Broadband Deployment should commit to the utilization of world-class broadband data and mapping analytics, leveraging available data sources to avoid a duplication of efforts.

RECOMMENDATION 4.2: Establish an Office of Broadband Deployment
An Alaska Office of Broadband Deployment should be established to provide leadership and direction to the state's efforts to ensure the expansion of broadband access and digital equity for all Alaskans.

RECOMMENDATION 4.3: Establish a State Broadband Advisory Board
The State should establish a permanent State Broadband Advisory Board (SBAB) to provide guidance and direction to the Office of Broadband Deployment, representing local, Native, school, health, business, and the general public's interests.

RECOMMENDATION 4.4: Establish Regional Broadband Planning Committees
Regional Broadband Planning Committees (RBPCs) should be established as regional planning bodies to formalize the engagement of local government, native leaders, and the general public in the advancement of broadband connectivity and digital equity in a given region. **Their purpose will be to identify local broadband connectivity needs, conduct planning efforts, provide assistance to local government and native leaders, and integrate into the statewide broadband planning process in collaboration with the SBAB and the Office of Broadband Deployment.**

RECOMMENDATION 4.5: Create Broadband Development Planning Areas
RBPCs should be formed in accordance with broadband development planning areas, the boundaries of which are to be defined by the Office of Broadband Deployment. These boundaries should be consistent with federal definitions, following established borough or census area boundaries or some combination thereof.

RECOMMENDATION 4.6: Write an Equity Plan
The Office of Broadband Deployment should prioritize the creation of a durable digital equity plan that includes speed test comparisons, pricing data, and physical network gap details broken down by location. The report should indicate locations to improve broadband equity.

RECOMMENDATION 4.7: Partner with Alaskans
Community-level engagement should be a priority when it comes to data collection efforts, including local speed-testing and the validation of provider-reported data.

State Participation

RECOMMENDATION 5.1: Establish a Vision for State Broadband Policy
The state's vision is to make it possible for every Alaskan to participate and be competitive in the global community by facilitating access to the full benefits of broadband with improved quality of service and lower costs.

RECOMMENDATION 5.2: Set Long-Term Goals
The State of Alaska should adopt the following long-term goals for broadband access: (4) By no later than 2030, all Alaska homes and businesses shall have access to broadband service that provides minimum download speeds of at least 25 megabits per second and minimum upload speeds of at least three megabits per second; (5) By no later than 2035, all Alaska homes and businesses shall have access to broadband service that provides minimum download speeds of at least 100 megabits per second and minimum upload speeds of at least 20 megabits per second; and (6) Rates for consumer broadband service should be transparent and offset, or otherwise adjusted, to ensure equitable affordability for all Alaskans.

RECOMMENDATION 5.3: Establish a Broadband Parity Adjustment
In recognition of the scale of the investment necessary to bring adequate broadband infrastructure into every Alaska community, policymakers should create a Broadband Parity Adjustment that supports equitable broadband costs across Alaska's high-rate areas as compared with those in low-rate communities. The program could be structured similarly to Alaska's Power Cost Equalization program or the FCC's Emergency Broadband Benefit program.

RECOMMENDATION 5.4: Enhance Public Safety & Cybersecurity
The State should work to enhance broadband services for first responders, coordinate with the FirstNet Network Authority, develop plans for broadband infrastructure recovery in the event of a disaster, and include cybersecurity considerations during project development.

RECOMMENDATION 5.5: Improve Infrastructure Processes
Streamlined permitting processes, smart policies like "dig once" and the designation of rights of way as public assets, and partnerships with Canadian telecom networks along Alaska's border should be pursued in order to reduce broadband deployment times.

RECOMMENDATION 5.6: Strengthen Alaska's Broadband Capacity & Competency
Create or augment existing training programs for Alaska's students and workforce through the Department of Education and Early Development, University of Alaska, and the Alaska Department of Labor and Workforce Development that provide the skills needed to build, repair, maintain, and operate Alaska's broadband networks.

Equitable Use of State Funding

RECOMMENDATION 6.1: Prioritize the Unserved & Underserved
The State should prioritize broadband deployment that lowers costs and increases the speed and quality of broadband services in unserved and underserved communities, basing decisions on a variety of factors determined by the Office of Broadband Deployment with input from the State Broadband Advisory Board and Regional Broadband Planning Committees.

RECOMMENDATION 6.2: Balance Middle & Last-Mile Investment
Broadband investment should be balanced between establishing a robust fiber backbone to serve all parts of Alaska and the utilization of appropriate technologies for improved last-mile service delivery.

RECOMMENDATION 6.3: Develop a Cohesive Investment Strategy
The Office of Broadband Deployment, the State Broadband Advisory Board, and the Regional Broadband Planning Committees should carefully and methodically consider eligibility rules and limitations for federal broadband funding programs to ensure that adequate funding is directed appropriately toward both middle-mile and last-mile infrastructure needs. ***A focused, strategic approach should be employed to ensure the most effective use of these funds.***

RECOMMENDATION 6.4: Prioritize Public-Private Partnerships
Grant programs should be structured to incentivize providers to invest private capital.

RECOMMENDATION 6.5: Create a Fair Grant Application Process
The Office of Broadband Deployment should establish a grant application process in which broadband service providers and other eligible entities may submit project proposals to expand the state's middle-mile or last-mile infrastructure in unserved and underserved areas. The Office of Deployment should work in consultation with the Regional Broadband Planning Committees and the State Broadband Advisory Board.

RECOMMENDATION 6.6: Ensure Ongoing Funding
The task force recommends that, if necessary and feasible, the Legislature should provide adequate funding to the Office of Broadband Deployment for its own operations, the implementation of a grant program to fund priority infrastructure projects, and for the establishment of the Broadband Parity Adjustment program.

RECOMMENDATION 6.7: Engage Alaskans
The Office of Broadband Deployment should make a concerted effort to engage all Alaskans in its work, from the identification of needs to the pursuit of viable projects to address them. The office should establish a website that is updated frequently and incorporate the use of social and traditional media to seek input and communicate progress toward achieving universal, affordable access across Alaska.

Appendix E: Community Service Levels by Census-Designated Place

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Adak	298	Adak Telephone Utility							
Akhiok	69	Alaska Communications							
Akiachak	724	United Utilities		GCI			Y	Y	2021
Akiak	420	United Utilities		GCI			Y	Y	2021
Akutan	990	Alaska Communications		OptimERA				Y	
Alakanuk	704	United Utilities		GCI			Y	Y	2021
Alatna	19	Alaska Power & Telephone						Y	2028
Alcan Border	29	Alaska Communications							
Aleknagik	243	Nushagak Cooperative							2023
Aleneva	8								
Allakaket	160	Alaska Power & Telephone						Y	2028
Ambler	263	OTZ Telephone Cooperative						Y	
Anaktuvuk Pass	365	ASTAC							
Anchor Point	2,090	Alaska Communications	GCI	SPITwSPOTS		Y	Y		
Anchorage	291,845	Alaska Communications	GCI		Y	Y	Y		
Anderson	282	Matanuska Telephone Association			Y	Y	Y	Y	
Andreafsky	93								
Angoon	404	Alaska Communications	GCI		Y	Y	Y		
Aniak	477	Bush-Tell		GCI			Y		
Anvik	77	Bush-Tell		GCI			Y		
Arctic Village	193	United Utilities							
Atka	50	Alaska Communications		GCI			Y		

[22] *Service is generally available throughout the CDP. However, certain locations may be unable to receive that service level. Mapping to define each location will be available when the FCC completes its Broadband Data Collection program.*

[23] *These columns indicate whether a provider is legally obligated to upgrade their service per a federal agreement. This information was voluntarily reported to the task force by providers. It is highly likely that additional federal commitments exist beyond those included in this table, and this information should not be used for determining the existence of enforceable buildout commitments when submitting grant applications.*

[24] *An "incumbent local exchange carrier" is the telecom provider (or its successor) who provided telephone exchange services prior to deregulation in 1996.*

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Atmautluak	338	United Utilities		GCI			Y	Y	2021
Atqasuk	269	ASTAC						Y	2022
Auke Bay	5,373	Alaska Communications							
Badger (Fairbanks)	18,913	Alaska Communications				Y	Y		
Bear Creek	2,093	TelAlaska		SPITwSPOTS	Y	Y	Y	Y	2022
Beaver	69	United Utilities							
Beluga	20	Matanuska Telephone Association							
Bethel	6,259	United Utilities	GCI				Y	Y	2021
Bettles	7	Alaska Power & Telephone						Y	2028
Big Delta	476	Alaska Communications							
Big Lake	3,814	Matanuska Telephone Association			Y	Y	Y	Y	
Big Salt	25	Alaska Communications					Y		
Birch Creek	28	United Utilities							
Brevig Mission	451	TelAlaska						Y	2022
Buckland	509	OTZ Telephone Cooperative						Y	
Buffalo Soapstone	1,001	Matanuska Telephone Association			Y	Y	Y	Y	
Butte	3,686	Matanuska Telephone Association			Y	Y	Y	Y	
Cantwell	190	Matanuska Telephone Association			Y	Y	Y	Y	
Central	87	United Utilities						Y	2021
Chalkyitsik	79	United Utilities							
Chase	28	Matanuska Telephone Association							
Chefornak	457	United Utilities		GCI			Y	Y	2021
Chena Ridge	6,244	Alaska Communications				Y	Y		
Chenega	61	United Utilities							
Chevak	1,014	United Utilities		GCI			Y	Y	2021
Chickaloon	271	Matanuska Telephone Association			Y	Y	Y	Y	

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Chicken	6								
Chignik	95	Alaska Communications		GCI			Y	Y	
Chignik Lagoon	81	Alaska Communications							
Chignik Lake	57	Alaska Communications							
Chiniak	45	Alaska Communications							
Chisana	3	Alaska Power & Telephone						Y	2028
Chistochina	83	Copper Valley Telephone Cooperative				Y	Y	Y	2023
Chitina	85	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Chuathbaluk	100	United Utilities		GCI			Y	Y	2021
Chugiak	5,418	Matanuska Telephone Association	GCI		Y	Y	Y	Y	
Circle	85	Ayuska Communications							
Clam Gulch	216	Alaska Communications					Y		
Clark's Point	69	Nushagak Cooperative		GCI					2023
Coffman Cove	174	Alaska Communications	Alaska Power & Telephone					Y	
Cohoe (Kenai Peninsula)	1,527	Alaska Communications				Y	Y		
Cold Bay	60	TelAlaska						Y	
Coldfoot	14	Summit Telephone Company							
College	12,202	Alaska Communications				Y	Y		
Cooper Landing	269	TelAlaska				Y	Y	Y	
Copper Center	323	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Cordova	2,343	Cordova Telephone Cooperative	GCI		Y	Y	Y		
Covenant Life	63	Alaska Power & Telephone				Y	Y		
Craig	1,074	Alaska Power & Telephone				Y	Y		
Crooked Creek	80	Bush-Tell							
Crown Point	80	TelAlaska				Y	Y	Y	

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Deering	166	OTZ Telephone Cooperative						Y	
Delta Junction	1,157	Alaska Communications					Y		
Deltana (SE Fairbanks)	2,249	Alaska Communications				Y	Y		
Denali Park	186	Matanuska Telephone Association			Y	Y	Y	Y	
Diamond Ridge (Homer)	1,330	Alaska Communications		SPITwSPOTS		Y	Y		
Dillingham	2,327	Nushagak Cooperative						Y	2023
Diomede	97	TelAlaska						Y	
Dot Lake	15	Alaska Power & Telephone				Y	Y		
Dot Lake Village	34	Alaska Power & Telephone				Y	Y		
Douglas	5,755	Alaska Communications	GCI		Y	Y	Y		
Dry Creek	82	Alaska Power & Telephone						Y	2028
Eagle	75	Alaska Power & Telephone							
Eagle River	6,229	Matanuska Telephone Association	GCI		Y	Y	Y	Y	
Eagle Village	64	Alaska Power & Telephone							
Edna Bay	47	Alaska Power & Telephone						Y	2028
Eek	349	United Utilities		GCI			Y	Y	2021
Egegik	85	Alaska Communications		GCI			Y		
Eielson AFB	2,446	Alaska Communications	GCI		Y	Y	Y		
Eklutna	54	Matanuska Telephone Association			Y	Y	Y	Y	
Ekuk	2	Nushagak Cooperative		GCI					2023
Ekwok	100	Bristol Bay Telephone Cooperative		GCI			Y	Y	2024
Elfin Cove	16	Alaska Communications							
Elim	351	TelAlaska		GCI			Y	Y	
Emmonak	836	United Utilities		GCI			Y	Y	2021
Ester	2,436	Alaska Communications				Y	Y		

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Eureka Roadhouse	36	Copper Valley Telephone Cooperative				Y	Y	Y	2025
Evansville	8								
Excursion Inlet	16								
Eyak	135								
Fairbanks	30,955	Alaska Communications	GCI		Y	Y	Y		
False Pass	42	Alaska Communications							
Farm Loop	1,306	Matanuska Telephone Association			Y	Y	Y	Y	
Farmers Loop	4,761	Alaska Communications				Y	Y		
Ferry	27	Matanuska Telephone Association				Y	Y		
Fishhook	6,874	Matanuska Telephone Association			Y	Y	Y	Y	
Fort Greely	469	Alaska Communications	GCI		Y	Y	Y		
Fort Wainwright	8,952	Alaska Communications	GCI		Y	Y	Y		
Fort Yukon	525	TelAlaska		GCI			Y	Y	
Four Mile Road	30	Alaska Communications							
Fox	416	Alaska Communications							
Fox River	672	Alaska Communications				Y	Y		
Fritz Creek	2,199	Alaska Communications		SPITwSPOTS		Y	Y		
Funny River	1,032	Alaska Communications		SPITwSPOTS		Y	Y		
Gakona	194	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Galena	445	TelAlaska						Y	
Gambell	667	United Utilities							
Game Creek	17								
Gateway	7,300	Matanuska Telephone Association			Y	Y	Y	Y	
Georgetown	2								
Girdwood	2,769	Alaska Communications	GCI		Y	Y	Y		
Glacier View	231	Matanuska Telephone Association			Y	Y	Y	Y	
Glennallen	449	Alaska Communications							

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Gold Sand Acres	70								
Goldstream	3,615	Alaska Communications				Y	Y		
Golovin	150	TelAlaska		GCI			Y	Y	
Goodnews Bay	284	United Utilities		GCI			Y	Y	2021
Grayling	190	Bush-Tell		GCI			Y		
Gulkana	111	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Gustavus	537	Alaska Communications							
Haines CDP	2,516	Alaska Power & Telephone			Y	Y	Y		
Halibut Cove	86	Alaska Communications		SPITwSPOTS		Y	Y		
Happy Valley (Kenai Peninsula)	622	Alaska Communications				Y	Y		
Harding-Birch Lakes (South of Salcha)	320	Alaska Communications				Y	Y		
Healy	1,093	Matanuska Telephone Association			Y	Y	Y	Y	
Healy Lake	27	Alaska Power & Telephone						Y	2028
Hobart Bay	1								
Hollis	132	Alaska Power & Telephone				Y	Y		
Holy Cross	158	Bush-Tell		GCI			Y		
Homer	5,478	Alaska Communications	GCI	SPITwSPOTS	Y	Y	Y		
Hoonah	782	Alaska Communications							
Hooper Bay	1,239	United Utilities		GCI			Y	Y	2021
Hope	215	Alaska Communications					Y		
Houston	2,112	Matanuska Telephone Association			Y	Y	Y	Y	
Hughes	93	Alaska Communications							
Huslia	293	Alaska Communications							
Hydaburg	397	Alaska Power & Telephone				Y	Y		
Hyder	78	Alaska Power & Telephone						Y	2028

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Igiugig	56	Bristol Bay Telephone Cooperative		GCI			Y	Y	2022
Iliamna	109	TelAlaska		GCI			Y	Y	
Ivanof Bay	7	Alaska Communications							
Joint Base Elmendorf-Richardson	11,953	Alaska Communications	GCI		Y	Y	Y		
Juneau	31,986	Alaska Communications	GCI		Y	Y	Y		
Kachemak	506	Alaska Communications		SPITwSPOTS		Y	Y		
Kake	570	Alaska Communications					Y		
Kaktovik	235	ASTAC						Y	2022
Kalifornsky	8,595	Alaska Communications		SPITwSPOTS	Y	Y	Y		
Kaltag	159	Alaska Communications							
Karluk	27	Alaska Communications							
Kasaan	85	Alaska Communications	Alaska Power & Telephone					Y	
Kasigluk	627	United Utilities		GCI			Y	Y	2021
Kasilof	542	Alaska Communications		SPITwSPOTS		Y	Y		
Kenai	7,056	Alaska Communications	GCI	SPITwSPOTS	Y	Y	Y		
Kenny Lake	305	Copper Valley Telephone Cooperative				Y	Y	Y	2022
Ketchikan	8,103	KPU	GCI		Y	Y	Y		
Kiana	409	OTZ Telephone Cooperative						Y	
King Cove	919	TelAlaska		GCI			Y	Y	
King Salmon	301	Bristol Bay Telephone Cooperative					Y	Y	2022
Kipnuk	700	United Utilities		GCI			Y	Y	2021
Kivalina	427	OTZ Telephone Cooperative						Y	
Klawock	761	Alaska Communications					Y		
Klawock Lake	31								
Klukwan	95	Alaska Power & Telephone				Y	Y		
Knik River	816	Matanuska Telephone Association			Y	Y	Y	Y	

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Knik-Fairview	19,671	Matanuska Telephone Association			Y	Y	Y	Y	
Kobuk	143	OTZ Telephone Cooperative						Y	
Kodiak	5,818	Alaska Communications	GCI		Y	Y	Y		
Kodiak Station	1,304	Alaska Communications	GCI		Y		Y		
Kokhanok	157	Alaska Communications		GCI			Y		
Koliganek	195	Bristol Bay Telephone Cooperative					Y	Y	2024
Kongiganak	544	United Utilities		GCI			Y	Y	2021
Kotlik	649	United Utilities							
Kotzebue	3,112	OTZ Telephone Cooperative	GCI				Y	Y	
Koyuk	348	TelAlaska		GCI			Y	Y	
Koyukuk	95	Alaska Communications							
Kupreanof	32	Alaska Communications							
Kwethluk	814	United Utilities		GCI			Y	Y	2021
Kwigillingok	374	United Utilities		GCI			Y	Y	2021
Lake Louise	31	Copper Valley Telephone Cooperative				Y	Y	Y	2022
Lake Minchumina	9	United Utilities						Y	2021
Lakes	9,410	Matanuska Telephone Association			Y	Y	Y	Y	
Larsen Bay	73	Alaska Communications					Y	Y	
Lazy Mountain	1,513	Matanuska Telephone Association				Y	Y		
Levelock	70	Bristol Bay Telephone Cooperative		GCI			Y	Y	2022
Lime Village	15	United Utilities						Y	2021
Livengood	9	United Utilities						Y	2021
Loring	2	KPU							
Lowell Point	94	TelAlaska				Y	Y	Y	2022
Lower Kalskag	288	Bush-Tell		GCI			Y		
Lutak	48	Alaska Power & Telephone				Y	Y		

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Manley Hot Springs	104	United Utilities					Y	Y	2021
Manokotak	483	Nushagak Cooperative		GCI				Y	2023
Marshall	471	United Utilities		GCI			Y	Y	2021
McCarthy	33	Copper Valley Telephone Cooperative				Y	Y	Y	2022
McGrath	321	United Utilities							
Meadow Lakes	9,284	Matanuska Telephone Association			Y	Y	Y	Y	
Mekoryuk	206	United Utilities		GCI			Y	Y	2021
Mendeltna	31	Copper Valley Telephone Cooperative				Y	Y	Y	2024
Mentasta Lake	122	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Metlakatla	1,359	Alaska Power & Telephone				Y	Y		
Minto	170	United Utilities					Y	Y	2021
Moose Creek (Eilsen)	627	Alaska Communications				Y	Y		
Moose Pass	233	TelAlaska				Y	Y	Y	
Mosquito Lake	268	Alaska Power & Telephone						Y	2023
Mountain Village	808	United Utilities		GCI			Y	Y	2021
Mud Bay	199	Alaska Power & Telephone				Y	Y		
Nabesna	3								
Naknek	488	Bristol Bay Telephone Cooperative					Y	Y	2022
Nanwalek	280	Alaska Communications							
Napaimute	2								
Napakiak	351	United Utilities		GCI			Y	Y	2021
Napaskiak	440	United Utilities		GCI			Y	Y	2021
Noatak	583	OTZ Telephone Cooperative							
Naukati Bay	137	Alaska Power & Telephone				Y	Y		
Nelchina	67	Copper Valley Telephone Cooperative				Y	Y	Y	2025

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Nelson Lagoon	30	Alaska Communications							
Nenana	362	Alaska Communications							
New Stuyahok	476	Bristol Bay Telephone Cooperative		GCI			Y	Y	2024
Newhalen	211	TelAlaska		GCI			Y	Y	
Newtok	339	United Utilities		GCI			Y	Y	2021
Nightmute	286	United Utilities		GCI			Y	Y	2021
Nikiski	4,510	Alaska Communications		SPITwSPOTS		Y	Y		
Nikolaevsk	294	Alaska Communications		SPITwSPOTS		Y	Y		
Nikolai	87	United Utilities						Y	2021
Nikolski	17	Alaska Communications		GCI			Y		
Ninilchik	821	Alaska Communications		SPITwSPOTS		Y	Y		
Noatak	555	OTZ Telephone Cooperative						Y	
Nome	3,690	TelAlaska	GCI			Y	Y	Y	2022
Nondalton	126	Alaska Communications		GCI			Y		
North Pole	2,091	Alaska Communications	GCI		Y	Y	Y		
Northway	60	Alaska Communications							
Northway Junction	57	Alaska Communications							
Northway Village	84	Alaska Communications							
Norvik	651	OTZ Telephone Cooperative						Y	
Nuiqsut	505	ASTAC				Y	Y		
Nulato	228	Alaska Communications							
Nunam Iqua	213	United Utilities		GCI			Y	Y	2021
Nunapitchuk	560	United Utilities		GCI			Y	Y	2021
Old Harbor	203	Alaska Communications							
Oscarville	74	United Utilities		GCI			Y	Y	2021
Ouzinkie	142	Alaska Communications							
Palmer	6,041	Matanuska Telephone Association	GCI		Y	Y	Y	Y	
Paxson	35								
Pedro Bay	36	Alaska Communications		GCI			Y		

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Pelican	69	Alaska Communications							
Perryville	97	Alaska Communications							
Petersville	8	Matanuska Telephone Association							
Pilot Point	81	Alaska Communications		GCI			Y		
Pilot Station	606	United Utilities		GCI			Y	Y	2021
Pitkas Point	116	United Utilities		GCI			Y	Y	2021
Platinum	48	United Utilities		GCI			Y	Y	2021
Pleasant Valley	714								
Point Baker	26	Alaska Communications							
Point Hope	775	ASTAC				Y	Y		
Point Lay	299	ASTAC							
Point MacKenzie	2,055	Matanuska Telephone Association			Y	Y	Y	Y	
Point Possession	42								
Pope-VanNy Landing	5								
Port Alexander	57	Alaska Communications							
Port Alsworth	226	Alaska Communications		GCI			Y		
Port Graham	180	Alaska Communications							
Port Heiden	105	Alaska Communications		GCI			Y		
Port Lions	177	TelAlaska		GCI			Y	Y	
Port Protection	29	Alaska Communications							
Primrose	65	TelAlaska				Y	Y	Y	2022
Prudhoe Bay	2,174	ASTAC	Alaska Communications		Y	Y	Y		
Quinhagak	716	United Utilities		GCI			Y	Y	2021
Rabbit Creek (Anchorage)	4,065	Alaska Communications				Y	Y		
Rampart	97	United Utilities						Y	2021
Red Devil	16	Bush-Tell							
Red Dog Mine	309								
Ridgeway (Kenai Peninsula)	2,194	Alaska Communications				Y	Y		
Ruby	149	United Utilities					Y	Y	2021
Russian Mission	350	United Utilities		GCI			Y	Y	2021

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Saint George	59	Alaska Communications		GCI			Y		
Saint Mary's	555	United Utilities		GCI			Y	Y	2021
Saint Michael	394	TelAlaska		GCI			Y	Y	
Saint Paul	385	Alaska Communications							
Salamatof (Kenai Peninsula)	1,155	Alaska Communications		SPITwSPOTS		Y	Y		
Salcha	980	Alaska Communications				Y	Y		
Sand Point	897	TelAlaska						Y	
Savoonga	735	United Utilities							
Saxman	434	KPU			Y	Y	Y		
Scammon Bay	593	United Utilities		GCI			Y	Y	2021
Selawik	832	OTZ Telephone Cooperative						Y	
Seldovia	226	Alaska Communications		SPITwSPOTS		Y	Y		
Seldovia Village	185			SPITwSPOTS		Y	Y		
Seward	2,545	TelAlaska	GCI		Y	Y	Y	Y	2022
Shageluk	91	Bush-Tell		GCI			Y		
Shaktoolik	272	TelAlaska		GCI			Y	Y	
Shishmaref	577	TelAlaska							
Shungnak	253	OTZ Telephone Cooperative						Y	
Silver Springs	93	Copper Valley Telephone Cooperative				Y	Y		
Sitka	8,532	Alaska Communications	GCI		Y	Y	Y		
Skagway	1,095	Alaska Power & Telephone			Y	Y	Y		
Skwentna	30	Matanuska Telephone Association							
Slana	134	Alaska Communications							
Sleetmute	95	Bush-Tell							
Soldotna	4,233	Alaska Communications	GCI	SPITwSPOTS	Y	Y	Y		
South Lakes	4,920	Matanuska Telephone Association			Y	Y	Y		
South Naknek	80	Bristol Bay Telephone Cooperative					Y	Y	2023

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
South Van Horn	538	Alaska Communications					Y		
Stebbins	618	TelAlaska		GCI			Y	Y	
Steele Creek (Fairbanks)	6,857	Alaska Communications				Y	Y		
Sterling	5,994	Alaska Communications		SPITwSPOTS		Y	Y		2021
Stevens Village	44	United Utilities							
Stony River	39	Bush-Tell							
Sunrise	14	Alaska Communications							
Susitna	16	Matanuska Telephone Association				Y	Y	Y	
Susitna Nrth	1,696	Matanuska Telephone Association				Y	Y	Y	
Sutton-Alpine	1,041	Matanuska Telephone Association			Y	Y	Y	Y	
Takotna	80	United Utilities						Y	2021
Talkeetna	931	Matanuska Telephone Association			Y	Y	Y	Y	
Tanacross	100	Alaska Power & Telephone				Y	Y		
Tanaina	9,153	Matanuska Telephone Association			Y	Y	Y		
Tanana	216	United Utilities					Y	Y	2021
Tatitlek	98	Copper Valley Telephone Cooperative				Y	Y		
Tazlina	271	Copper Valley Telephone Cooperative				Y	Y	Y	2021
Telida	2								
Teller	235	TelAlaska						Y	2022
Tenakee Springs	140	Alaska Communications							
Tetlin	122	Alaska Power & Telephone				Y	Y		
Thorne Bay	562	Alaska Communications					Y		
Togiak	873	United Utilities		GCI			Y	Y	2021
Tok	1,213	Alaska Power & Telephone				Y	Y		
Toksook Bay	667	United Utilities		GCI			Y	Y	2021

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Tolsona	32	Copper Valley Telephone Cooperative				Y	Y	Y	2023
Tonsina	79	Copper Valley Telephone Cooperative				Y	Y	Y	2022
Trapper Creek	453	Matanuska Telephone Association			Y	Y	Y	Y	
Tuluksak	361	United Utilities		GCI			Y	Y	2021
Tuntutuliak	464	United Utilities		GCI			Y	Y	2021
Tununak	376	United Utilities		GCI			Y	Y	2021
Twin Hills	89	United Utilities		GCI			Y	Y	2021
Two Rivers	645								
Tyonek	143	Matanuska Telephone Association		SPITwSPOTS		Y	Y		
Ugashik	12								
Unalakleet	721	United Utilities		GCI			Y	Y	2021
Unalaska	4,592	TelAlaska		OptimERA				Y	2023
Upper Kalskag	220	Bush-Tell					Y		
Utqiagvik	5,400	ASTAC	GCI			Y	Y		
Valdez	3,876	Copper Valley Telephone Cooperative	GCI		Y	Y	Y	Y	2022
Venetie	164	United Utilities							
Wainwright	553	ASTAC				Y	Y		
Wales	150	TelAlaska						Y	
Wasilla	8,736	Matanuska Telephone Association	GCI		Y	Y	Y	Y	
Whale Pass	57	Alaska Power & Telephone						Y	2028
White Mountain	201	TelAlaska						Y	
Whitestone	144								
Whittier	280	United Utilities	Alaska Communications		Y	Y	Y	Y	2021
Willow	2,141	Matanuska Telephone Association			Y	Y	Y	Y	
Willow Creek	206					Y	Y		
Wiseman	11								
Womens Bay	765	Alaska Communications					Y		

Location	Pop.	ILEC-ISP[24]	Other ISPs	Wireless Provider	Speed (Mbps)[22]			Upgrades[23]	
					100	25/3	10/1	Committed	Year
Wrangell	2,400	Alaska Power & Telephone	GCI		Y	Y	Y		
Yakutat	540	Alaska Communications						Y	2023