Aleknagik to Koliganek Road Study

DRAFT November 2026

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AADT	Average Annual Daily Traffic
ADEC	State of Alaska Department of Environmental Conservation
ADE&ED	Alaska Department of Education & Early Development
ADFG	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADT	Average Daily Traffic
AEDG	Alaska Energy Data Gateway
AHFC	Alaska Housing Finance Corporation
ALS	Alaska Logistics Services
ANCSA	Alaska Native Claims Settlement Act
ATV	All-Terrain Vehicle
BBNA	Bristol Bay Native Association
BCA	Benefit-Cost Analysis
BLM	Bureau of Land Management
CITB	Cook Inlet Tug and Barge
DCRA	State of Alaska, Division of Community and Regional Affairs
DMV	Department of Motor Vehicles
DOLWD	Department of Labor and Workforce Development
DOT	Department Of Transportation
DOT&PF	Alaska Department of Transportation and Public Facilities
DOTID	Department of Transportation and Infrastructure Development (BBNA)
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of no Significant Impact
FY	Fiscal Year
IPaC	Information for Planning and Conservation
LAML	Lynden Alaska Marine Lines
LRTP	Long Range Transportation Plan
mi	Mile
MCH	Mulchatna Caribou Herd
MUTCD	Manual on Uniform Traffic Control Devices
NEPA	National Environmental Policy Act (of 1969)
NMFS	National Marine Fisheries Service

NMWC	Nushagak-Mulchatna Watershed Council
NTTFI	National Tribal Transportation Facility Inventory
NWI	National Wetland Institute
O&M	Operations and Maintenance
OSDA	Official Site of Dillingham, Alaska
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
ROW	Right-Of-Way
SF	Square Foot
SSD	Stopping Sight Distance
STG	St. George Construction Incorporated
TBD	To Be Determined
TEK	Tribal Ecological Knowledge
TTP	Tribal Transportation Program
UAF	University of Alaska Fairbanks
USACE	US Army Corps of Engineers
USDA	United States Department of Agriculture
USCG	United States Coast Guard
EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USNO	United States Navel Observatory
VBB	Visit Bristol Bay
VPO	Village Police Officer
VPSO	Village Public Safety Officer
WB-50	Tractor-Semitrailer Design Vehicle
WRCC	Western Regional Climate Center
YB	Young Brothers

EXECUTIVE SUMMARY

The Aleknagik to Koliganek Road Feasibility Study (A2K Study) evaluates the potential for establishing new overland transportation connections among the communities of Aleknagik, Ekwok, New Stuyahok, Koliganek, and Portage Creek in Southwest Alaska. Funded by the FY2023 RAISE Grant and the Denali Commission, the study was initiated by Bristol Bay Native Association (BBNA) to explore whether surface transportation could improve year-round mobility, reduce living costs, expand access to essential services, and strengthen economic and social resilience for communities along the Nushagak River. This planning-level assessment does not propose construction but instead provides communities and Tribal governments with the information needed to evaluate whether road development is desired, feasible, and beneficial.

Purpose and Scope

The study examines existing transportation conditions, regulatory and environmental constraints, conceptual route alternatives, capital and maintenance costs, and community priorities and concerns. Work included public and stakeholder engagement, desktop data collection, preliminary corridor identification, environmental and cultural considerations, cost evaluation, and engineering-level feasibility analysis. Three main route alternatives and the No Action Alternative were developed for comparison.

Existing Conditions and Need

The study area communities are currently accessible only by small aircraft, boats, and seasonal snowmachine or ATV travel. These modes are often expensive, unreliable, weather-dependent, and potentially hazardous. Limited access contributes to high costs of goods, delayed emergency response, constrained economic opportunity, and barriers to essential services such as healthcare, education, and public safety. Freight logistics are similarly challenged, with upriver communities frequently facing fuel shortages or limited barge access due to low water levels and shifting river channels. Climate change is further reducing winter travel reliability through thawing permafrost, unpredictable ice conditions, and increasing storm events.

These factors collectively create an underlying need to evaluate whether improved surface access could enhance reliability, safety, and affordability of transportation for the region.

Alternatives Evaluated

Three conceptual corridors were analyzed:

Alternative 1: Central Route – Follows a central alignment from Aleknagik through Ekwok and New Stuyahok to Koliganek, with a spur toward Portage Creek.

Alternative 2: Northern Route – Travels farther north through higher terrain before connecting to Koliganek, with spurs to Ekwok, New Stuyahok, and Portage Creek.

Alternative 3: Southern Route – Parallels the Nushagak River, traveling farther south closer to Portage Creek and providing more direct community access.

Alternatives were assessed for engineering feasibility, environmental impacts, hydrology, terrain constraints, constructability, material availability, and long-term maintenance considerations. Planning-level cost estimates range from approximately $1.10–$1.37 billion for full system build-out, with life-cycle costs following similar trends.

Community Input and Key Themes

Community engagement revealed significant variation in priorities among communities:

- Strongest support exists for a road between Ekwok and New Stuyahok, a long-standing priority in Long-Range Transportation Plans for both communities.
- Aleknagik expressed mixed interest, highlighting both potential benefits and concerns about increased traffic and social impacts.
- Koliganek strongly opposed any road connection due to concerns about wildlife, subsistence impacts, cultural change, and community autonomy.
- Portage Creek did not participate in public meetings and provided minimal input.

Common concerns across communities include:

- Protection of subsistence resources and wildlife,
- Potential increases in drugs, alcohol, and outside access,
- Environmental impacts to wetlands and fish-bearing rivers,
- High construction and maintenance costs, and
- Uncertainty about long-term community benefits.

Feasibility Overview

The analysis shows that while road construction is technically feasible, feasibility in practice will depend on:

- Community support and Tribal approval,
- Ability to fund and maintain the road system,
- Environmental permitting challenges,
- Economic benefit-to-cost justification, and
- Impacts to subsistence, culture, and community well-being.

Among complete corridor alternatives, Alternatives 1 and 3 scored highest in comparative evaluation. However, large capital costs mean no full corridor is fundable in the near term. A phased approach would be necessary, prioritizing the most desired and impactful segments.

Key Findings and Considerations

Comparative scoring of alternatives is used as a planning tool and does not identify or select a preferred alternative. The criteria are not weighted, and the relative importance of criteria may

vary among affected communities and stakeholders. Based on initial engineering analysis and community sentiment, initial key findings and considerations are as follows:

- The Ekwok to New Stuyahok connection has received comparatively strong community interest and is identified as a transportation priority in the existing LRTPs for both communities. At approximately 11 miles, it is shorter than the other community-to-community connections evaluated and may present fewer funding, construction, and maintenance challenges. Further consideration of this connection should be based on additional community and Tribal direction following public review.
- Further evaluate the Aleknagik to Ekwok connection if additional community engagement and economic analysis determine connectivity to Dillingham is broadly supported and beneficial.
- Initial engagement identified strong opposition to a road connection in Koliganek, while limited community input has been received regarding a Portage Creek connection. Additional community and Tribal direction would be required before either connection could be considered for further evaluation.
- Continue supporting Tribal-led decision-making, further environmental study, and coordinated planning with local, state, and federal partners.

Potential Next Steps

If desired by communities, advancing any preferred corridor(s) would require:

- Additional Tribal consultation and resolutions of support,
- Confirmation of community priorities,
- Geotechnical, hydrological, cultural, and environmental field studies,
- Refinement of route alignments and cost estimates, and
- Acquisition of planning and design funding through federal and regional programs.

The A2K Study provides the foundation for communities to make informed decisions about transportation access and future regional development. This study does not constitute selection, approval, or authorization of road construction or alignment. Ultimately, the viability of any connection will depend on whether it advances community goals, protects subsistence and cultural values, and meaningfully improves quality of life for residents of the Nushagak River region.

1.0 STUDY BACKGROUND AND PURPOSE

The Aleknagik to Koliganek Road Feasibility Study (A2K Study) is an early-stage planning document that evaluates the potential for surface transportation connections between the communities of Aleknagik and Koliganek, Alaska. Bristol Bay Native Association (BBNA) Department of Transportation and Infrastructure Development (DOTID) was awarded a Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant from the United States Department of Transportation (USDOT) in fiscal year (FY) 2023 and a Denali Commission Program grant. BBNA DOTID hired a team of planners, engineers, and professionals to complete this study on behalf of the communities. The Study Team and Study Communities are listed below:

Study Team

Owner / Sponsor
Bristol Bay Native Association

Funding Agencies
USDOT (RAISE Grant Program) and the Denali Commission

Project Lead / Civil Engineering / Planning
Bristol Engineering Services Company, LLC

Planning / Public Engagement / Economic Analysis
Agnew::Beck Consulting

Surveying / Land Status Research
Bristol Infrastructure Design Services, LLC

Environmental
Midnight Sun Environmental, LLC

Cultural Resources
True North Sustainable Development Solutions, LLC

Geotechnical Engineering
Shannon & Wilson, Inc.

Communities

Aleknagik

Dillingham

Portage Creek

Ekwok

New Stuyahok

Koliganek

1.1 STUDY PURPOSE AND GOALS

The purpose of the A2K Study is to evaluate possible routes between the communities, collect feedback from stakeholders on potential impacts, and understand the possible economic benefits. This study does not propose the construction of a road system but instead focuses on determining if road connections would be desired, feasible, and beneficial to communities.

The goals of this study are to:

- Determine community interest in road connections.
- Identify any benefits or impacts.
- Understand how road connections would affect safety, economic development, access to services, cultural livelihood, and the environment.
- Understand project costs and next steps.

A Final A2K Study can be used to guide communities with decision-making for future regional transportation planning. Information from this study may be used by stakeholders to apply for funding for future project phases and to develop a framework for design of one or more of the presented road corridors.

What this study does and does not do is summarized below:

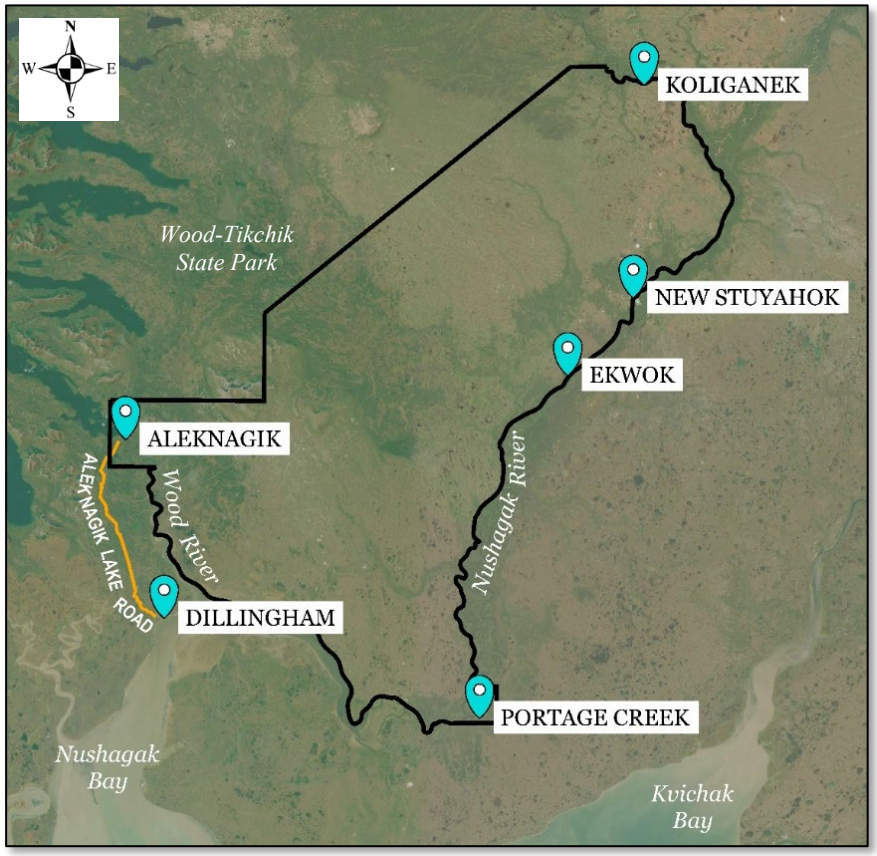
What This Study Does

- Considers the possibility of road connections between Aleknagik, Portage Creek, Ekwok, New Stuyahok, and Koliganek.
- Evaluates both pros and cons of the potential roads including economic, environmental, social, and cultural considerations.
- Identifies if communities want road connections or not.
- Helps communities make informed decisions about road connection planning.
- Identifies potential road corridors based on community input and traditional local knowledge.

What This Study Does NOT Do

- Make decisions for communities.
- Build roads.
- Solicit input from outside interests.
- Promote the Nuyakuk Hydroelectric Project.
- Promote mining or resource development.

Exhibit 1-1: Study Area and Project Boundary



The study area is bound to the east by the Nushagak River, to the southwest by the Wood River, and to the northwest by the Wood-Tikchik State Park.

Study communities are often referenced in order throughout this report by their location up the Nushagak River starting in Aleknagik.

1.2 How this Study was Initiated

BBNA supports the Tribes in Ekwok, New Stuyahok, and Portage Creek with their Tribal Transportation Program (TTP) management, including development of their local Long-Range Transportation Plans (LRTPs). BBNA also assists these Tribes with identifying funding opportunities for priority projects listed in the LRTPs. Aleknagik, Koliganek, and Dillingham do not participate in BBNA's TTP Consortium.

LRTPs are community-driven planning documents that identify transportation needs and priorities over a 20-year planning horizon. All LRTPs undergo a public review and public meeting and are adopted by Tribal Resolution. Within the LRTPs, Tribes can also identify existing facilities to add to the National Tribal Transportation Facilities Inventory (NTTFI), a database managed by the Bureau of Indian Affairs (BIA). Adding facilities to the NTTFI allows Tribes to spend TTP annual tribal share funding on maintenance and improvements. Past LRTPs that identified the need to develop or improve surface connections between project communities are noted below:

Ekwok LRTP 2018

- Tribal Priority: "Plan, design, and construct road between Ekwok and New Stuyahok."
- Added existing winter trail from Ekwok to Dillingham to NTTFI.

New Stuyahok LRTP 2018

- Tribal Priority: "Improve / maintain trail, and design and construct New Stuyahok to Ekwok Road"
- Added existing winter trail from New Stuyahok to Ekwok to NTTFI.
- Added existing winter trail from New Stuyahok to Koliganek to NTTFI.

Portage Creek LRTP 2018

- Tribal Priority: "Continue maintenance activities on routes listed in the NTTFI."
- Existing NTTFI includes: Ekwok Trail, Dillingham Trail

In 2023, two funding opportunities became available to support tribal governments with transportation projects, the RAISE grant and the Denali Commission Program grant. BBNA notified Ekwok, New Stuyahok, and Portage Creek of the opportunities via email and followed up via phone to understand their interest in applying. BBNA heard back from the Native Village of Ekwok's Tribal Administrator who explained, at the time, several local priorities were already funded and underway. Since funding was not needed for other projects, the Tribal Administrator expressed interest in a study evaluating a route connection between Dillingham, Ekwok, and New Stuyahok, specifically to help improve transportation of fuel to New Stuyahok to address their supply issues. He noted fuel barges can consistently reach Ekwok but cannot always reach New Stuyahok due to low water levels in the Nushagak River. The Tribal Administrator agreed to allow BBNA to apply to the Denali Commission Program grant on behalf of the Native Village of Ekwok in February 2023. Formal Tribal Resolution was not required for the grant application.

At the same time, BBNA evaluated community LRTPs for projects that may be potentially eligible for the RAISE grant. The RAISE program specifically funds projects that are regionally or

nationally significant, address supply chain or freight bottleneck issues, remove barriers to connecting communities, and promote economic growth. As BBNA is intimately familiar with the economic and transportation challenges of the region, this study was determined to be a good fit for the RAISE program. BBNA applied on behalf of the communities. Since this is only a planning level study, not an infrastructure project, formal Tribal Resolution was not required for the grant application. BBNA decided to include the other communities along the Nushagak River drainage (Koliganek and Portage Creek) in the event they were interested in learning more about the potential effects of routes connecting nearby communities.

BBNA was successfully awarded funding from both grants. In the applications, BBNA included significant public engagement from all communities, to ensure local voices drive the outcome of this planning study.

1.3 STUDY SCOPE

The scope of this study includes public and stakeholder engagement, data collection, preliminary corridor development, and the A2K Study reporting. All work is "desktop" only, i.e. no field work is included with this study. Additionally, this study includes planning-level engineering analysis necessary to evaluate conceptual corridors but does not constitute project design or development of construction documents.

The following specific tasks are included within the study scope:

Public & Stakeholder Engagement

Public and stakeholder engagement is key to ensure the study aligns with local planning initiatives and addresses community needs with minimal adverse outcomes. Engagement includes general outreach and information sharing with the public and primary stakeholders, two public meetings held in each community to discuss the study, two public surveys to collect feedback, and several stakeholder meetings to present study findings.

Data Collection

Data collection from existing available sources as relevant to the study may include topography, land status, cultural and historic properties, environmental, economic, and geotechnical information.

Preliminary Corridor Development

Preliminary corridor development includes identifying route options based on public feedback and data collection. This involves evaluating and comparing several alternatives based on constructability, cost, environmental impact, and other significant planning considerations.

A2K Study Reporting

Reporting in the A2K Study involves summarizing data collected, comparing route options, and describing planning considerations such as potential economic, environmental, cultural, and social impacts. Public and stakeholder reviews of the Draft and Final-Draft versions are included. This deliverable includes a separate Geotechnical Report, Environmental Report, Economic Analysis, as appended. The Cultural Resources Report will not be disseminated to the public, due to the sensitivity of information.

1.4 STUDY NEED

Existing transportation conditions within the study area present several challenges related to access, mobility, safety, economic opportunity, and the delivery of essential services. This section discusses the transportation needs and related impacts experienced by the communities, with consideration of the role and limitations of existing surface transportation infrastructure.

1.4.1 Transportation Challenges

The communities of Ekwok, New Stuyahok, Koliganek, and Portage Creek are isolated, with no road system linking them to each other or to Aleknagik and Dillingham. Dillingham is the regional hub of Bristol Bay offering services and amenities that are not available in the villages. To access Dillingham, residents rely almost entirely on small aircraft and seasonal river and trail travel. People traveling from elsewhere in the state to any of the study area communities typically must travel to Dillingham first by plane, then switch airlines and take a smaller plane to the village. Some airlines offer flights direct to Anchorage. Freight movement takes a similar pattern but by water, typically a barge from Seattle or Anchorage to Dillingham, then a smaller vessel up the Nushagak River to the villages. Occasionally, people will also travel between communities using personal vehicles; small skiffs or fishing boats when the river is ice-free and snowmobiles across unmarked and unmaintained trails when the ground is covered in snow and water crossings are frozen to an adequate thickness.

Air travel is the only year-round option, yet it is limited to commercial flight schedules and carries high costs. Fog and inclement weather, which is common and can occur rapidly, contribute to frequent flight cancellations. This impacts travel for work, school, community events, medical and court appointments, and more. With only one or two flights to each community per day, people must miss excessive school or work even for short events lasting a few hours or less such as sporting games, work meetings, or doctor visits.



Largest plane used by Grant Aviation to transport freight to study communities

Barge schedules are significantly less frequent, typically only traveling to the communities a few times per year or less. Barges are often cancelled, delayed, or cannot access communities farther upriver due to low water levels, sand bars, and the ever-changing channels of the braided dynamic Nushagak River system.

Existing travel modes can be expensive, logistically challenging, weather-dependent, and hazardous, leaving communities periodically cut off from both essential services and amenities that support community well-being and quality of life.

1.4.2 Limited Access to Essential Services and Amenities

Remote rural Alaska communities typically have very limited local services, often consisting of only a small grocery/retail outlet (if any) and a basic health clinic staffed primarily by community

health aides. Residents need to travel often to Dillingham for essential services including comprehensive health and dental care, education and training, shopping, court and legal services, automobile repair, and more. They also need to travel to Dillingham and other nearby communities for work, sports and community events, church, visiting family and friends, and subsistence activities.

Residents face barriers to healthcare, especially emergency care, because the regional hospital in Dillingham is accessible only by air. Weather delays can prevent patients from receiving timely treatment, and communities without stationed police or fire services face long response times. With limited local health resources, residents may be delaying or neglecting diagnosis, treatments, and medications, ultimately impacting the health and well-being of the local populations.

Access to other emergency services such as law enforcement and firefighting is also limited in the smaller communities. Each village may have one trained Village Public Safety Officer (VPSO) or Village Police Officer (VPO) and a volunteer fire department. If a fatality occurs, State Troopers must mobilize from Dillingham during clear weather. If a major injury occurs, victims may need to take a medivac using an air ambulance helicopter to Dillingham or Anchorage. Without a fully trained fire department and firefighting equipment, isolated communities are at a higher risk of fire damage. In the event of a severe wildfire, residents can only evacuate by river since smoke would likely suspend air travel.

Education and cultural exchange are also limited. Students, teachers, and elders cannot easily travel between communities for language programs, cultural events, or school activities. Families face high costs to visit relatives in neighboring villages, weakening social ties.

Visitors often travel to the study area communities from Anchorage, Dillingham, or other areas of the state or country to visit friends and family, or to provide professional services such as training, healthcare, education, engineering and construction, veterinarian care, research, and more. Lack of local lodging, transportation options, and amenities cause costly and challenging travel for visitors. This in turn affects local access and costs of these services.

1.4.3 Economic Hardship and Limited Opportunity

Limited transportation access contributes to economic challenges within the study area by increasing the cost of goods, restricting access to employment opportunities, and increasing the cost and logistics of infrastructure development. Communities within the study area have relatively small local economies with limited local job positions. Opportunities for outside employment are limited by the lack of reliable, daily transportation access to nearby communities.

The availability of essential services and skilled workers is also affected by the limited local labor pool. Positions such as teachers, healthcare providers, public safety personnel, and other specialized workers may require recruitment from outside the community. Limited transportation connections can increase the difficulty and cost of traveling to and from communities and may create additional challenges for recruiting and retaining workers. Limited access to services may also be a deterrent for people to reside and work in isolated communities.

Employment prospects within the area are limited and focused on government and community-serving positions, as shown in Table 1-1. Other common job options include commercial fishing, education, healthcare, public services, maintenance, and construction. Employment rates range from 36.1% in Aleknagik to 54.2% in Ekwok, according to the 2024 United States Census Bureau (U.S. Census). Government employment accounts for a substantial share of employment in each community, ranging from 46.7% in Aleknagik to 71.4% in Koliganek (U.S. Census, 2024). Portage Creek was excluded from this comparison because of its very small year-round population, which resulted in no reported employment data. This concentration reflects the limited diversity of local employment opportunities and the relatively small size of the local economies.

Table 1-1: Community Employment Rates

Community	Employment Rate	Government Employment
Aleknagik	36.1%	46.7%
Portage Creek	00.0%	00.0%
New Stuyahok	53.3%	70.1%
Ekwok	54.2%	53.8%
Koliganek	37.8%	71.4%

Source: US Census, 2024.

Housing availability is another significant constraint. The limited housing stock in many rural Alaska communities can result in multiple generations or families sharing homes. Housing development and rehabilitation are further complicated by the high cost and limited availability of construction materials, equipment, and labor. Seasonal freight access and reliance on inconsistent barges and air transportation can increase the cost and uncertainty of delivering materials, while shore construction seasons limit the time available to complete housing and infrastructure projects.

Table 1-2: Community Housing Data

Community	Total Housing Units	Occupied Housing Units	Vacant Housing Units	Average Household Size[1]	Homeownership Rate	Median Gross Rent
Aleknagik	120	39	81	6 (+/-2)	82.1%	N/A
Portage Creek	15	1	14	2 (+/-2)	100.0%	N/A
New Stuyahok	109	99	10	5 (+/-2)	63.6%	$900.00
Ekwok	27	13	14	5.5 (+/-3)	100.0%	N/A
Koliganek	51	43	8	4.5 (+/-1.5)	67.4%	$900.00

Notes:
Source: U.S. Census, 2024.

1. Average household size calculated as total population divided by total occupied housing units.

Housing conditions in Bristol Bay region also contribute to economic hardship and limited opportunities. According to the Alaska Housing Finance Corporation (AHFC), many occupied homes in the Bristol Bay region are overcrowded, cost-burdened, and have significant housing needs. These conditions reflect a regional shortage of adequate and affordable housing and can make it more difficult for communities to accommodate population needs and attract and retain workers. The high cost and logistical challenges of transporting construction materials and equipment to rural communities can further increase the cost and difficulty of developing and maintaining housing (AHFC, 2017).

The economic and housing challenges described above are particularly significant in Alaska Native communities, which make up most of the population in the region. The combination of limited employment opportunities, housing shortages, high transportation costs, and limited access to goods and services contributes to persistent inequities.

Bristol Bay Region Housing Statistics

16% of occupied housing units are overcrowded or severely overcrowded (x5 national average).

23% of householders are cost-burdened, spending 30% of income on housing-related costs.

6% of occupied homes lack complete kitchens.

12% of occupied homes lack complete bathrooms.

Source: AHFC, 2017.

1.4.4 Safety Risks of Current Travel Modes

Safety is a concern for all existing travel modes between communities in the study area. Residents rely on small aircraft, boats, ATVs, and snowmachines to reach nearby communities and regional services. These modes are essential without an interconnected road system, but they expose travelers to inclement weather, rough terrain, adverse river conditions, and other hazards that make routine travel unpredictable and sometimes life-threatening. Safety risks are elevated because emergency response resources are limited and assistance may be difficult to access when conditions deteriorate.

Winter travel presents persistent challenges. ATV travel often occurs on unmaintained or poorly marked trails, frozen rivers, and informal routes where conditions change rapidly. Blowing snow, limited visibility, changing ice conditions, open water, overflow, and similar hazards make routes difficult to follow and increase the risk of crashes or travelers becoming stranded. The Alaska DOT&PF Winter Trail Program identifies winter trails and seasonal routes as critical connections for rural communities, but also notes that weather can change without warning, daylight may be limited, and emergency assistance may be far away (DOT&PF, 2026). The Alaska DOT&PF *Strategic Highway Safety Plan* also reports elevated injury risks associated with off-road vehicles in rural areas. Between 2007 and 2016, Alaska Native people were hospitalized at six times the rate of non-Native people (DOT&PF, 2024). Between 2007 and 2016, Alaska Native people were hospitalized at six times the rate of non-Native people due to ATV incidents (DOT&PF, 2024).

Regional boat travel presents additional hazards. During the open-water season, small boats and skiffs face changing weather, wind, waves, low water, and strong currents that increase the risk of capsizing or stranding. Cold-water immersion can become life-threatening quickly. ADFG notes

that most Alaska waters are cold enough that survival may be measured in minutes and emphasizes the rapid onset of cold-water shock and hypothermia (ADFG, 2026).

Intercommunity winter travel commonly relies on marked winter trails, but markers such as tripods are easily damaged, causing navigation difficulties. Adequate snow cover and ice thickness are required for safe travel; thin ice or open water can lead to dangerous immersion. Whiteout conditions can develop suddenly, stranding travelers without cell service. Limited transportation and communication options make timely emergency response difficult.

Climate change is further increasing the vulnerability of trail routes. Alaska has experienced substantial warming, with changes in temperature, precipitation, snow cover, and the timing and duration of ice seasons. Observations show reduced maximum ice thickness across several regions and shorter periods of safe ice travel at roughly half of monitored sites. River ice also varies significantly from year to year, making winter travel increasingly difficult to predict (Arp et al., 2020). Permafrost thaw contributes additional challenges, as ground settlement, erosion, cracking, and sinkholes can alter established routes and make previously reliable trails unsafe (University of Alaska Fairbanks [UAF], 2022). These changes reduce the reliability of snowmachine and ATV travel and increase reliance on alternative routes.

Air travel is also essential but highly weather-dependent. Poor visibility, wind, freezing rain, and other adverse conditions can delay or cancel flights, affecting medical transportation and emergency response. When aircraft cannot operate, responders and residents may have limited alternatives for reaching neighboring communities or medical facilities.

1.4.5 Infrastructure Limitations and Inefficient Public Services

The geographic isolation of communities within the area creates ongoing challenges for constructing, maintaining, and repairing essential infrastructure and responding to failures. Community facilities like power plants, bulk fuel storage, water and wastewater systems, and solid waste sites are often operated locally, but may require outside support. Because of the limited transportation network, obtaining construction materials, heavy equipment, replacement parts, and specialized contractors can be costly and logistically difficult. Heavy equipment and materials may need to be transported by air or seasonal marine freight, while weather and seasonal conditions can delay or prevent deliveries. As a result, emergencies such as water system or power outages, fuel spills, and facility damage due to natural hazards can have a greater impact on the community. The use of specialized equipment and personnel can be particularly challenging for small communities with limited local workforces and financial resources.

Operating rural public infrastructure is costly on both a local and state level. There may be inefficiencies, specifically for towns located relatively close (like Ekwok and New Stuyahok which are only about 10 miles apart), for operating duplicate facilities that could otherwise be shared. This may include airports, landfills, bulk fuel storage, schools, and power generation facilities.

2.0 REGULATORY AND PLANNING FRAMEWORK

This section summarizes the federal, state, tribal, and local planning requirements, tribal consultation obligations, and transportation plans applicable to this study.

2.1 COMMUNITIES AND LOCAL STAKEHOLDERS

The A2K Study involves five communities and multiple stakeholders from each place including Tribal and municipal governments and native village corporations as shown in Table 2-1.

Table 2-1: Local Stakeholders

Community	Stakeholder	Stakeholder Type	Incorporation Type
Dillingham	Curyung Tribal Council	Federally Recognized Tribe	First Class City
	City of Dillingham	Municipality	
	Choggiung Limited	Native Village Corporation	
Aleknagik	Native Village of Aleknagik	Federally Recognized Tribe	Second Class City
	City of Aleknagik	Municipality	
	Aleknagik Natives Limited	Native Village Corporation	
Portage Creek	Portage Creek Village	Federally Recognized Tribe	Unincorporated
Ekwok	Native Village of Ekwok	Federally Recognized Tribe	Second Class City
	City of Ekwok	Municipality	
	Ekwok Natives Limited	Native Village Corporation	
New Stuyahok	New Stuyahok Village	Federally Recognized Tribe	Second Class City
	City of New Stuyahok	Municipality	
	Stuyahok Limited	Native Village Corporation	
Koliganek	New Koliganek Village Council	Federally Recognized Tribe	Unincorporated
	Koliganek Natives Limited	Native Village Corporation	

Unincorporated communities do not have local city municipalities.

Stakeholders have different roles within the community and for this study:

Federally Recognized Tribes

Federally recognized tribes in rural Alaska are sovereign governments with inherent authority that predates the U.S. Constitution. This recognition establishes a government-to-government relationship with both the U.S. federal government and the State of Alaska, allowing them to govern their members, manage affairs, and receive certain federal services. Tribes may own land locally and may fund or assist with road maintenance. For this study, the tribes are the primary stakeholders guiding community need and study outcomes.

Municipalities

In rural Alaska, a city municipality is a small, incorporated local government that provides essential local services, enforces local regulations, and represents the interests of its residents. The governing body is usually the city council, which sets policy, adopts the budget, and enacts ordinances. The mayor serves as the chief executive. The city often owns land and public right-of-way within city limits, conducts or assists with road maintenance, and works with the Tribe and other entities on community development.

Native Village Corporations

Village corporations were created as part of the Alaska Native Claims Settlement Act of 1971 (ANCSA), which aimed to settle land claims and provide economic opportunities for Alaska Natives. Each corporation is owned by Alaska Native shareholders and manages land for their benefit. They are significant landowners within the study area and play a vital role in the local economy by managing resources and providing jobs.

2.2 APPLICABLE AGENCIES AND AUTHORITIES

Several agencies have authority for instituting regulations or requirements that may be impact the scope of this study, as described below.

State Agencies:

- **Alaska Department of Transportation & Public Facilities (DOT&PF)** – Provides transportation planning, design, and project development throughout the state for infrastructure projects. Can review project documents and provide feedback. Publishes official construction standards and specifications for highway projects.
- **Alaska Department of Conservation (ADEC)** – Responsible for protecting air, water, and land quality. Reviews projects for compliance with environmental regulations, such as water quality, stormwater and erosion control, and potential contamination issues.
- **Alaska Department of Fish and Game (ADFG) –** Protects fish habitat under Alaska statute reviews impacts to streams, wetlands, and wildlife.
- **Alaska Department of Natural Resources (ADNR)** – Manages state lands and natural resources. Issues permits for land use (e.g., rights-of-way and easements), evaluates impacts to state land, and ensures compliance with resource management policies including water use and habitat considerations.
- **State Historic Preservation Office (SHPO)** – Reviews potential impacts to cultural and historic resources under Section 106 of the National Historic Preservation Act. Coordinates consultation with tribes and other stakeholders.

Federal Agencies:

- **Federal Highway Administration (FHWA)** – Provides federal funding oversight, sets standards for project planning and design of federally-funded roads, and reviews / approves environmental documents for compliance with the National Environmental

Policy Act (NEPA). FHWA jointly administers the TTP with BIA. The TTP funds planning, design, construction, and maintenance of transportation facilities serving tribal communities in support of tribal priorities.

- **Bureau of Indian Affairs (BIA)** – Oversees transportation projects on or affecting tribal lands. Provides technical assistance, may act as lead or cooperating agency for NEPA, and ensures protection of tribal interests and trust resources. BIA jointly administers the TTP with FHWA.
- **Environmental Protection Agency (EPA)** – Oversees compliance with federal environmental laws and may review project NEPA documents. Provides comments on environmental impacts and mitigation.
- **U.S. Army Corps of Engineers (USACE)** – Regulates impacts to waters of the U.S. and wetlands under Section 404 of the Clean Water Act. Issues permits for dredge and fill activities and evaluates alternatives and mitigation.
- **U.S. Fish and Wildlife Service (USFWS)** – Reviews impacts to fish, wildlife, and habitats. Conducts consultation under the Endangered Species Act and may recommend conservation measures.
- **National Marine Fisheries Service (NMFS)** – Conducts consultation under the Endangered Species Act and Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat) if a project affects anadromous fish (e.g., salmon) or marine habitats.
- **U.S. Coast Guard (USCG)** – Permits bridges or crossings over navigable waters under Rivers and Harbors Act of 1899 to ensure navigation is not impeded.
- **Bureau of Land Management (BLM)** – Manages federal public lands and issues rights-of-way and land use authorizations if a project crosses BLM land.

2.3 Tribal Consultation and Community Engagement

Tribal consultation and community engagement are central to this study. The study is structured to include multiple rounds of Tribal consultation. This section summarizes consultation and engagement methods including meetings, interviews, surveys, and more.

2.3.1 Consultation Process and Methods

Entity and public engagement for the A2K Study was designed to ensure early, continuous, and meaningful input from potentially affected communities. Engagement efforts focused on the communities of Aleknagik, Ekwok, New Stuyahok, Koliganek, and Portage Creek, with additional outreach to Dillingham. The overall engagement approach follows a multi-phase process:

- Initial stakeholder outreach and study website development
- Round 1 stakeholder and public meetings
- Round 1 public survey
- Draft report development

- Round 2 stakeholder and public meetings
- Round 2 public survey
- Regional and individual stakeholder coordination
- Final report development and review

This phase approach ensures that community input is incorporated iteratively throughout the study and allows opportunities for communities to review and respond to findings before finalization. Engagement phases are discussed in more detail below.

2.3.2 Initial Stakeholder Outreach and Website Development

The consultation process began with the distribution of a Stakeholder Outreach Letter form BBNA, announcing the launch of the study and describing its purpose, scope, and planned activities. The letter invited Tribes and regional partners to participate in the public engagement, review and provide feedback on draft findings and routes, and to stay informed as the study progressed. The letter also provided a link to the study website where information can be found regarding study scope, timeline, engagement meetings, and documents.

2.3.3 Entity Kickoff Meetings

Following the initial outreach, the study team scheduled Tribal Entity Meetings with each Tribal Council. City and Tribal Corporations were invited to participate as well, as applicable. During these meetings, Tribal Councils were provided the option to continue participation in the study or to opt out. Each community was also offered the opportunity for Bristol to host two local public meetings. It was clarified that participation with the study does not mean agreement or disagreement with road connections, but ensures that the community's perspectives, concerns, and priorities are represented in the study's findings and final report. All Councils chose to continue with participation and public meetings except Portage Creek, which chose not to have any public meetings.

2.3.4 Public Meetings

Public meetings were subsequently offered within the participating communities as part of the first round of public engagement along with a public survey to gather broader community feedback.

Round 1 of public meetings were conducted in Ekwok, New Stuyahok, Koliganek, and Aleknagik between October 2025 and March 2026. Meetings were publicly advertised through flyers and held in accessible community locations. Each meeting included:

- A presentation describing the study, purpose, scope, and limitations.
- Distribution of informational materials and maps.
- Facilitated question-and-answer sessions.
- Open discussion to gather community perspectives.

Outcomes and comments are discussed further in Section 5.5. Community Meeting Summaries can be found in Appendix A.

Following the publication of the Draft A2K Study, a second round of public engagement will occur, including additional public meetings in each community and a follow-up survey. Regional stakeholder meetings and individual coordination will be conducted as needed, ensuring that Tribes remain central to the decision-making and feedback process throughout the study.

2.3.5 Online Surveys

An online survey was developed and distributed during the first round of public engagement and distributed to community members following the public meeting to provide additional opportunities for community input. At the time of this draft report, survey responses from the first round of public engagement are discussed within the Economic Analysis in Appendix B.

2.3.6 Incorporation of Traditional Ecological Knowledge (TEK)

Traditional Ecological Knowledge (TEK) was identified as an essential component of the study. Community members shared insights related to:

- Seasonal travel routes, including snowmachine and historic dog team trails.
- Changes in environmental conditions, such as permafrost thaw, vegetation shifts, and changing wildlife patterns.
- Subsistence practices and culturally significant areas.

Participants emphasized the importance of incorporating TEK respectfully and ensuring that sensitive cultural and historical information is protected.

The study team will continue to work with Tribal representatives to incorporate TEK into project analysis, ensuring that local knowledge informs understanding of environmental conditions, route feasibility, and potential impacts.

2.4 NEPA Considerations

The National Environmental Policy Act (NEPA) establishes a federal framework for evaluating potential environmental impacts of projects that involve federal funding, permits, or approvals. NEPA requires federal agencies to consider environmental, social, and cultural resources when making decisions and provides opportunities for public participation.

NEPA review can take three primary forms, depending on the potential for significant environmental effects.

Categorical Exclusion (CE)

Applied to projects with no anticipated significant environmental impacts, typically routine or minor activities. Projects qualifying for a CE do not require an Environmental Assessment (EA) or Environmental Impact Statement (EIS).

Environmental Assessment (EA)

Conducted when potential impacts are uncertain or may be significant but could be mitigated. An EA evaluates alternatives and determines whether a Finding of No Significant Impact (FONSI) can be issued, avoiding a full EIS.

Environmental Impact Statement (EIS)

Required for projects expected to have significant environmental effects. An EIS provides a detailed analysis of potential impacts, considers multiple alternatives, and includes extensive public review before decisions are made.

The A2K Study is not a NEPA document. Rather, it is an early-stage planning effort intended to inform future project development, if desired, and potential environmental review. Information generated by this study, such as route options, environmental considerations, and community input, can help determine the appropriate NEPA pathway (CE, EA, or EIS) for any future federal permitting, funding, or construction actions.

Additional NEPA requirements and environmental considerations will be discussed in an Environmental Report to be submitted with the Final-Draft A2K Study in Appendix F.

2.5 LAND OWNERSHIP AND JURISDICTION

Landownership and jurisdiction are critical considerations in the development and evaluation of potential route corridors between Aleknagik and Koliganek. The study area contains a mix of State of Alaska lands, federal lands administered by the Bureau of Land Management (BLM), Alaska Native Claims Settlement Act (ANCSA) corporation lands, Native Allotments, municipal lands, and other private holdings. Exhibit 2-1 illustrates general landownership patterns within the area.

According to preliminary research, State-owned lands comprise a substantial portion of the study area and provide the largest contiguous areas potentially available for transportation development. Land conveyed under ANCSA also makes up a significant amount of land within the study area and generally centralizes around each community. These are lands owned by Native Village Corporations associated with Aleknagik, Dillingham, Portage Creek, Ekwok, New Stuyahok, and Koliganek. Additional lands are owned by Bristol Bay Native Corporation (BBNC) and the BLM.

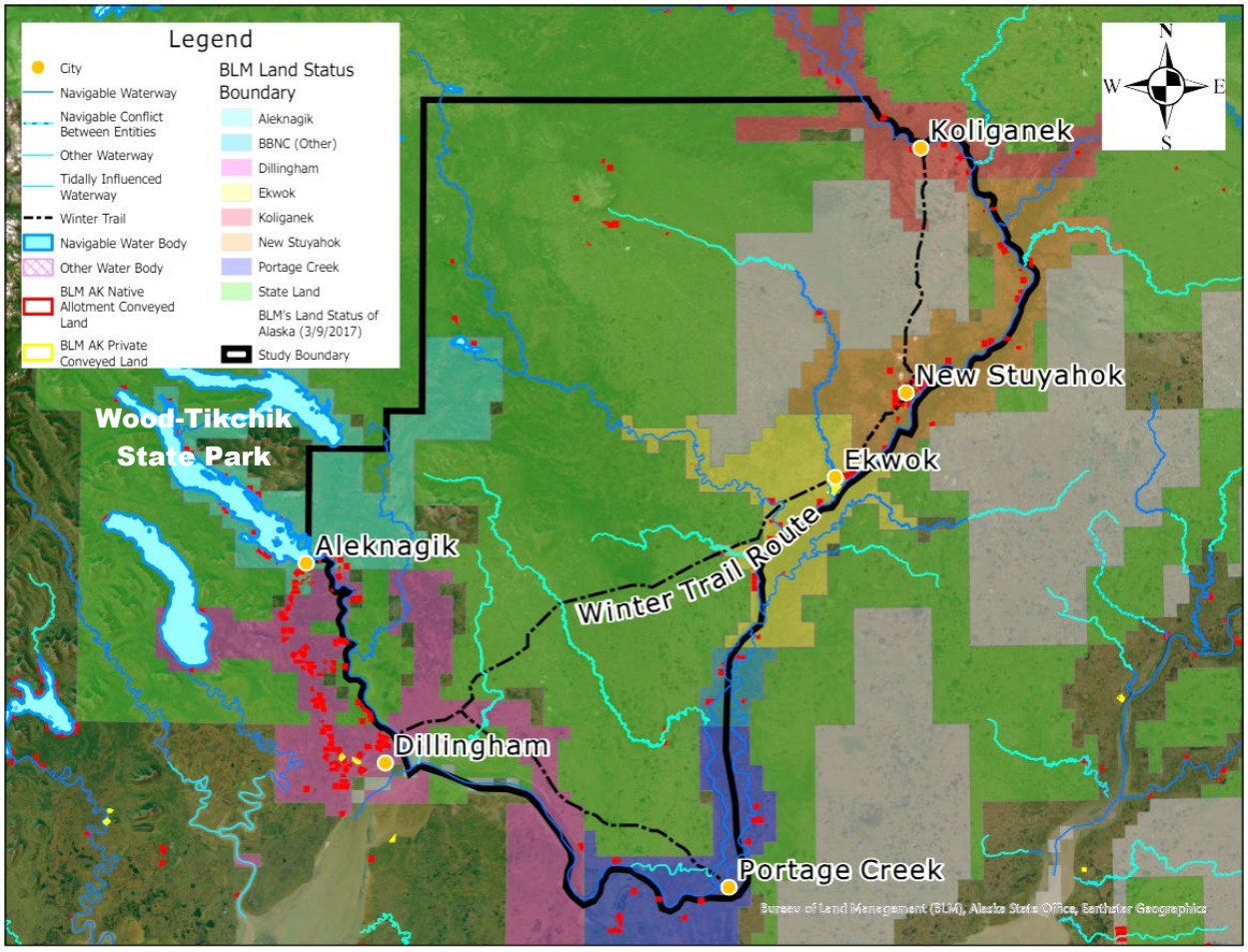
Native Allotments are present within the study area, typically occurring near communities or along waterways. Because Native Allotments represent privately held lands and obtaining right-of-way is a lengthy and challenging process through the BIA, it is advised to avoid route development through them. However, some landowners may desire improved access near their allotments for private development or subsistence activities.

The study area excludes the Wood-Tikchik State Park which is State-owned protected land that would likely restrict the development of public roads. The park holds recreational, ecological, and cultural significance to the region and state.

Right-of-way or easements would be required for any proposed roads. This process involves surveying, landowner coordination, easement document development and approvals, and may

involve NEPA and other processes depending on the landowner and project funding. Consultation with Tribal governments and local stakeholders remains an important component of transportation planning due to regional importance of subsistence activities, traditional land use, and cultural resources within the area.

Exhibit 2-1: Preliminary Land Status Map



Larger and more detailed maps are provided in Appendix C. Refined mapping will be conducted for the Final-Draft A2K Study along preferred route corridors (to be determined), as desired.

2.6 RELATIONSHIP TO EXISTING TRANSPORTATION PLANS

The A2K Study builds upon transportation priorities that have been identified through Tribal, regional, and state transportation planning efforts. Throughout these planning documents, improving transportation access, reliability, safety, and regional connectivity have consistently been identified as a critical need for rural communities in the Bristol Bay region.

At the community level, both the Ekwok and New Stuyahok LRTPs identify a roadway connection between communities as a transportation priority for further evaluation.

Regionally, the study supports the transportation planning efforts of the BBNA Department of Transportation and Infrastructure Development, which works collaboratively with member Tribes to identify, prioritize, and advance transportation improvements throughout the Bristol Bay region. BBNA's transportation program emphasizes improving community accessibility, strengthening transportation resilience, and supporting infrastructure investments that benefit communities.

The study also complements broader regional initiatives aimed at improving connectivity throughout Bristol Bay. Funding has recently been secured for a regional connectivity planning effort called the Bristol Bay Connectivity Study that will evaluate multimodal transportation opportunities, including roads, ferries, and other transportation improvements, to better connect approximately 30 communities across the region. The A2K Study provides corridor-specific information that can support and inform this broader planning effort.

At the state level, the study is consistent with the DOT&PF's goals of improving transportation system connectivity, reliability, accessibility, and safety. By evaluating the feasibility of a new road corridor, the study supports long-term planning efforts intended to improve transportation options for rural Alaskan communities while recognizing the engineering, environmental, cultural, and financial considerations associated with major infrastructure investments.

The A2K Study also builds upon previous corridor planning efforts in Bristol Bay, including the Dillingham to Manokotak Road Feasibility Study, which evaluated the feasibility of expanding the surface transportation connections between rural communities in Bristol Bay. Although serving a different corridor, the A2K Study advances a similar objective of evaluating whether additional road infrastructure could improve transportation options and regional connectivity.

Through a very long-term planning outlook (20+ years), combining the proposed road to Manokotak with a potential route to the Nushagak River communities would expand the road network out of Dillingham and extend the reach of the hub's services to a broader population. Related regional and state planning efforts may eventually lead to expansions of the Alaska Highway, Rail, or Marine Highway Systems to the Bristol Bay region as well.

2.7 DATA COLLECTION

Data collection for the A2K Study consisted of compiling and reviewing existing information from federal, state, tribal, and regional sources, supplemented by technical investigations and public outreach conducted as part of this study. Data collected and evaluated included topography, land status, cultural and historic resources, environmental conditions, socioeconomic information, and geotechnical characteristics.

Key sources used to develop this study include community meeting summaries (Appendix A), Economic Analysis (Appendix B), Land Status Mapping (Appendix C), Preliminary Geotechnical Report (Appendix D), Route Alternatives (Appendix E), and Preliminary Environmental Report (Appendix E). Due to the sensitivity of information provided in the Cultural Resources Report, the report will not be disseminated to the public; BBNA will retain the document for future planning purposes. These resources were used to identify opportunities and constraints within the study area and to support the evaluation of potential corridor alternatives.

3.0 EXISTING CONDITIONS

This section describes the existing physical, environmental, transportation, demographic, and economic conditions within the A2K Study area. Understanding these baseline conditions provides important context for evaluating the feasibility of an overland transportation corridor by identifying the factors that influence mobility, access to essential services, infrastructure development, and long-term transportation needs. The information presented in this section is based on available data, technical studies completed for this study, agency resources, and community input gathered throughout the study process.

The A2K Study area encompasses the communities of Aleknagik, Portage Creek, Ekwok, New Stuyahok, and Koliganek, which are situated along the Wood and Nushagak River systems. These communities have longstanding social, cultural, and economic relationships and rely on a combination of transportation modes and facilities to access essential services, healthcare, education, and subsistence resources. Although each community has unique characteristics, they share many common features, including small and predominantly Alaska Native populations, economies supported by commercial fishing, a traditional subsistence lifestyle, similar limited access to public services, and seasonal employment. The communities share a common reliance on multiple transportation modes to meet everyday needs.

3.1 COMMUNITY BACKGROUNDS

3.1.1 History and Culture

The study communities share a common history closely associated with the Wood and Nushagak River systems. Historically, these waterways provided transportation routes between communities and access to fishing, hunting, and other subsistence resources. The communities developed at locations that supported travel and resource use, and many have relocated over time in response to flooding, changing transportation needs, or access to public services. Today, the communities remain predominantly Yup'ik, and fishing, subsistence harvesting, and cultural traditions continue to play an important role in community life (State of Alaska, Division of Community and Regional Affairs [DCRA], 2026).

Aleknagik derives its name from the Yup'ik phrase meaning "Wrong Way Home," referring to travelers who became disoriented by fog and tides while traveling between the Wood and Nushagak Rivers. Historically used as a seasonal fish camp, Aleknagik developed into a permanent settlement during the 1930s following the construction of a territorial school, post office, and other community facilities. The construction of the road connecting Aleknagik to Dillingham in 1959 significantly improved year-round access and contributed to the community's growth. Today, Aleknagik remains a traditional Yup'ik community with historical influences from the Russian Orthodox, Moravian, and Seventh-day Adventist churches (DCRA, 2026).

Portage Creek takes its name from the historic portage route that allowed travelers to transport boats between the Nushagak and Kvichak River systems, avoiding the open waters of Bristol Bay. The site was traditionally used as a seasonal Yup'ik campsite before coming a

permanent community in the early 1960s. Although the population has declined over time, the area continues to serve as an important location for subsistence activities, recreation, hunting, and fishing (DCRA, 2026).

Ekwok, meaning "end of the bluff," is recognized as the oldest continuously occupied Yup'ik village along the Nushagak River. Historically established as a seasonal fish camp and berry harvesting area, it became one of the largest settlements on the river during the early twentieth century. Following severe flooding in the early 1960s, the community relocated to high ground, where it remains today. Fishing, subsistence harvesting, and Yup'ik cultural traditions continue to play a central role in community life (DCRA, 2026).

New Stuyahok, meaning "going downriver place," occupies the third location remembered by community members after previous relocations caused by flooding and transportation limitations. The village moved to its current location in 1942 to improve access to river transportation and barge service. The subsequent construction of a school, post office, and airstrip supported continued community growth. Today, New Stuyahok remains a predominantly Yup'ik community with strong Russian Orthodox influences and a lifestyle centered on fishing and subsistence activities (DCRA, 2026).

Koliganek is a historic Yup'ik village that was first documented in the late nineteenth century. The community has relocated approximately four miles downstream from its original site but has maintained its strong cultural identity and connections to the Nushagak River. Subsistence harvesting, fishing, and Russian Orthodox traditions continue to be important aspects of community life (DCRA, 2026).

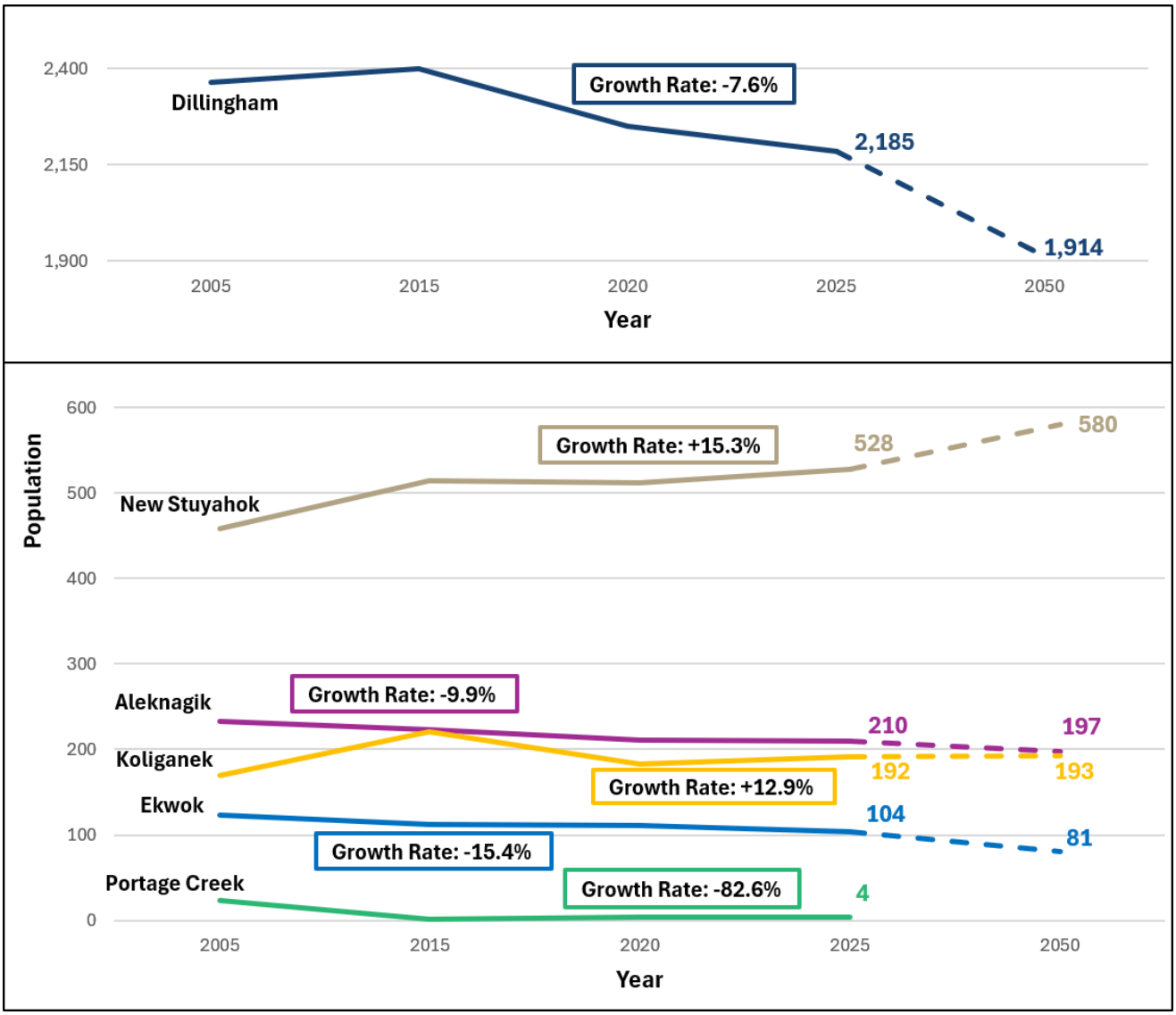
3.1.2 Demographics

Understanding existing populations and future growth or decline is important for estimating future traffic demands and travel patterns of potential route connections. The communities within the A2K study area are small, rural communities that collectively support approximately 1,000 residents, while the regional hub of Dillingham has a population of about 2,200 residents. The population of Dillingham is approximately 55% Alaska Native, while the Alaska Native population is approximately 69% on average for the other communities.

Population trends vary among the study communities. Between 2005 and 2025, New Stuyahok and Koliganek experienced population growth, while Aleknagik, Ekwok, and Portage Creek experienced population declines. Dillingham also experienced a modest population decline during this period. Population projections through 2050 indicate that the Dillingham Census Area is expected to experience gradual population decline, although individual community trends may vary. Historical population estimated and projections for the study area are shown in Exhibit 3-1.

The demographic characteristics of the study area, including population trends, age distribution, and projected changes, are discussed in greater detail in the accompanying Economic Analysis, found in Appendix B, prepared for the A2K Study.

Exhibit 3-1: Study Area Population Estimated and Projections (2005-2050)



Notes:

2. Source: Alaska Department of Labor and Workforce Development (DOLWD, 2025).
3. Some data not available for Portage Creek.
4. Growth rates shown are from the years 2005 through 2025.

3.1.3 Economy

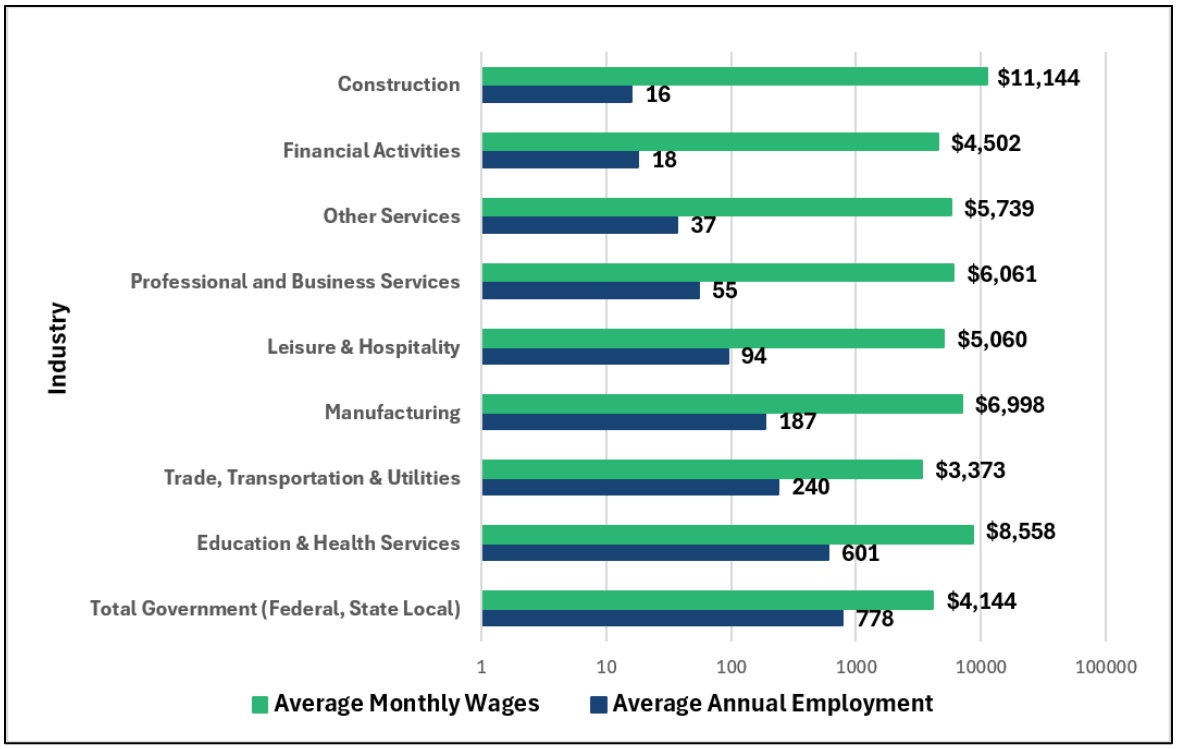
The study area supports a mixed cash-subsistence economy that combines seasonal commercial industries with year-round public employment and traditional subsistence activities. While each community has unique economic characteristics, residents generally rely on a combination of commercial fishing, subsistence harvesting, tribal and local government employment, education, healthcare, construction, transportation services, and small business. Dillingham functions as the

regional economic center, providing employment opportunities, education / training, healthcare, retail services, banking, transportation, and government services for surrounding communities.

Public-sector and community-serving employment represents an significant component of the regional economy. In 2025, government employment accounted for 778 (38%) average annual jobs in the Dillingham Census Area, while private-sector employment accounted for 1,289 (62%) average annual jobs. Education and health services represented the largest private-sector employment category, followed by trade, transportation, and utilities and then leisure and hospitality. Commercial fishing and seafood processing also provide important seasonal employment and income throughout the region.

Exhibit 3-2 provides an overview of employment and wages by industry in the Dillingham Census Area. Additional information regarding employment, wages, commercial fishing, regional economic conditions, and economic assumptions used in this study is provided in the accompanying Economic Analysis, found in Appendix B.

Exhibit 3-2: Annual Average Employment in the Dillingham Census Area (2025)



Source: DOLWD, 2026.

3.2 TRANSPORTATION AND UTILITIES

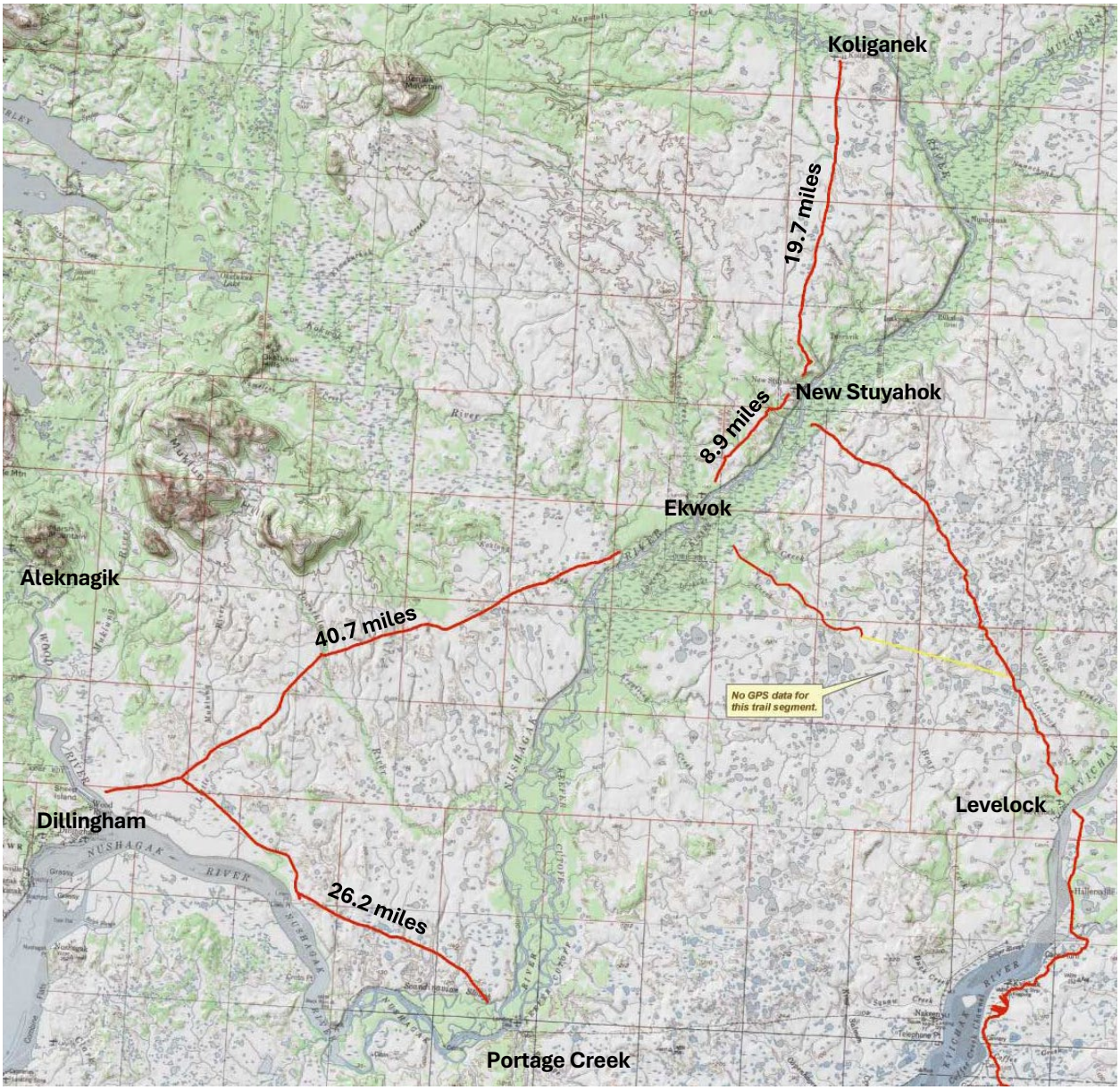
The study area is a remote region without connection to the state's main road system, relying instead on ATVs, snowmachines, boats, and air and marine services for travel and freight. Limited road access, seasonal conditions, and frequent weather disruptions lead to higher transportation costs, longer travel times, and reduced reliability. These constraints affect emergency response,

economic activity, public services, and access to essential goods, providing important context for assessing the feasibility of an all-season transportation corridor.

3.2.1 Existing Roads and Trails

Communities in the study area rely on small, isolated gravel road networks. Aleknagik is the only community connected to Dillingham by a 22-mile long, two-lane paved roadway, Aleknagik Lake Road. Dillingham has an established paved roadway network that provides transportation throughout the community.

Exhibit 3-3: Existing Winter Trails



Source: BBNA, 2026.

The remaining communities primarily depend on winter travel for access to regional services via seasonal snowmachine trails, though their availability varies with weather, snowfall, and river conditions, creating especially limited travel options during freeze-up and breakup. A regional winter trail system extends from the Wood River near Dillingham toward Ekwok, New Stuyahok, and Koliganek, as shown on Exhibit 3-3.

3.2.2 Airstrips

Air travel provides the primary year-round connection between the study communities and Dillingham. Each community is served by a public airport with scheduled passenger, mail, and air cargo service provided by regional carriers. Because runways are relatively short, service is typically provided by commuter aircraft rather than larger commercial planes. While air transportation provides access to essential services, flight operations are frequently affected by weather conditions. Air transportation is also one of the most expensive modes of travel.

Apart from the Portage Creek airstrip, all others are owned and maintained by the State of Alaska. Existing airstrip characteristics are summarized in Table 3-1.

Table 3-1: Runway Data

Community	Runway Dimensions (ft)	Surface	Condition
Dillingham	6400’ x 150’	Pavement	Good
Aleknagik	2030’ x 60’	Gravel	Good
Portage Creek	1920’ x 60’	Gravel	Maintenance and condition unknown
Ekwok	3300’ x 75’	Gravel	Good
New Stuyahok	3280’ x 75’	Gravel	Fair; runway is soft during breakup, causing closures
Koliganek	3300’ x 75’	Gravel	Good

It is common for rural communities in Alaska to rely on air for heavy freight transport typically via C-130 Hercules airplanes. A fully loaded C-130 Hercules requires a minimum runway length for takeoff and landing. Since the communities cannot receive an airplane of this weight, apart from Dillingham, they more often rely on barges for heavy freight delivery.

3.2.3 Ports and Marine Access

Marine transportation plays an important role in delivering fuel, construction materials, heavy equipment, and other bulk freight that cannot be transported economically by aircraft. However, apart from Dillingham and Aleknagik, none of the study communities have developed commercial port facilities.

Dillingham is the primary, and only sheltered, seasonal marine hub for southwest Alaska, supporting regional communities through port and marine transportation services. The Port of

Dillingham supports high-volume freight operations and Bristol Bay's commercial salmon fleet (OSDA, 2026). Facilities include a central dock, harbor, and two additional boat ramps at Kanakanak Beach and Wood River Landing. Major marine carriers serving the Port of Dillingham include Lynden Alaska Marine Lines (LAML), Bowhead Transport, and Coastal Transportation, with shipments originating primarily from Seattle or Anchorage. The port also serves as a boat yard and provides marine services supporting commercial fishing, cargo, and recreational vessels.

Table 3-2: Dillingham Barge Service Schedule

Company	Service Months	Approximate Number of Barges by Month					
		April	May	June	July	August	September
LAML	April - September	2	3	2	0	1	1
Bowhead Transport	April - September	Barge service frequency varies with freight volume. Typically, barges make two deliveries each during the spring, summer, and fall, for a total of six per year					
Coastal Transportation	September - December	Coastal Transportation primarily serves the Aleutian Islands and does not operate scheduled barge service to Dillingham, but can provide service upon request.					

Aleknagik has a community-operated 100-foot dock on Lake Aleknagik that supports barge and lighterage operations during the ice-free season, as well as a breakwater and boat launch ramp (AEDG, 2026). During the summer and fall, marine transportation services to Aleknagik are provided by LAML, Cook Inlet Tug & Barge (CITB), and local logistics providers such as Carlile Transportation (LAML, 2026; CITB, 2026; YB, 2026).

In contrast, Portage Creek, Ekwok, New Stuyahok, and Koliganek generally receive seasonal freight deliveries by shallow-draft barges or landing craft, with cargo unloaded directly onto riverbanks or beaches due to the absence of permanent marine infrastructure. River depth, seasonal water levels, and channel conditions can further limit marine access, particularly to the upstream communities. LAML does not have a published sailing schedule to the study area communities but provides on-demand service from April through October. Barges can reportedly reach Ekwok under typical conditions but face greater challenges reaching New Stuyahok and Koliganek due to shallow sandbars and shifting river channels.

3.2.4 Utilities and Pipelines

Existing telecommunication and electric systems, water and wastewater infrastructure, and bulk fuel storage facilities were reviewed within the study area to identify existing conditions and help assess how potential routes may adversely affect or help improve these services.

All study communities, apart from Portage Creek, have public water distribution and wastewater collection systems that are owned and operated by either the local municipality or Tribe, as well as established electrical systems and bulk fuel facilities. Nushagak Electric & Telephone

Cooperative, Inc. provides power to Dillingham and Aleknagik, while Alaska Village Electric Cooperative, Inc. (AVEC) provides power to New Stuyahok and Ekwok through an electrical intertie connecting the two communities. The New Stuyahok and Ekwok electrical systems were interconnected in 2016, with the New Stuyahok power plant serving as the primary energy generation facility (AEDG, 2026). The New Koliganek Village Council operates their own local electric utility. Telecommunications infrastructure via fiber-optic connects Dillingham, Levelock, Aleknagik, and Ekwok. Additional fiber-optic connections to New Stuyahok and Koliganek are planned through the Bristol Bay Telephone Cooperative USDA ReConnect 3 project (BBTC, 2026). Although the condition and operation of each facility may vary, most communities rely on diesel fuel for power generation, making fuel logistics and storage a critical component of reliable service. Table 3-3 summarizes existing bulk fuel storage infrastructure for each community. Additional information on fuel and electricity costs is provided in the Economic Analysis Report in Appendix B.

Table 3-3: Existing Bulk Fuel Storage Facilities

Community	Bulk Fuel Facilities (Public and Private)	Total Capacity (Gallons)
Dillingham	Alaska DOT&PF Maintenance Station; Vitus Terminal, Icicle Processing Facility, ADF&G, AT&T, UAF, Bristol Express, Alaska Commercial Company	~37,500 (see note 1)
Aleknagik	Moody's Marina & Sea Lighterage, Southwest Region School District, Mission Lodge, City of Aleknagik, GCI at Agulowak Lodge	~100,000
Koliganek	Alaska Power System, Southwest Region School District (SWRSD), New Koliganek Village Council, Airport Maintenance Station	~132,000
Ekwok	City of Ekwok, AVEC, SWRSD, Airport Maintenance Station	~151,200
New Stuyahok	AVEC, SWRSD, Stuyahok, Ltd., Airport Maintenance Station	~455,000
Portage Creek	None	0

Notes:
1. Capacity for Dillingham may be misrepresented. No data available for Port of Dillingham, Peter Pan Seafoods, Nushagak Electric, Bristol Alliance Fuels, and others not listed.
2. Total capacity includes both gasoline and diesel fuel storage capacity.
3. Source: DCRA, 2026.

The study area does not contain major pipeline systems, natural gas networks, or other regional transmission infrastructure.

3.3 PHYSICAL ENVIRONMENT

This section discusses a general overview of the physical environment within the study area, including terrain, hydrology, climate, and soils.

3.3.1 Terrain

The study area spans approximately 2,100 square miles containing terrain characterized by expansive low-relief landscapes shaped by glacial processes, permafrost influences, and ongoing fluvial activity. Elevations are generally low, with minimal topographic variation, resulting in rolling terrain, extensive bogs, and broad wetland complexes with poorly drained, glacially influenced soils. However, a series of mountain ranges are present along the northwestern border of the study area and include Marsh Mountain, Muklung Hills, Okstukuk Hills, and Kemuk Mountain. Surface water is abundant and often interconnected due to a high water table with limited drainage gradients. Vegetation is dominated by low shrub and lichen tundra, with wet sedge tundra in low-lying areas and only sparse forest cover (Alaska Department of Natural Resources [ADNR], 2013). Forest cover generally represents better ground for roadway construction and is primarily present near Aleknagik, through the center of the study area, and along major river channels.

Hydrologically, the study area is strongly influenced by the Nushagak and Wood River systems and their numerous tributaries, sloughs, and distributary channels. The Nushagak River is a large, meandering river with a wide floodplain, actively migrating channels, and multiple sides channels that create complex crossing conditions. Similarly, the Wood River drainage includes interconnected lakes and rivers that ultimately flow into Bristol Bay. These rivers, along with other rivers in Bristol Bay support the world's largest sockeye salmon fisheries (NOAA, 2004). The lower reaches of all streams and rivers that terminate at the Bristol Bay coast are subject to substantial tidal fluctuations, since Bristol Bay has the eighth largest tide in the world. These tidal dynamics extend upstream into portions of the Nushagak River system (ADFG 2026a).

While the FEMA Flood Map Service Center has not mapped any floodplains in the Bristol Bay regions, floodplains throughout the study area are extensive and frequently inundated during seasonal high flows. Overbank flooding, channel migration, and sediment deposition are common processes, which can result in unstable ground conditions and shifting channel alignments (Nushagak-Mulchatna Watershed Council [NMWC], 2007).

3.3.2 Climate

Communities within the study area experience similar climates due to their proximity. The region falls within the transitional climate zone. The weather patterns include long, cold winters and short, warm summers, with annual precipitation ranging from 20 to 35 inches. Winters are typically marked by extremely strong winds, with fog and low clouds common during the summer months (DCRA, 2026). The region receives approximately six hours of sunlight on average per day in the winter months, and approximately 20 hours per day in the summer (Sunrise and Sunset Times, 2026). Average low and high temperatures range from 9.5°F in January to 61.2°F in July, respectively. Dillingham receives an average of 90.9 inches of snowfall annually (National Oceanic and Atmospheric Administration [NOAA], 2026b) Table 3-4 details the average temperature, precipitation, snowfall, and hours of daylight in Dillingham, the nearest weather station.

Table 3-4: Dillingham Monthly Climate Summary

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Temperature (°F)[1]	15.1	18.2	22.3	31.6	43.3	51.2	55.1	53.6	46.8	33.4	22.2	17.1	34.8
Average Max. Temperature (°F)[1]	20.7	24.0	28.4	37.8	50.3	58.1	61.2	59.8	52.7	39.3	27.5	22.6	40.2
Average Min. Temperature (°F)[1]	9.5	12.5	16.3	25.5	36.4	44.4	49.0	47.4	40.9	27.6	16.9	11.6	28.2
Average Total Precipitation (in.)[1]	1.74	1.12	1.66	0.88	1.25	2.04	2.64	3.84	3.62	2.40	2.34	1.79	25.32
Average Total Snowfall (in.)[1]	22.8	9.8	14.7	4.7	0.3	0.0	0.0	0.0	0.1	3.1	17.5	17.9	90.9
Hours of Daylight (% of day)[2]	26.4	34.0	44.9	55.2	66.0	74.9	76.5	69.3	58.7	47.8	36.9	28.0	N/A

Sources:

4. National Oceanic and Atmospheric Administration (NOAA), 2026b. U.S. Climate Normals for Dillingham FAA AP, Alaska Station 50-2457 for Period of Record 1991 to 2010.
5. United States Navel Observatory (USNO), 2026. Duration of daylight/darkness tables for one year for Dillingham, Alaska (59.0406, -158.4656).

3.3.3 Climate Change

Climate change is having a significant impact on the local environment and throughout Alaska. The statewide average temperature has increased approximately 3°F over the past 60 years, more than twice the rate of warming observed in the rest of the United States. Winter temperatures have increased by approximately 6°F over the same period. By mid-century, average annual temperatures are projected to rise an additional 2 to 4°F. Although precipitation is projected to increase, higher temperatures and longer growing seasons are expected to increase evaporation, potentially resulting in a drier overall condition in some areas (United State Environmental Protection Agency [EPA], 2014).

Climate change is also affecting lakes, wetlands, and vegetation patterns. In areas of discontinuous permafrost, some lakes are shrinking due to increased evaporation and drainage through thawed soils, while others may expand as thawing permafrost causes shoreline collapse. In some areas, shrub species are replacing lichens and other tundra vegetation. Warmer and drier conditions are contributing to increased wildfire frequency and insect outbreaks in boreal forests (EPA, 2014).

During a public meeting in New Stuyahok as part of the A2K Study community engagement, residents described noticeable environmental changes consistent with broader climate change trends in the region. Residents reported stronger winds, warmer temperatures than in past decades, and thawing permafrost. The melting permafrost has contributed to ground instability and an increase in swampy areas. Participants also observed expanded vegetation growth, including more alders and willows in areas that were previously less densely vegetated.

These climate shifts are contributing to widespread permafrost thaw, altered hydrology, and ecosystem change that may influence daily life, subsistence activities, and infrastructure resilience. Approximately 80 percent of Alaska overlies permafrost, and thawing ground ice can result in subsidence, frost heaves, and uneven settlement that damages roads, airstrips, and other infrastructure. Changes in freeze-thaw cycles are expected to increase maintenance costs and reduce the reliability of transportation systems. Shorter seasons for ice roads and winter travel routes have also been observed in many parts of the state (EPA, 2014). Stronger winds may impact river travel and boating safety. Shifts in vegetation, drainage patterns, and ground stability may also alter established trails and customary routes.

3.3.4 Soils and Material Sources

Shannon and Wilson (S&W) developed a *Preliminary Geological and Geotechnical Assessment Report* for this study (Appendix D). The report characterizes the study area by rolling terrain, extensive bogs, glacially influenced soils, and isolated permafrost. Primary geologic hazards related to the development of new roadway corridors include soft and compressible soils, erosion, flooding, landslides, seasonal frost effects, and thaw unstable permafrost. More information about area soils, geology, and geological hazards are provided in Appendix D.

Exhibit 3-4 and Table 3-5 show existing known material sites within the study area, as well as some areas with potential to contain borrow material based on a preliminary desktop geological assessment. It is possible for additional material sites to be present within the study area.

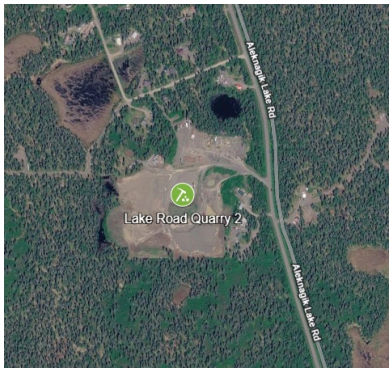
Within Ekwok, New Stuyahok, and Koliganek, there is potential to extract gravel from bars in the Nushagak River. This has been done in the past but requires frozen conditions for safe access. Additionally, there are old runways in New Stuyahok and Koliganek which may contain good quality aggregate that could be salvaged for new road construction, if approved by the communities. There are no known material sources in Portage Creek.

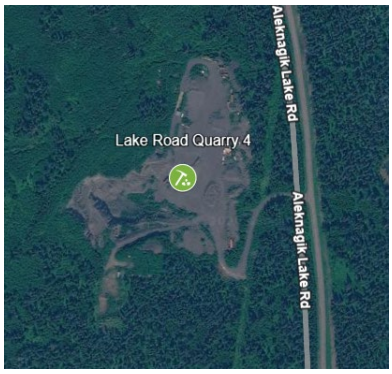
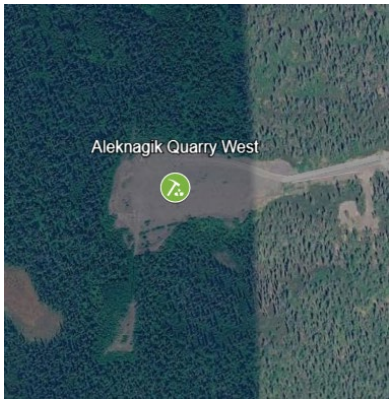
Exhibit 3-4: Existing and Potential Material Sites Map



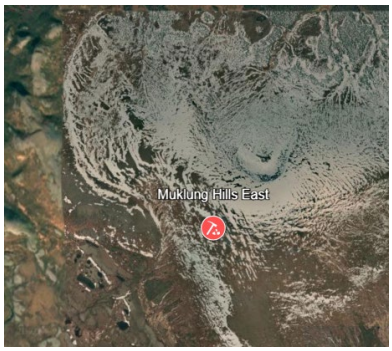
Table 3-5: Existing and Potential Material Sites

Aerial Image	Site Name	Location	Status
	Lake Road Quarry 1	Dillingham	City of Dillingham (active)

Aerial Image	Site Name	Location	Status
	Dillingham Quarry West	Dillingham	City of Dillingham (active)
	Lake Road Quarry 2	Dillingham	City of Dillingham (active)
	Lake Road Quarry 3	6 miles northwest of Dillingham	Unknown (active)
	Warehouse Mountain	8 miles southwest of Aleknagik	Choggiung Limited (active)

Aerial Image	Site Name	Location	Status
	Lake Road Quarry 4	4 miles south of Aleknagik	Unknown (active)
	Aleknagik Quarry West	Aleknagik	City of Aleknagik (active)
	Ekwok Quarry	Ekwok	City of Ekwok (active)
	Nushagak River Source	New Stuyahok	Old site in river bar

Aerial Image	Site Name	Location	Status
	Koliganek Quarry	Koliganek	Old site in river bar east of community
	Marsh Mountain	3 miles east of Aleknagik	Undeveloped, exploration needed
	Muklung Hills South	9 miles east of Aleknagik	Undeveloped, exploration needed
	Muklung Hills North	11 miles northeast of Aleknagik	Undeveloped, exploration needed

Aerial Image	Site Name	Location	Status
	Muklung Hills East	15 miles east of Aleknagik	Undeveloped, exploration needed
	Okstukuk Hills	19 miles northeast of Aleknagik	Undeveloped, exploration needed
	Kemuk Mountain	24 miles west of Koliganek	Undeveloped, exploration needed

1. Ownership and status of borrow sites will be verified for Final-Draft.
2. The location of existing borrow sites was identified through Google Earth imagery. Other sites may exist.

3.4 BIOLOGICAL AND ENVIRONMENTAL RESOURCES

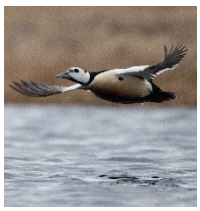
This section discusses known or likely environmental resources such as wetlands, fish habitat, and wildlife corridors using available mapping and secondary data to flag potential constraints. Additional information will be provided in the Environmental Report with the Final-Draft A2K Study submittal.

3.4.1 Wildlife

The local terrain is home to a range of animals. The mosaic of wetlands, ponds, and lakes supports breeding and staging habitat for numerous migratory birds and waterfowl, while riparian areas and willow-dominated lowlands provide important forage for moose and other herbivores. The broader Nushagak River watershed supports abundant populations of large mammals including brown bear, moose, gray wolves, and the Mulchatna Caribou Herd (EPA, 2014). Raptors such as bald eagles and golden eagles may nest or forage in the region, particularly along river corridors and near lakes where fish and waterfowl are abundant (ADNR, 2013).

3.4.2 Threatened and Endangered Species

Preliminary research was performed using the United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) online system. The IPaC Resources Report (Appendix F) shows that no endangered species are expected to occur within the study area.



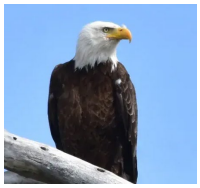
Steller's Eider

The Steller's Eider is listed as a threatened species under the Endangered Species Act. This species primarily breeds in northern Alaska but may occur seasonally in coastal areas of southwest Alaska during migration or wintering periods. While designated critical habitat for Steller's Eider does not overlap the study area, individuals could potentially occur in nearby coastal or wetland environments.



Migratory Birds

Several migratory birds protected under the Migratory Bird Treaty Act that may occur within or near the study area. These species may utilize wetlands, lakes, and riparian areas for nesting, foraging, or migration stopover habitats.



Bald Eagle

The bald eagle is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles may nest or forage in areas with large trees near rivers, lakes, and coastline. Project activities occurring near potential nesting areas could require buffer distances or seasonal restrictions to avoid disturbance.

Source: ADEC, 2019. Photos from USFWS, 2026.

3.4.3 Fish Habitat

The Nushagak River is located in Southwestern Alaska and flows roughly 390 km (242 miles) from its headwaters into Bristol Nay near Dillingham. The Nushagak drainage has two main tributaries: the Nuyakuk River, draining Tikchik lakes from the west; and Mulchatna River, which flows into the Nushagak River from the east. The Nushagak River supports one of the largest Chinook salmon runs in Alaska with an average annual total run index of approximately 235,000 fish and spawning escapement index of approximately 157,000 fish (ADFG, 2026b).

Waters documented in the Alaska Anadromous Waters Catalog are afforded protection under the State of Alaska's Anadromous Fish Act (AS 16.05.871-.901), which regulates activities within

cataloged streams to protect fish habitat. Based on the Alaska Department of Natural Resources (ADNR) anadromous waters catalog data for the study area, over a dozen anadromous fish species are documented within the mapped streams and lakes. Prominent anadromous waterbodies within or near the study corridor are shown on Exhibit 3-5.

Exhibit 3-5: Study Area Anadromous Waters



Source: ADFG, 2026d. Only prominent waterbodies shown; numerous smaller tributaries, sloughs, and connected wetlands within the drainage cataloged as anadromous waters may not be displayed.

3.4.4 Wetlands and Critical Habitat

According to the National Wetland Inventory (NWI), much of the study area is not mapped for the presence of wetlands. From the information that is available, there is an approximate 25-square-mile section of wetlands on the northeast quadrant, just south of Koliganek. There is another approximately 120 square mile section that reaches from Dillingham to just south of Aleknagik. This mapped wetland area makes up approximately 7% of the study area. However, the unmapped

area which may contain wetlands is approximately 70% of the study area (NWI, 2026). Wetland and floodplain systems play an important ecological role in maintaining water quality, regulating hydrology, and providing habitat connectivity throughout the watershed.

While the IPaC Resources Report shows there are no critical habitats within the study area, there is important habitat for the Mulchatna Caribou Herd. Caribou from this herd migrate seasonally across large portions of the region and are important subsistence resources for many local communities. The herd has experienced significant population fluctuations over the past several decades, with numbers increasing to approximately 190,000 animals at their peak in 1997 before declining substantially in the early 2000s with an estimated population of 14,846 animals in the fall of 2025 (ADFG, 2025).

3.4.5 Scenic and Recreational Resources

Scenic Resources: The study area between Aleknagik and Koliganek is characterized by expansive river valleys, wetlands, lakes, and rolling upland terrain. The region contains relatively undeveloped landscapes with limited road infrastructure, providing scenic views of intact boreal and tundra ecosystems. Prominent landscape features include the Nushagak River and its tributaries, as well as numerous lakes and wetlands that form part of the larger Bristol Bay watershed (NMWC, 2007).

Recreational Resources: Outdoor recreation in the study area is primarily centered on fishing, hunting, berry picking, boating, and wildlife viewing. The Nushagak River drainage supports internationally recognized sport and subsistence fisheries for salmon and other species. Boating, plane, and floatplane access are common modes of travel and recreation due to the limited road network in the region.

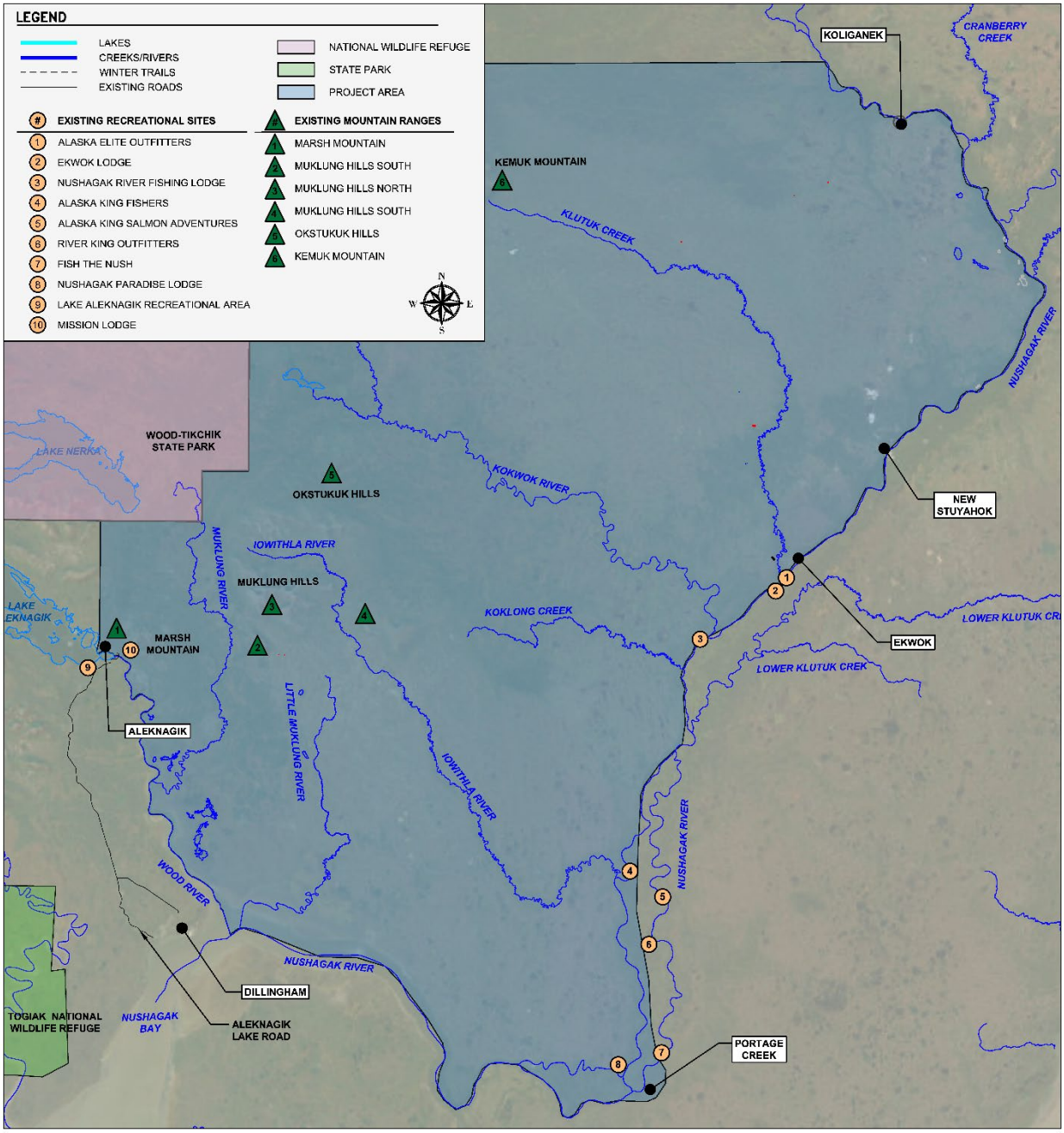


Commercial Sport Fishing Lodge on the Nushagak River (NMWC, 2007).

Nearby protected lands further support recreational use. The Wood-Tikchik State Park, located northwest of the study area, is the largest state park in America and attracts visitors for expedition-level fishing, boating, camping, hiking, and other wilderness recreation. It is only accessible by float plane from Dillingham; there are no roads in and no developed campgrounds. There are several fly-in fishing lodges on the Wood River Lakes. The park's lake and river system contributes to the broader recreational value of the region (NMWC, 2007).

Known existing recreational sites are shown in Exhibit 3-6.

Exhibit 3-6: Existing Recreational Sites



3.5 CULTURAL AND SUBSISTENCE RESOURCES

Aleknagik, Dillingham, Portage Creek, Ekwok, New Stuyahok, and Koliganek have long-standing cultural connections to the Nushagak River watershed and surrounding lands. Subsistence activities, traditional travel routes, and culturally important sites remain integral to community identity and local economies. This section summarizes known information regarding subsistence use areas, cultural and historic resources, and traditional travel corridors within the study area

based on available literature, mapping resources, and preliminary community input. Because this feasibility study is a planning-level evaluation, the discussion below does not constitute a formal cultural resource inventory or determination of eligibility for historic properties. Additional consultation with Tribes and review of cultural resources database would be required during future project development.

3.5.1 Subsistence Use Areas

The study area contains a significant portion of the Nushagak River Watershed and Traditional Use Area. Traditional knowledge interviews conducted in the region indicate that local residents utilize broad areas of the watershed throughout the year for harvesting activities, including locations for seasonal fish camps, hunting areas, and winter trapping grounds.

CONSERVATION TARGET AREAS	
Lower Mainstem Nushagak River Corridor	Nushagak River from the confluence of the Mulchatna River to confluence of Wood River, including the Wood River.
Tundra Wetlands	Wet and moist tundra generally in the lower watershed.
Middle Nushagak and Mulchatna River Corridors	Mouth of the Mulchatna River to confluence of the Chilikadrotna River, Nushagak River from Mulchatna connfluence to Chilikadrotna River, Nushagak River from Mulchatna River including the King Salmon and Nuyakuk. The Iowithla, Kokwok and Muklung rivers also exhibit similar characteristics.
Upland Tundra Complex	Alpine tundra generally in mountaneous area in the upper watershed.
Upper Nushagak and Mulchatna River Corridors	Mulchatna River above Chilikadrotna River, Nushagak River above King Salmon River.
Headwater Lakes	Deep glacial lakes of the Wood-Tikchik State Park. Small and moderate sized lakes draining into Mulchatna and Nushagak rivers. Amanka, Ualik and Nunauaugaluk Lakes.
Salmon	Dispersed throughout the watershed.

Flora and Fauna Considered Most Integral to Traditional Use:

Fish

1. Sockeye, Chinook & Coho Salmon
2. Pink & Chum Salmon
3. Whitefish
4. Winter Freshwater Fish

Mammals

5. Moose
6. Caribou

Other

7. Waterfowl
8. Edible & Medicinal Plants

Source: NMWC, 2007.

Fishing for salmon and other species in the Nushagak River and its tributaries represents one of the most significant subsistence activities. Subsistence hunting of moose and caribou occurs throughout the uplands and river corridors surrounding the communities. Residents harvest waterfowl and small game as well. Plant gathering and berry picking also occur throughout the study area, particularly during the late summer and fall. These activities commonly occur in tundra and riparian areas accessible from rivers, lakes, and seasonal trails (NMWC, 2007).

The Nushagak-Mulchatna Watershed Council has delineated six conservation target areas that represent habitat types important for traditional use species, as shown below. Because subsistence activities are closely tied to seasonal conditions and resource availability, use areas may vary from year to year. Detailed mapping of subsistence use areas would require coordination with local Tribes and others.

3.5.2 Cultural and Historic Resources

True North Sustainable Development Solutions, LLC (True North) developed a desktop study to discuss the prehistory, regional ethnohistory, and regional history of the study area, as well as documented cultural resources from the Alaska Heritage Resources Survey (AHRS) database and potential areas of concern for the potential alignments. Since the report contains sensitive information, it is not appended to this study, rather, it is incorporated by reference.

The review identified a total of 151 previously documented cultural resources within the study area, including prehistoric archaeological sites, historic Yup'ik village sites, historic buildings, and cannery-related structures, the majority of which have not yet been formally evaluated for eligibility to the National Register of Historic Places (NRHP). In general, areas of concern that have a potential for containing cultural resources include:

Low Potential

Heavily disturbed areas, perennially water-logged lands, presence of patterned ground.

Moderate Potential

Landforms elevated above the surrounding tundra, areas with a lack of patterned ground, islands within waterways with elevated terrace(s), areas cleared of trees, and areas with access to nearby fresh water.

High Potential

Areas with high concentrations of AHRS sites, well drained terraces that rise 5-meters to 15-meters along interior water courses or at river confluences, areas with a lack of patterned ground and with fireweed, ferns, and cow parsnip as ground cover. Upright wooden posts or rock piles that align linearly.

Areas of Interest

Specific locations that have access to resources such as water, as a potential outlook for hunting activities, or the location of a possible settlement.

Source: True North, 2026.

3.5.3 Traditional Corridors

Traditional travel routes within the study area follow existing natural corridors, including the Nushagak River, frozen waterways, and areas of relatively low-relief terrain. The Nushagak River serves as the primary intercommunity transportation corridor between the study communities. During the summer, the Nushagak River is used for boat travel, while during the winter, travel shifts to overland along frozen river channels via snowmachines. Under Revised Statute (RS) 2477, several historic trails were granted right-of-way, providing legal access across public lands. According to the DNR RS 2477 Trails database, the Togiak-Nushagak Trail, Dillingham-Lewis Point Trail, and Lewis Point-Naknek Trail are RS 2477 trails within the study area located in the southern portion near Dillingham and Portage Creek. These are known historic dogsled and winter trail routes. Modern, marked winter trails are discussed in Section 3.2.1. There is potential for other undocumented historic trails or travel routes within the study area as well (True North, 2026).

4.0 ROUTE ALTERNATIVES

Three route alternatives were investigated as part of this feasibility study and evaluated against the No Action Alternative. All route alternatives begin in Aleknagik and provide a surface connection to all study communities through different alignments. Each route alternative is discussed further below, while a feasibility analysis and comparison of alternatives is provided in Section 5.0. The alternatives are as follows:

- No Action
- Alternative 1: Central Route
- Alternative 2: Northern Route
- Alternative 3: Southern Route

4.1 NO ACTION

The No Action Alternative serves as the baseline condition for evaluating the other study alternatives. It provides a reference point for assessing the potential benefits, impacts, and costs associated with the route alternatives. Under this alternative, no roadway or transportation improvements would be implemented within the study area. No capital costs would be incurred, and no additional Operations and Maintenance (O&M) costs would be anticipated. The study area would remain without year-round surface transportation access, and existing constraints related to mobility, emergency access, and connectivity would remain unchanged.

4.2 ALTERNATIVE 1: CENTRAL ROUTE

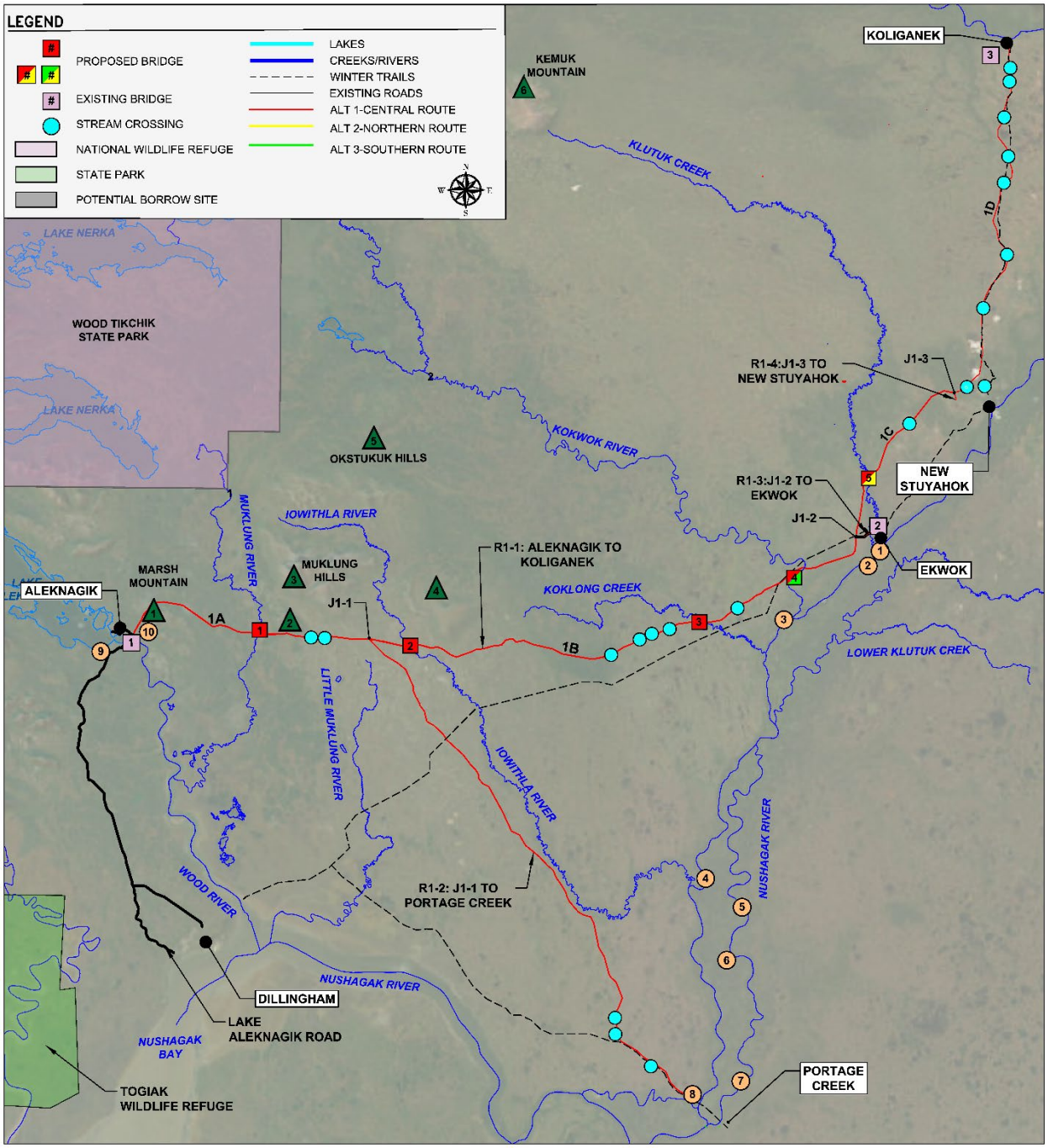
Alternative 1: Central Route is approximately 106 miles in length as illustrated in Exhibit 4-1. The alternative consists of two main routes. One follows a path through the approximate center of the study area connecting Aleknagik, Ekwok, New Stuyahok, and Koliganek (designated as route number R1-1), while a southern spur extending to Portage Creek (R1-2). The alignment begins at Aleknagik, traverses around the north side of Marsh Mountain, continues due east before heading northeast toward Ekwok near Koklong Creek continuing through New Stuyahok, then heads north and terminates in Koliganek. Route R1-1 is divided into Segments 1A through 1E based on community-to-community roadway connections. This alignment follows the existing winter trail from Dillingham to Koliganek more closely than other alternatives.

A separate branch traverses southeast toward Portage Creek starting at junction number J1-1 and terminates on the northern shore of the Nushagak River near the Nushagak Paradise Lodge. Since Portage Creek is located on the southern shore of the Nushagak River, several major bridges and stream crossings would be required to reach Portage Creek by road from Aleknagik across the wide braided river system. Since Portage Creek is primarily a seasonal fishing community, a more economical option may be providing a public boat launch and/or ferry terminal at the terminus of R1-2. This would require another 2.3-miles of river travel to reach Portage Creek.

Additionally, some community members have expressed the desire to keep major thoroughfare roadways outside of developed communities to reduce commuter traffic through residential and

business areas. To accommodate this request, Alternative 1 includes short spurs from the main alignment into both Ekwok and New Stuyahok.

Exhibit 4-1: Alternative 1 – Central Route Alignment



Larger figures are provided in Appendix E with more information on terrain features, recreation sites, and stream crossings.

Four potential gravel sources were identified near the Alternative 1 alignment. The alternative also may improve access to five known existing recreational sites.

Table 4-1 summarizes the route lengths by segment.

Table 4-1: Alternative 1 – Route Lengths by Segment

Route / Segment #	Description	Length (mi)
R1-1	**Aleknagik to Koliganek (Main Route)**	**72.5**
1A	Aleknagik to J1-1	14
1B	J1-1 to J1-2	28
1C	J1-2 to J1-3	10
1D	J1-3 to Koliganek	20.5
R1-2	**Portage Creek Spur (J1-1 to Nushagak River)**	**32**
R1-3	**Ekwok Spur (J1-2 to Ekwok)**	**1**
R1-4	**New Stuyahok Spur (J1-3 to New Stuyahok)**	**0.5**
	Total Length of Alternative	**106**

Bridges would be required along the route at any stream or river crossing 20 feet wide or more. At creek crossings less than 20 feet wide (as visible and measured using Google Earth aerial imagery), a stream culvert was assumed. If creeks are fish bearing, use of arch-plate culverts would help maintain the natural stream bed; otherwise, standard culverts may be used. More drainage road-crossing culverts would be required along the roadway to maintain natural drainage patterns and avoid roadside ponding and erosion. Alternative 1 includes five bridge crossings and 19 other stream crossings, as shown in Table 4-2.

Table 4-2: Alternative 1 – Bridge Summary

Crossing #	Crossing Length (ft)	River/Creek Name	Anadromous
B1	58	Unknown	-
B2	62	Iowithla River	Yes
B3	31	Koklong River	Yes
B4	191	Kokwok River	Yes
B5	53	Klutuk Creek	Yes

4.3 ALTERNATIVE 2: NORTHERN ROUTE

Alternative 2: Northern Route is illustrated in Exhibit 4-2, totaling approximately 129 miles long. The route begins in Aleknagik following forested terrain northeast to Kemuk Mountain, then heads east to Koliganek (designated as route number R2-1). To reach the other communities, a spur from junction J2-1 heads southeast, then diverges in either direction towards Ekwok or New Stuyahok. From Ekwok, the route would follow the Nushagak River southwest to Portage Creek. Similar to Alternative 1, Alternative 2 does not include bridges across the Nushagak River; it terminates on the northern shore, requiring river travel the remaining way to Portage Creek.

Table 4-3 summarizes the route lengths by segment for Alternative 2.

Table 4-3: Alternative 2 – Route Lengths by Segment

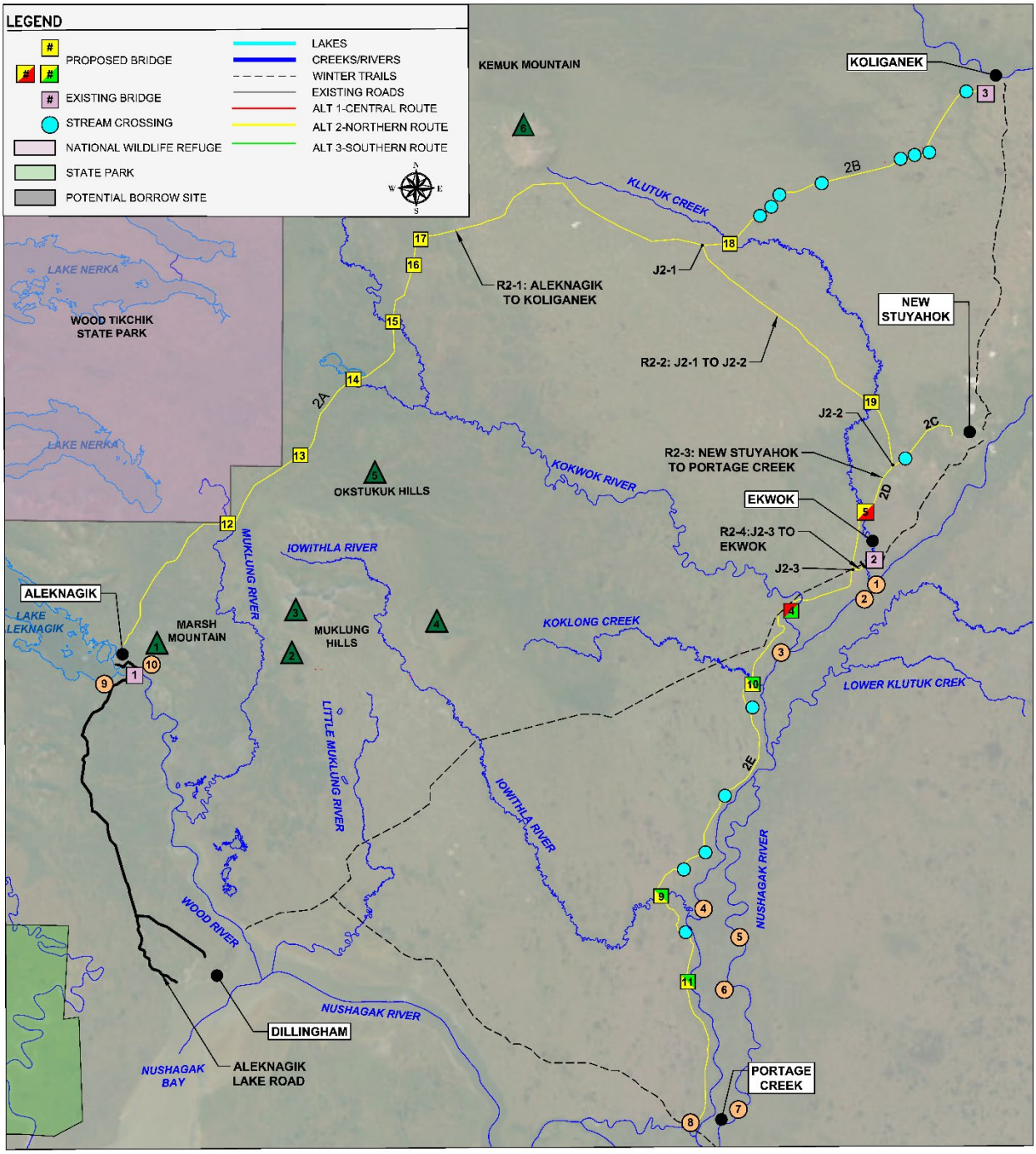
Route / Segment #	Description	Length (mi)
R2-1	**Aleknagik to Koliganek (Main Route)**	**64**
2A	Aleknagik to J2-1	45
2B	J2-1 to Koliganek	19
R2-2	**Ekwok to New Stuyahok Spur (J2-1 to J2-2)**	**16**
R2-3	**New Stuyahok to Portage Creek**	**48**
2C	New Stuyahok to J2-2	4
2D	J2-3 to J2-2	6
2E	Portage Creek to Ekwok	38
R2-4	**J2-3 to Ekwok**	**1**
	Total Length of Alternative	**129**

Four potential gravel sources were identified near the Alternative 2 alignment. The alternative does not provide access to any known existing recreational sites, but there is potential to develop several along the route, if desired.

There is a large boggy area south of Kemuk Mountain that is not ideal for road construction. This route may provide a more direct route to Koliganek and traverse fewer areas of wetlands, but it would increase the travel distance to Dillingham from Ekwok, New Stuyahok, and Portage Creek.

Alternative 2 includes 12 bridge crossings, as shown in Table 4-4, and 15 other stream crossings ranging from 3-19 feet wide.

Exhibit 4-2: Alternative 2 – Northern Route



Larger figures are provided in Appendix E with more information on terrain features, recreation sites, and stream crossings.

Table 4-4: Alternative 2 – Bridge Summary

Crossing #	Crossing Length (ft)	River/Creek Name	Anadromous
B5	53	Klutuk Creek	Yes
B6	53	Klutuk Creek	Yes
B9	132	Iowithla River	Yes
B10	21	Unknown	-
B11	21	Unknown	-
B13	39	Unknown	-
B14	82	Unknown	-
B15	102	Unknown	-
B16	22	Unknown	-
B17	28	Unknown	-
B18	33	Klutuk Creek	Yes
B19	58	Unknown	-

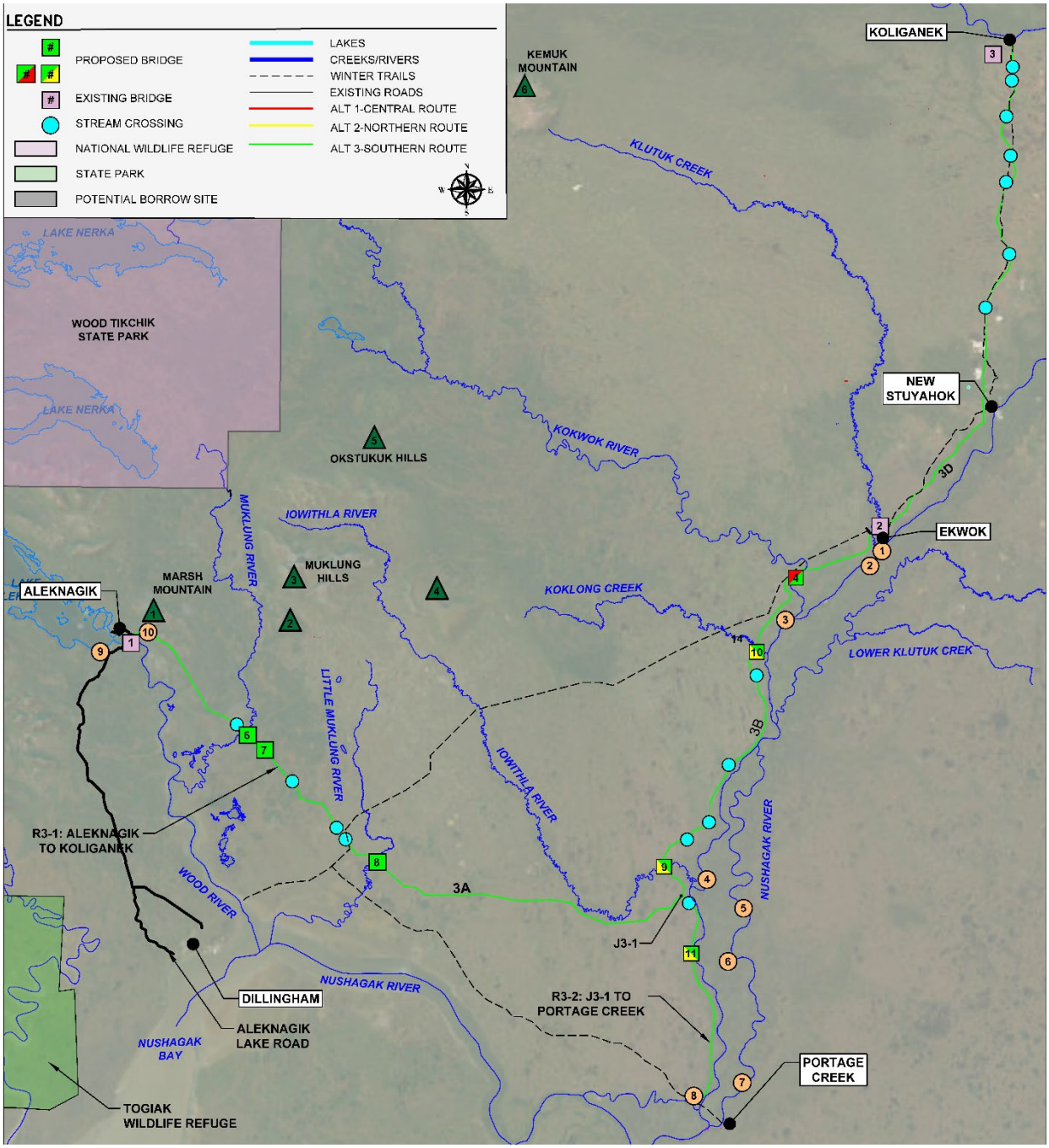
4.4 ALTERNATIVE 3: SOUTHERN ROUTE

Alternative 3: Southern Route is approximately 106 miles long and generally follows an alignment parallel to the Nushagak River, as displayed in Exhibit 4-3. The route begins at Aleknagik and extends southeast toward the Nushagak River, then traverses northeast towards Ekwok and on to New Stuyahok and Koliganek (R3-1). At junction J3-1, a new segment branches south towards Portage Creek (R3-2), terminating on the north shore of the Nushagak River and requiring boat access to the community.

One primary difference between Alternative 3 compared to Alternatives 1 and 2 is the routing between Ekwok and New Stuyahok. Rather than the main route traversing to the west of the communities with separate spurs providing access into the townsites, Alternative 3 provides more direct access to the communities. Larger figures in Appendix E show the preliminary proposed routing for consideration.

Although the southern portion of the study area appears to generally consist of wetlands and boggy areas, forested areas and more stable ground for road construction is generally present along the shores of the major rivers, potentially improving constructability of the route segments adjacent to the Nushagak River. However, careful consideration of river migration and erosion would need to be considered to reduce future impacts to potential routes. There are no mountains or hills with obvious signs of material sources along this alignment, so material availability for construction may be limited to existing sites in the communities, or extraction of river aggregate along the Nushagak River. Alternative 3 may also improve access to eight known existing recreational sites.

Exhibit 4-3: Alternative 3 – Southern Route



Larger figures are provided in Appendix E with more information on terrain features, recreation sites, and stream crossings.

Table 4-5 summarizes the route lengths by segment for Alternative 3.

Table 4-5: Alternative 3 – Route Lengths by Segment

Route / Segment #	Description	Length (mi)
R3-1	**Aleknagik to Koliganek (Main Route)**	**94**
3A	Aleknagik to J2-1	37
3B	J2-1 to Koliganek	27
3C	Portage Creek to Ekwok	11
3D	J2-3 to J2-2	19
R3-2	**Portage Creek Spur (J3-1 to Portage Creek)**	**12**
	Total Length of Alternative	**106**

Alternative 3 includes 7 bridge crossings, as shown in Table 4-6, and 17 other stream crossings ranging from 3-19 feet wide.

Table 4-6: Alternative 3 – Bridge Summary

Crossing #	Crossing Length (ft)	River/Creek Name	Anadromous
B4	191	Kokwok River	Yes
B6	74	Muklung River	Yes
B7	30	Muklung River	Yes
B8	62	Little Muklung	Yes
B9	132	Iowithla River	Yes
B10	21	Unknown	-
B11	21	Unknown	-

5.0 FEASIBILITY ANALYSIS & COMPARISON OF ALTERNATIVES

This section discusses the overall feasibility and comparison of the potential route connections based on preliminary design criteria, construction and maintenance requirements, environmental considerations, anticipate economic and social impacts, community preferences, and costs. Overall, potential routes are technically feasible from a construction standpoint; however, the likelihood of implementation will be closely tied to the benefit/cost analysis and community preference.

It is important to note that the considerations below are based on desktop studies only and are only intended to support initial planning, conceptual level engineering, and impact analysis for the potential development of roadway corridors.

5.1 PRELIMINARY DESIGN

The general design does not vary significantly between route alternatives, however, there are several design options to be considered. Given the rural area of the potential routes, limited local maintenance capacity, and anticipated low volume, it is likely any potential roads would consist of an un-paved, gravel surface. Two-lanes are assumed for preliminary planning, however, if anticipated construction costs are extraordinarily high, the road could be reduced to a two-way one-lane road with vehicle turnouts provided at certain intervals for passing. Although one major purpose of the potential route connections would be to improve year-round access between communities, if snow-removal maintenance is not feasible, some or all of the segments could be seasonal routes, only accessible during snow free months of the year.



Example of two-way two-lane gravel road; Ekwok Landfill Road (Bristol, 2016)

5.1.1 Design Criteria

Design standards are generally governed by roadway functional classification, design speed, design vehicle, and traffic volume. The American Association of State Highway and Transportation Officials, (AASHTO) *Guidelines for Geometric Design of Low-Volume Roads* (2019) was used in determining the preliminary design criteria for the route connections.

The preliminary design criteria which were used to generate preliminary cost estimates are summarized Table 5-1. These criteria will need to be verified during design of any route.

Table 5-1: Preliminary Design Criteria

Parameter	Criteria	Notes
Functional Classification	Rural Major Access Road	Functions as a collector or even minor arterial, but serves a dual function of connecting communities and providing access to abutting properties for residential, recreation, and other.
Design Speed Posted Speed	55 mph 45 mph	Consider travel times, terrain, enforcement, and emergency response. The posted speed limit of other similar roads in Alaska ranges from 40-65 mph.
Design Vehicle	WB-50 (maximum)	Passenger cars, and possibly ATVs, are assumed to be the most common vehicle type. Trucks hauling fishing vessels or camper/RVs may also be common. WB-50 is a 55-foot long tractor-semitrailer (18-wheeler) which may be used to transport fuel and goods to communities. Loading weights and turning radii will need to be identified for road / bridge design. Routes would need to support maintenance equipment.
Estimated Future AADT	< 2,000 veh/day	See Table 5-2.
Number of lanes Lane width Shoulder width Total road width (2-lanes) Total road width (1 lane)	1-2 10 feet 1 foot 22 feet 12 feet	Route connections would have two-way traffic. Two lanes assumed. The segment to Portage Creek could be reduced to one lane with vehicle turnouts given the very low volume. If a two-lane road is cost-prohibitive for other segments, they could be reduced to one lane.
Minimum spacing of vehicle turnouts	1,000 feet	Turnouts are required for passing vehicles on two-way one lane roads.
Foreslope	3H:1V Varies as noted	Minimum 2H:1V in stable upland soils Increase to 4H:1V in areas needing improved recoverability Increase to 5H:1V in bog/permafrost areas to accommodate subsidence

Note: Horizontal and vertical alignment design criteria are not shown. Features such as horizontal and vertical curves, grades, superelevation, and stopping sight distance are controlled by the design speed and terrain and would need to be confirmed during design of any route.

The projected average daily traffic (ADT) is used for the basis of design, including growth rates for a 20-year design life. Seasonal, peak traffic volumes should be used. A full ADT study was not completed for this study. Table 5-2 shows estimated future ADT for each route segment using the

assumptions noted. Overall, it is estimated A2K study routes would be low volume roads. Traffic may increase during summer months for peak fishing and construction season.

Table 5-2: Estimated Traffic Volumes

Segment	Current ADT	Estimated Future ADT	Design ADT
Aleknagik to Dillingham	260	750	401-2,000
Aleknagik to Koliganek	-	630	401-2,000
Ekwok to New Stuyahok	-	660	401-2,000
New Stuyahok to Koliganek	-	535	401-2,000
Portage Creek to Aleknagik	-	200	<250

Table Notes / Assumptions:

1. ADT estimates shown assume all segments are constructed.
2. ADT estimates are based on 20-year driving population, using 1% growth rate for all communities except New Stuyahok which has a 3% growth rate. This is conservative. Driving age is approximately 20-74 years old.
3. Assumes the following trip frequencies between communities:
    a. Residents of Ekwok and New Stuyahok drive to Dillingham once every 2 weeks.
    b. Residents of Koliganek drive to Dillingham once every 6 weeks, assuming longer road distance will reduce travel frequency compared to Ekwok and New Stuyahok.
    c. Residents drive between Ekwok and New Stuyahok twice per week.
    d. Residents drive between Dillingham and Aleknagik once per week. This aligns with current ADT of driving age population.
    e. Residents of each village (excluding Dillingham and Portage Creek) drive to each village once per month.
    f. 10% of Dillingham residents drive to Portage Creek once per month, for 6 months of the year (during fishing season).
    g. Residents of Dillingham drive to Ekwok, New Stuyahok, and Koliganek 0 times. Although this is not accurate, the above assumptions are conservative and should capture the expected low traffic volume coming from Dillingham.
4. Does not include visitors or transient populations.
5. Trip purposes are described further in the Economic Analysis (Appendix B).

5.1.2 Geotechnical Considerations

Geotechnical considerations for roadway projects generally include site preparation and embankment development, establishing cut and fill slopes, development of roadway structural sections, bridge and culvert foundations, and retaining walls. Other factors such as slope stability, addressing potential settlements, geohazards, constructability, and borrow source availability should also be considered.

Shannon and Wilson (S&W) developed a *Preliminary Geological and Geotechnical Assessment Report* for this study (Appendix D). Existing geotechnical data in the study area is limited. To support future design phases, a phased investigation approach would be beneficial, incorporating additional geologic and geotechnical assessments, detailed terrain and landform mapping, field

reconnaissance, and subsurface explorations such as borings, test pits, and geophysical surveys. These efforts will be essential for refining corridor alignments, evaluating geohazards, and ensuring the feasibility and resilience of the potential route corridor infrastructure.

The study area includes numerous rivers and drainages, boggy areas, rolling hills, local mountainous terrain, and isolated permafrost soils. Primary geologic hazards in the study area related to the development of new roadway corridors include soft and compressible soils, erosion, flooding, landslides, seasonal frost effects, and thaw unstable permafrost. Other potential hazards include seismically induced hazards such as liquefaction and lateral spreading, and ashfall from distant volcanos in the Aleutian-Alaska Range.

Corridor development should consider geotechnical factors that may adversely affect project feasibility, constructability, cost, and long-term performance, including, but not limited to:

- Identifying and avoiding areas that likely contain challenging soil conditions such as wetland areas, boggy terrain, estuarine and tidal deposit areas, and unstable permafrost areas, to the extent possible.
- Prioritizing routes with a higher potential for suitable material sources in proximity to the project to reduce costs since substantial volumes of fill material would be advantageous for roadway construction.

General site condition and preparation steps for roadway design and construction include:

- Clearing and grubbing to remove vegetation and unsuitable organic soils prior to grading and structural section construction.
- Remove organic soils within 4 feet of finished grade in well-drained uplands.
- Organic soils more than 4 feet below finished grade to be left in place in uplands.
- In boggy areas, minimize disturbance to maintain the integrity of the peat mat.
- In boggy areas, vegetation should be cut close to the ground surface to keep the peat mat intact.

Additional typical / structural section and bridge considerations based on geotechnical assumptions are provided in the following sections.

5.1.3 Typical Section

The assumed preliminary typical section for potential route connections consists of:

- Two-way two-lane road, 22 feet wide
- Center crown with 3% cross slope
- Min 2H:1V side slopes in stable upland soils
- 3H:1V or 5H:1V side slope in bog/permafrost areas
- Geotextiles and/or geogrids would provide separation and reinforcement throughout, with geofabric extending 10 feet beyond toe in boggy areas

A two-way one-lane road could be provided if needed to reduce construction costs, however, two-lane roads were assumed for all routes in this study.

5.1.4 Structural Section

The structural section of potential route connections would vary depending on subsurface conditions and terrain. Generally, two preliminary structural sections are assumed, one for upland areas and one for boggy areas, as follows:

- **Upland Areas**
  - 4 inches of E-1 Surface Course over,
  - 20 inches of Modified Selected Material Type B (or better) over,
  - Woven geofabric over,
  - Existing ground

- **Boggy Areas**
  - 4 inches of E-1 Surface Course over,
  - 30 inches of Modified Selected Material Type B (or better) over,
  - Woven geofabric over,
  - Existing ground

5.1.5 Hydrology

Bridges or stream culverts would be required along route connections at river or creek crossings, and drainage culverts and other features would be needed to maintain natural drainage patterns and reduce impacts from stormwater. Preliminary bridge and stream culvert locations are discussed in Section 4.0 and shown on the figures in Appendix E. The figures do not show regular drainage culverts.

A hydrology study during preliminary design would be required to evaluate major water crossings, wetland areas, flood levels, and drainage design requirements. Roadway hydrology features may include, but are not limited to, culverts, arch culverts, bridges, roadside ditches, and erosion protection at areas with higher scour potential.

Additional engineering considerations for bridge and drainage structures include:

- **Bridges**
  - Bridges are typically required at water crossings with a span of 20 feet or more.
  - Deep pile foundation advised at major bridges, embedded to a depth of at least 50 feet for frost protection or deeper.
  - Shallower concrete footing foundations can be considered.
  - Scour depth must be considered.
  - Preliminary bridge design assumes 34-foot-wide bridges with gravel roadway approaches.

- Conventional girder bridge construction is assumed, either steel plate girders or precast/prestressed concrete type bridges installed using cranes with access from both sides.
- Bridge abutments may be steel sheet piles, riprap, gabion baskets, or other, depending on site conditions.





Example single span bridge; Ekwok Landfill Road (Bristol, 2016)

- **Arch Culverts**
  - Arch culverts can be used where there is a desire to maintain the natural steam bed for fish passage at spans less than 100 feet.
  - Foundation requirements depend on actual subsurface bearing conditions at each crossing location.

- **Drainage Culverts**
  - Install minimum 24-inch diameter cross culverts at smaller creeks and drainages.
  - Larger pipes or arch culverts may be required for larger flows or wider channels.
  - Pipes should be found on Selected Material Type A, or other appropriate bedding materials, bearing on firm, unyielding mineral soils.
  - Preload embankments to consolidate organics at least three months before trenching and installation.
  - Bedding should extend at least 12 inches below pipe or half the diameter, whichever is greater.
  - Minimum pipe cover is 2 feet or half the pipe diameter.

5.1.6 Roadway Features

Roadway features can improve the accessibility, safety, and driver experience of the roadway. Some optional roadway features that may be included, depending on cost and community preference, are:

Signs – Signs are used for navigation and to portray rules of the road. The *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) is the national standard for all traffic

control devices. A2K Study routes may consider use of native language signs in addition to English signs. Road signs and markers should be highly reflective for improved visibility along unlit stretches of road. Standard signs for rural connector roads include:

- Regulatory – speed limit, movement prohibition, lane control, vehicle requirements, etc.
- Navigation – mile markers, street names, destination distances, river names, turnouts, etc.
- Intersection – stop, yield, junction, etc.
- Warning – steep grade, curve delineators, animal crossings, hazards, etc.
- Recreation – scenic / cultural viewpoints, recreation site names and access, etc.

Recreation / cultural sites – It is likely that route corridors, particularly between Aleknagik and Ekwok, would open land access to recreation sites that may be developed by other entities. These may include campgrounds, hiking trails, fishing and hunting sites, river or lake access, and more. Signage and access should be provided at known recreational sites. Scenic and cultural viewpoints may also be provided along routes consisting of a vehicle turnout, parking area, informational placards, and other features as desired.



Klutuk Creek and Fred P. Hurley Sr. Memorial Bridge in Ekwok.

Prohibited areas – There may be private lands, native allotments, protected lands, or traditional subsistence areas along the route corridors that are not open to the public. These areas should be identified through community planning and avoided, or provisions such as signage or gates at private access points can be installed to restrict access.

Rest stops – Rest stops with restrooms may be desired along routes longer than 50 miles between communities or longer than 1 hour of driving time.

Turnouts – In addition to turnouts for scenic viewpoints and rest stops, turnouts are required every 1,000 feet along the route in undeveloped areas. Spacing requirements increase to every 500 feet for two-way one lane roads. Turnouts could also be used as bus stops for public transit, if desired.

Lights – Streetlights would likely not be provided along all routes due to cost. However, high-priority routes or intersections may include lighting near existing electrical distribution systems, for example, at junctions near communities. If corridor development includes an electrical intertie from Aleknagik to Ekwok, this may provide opportunity for streetlights along the intertie.

Emergency call boxes – It may be beneficial to place call boxes every 10 miles along the chosen route to improve emergency response. Spacing can be adjusted based on cost and need. Call boxes would likely require a solar panel, battery enclosure, satellite or radio communications (cellular not available), 911/public safety dispatch, and transmission of GPS location with the call.

Guardrails – Guardrails can be installed at bridge approaches, steep embankments, sharp curves, and other areas, as needed.

ATV features – ATVs are commonly used in the region, particularly the villages, for everyday travel both within communities and to surrounding subsistence areas. ATVs are prohibited on Dillingham city streets. However, the route connections may be designed to accommodate ATVs. If there is a desire to allow ATVs to share the road, this needs to be considered in design including operating speeds and signage. Guardrails are not advised for primarily ATV roadways. Alternatively, the routes could include an ATV lane parallel to the main road, and/or ATV access points at established subsistence trails.

Wildlife crossings – Depending on outcomes of environmental studies, wildlife crossings may be desired at select areas along the route to mitigate animal-vehicle collisions and accommodate species movement while ensuring road safety. Wildlife mitigation types include overpasses, underpasses, signage, fencing, animal guards, wildlife detection driver warning systems, and more.

Pedestrian features – Walking paths, crosswalks, and other features would not be required.

5.1.7 Utilities

At this time, the route corridors do not consider utilities. However, there is potential for an electrical intertie between Aleknagik and Ekwok to be developed in conjunction with a road project. This would require further planning and coordination with Nushagak Electric, AVEC, and other local stakeholders.

5.2 Construction Logistics

Construction in rural Alaska can be challenging and costly due to limited access to remote areas, limited availability of local material sources, and limited labor and resources. Careful planning of construction logistics will be required to mitigate project feasibility and cost.

5.2.1 Material Sources

In general, the closer a route is to a material source, the lower the cost to construct due to reduced time, labor, fuel, and equipment to transport material to the project site. It is also possible to import material from elsewhere via barge to communities with riverine access, typically at a higher price.

Material sites may contain pit-run gravel, crushed stone, or hard rock of variable quantity and quality. Existing material sites should be evaluated for types and volumes of borrow available and their suitability for roadway construction in accordance with material specifications. Geotechnical explorations and planning would be required to delineate potential borrow sources and identify development requirements. This may include land acquisition, permitting, removal of overburden, processing such as screening and crushing, and more.

In general, Alternatives 1 and 2 are closer to more existing material sites and potential sites (mountain ranges) than Alternative 3. All alternatives could utilize the existing quarries in

Aleknagik and Ekwok for construction of route segments near those communities. It may be possible to obtain material from the Nushagak River as well, assuming winter extraction. Higher quality aggregate, such as for surface course material, may need to be processed and transported from Dillingham.

5.2.2 Access Constraints

Construction scheduling would be limited to access and seasonal constraints within the study area. Construction season in this area is typically May through October. However, some winter activities may be feasible such as material development, transportation, and staging. Additionally, geotechnical investigations may require frozen ground to mobilize drill rigs over tundra.

Barge and plane access constraints would also affect constructability. Barges can only reach Ekwok when the Nushagak River is ice free. Barges can rarely reach New Stuyahok and Koliganek due to low water levels. It may be possible to mobilize some equipment and materials via plane, however, runways in Ekwok, New Stuyahok, Koliganek and Portage Creek are not long enough to safety accommodate a fully loaded Lockheed C-130Q Hercules (155,000 pounds). If equipment is transported by plane, it would likely need to be shipped in pieces and assembled in the community. Often, equipment could be left in a community if it cannot easily be transported back.

Assuming the connection to Aleknagik is desired and given both existing and potential material sources are available near Aleknagik, it is likely the route construction would begin in Aleknagik and be built towards Ekwok to at least a halfway point. With barge access, Ekwok would be a feasible starting point for route construction towards both Aleknagik and New Stuyahok.

5.2.3 Labor Resource Availability

Another challenge for route construction would be labor, equipment, and housing availability.

Overall, construction labor availability statewide is limited, but a project of this size would still likely receive several construction bids. However, the use of local (force account) labor to supplement the project would support local job opportunities and benefit the communities. It is typical for rural communities in Alaska to have at least a small crew of trained operators and laborers available for local projects. Local crews may require additional training, tools, gear, and supplies. A prime contractor is may help manage the overall project schedule and budget, but the contract could include local labor hire stipulations.

Similarly, local equipment is limited. Each community likely has a fleet of heavy equipment owned by the Tribe or City, but additional equipment would be required for the project.

Construction crews would need to carefully consider housing availability in each community. There are no known lodging options to support a full outsourced construction crew in Ekwok, New Stuyahok, Koliganek and Portage Creek. Housing options in Dillingham may also be limited, especially in summer, when demand is high during fishing season. It is possible that mobilized labor camps would be required to support crews throughout the project.

5.3 Environmental and Cultural Considerations

This section summarizes key environmental considerations and requirements that could influence the location, design, construction, operation, and overall feasibility of potential routes between Aleknagik and Koliganek.

5.3.1 Wetlands and Fish Habitat

Wetlands and aquatic habitats represent one of the most significant environmental constraints within the study area. Available mapping indicates that portions of the study area contain wetlands, however, much of the corridor remains unmapped. Field conditions suggest that wetlands and saturated soils may be far more extensive than currently documented.

Table 5-11 lists the potential effects of roadway construction on wetlands and aquatic resources as well as possible avoidance and mitigation strategies.

Table 5-3: Wetlands Impacts and Avoidance Strategies

Potential Impacts	Potential Avoidance and Mitigation Strategies
• **Direct wetland fill and disturbance:** Placement of roadway embankments, culverts, or bridge abutments may result in the loss or alteration of wetland areas within the construction footprint. • **Hydrological alterations:** Road embankments can modify natural drainage patterns, potentially altering surface water flow, groundwater movement, and wetland connectivity. • **Sedimentation and water quality impacts:** Construction activities such as grading, excavation, and equipment operation near waterways may increase erosion and sediment delivery to streams and lakes. • **Stream crossing impacts:** Culverts or other structures placed at stream crossings may alter channel morphology or impede fish passage if improperly designed.	• Aligning the roadway to avoid major river systems and mapped anadromous streams where feasible. • Locating crossings at narrow, stable sections of streams to minimize disturbance. • Spanning larger rivers or floodplain channels with bridges where appropriate. • Reducing the roadway footprint in wetland areas through alignment refinement or design adjustments. • Limiting construction staging areas and access routes within riparian zones. • Scheduling in-water work during approved timing windows established to protect fish spawning and migration periods. • Installation of fish-passable culverts designed to meet ADFG fish passage standards. • Use of open-bottom arch culverts or bridges where appropriate to maintain natural stream substrates and channel processes. • Proper sizing of culverts to accommodate bankfull flows and reduce the risk of blockage or overtopping. • Installation of erosion protection and bank stabilization measures at inlet and outlet locations. • Restoration of temporarily disturbed wetland areas following construction.

Potential Impacts	Potential Avoidance and Mitigation Strategies
	• Implementation of stormwater and erosion control measures during constructions. • Adhere to all environmental regulations and permitting requirements.



Salmon passage (NMWC, 2007)

Avoidance of sensitive wetlands and aquatic habitats would be beneficial during route selection and design. Where stream crossings cannot be avoided, design considerations will be necessary to maintain aquatic habitat connectivity and fish passage.

More detailed wetland delineation and aquatic habitat assessments would be required during future project development to quantify potential impacts and determine mitigation requirements.

In general, Alternative 3 has the fewest river / creek crossings, while Alternatives 2 and 3 are assumed to have the lowest impact on wetlands based on aerial imagery and limited NWI mapping data.

5.3.2 Wildlife

New route corridors through undeveloped wilderness have the potential to impact regional wildlife. While preliminary review through the USFWS IPaC system indicates that no federally listed endangered species are expected to occur within the study area, wildlife resources may still present constraints to project development. Species of particular concern include Steller's Eiders (listed as threatened under the Endangered Species Act), the Mulchatna Caribou Herd, and bald eagles as discussed in Section 3.4. Table 5-4 lists the potential effects of road construction on local wildlife as well as possible avoidance and mitigation strategies.

Table 5-4: Wildlife Impacts and Avoidance Strategies

Potential Impacts	Potential Avoidance and Mitigation Strategies
• **Habitat disturbance and fragmentation:** Vegetation clearing and roadway construction could result in localized loss of habitat within the project footprint. • **Movement disruptions:** Linear infrastructure such as roads may influence wildlife movement patterns, particularly for wide-ranging species such as caribou or moose. • **Increased human access:** New transportation infrastructure may increase	• Aligning the roadway to avoid known concentration areas or seasonal migration corridors where possible. • Maintaining natural terrain features and minimizing barriers along the corridor. • Maintaining open roadside conditions in areas where wildlife crossings are likely to occur. • Installing wildlife crossing signage in areas with frequent animal movement.

Potential Impacts	Potential Avoidance and Mitigation Strategies
access to previously remote areas, which could affect wildlife behavior or harvest pressure. • **Construction disturbance:** Noise, vehicle traffic, and human activity during construction may temporarily displace wildlife from nearby habitats. • **Wildlife collisions:** Vehicle traffic would likely result in collisions with wildlife including small and large mammals and birds. This is a safety risk for both humans and animals.	• Considering wildlife crossing structures (overpass or underpass) where appropriate. • Avoid fencing that could restrict animal movement unless necessary for safety purposes. • Conducting vegetation clearing outside of the primary bird nesting season where feasible. • Preforming pre-construction nest surveys in areas with potential for suitable habitat. • Establishing protective buffers around active nests if discovered during project development.

The study area lies within the range of the Mulchatna Caribou Herd. Although the direct footprint of a roadway would represent a small portion of the herd's overall range, a new corridor could intersect seasonal travel routes or foraging areas. Caribou responses to linear infrastructure vary and may depend on road design, traffic levels, and the location of the alignment relative to seasonal migration patterns. Wildlife crossing structures such as overpasses or underpasses are becoming more common in the contiguous US but are not typical for rural roads in Alaska. Although this is an innovative strategy worth considering, it could greatly increase project costs.

Because wildlife movement patterns vary seasonally and from year to year, detailed wildlife studies would likely be required during project development to identify migration routes, calving area, and important habitat locations.

Generally, all routes may have similar impacts to wildlife. However, routes through forested terrain have a higher potential to impact bald eagle nests during construction clearing activities. Additionally, wildlife collisions may be more common through forested areas due to the higher concentration of animals and a narrower line of sight with trees bordering the road. Alternative 1 involves the least mileage through forested terrain compared to other routes.

5.3.3 Cultural Resources

Communities along the Nushagak River have long-standing cultural ties to the surrounding landscape. Cultural resources within the study area may include archaeological sites, historic travel routes, traditional camps, and areas associated with subsistence use. Although this feasibility study does not include a detailed resource inventory, the potential exists for previously undocumented archaeological sites along riverbanks, lakeshores, and historic travel corridors. Table 5-5 lists the potential effects of road construction on cultural resources as well as possible avoidance and mitigation strategies.

Table 5-5: Cultural Resource Impacts and Avoidance Strategies

Potential Impacts	Potential Avoidance and Mitigation Strategies
• Excavation or grading that disturbs archaeological deposits. • Alteration of landscapes associated with traditional use. • Increased access to previously remote cultural sites. • The potential for inadvertent discovery or disturbance of prehistoric or historic sites during construction activities. • Impacts to subsistence practices by altering travel routes, changing patterns, or affecting wildlife distributions.	• Incorporating cultural resource data into alignment screening and route selection. • Avoidance of areas with high or moderate potential to contain cultural resources. • Conducting cultural resource surveys prior to final design. • Adjusting the alignment to avoid known archaeological sites where feasible. • Establishing protective buffers around identified sites. • Conduct archaeological documentation or data recovery if avoidance is not feasible. • Provide on-site archaeological monitoring during construction within sensitive areas. • Maintaining access to existing river crossings, trails, and harvesting areas where feasible. • Designing roadway connections or pullouts that support continued access to subsistence use areas. • Coordinating with local communities and Tribal governments during project planning.

Avoidance of known cultural resource locations is typically the ideal management strategy. Prior to construction, a formal cultural resource inventory and consultation process would be required to identify and evaluate historic properties that may be affected by the project. Consultation with Tribes and regulatory agencies would be required to ensure compliance with applicable cultural resource protection laws.

Overall, Alternative 2 appears to traverse more terrain with a low potential to impact cultural resources than other alternatives.

5.3.4 Climate, Climate Change, and Natural Hazards

Climate considerations and climate change trends present potential constraints for roadway construction and long-term infrastructure performance within the study area. Climate-related impacts and potential avoidance strategies are summarized in Table 5-6.

Table 5-6: Climate-Related Impacts and Avoidance Strategies

Potential Impacts	Potential Avoidance and Mitigation Strategies
• **Permafrost thaw and ground instability:** Thawing permafrost can lead to settlement, frost heave, and reduced structural stability for road embankments. • **Changing hydrology:** Increased precipitation, altered runoff patterns, and thawing soils may affect drainage systems and increase erosion risk. • **Seasonal construction limitations:** Short construction seasons and variable ground conditions may limit the period available for earthwork and heavy equipment operations. • **Increased maintenance requirements:** Freeze-thaw cycles and warming temperatures may increase roadway maintenance needs over time. • **Flooding hazards:** Natural floodplains adjacent to water bodies have the potential to cause road washouts during severe events. • **Avalanche and rockslide hazards:** Avalanche and rockslide hazards may be present along steep mountain faces, increasing the potential for roadway damage and human safety risks.	• Design roadway embankments to account for potential permafrost thaw and ground settlement. • Installing adequate drainage infrastructure to maintain natural hydrologic flow patterns. • Utilizing geotextiles, insulation layers, or other engineering methods where permafrost is present. • Selecting alignments that avoid areas of highly unstable or poorly drained soils when possible. • Avoiding routes through flood plains to the greatest feasible extent and including design features to mitigate flood impacts such as elevated embankments or erosion protection. • Avoiding possible avalanche or landslide areas as feasible and install appropriate signage through hazard areas.

The presence of floodplains, avalanche/rockslide zones, and permafrost is unknown. Further evaluation would be required through geotechnical investigations and hydrology studies. A preliminary analysis indicates each route may be impacted differently by climate conditions. For example, Alternative 2 appears to traverse fewer potential floodplain areas, while Alternative 3 avoids mountainous terrain where avalanche/rockslide risks may be present. Both Alternatives 1 and 2 have a lower potential of encountering permafrost.

5.3.5 Environmental Permitting

Regardless of alignment, NEPA processes and environmental permitting would be required for route development. The level of review and specific permits will depend on the selected alignment, federal funding and permitting nexus, affected resources, and anticipated construction activities. Below are the preliminary anticipated environmental requirements:

- **Environmental Assessment (EA)** – At a minimum, an EA would likely be required if the project involves federal funding or another federal action, subject to the lead federal agency's NEPA procedures and determination of the appropriate level of review. The process will evaluate alternatives, including the No Action Alternative, potential

environmental impacts, and mitigation measures. An Environmental Impact Statement (EIS) may be required if significant impacts are anticipated.

- **Tribal Consultation and Community Engagement –** Engage potentially affected federally recognized Tribes, Alaska Native corporations, landowners, and local governments throughout project planning and environmental review. Document consultation activities, concerns raised, and how feedback informs alignment selection and project design.
- **Section 404 Wetlands Delineation and Permitting –** Conduct a wetlands and other waters delineation within the proposed project corridor and other areas of potential disturbance. Obtain a U.S. Army Corps of Engineers (USACE) Section 404 permit for the discharge of dredged or fill material into jurisdictional waters of the United States, including applicable wetlands. Evaluate individual versus general permit eligibility, avoidance and minimization measures, compensatory mitigation requirements, and associated Section 401 water quality certification requirements.
- **Section 401 Water Quality Certification –** Coordinate with the Alaska Department of Environmental Conservation (ADEC) to determine whether Section 401 certification or a waiver is required in association with a federal permit or license that may result in discharges to waters of the United States.
- **Floodplain Development and Navigable Waters –** Adhere to federal navigable-waterway requirements, including USACE Section 10 authorization and state floodplain development approvals.
- **Threatened and Endangered Species Consultation –** If a federal action may affect listed species, coordinate with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS), as applicable, to complete Endangered Species Act Section 7 consultation.
- **Essential Fish Habitat (EFH) Consultation –** If the project may adversely affect federally managed fish species or their essential fish habitat, coordinate with NMFS to assess potential effects of stream crossings, sedimentation, culverts, and aquatic habitat and mitigation requirements.
- **Fish Habitat Permits –** Coordinate with the Alaska Department of Fish and Game (ADF&G) regarding fish habitat permits and applicable requirements related to crossings at fish-bearing waters.
- **Migratory Birds, Eagles, and Other Wildlife –** Assess potential effects on migratory birds, nesting habitat, bald and golden eagles, and other sensitive wildlife. Identify seasonal restrictions, buffer zones, and other avoidance measures, and determine whether additional consultation or permits are necessary.
- **Section 106 Cultural Resources and Historic Properties –** Conduct archaeological and cultural resource surveys to identify historic properties, archaeological sites, and other cultural resources. Coordinate with the State Historic Preservation Office (SHPO), affected Tribes, Alaska Native corporations, and the federal lead agency to support

compliance with Section 106 of the National Historic Preservation Act. Develop avoidance measures or treatment plans if resources may be affected.

- **Floodplain and Hydrologic Assessment –** Determine whether Executive Order 11988 floodplain requirements or other applicable federal floodplain review procedures apply, and incorporate appropriate drainage and flood resilience measures into design.
- **Stormwater, Erosion, and Sediment Control –** Develop erosion and sediment control measures for road construction, borrow sites, embankments, stream crossings, and staging areas. Determine whether an Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit is required for stormwater discharges associated with construction activities, and prepare a Stormwater Pollution Prevention Plan (SWPPP).
- **Material Sites and Borrow Sources –** Obtain material-site approvals, land use authorizations, reclamation plans, and water use permits as required for extraction, hauling, stockpiling, and rehabilitation of proposed borrow sites.
- **Water Use Authorization –** Obtain temporary water use authorizations for construction, dust suppression, or other purposes from the Alaska Department of Natural Resources (ADNR), Division of Mining, Land and Water.
- **Land Use and State/Federal Agency Authorizations –** Coordinate with the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service, National Park Service, ADNR, or other applicable land managers based on the alignment and land status.

Other environmental consultation, permits, or requirements may be required. Additional information will be provided in the Environmental Report with the Final-Draft A2K Study.

5.4 Economic and Social Impacts

Economic and social impacts will be discussed in the Final-Draft A2K Study after alternatives are reviewed with Study Stakeholders.

5.4.1 Travel Time

Travel-time estimates were developed as part of the alternative evaluation to assess connectivity and travel efficiency between the communities. A consistent assumed average driving speed of 45 mph was used to estimate travel times for residents, freight, and service vehicles. The resulting travel times for each alternative are summarized in Table 5-7.

Table 5-7: Alternative Travel-Time Comparison

From ↔ To	Alternative 1: Central Route		Alternative 2: Northern Route		Alternative 3: Southern Route	
	Distance (mi)	Travel Time (hr)	Distance (mi)	Travel Time (hr)	Distance (mi)	Travel Time (hr)
Dillingham ↔ Aleknagik	24	0.6	24	0.6	24	0.6
Dillingham ↔ Ekwok	83	1.9	100	2.3	94	2.1
Dillingham ↔ New Stuyahok	95	2.2	98	2.2	105	2.4
Dillingham ↔ Koliganek	117	2.7	96	2.2	127	2.9
Dillingham ↔ Portage Creek	75	1.7	142	3.2	77	1.8
Aleknagik ↔ Ekwok	59	1.4	75	1.7	70	1.6
Aleknagik ↔ New Stuyahok	70	1.6	74	1.7	80	1.8
Aleknagik ↔ Koliganek	93	2.1	71	1.6	103	2.3
Aleknagik ↔ Portage Creek	50	1.2	117	2.7	53	1.2
Ekwok ↔ New Stuyahok	11	0.3	11	0.3	11	0.3
Ekwok ↔ Koliganek	34	0.8	45	1	33	0.8
New Stuyahok ↔ Koliganek	22	0.5	43	1	23	0.6

Notes:

1. Travel distances were rounded to the nearest mile, travel time in minutes was rounded to the nearest minute, and travel time in hours was rounded to the nearest tenth.
2. Since route lengths are preliminary, actual routes would be longer once refined based on terrain. Therefore, travel distance was increased by 10% for the travel time estimate.

Travel times vary by community connection and roadway alignment. Alternative 1 provides the shortest travel times from Aleknagik to all study communities except Koliganek. Alternative 2 provides the shortest travel time from Aleknagik direct to Koliganek, but the longest travel time to Portage Creek. Estimates are based on preliminary route lengths increased by 10 percent to account for potential refinements during design.

Lower travel times would improve the movement of people and goods and reduce costs associated with fuel consumption and travel time.

5.4.2 Freight Movement and Transportation Costs

A route connection between communities within the study area would provide an alternative to existing air and seasonal marine freight services, potentially improving delivery flexibility and access to heavy equipment, construction materials, and other supplies. Freight transported by road would likely originate in Dillingham and travel through Aleknagik before continuing to the other study communities. Depending on the route, travel distances would range between approximately

62 to 94 miles for the longest segment. A route connection could improve year-round access to bulk supplies and reduce transportation costs, as well as reduce reliance on weather dependent air freight and seasonal barge deliveries. However, potential cost savings would depend on freight volumes, vehicle and fuel costs, road conditions, maintenance requirements, and the existing rates and availability of air and marine freight services.

Based on the preliminary economic analysis, the potential route connections could reduce the cost of intercommunity travel compared with current air transportation. For example, a round-trip flight from Dillingham to Koliganek currently costs approximately $200 per person, while estimated round-trip driving costs range from approximately $78 to $105 per vehicle, depending on route lengths and fuel costs. These preliminary estimates suggest potential cost savings for residents, particularly when traveling with multiple passengers. If an individual made five trips to Dillingham per year, a route connection could save upwards of $600 on travel costs. Actual savings would depend on fuel prices, vehicle operating and maintenance costs, road conditions, and the number of occupants per vehicle. See the Economic Analysis in Appendix B for additional information.

Given the long distances involved and high regional fuel costs, further analysis of freight demand, shipment types, delivery costs, and operating expenses would be needed to determine whether a road connection could reduce overall transportation costs and how any savings might affect local business and household expenses.

5.4.3 Economic Development

A route connection could support economic development throughout the study area by improving access to construction materials, equipment, contractors, suppliers, and regional employments opportunities. More reliable surface transportation could help address logistical challenges associated with developing new housing and construction, repair, and maintenance of community infrastructure including sanitation systems, public facilities, and utilities. Road access could also create temporary employment during construction and ongoing opportunities for roadway maintenance and related services. Local hiring, workforce training, and contracting opportunities help communities capture some of these economic benefits. However, the extent of potential cost savings, employment opportunities, and effects on housing affordability would depend on freight rates, fuel and operating costs, construction methods, local workforce availability, and the long-term cost of maintaining the roadway.

Improved connectivity could also create greater regional coordination and resource sharing. Ekwok and New Stuyahok, which are approximately 10 miles apart, may have a particular potential to evaluate shared or coordinated services. During the first round of public engagement, New Stuyahok participants identified the possibility of sharing resources such as an airport, with Ekwok suggested as a potential location.

Maintaining small community schools is another important consideration for regional development. Alaska's school funding formula states that a public school with fewer than 10 students will lose full finding and, after a set period, will be required to close (Alaska Department of Education & Early Development [ADE&ED], 2023). When enrollment is low, school closures can affect families' ability to remain in a community and can have broader implications for

community viability. Improved connections between nearby communities could create opportunities to evaluate shared educational resources and travel arrangements, where feasible.

The Economic Analysis in Appendix B provides additional information on regional living costs, employment wages, and economic conditions. Further analysis is needed to determine the feasibility and potential benefits of specific regional development opportunities.

5.4.4 Recreation and Tourism

There is potential for development of new recreation and tourism sites within the study area, although plans or desires for development are unknown and require additional community input. These may include:

- Hiking trails or campgrounds near mountain ranges, including but not limited to:
  - Marsh Mountain
  - Muklung Hills
  - Okstukuk Hills
  - Kemuk Mountain
- Campgrounds, subsistence fish camps, commercial fishing lodges, fly fishing or dip net fishing sites, etc. at fish bearing rivers and creeks, including but not limited to:
  - Nushagak River
  - Muklung River
  - Little Muklung River
  - Iowithla River
  - Koklong Creek
  - Kokwok River
  - Klutuk Creek
- Campgrounds, lodges, or public boat launches at lakes, including but not limited to:
  - Okstukuk Lake

Although Nerka Lake and other potential recreational sites may be considered within the Wood-Tikchik State Park, it is highly unlikely public roads would be approved through the park.

Route connections have the potential to increase recreation and tourism within the study area, potentially bringing economic revenue to communities. Potential recreation and tourism opportunities will be evaluated in the Final-Draft based on community input.

5.4.5 Safety

A route connection between communities in the study area could improve emergency response by providing additional means of transporting first responders, medical personnel, injured patients, equipment, and supplies between communities. Improved overland access could be particularly beneficial when adverse weather, seasonal river conditions, or limited aircraft availability would otherwise delay travel. A road could also reduce reliance on small aircraft for some intercommunity trips, potentially reducing exposure to aviation-related risks for those trips.

Similarly, a maintained roadway could provide an alternative to certain ATV and snowmachine routes, where winter conditions, changing ice, poor visibility, and limited trail marking create safety concerns. However, the extent of these benefits would depend on seasonal conditions, roadway maintenance, and the ability of emergency services to use the route.

During public outreach, community members raised concerns about potential social and safety impacts associated with increased connectivity, including drugs and alcohol, property crime, and trespassing. These concerns warrant consideration. Improved access could help emergency responders reach incidents more efficiently, but a road could also increase outside access to communities and surrounding lands. Access management, clear property boundaries and signage, community coordination, and appropriate law enforcement and emergency response may help address these concerns. The potential effects of increased connectivity should continue to be evaluated with the communities.

Road design and operations would also need to address vehicle-related safety concerns, including increased truck traffic and dust from unpaved road surfaces. Using spur roads to connect to the communities would keep any through-traffic away town and lessen the impacts of dust and conflicts with pedestrians, ATVs, and other local road users. Roadway design, speed management, routine grading and maintenance, and appropriate dust control measures could further reduce these impacts.

5.4.6 Access to Services

An established route connection between the upper study communities and Aleknagik could improve access to essential services in Dillingham, the regional hub for healthcare, shopping, education, employment, and government services. Residents currently rely on air travel, boats, ATVs / snowmachines, and other seasonal transportation methods to reach services outside their communities. An overland connection could provide an additional travel option and make it easier to access medical appointments, pharmacies, groceries, educational opportunities, employment, court proceedings, and Department of Motor Vehicles (DMV) services. Improved access would continue to depend on road conditions, weather, and vehicle availability.

Healthcare access is a particularly important consideration. Kanakanak Hospital in Dillingham provides inpatient and outpatient care, emergency services, pharmacy services, and other regional healthcare services. However, labor and delivery services are not offered, and expecting mothers are generally referred to facilities in Anchorage for childbirth. A route connection to Dillingham would not by itself eliminate the need for this travel to Anchorage. However, improved regional access could make it easier for residents to reach existing healthcare services and could support future opportunities if regional maternity care services change or expand. More broadly, improved connectivity could help residents access routine and specialized care, potentially reducing some of the transportation challenges associated with obtaining healthcare in rural Alaska.

5.4.7 Cultural and Social Impacts

A route connection between the upper study communities and Aleknagik could improve access to subsistence areas and traditional use areas. Improved connectivity could provide additional

flexibility for traveling between communities and reaching family members, cultural activities, community and school events, and other gatherings. These opportunities are important in a region where subsistence activities support not only food security, but also cultural continuity, the sharing of traditional knowledge, and connections between generations. The extent of these benefits would depend on the route's alignment, access to surrounding lands and waterways, and the locations of important traditional use areas.

At the same time, a new road could change established travel patterns and affect traditional lifestyles. Increased outside access may raise concerns about trespassing, disturbance of subsistence activities, pressure on wildlife and other resources, and changes to the character of rural communities. The potential impacts on culturally important sites should be further evaluated in coordination with the Tribes and community members.

5.4.8 Tribal Sovereignty and Community Independence

As discussed above, establishing route connections between currently isolated rural communities in Alaska could gradually change transportation patterns, affect wildlife and subsistence practices, and alter certain aspects of daily life. However, these changes are unlikely to occur all at once, and the extent of their effects would depend on the location, design, access policies, and long-term management of the road, as well as the priorities of each community.

For many rural Alaska communities, limited transportation options contribute to high costs for essential goods, housing, utilities, and travel to medical care, education, employment, and other services. Communities also face challenges associated with limited local employment opportunities, declining populations, and reliance on outside funding to maintain essential infrastructure and services. These conditions can place long-term pressure on community viability and economic sustainability. Improved surface transportation could help address some of these challenges by reducing transportation barriers, improving access to regional services and markets, supporting local employment and business development, and increasing opportunities for residents to travel between communities.

Tribal sovereignty and community self-determination must therefore remain central to transportation planning. A road connection should not be viewed as an end in itself, nor should improved access require communities to compromise their cultural identity, subsistence practices, or authority over their own priorities. Rather, connectivity may provide additional options for communities to pursue their economic, social, and cultural goals on their own terms. Meaningful Tribal consultation and community-led decision-making throughout planning, design, and implementation are essential to identifying desired outcomes, addressing concerns, and determining appropriate access controls and protections.

Ultimately, road connectivity represents a potential opportunity to strengthen community resilience and independence by expanding transportation choices and access to resources. Its long-term value will depend on whether the connection responds to locally identified needs, protects important cultural and subsistence resources, and provides benefits that communities can sustain and control over time. The objective should not be to change the character of rural communities,

but to expand their options for maintaining vibrant, self-determined communities for future generations.

5.5 COMMUNITY AND TRIBAL ENGAGEMENT COMMENTS

This section discusses the initial feedback from study area communities. It is important to note community and stakeholder input may differ from technical study findings. Feedback is presented in general terms, although sentiment of individuals may vary. Additionally, these statements do not represent conclusions or decisions on behalf of any stakeholder. Complete community meeting summaries are provided in Appendix A.

5.5.1 Community Sentiment

During the first round of public engagement, the participation levels and community sentiment during the public meetings varied by location. The following gives an overview of each public meeting.

Ekwok: Community members engaged in a broad discussion of opportunities and challenges associated with a potential road connection. Participants identified potential benefits such as reduced cost of living, improved access to healthcare and education, and expanded economic opportunities. Concerns focused on environmental impacts, maintenance costs, and potential external influences on the community, including increased alcohol and drug access.

New Stuyahok: Discussion emphasized both interest in improved regional connectivity and concern about broader impacts. Many participants expressed support for connecting to nearby communities (Ekwok and Koliganek), particularly to improved reliability of goods movement when barge services are limited. However, there was notable concern about extending a connection to Aleknagik, including potential social impacts and association with other development projects. Concerns about environmental change, subsistence impacts, public safety, and increased alcohol and drug access were also raised.

Koliganek: Community members expressed strong opposition to the concept of a road connection. A community vote conducted during the public meeting indicated a clear majority against road connections to nearby communities, with approximately 91% of the participants showing opposition to a road connection. Concerns centered on protection of subsistence resources, environmental integrity, community autonomy, and potential social impacts such as increased drug and alcohol access. Participants also raised concerns About the study initiation process and emphasized the importance of local decision-making authority.

Aleknagik: Participants discussed both potential benefits and concerns, with focus on regional connectivity and existing transportation challenges. Benefits identified included reduced travel costs, improved emergency response access, and expanded subsistence opportunities. Concerns included increased traffic, social impacts, jurisdictional challenges, and environmental effects. Aleknagik is already dealing with issues of overcrowded parking areas and boat launches, and increased traffic through the community could exacerbate these issues. Participants also

emphasized the importance of preserving traditional travel routes and incorporating local knowledge into planning.

5.5.2 Key Concerns Raised by Communities

Across all engagement activities, several key concerns emerged consistently:

Environmental and Subsistence Impacts: Communities expressed concern about potential impacts to wetlands, rivers, wildlife, and subsistence resources. Protecting fish and game populations, maintaining water quality, and preserving access to traditional hunting, fishing, and gathering areas were identified as critical priorities.

Social and Public Safety Concerns: Many participants raised concerns about increased access to drugs and alcohol, impaired driving, and broader social changes associate with increased connectivity. Impacts on community safety, particularly for youth, were frequently discussed.

Loss of Local Control and Outside Influence: Concerns were raised about increased access by non-local individuals and potential development pressures. Some participants emphasized the importance of maintaining local governance over land and resources.

Economic Uncertainty: While potential cost reductions for goods and services were discussed, some communities questioned whether these benefits would materialize. Concerns about long-term road maintenance costs and funding responsibilities were also common.

Process and Trust: In some communities, particularly Aleknagik and Koliganek, participants expressed concern about how the study was initiated and emphasized the need for transparent, community-driven decision-making processes.

Equity and Access: Equity considerations were central to many community discussions. Participants highlighted disparities in access to healthcare, education, employment, and essential goods. A potential roadway was viewed by some as a means to improve access and reduce costs, particularly during periods when air or river travel transportation is limited. At the same time, concerns were raised that increased access could disproportionately impact smaller or more vulnerable communities through social disruption or resource competition. Ensuring that benefits are equitably distributed was identified as a critical consideration, and that communities retain control over how and whether development occurs. Participants also emphasized the importance of local hire opportunities and ensuring that economic benefits remain within the region.

5.5.3 Community Identified Priorities and Route Preferences

Community priorities varied across the study area:

- **Ekwok and New Stuyahok:** Interest in improved regional connectivity, particularly between neighboring upriver communities. Some participants expressed a preference for partial connections (e.g., between Ekwok and New Stuyahok, and potentially Koliganek) rather than a full connection to Aleknagik.

- **Koliganek:** Strong preference for no road connection. Protection of subsistence lifestyle, environmental resources, and community autonomy were identified as top priorities.
- **Aleknagik:** Interest in improved transportation efficiency and safety, with emphasis on incorporating community input, maintaining traditional routes, and addressing local infrastructure needs.
- **Portage Creek:** No input has been received.

Discussions of potential alignments to date were general in nature, with emphasis placed on avoiding sensitive environmental areas and respecting cultural and historical resources. More detailed route preference discussions will occur during the second round of public engagement and be addressed in the Final-Draft A2K Study.

5.6 Cost Analysis

A planning-level cost analysis was performed to evaluate and compare the three conceptual route alternatives. This section discusses cost assumptions, rough order of magnitude capital construction costs, anticipated operations and maintenance (O&M) requirements, life-cycle cost considerations, and cost related uncertainty and risk.

5.6.1 Major Cost Drivers

Generally, for this study, major cost drivers are shown below, giving an idea of how alternatives are anticipated to compare:

Table 5-8: Major Cost Drivers

Alternative	1 – Central	2 – Northern	3 – Southern
Cost Driver	**Relative Effect on Cost**		
Route Length	High	Very High	High
Bridges / Stream Crossings	Low	High	Medium
Boggy Areas	High	High	High
Permafrost	Medium	Low	Low
Distance to Borrow Material	Low	Low	High
Overall Cost Score	**Medium**	**High**	**Medium**

For this study, bridge costs assume conventional remote Alaska construction methods will be utilized with limited temporary works. Preliminary bridge costs by span length are shown in Table 5-9. Cost estimates assume normal stream crossings and no unusual marine exposure for bridges, and a typical width of 34-feet. Foundation costs assume typical driven pile or shallow foundation systems with moderate embedment depths. Long-span bridges greater than 500 feet are considered complex, therefore, costs of these bridges are highly uncertain.

Table 5-9: Estimated Bridge and Arch Culvert Costs by River/Creek Span Length

Span Length (Feet)	Cost Per Square Foot	Span Length (Feet)	Cost Per Linear Foot
Bridges		Arch Culverts	
≤ 75	$750	3-9	$2,000
76–150	$950	10-12	$2,600
151–300	$1,800	13-15	$4,000
301-500	$2,250	16-19	$5,300
> 500 or complex bridge	$5,000 (high uncertainty)	20+	Bridge assumed

Notes:

1. Bridge and structural arch plate culvert costs are estimated based on historic costs for other projects in Alaska.
2. Assume typical bridge width of 34 feet.
3. Assume typical culvert length of 60-feet, although lengths would vary by crossing.

The preliminary routes avoid wide river crossings, with the maximum crossing length being Bridge 5 at Kokwok River, approximately 200 feet long. If the need for longer bridges is identified during route design, these are high uncertainty / high-cost variability crossings and costs could easily vary by 50 percent or more. Costs may increase substantially where extended access construction, in-water cofferdams, or specialized erection methods are required. Sites requiring deep foundations, specialized pile systems, or significant scour mitigation may experience substantial cost increases.

Overall, reducing route length, minimizing total bridge crossings and span length, avoiding boggy and permafrost zones, and prioritizing routes with high potential to yield borrow material will be critical to reducing costs. In general, routes farther north and farther away from the Nushagak River are anticipated to have smaller but more creek crossings. Permafrost potential increases in the southeastern region of the study area, except immediately adjacent to the Nushagak River. Large boggy areas and wetlands appear to be present along all route options and are challenging to avoid. Mountains and hills with a high potential to contain aggregate resources are only available in the northwestern portion of the study area.

5.6.2 Capital Cost Estimates

Rough order of magnitude (ROM) capital costs were estimated using preliminary design assumptions, route length, number/size of bridges, and distance to existing or potential borrow sites, as shown in Table 5-10. Capital costs include design, permitting, construction, construction administration (CA), and mobilization costs.

Costs are provided for full alternatives. Specific connections between communities can be evaluated individually after feedback is received from the second round of public engagement.

Table 5-10: ROM Capital Cost Estimate Summary

Alternative	1: Central	2: Northern	3: Southern	
Length (Miles)	106	129	106	
ROW, 100-ft wide (Acres)	1285	1564	1285	
Budget Item	**ROM Capital Cost**			**Assumptions**
Permitting / Design				
Cultural Resources/Permitting	$12,720,000	$15,480,000	$12,720,000	$120,000 / mile
Geotechnical Investigation	$169,368,000	$205,892,000	$169,368,000	See note 1
Land Surveying	$14,840,000	$18,060,000	$14,840,000	$140,000 / mile
Wetlands/NEPA/Permitting	$19,080,000	$23,220,000	$19,080,000	$180,000 / mile
Engineering Design	$71,144,000	$84,568,000	$67,175,000	12% of Construction
Subtotal	$287,152,000	$347,220,000	$283,183,000	
Construction				
Right-of-Way Acquisition	$6,424,000	$7,818,000	$6,424,000	$5,000/ac, see note 2
Road Construction	$564,953,000	$674,969,000	$529,127,000	See note 3
Bridge / Arch Culvert Construction	$21,487,000	$21,947,000	$24,239,000	See note 4
Subtotal	$592,864,000	$704,734,000	$559,790,000	
Contingency	**$264,004,800**	**$315,586,200**	**$252,891,900**	**30% of Total**
Total ROM Cost	**$1.14 Billion**	**$1.37 Billion**	**$1.10 Billion**	
Approximate Cost Per Mile	*$10.8 Million*	*$10.6 Million*	*$10.3 Million*	

Notes / Assumptions:

1. Geotechnical investigation includes drilling boreholes at select areas along the alignment to identify subsurface conditions required for road section and bridge foundation design. Will require clearing in forested areas. May occur any time of year. Will require helicopters to transport crews and equipment to remote areas.
2. ROW includes purchase of land and appraisals, landowner coordination, mapping, easement development, etc.
3. Road construction includes mobilization, clearing, geotextile fabric, mining and placement of base and surface course, drainage culverts (12-36" diameter), topsoil and seeding, signage, housing and per diem, management, stormwater and erosion control, and testing.
4. Assumed normal stream crossings and no unusual marine exposure for bridges. Assume typical bridge width of 34-feet and arch culvert length of 60-feet. Cost varies by span length (see Table 5-9 and Table 5-9).

5.6.3 Operations and Maintenance Costs

Understanding maintenance requirements of the route connections is one of the most critical factors in determining feasibility of the route connections. Annual maintenance would be required to maintain the facilities in a state of good repair.

General gravel road maintenance varies by season in Alaska, as follows:

Table 5-11: General Maintenance Requirements

Activity	Season / Frequency	Equipment Required
Grading	Summer / annually	Motor grader, water truck
Ditch and culvert clearing	Summer / annually	Excavator, high-pressure water jet and portable pump
Brush cutting	Summer / annually	Excavator with brush cutter, skid steer, chainsaws, haul truck
Dust suppressant application	Summer / annually	Water truck, distributor/sprayer
Sign repair	Summer / as needed	Post driver
Streetlight replacement	Summer / as needed	Bucket truck
Bridge inspection	Summer / as needed	Manlift / inspection equipment
Snow plowing	Winter / often, as needed	Plow truck, motor grader with snow wing
Sanding	Winter / often, as needed	Sanding truck, loader
Road resurfacing	Long-term	Motor grader, loader, dump trucks, compactor
Culvert repair	Long-term	Excavator, loader, compactor
Guardrail repair	Long-term	Post driver, excavator
Bridge repair	Long-term	Crane, excavator, concrete equipment

Note: list of equipment does not include common vehicles and tools and may vary by location.

Maintenance responsibility will depend on road ownership. If the route connections are State-owned, like Aleknagik Lake Road, they would be maintained by the State. However, the State may issue maintenance agreements with local communities, if needed, for use of local labor and equipment using State funds. The study communities would need to prepare a needs assessment and procure additional equipment to support maintenance activities.

It is not guaranteed the routes would be owned by the State. In this case, maintenance would become the responsibility of local entities. It is highly unlikely rural Tribes and municipalities will have the capacity to maintain long route connections, as it is already challenging to maintain existing local roads with limited funding and resources. However, if local maintenance is required, the responsibility *may* be shared among all communities, for example:

- Aleknagik (Tribe and City) – halfway to Ekwok, and halfway to Portage Creek
- Ekwok (Tribe and City) – halfway to Aleknagik, and halfway to New Stuyahok
- New Stuyahok (Tribe and City) – halfway to Ekwok, and halfway to Koliganek
- Koliganek (Tribe) – halfway to New Stuyahok
- Portage Creek (Tribe) – halfway to Aleknagik

Annual operations and maintenance (O&M) costs were roughly estimated based on route length, the maintenance requirements discussed in Table 5-12, and the following assumptions:

- $300 hourly rate for equipment and operator
- Two hours per mile for summer maintenance operations
- One hour per mile for winter maintenance operations
- 6 maintenance events per summer
- 12 maintenance events per winter

Cost estimate summaries shown are preliminary only and subject to change.

Table 5-12: Annual Maintenance Cost Estimate Summary – Alternative 1

Route / Segment No.	Segment	Miles	Cost / Year	Assumed Maintenance Responsibility (nearest community)
Alternative 1 – Central Route				
1A, 1B	Aleknagik to Ekwok	42.0	$302,000	Aleknagik/Ekwok split 50/50
1C, R1-4, R1-4	Ekwok to New Stuyahok	11.5	$83,000	Ekwok/New Stuyahok split 50/50
1D	New Stuyahok to Koliganek	20.5	$148,000	New Stuyahok/Koliganek split 50/50
R1-2	J1-1 to Portage Creek	32.0	$230,000	Aleknagik/Portage Creek split 50/50
	Total	**106.0**	**$763,000**	

Exhibit 5-1: Annual Maintenance Cost Estimate by Community – Alternative 1

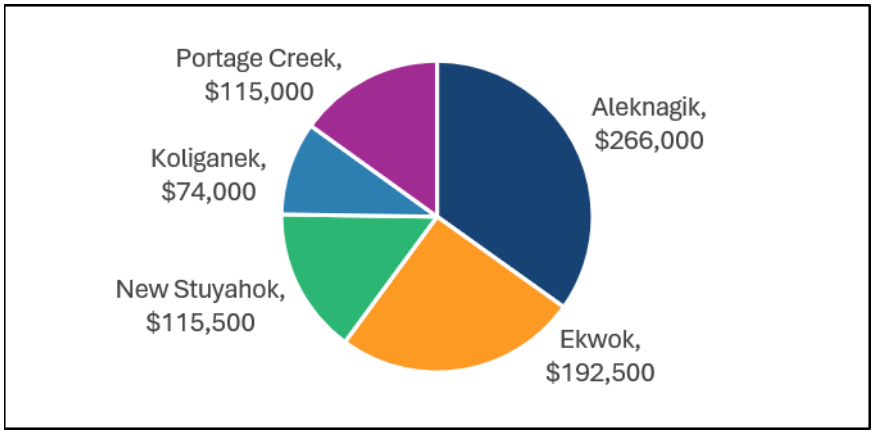


Table 5-13: Maintenance Cost Estimate Summary – Alternative 2

Route / Segment No.	Segment	Miles	Cost / Year	Assumed Maintenance Responsibility (nearest community)
Alternative 2 – Northern Route				
R2-1	Aleknagik to Koliganek	64.0	$461,000	Aleknagik/Koliganek split 50/50
R2-2	J2-1 to J2-2	16.0	$115,000	Ekwok/New Stuyahok split 50/50
2C, 2D, R2-4	New Stuyahok to Ekwok	11.0	$79,000	Ekwok/New Stuyahok split 50/50
2E	Ekwok to Portage Creek	38.0	$274,000	Ekwok/Portage Creek split 50/50
	Total	**129.0**	**$929,000**	

Exhibit 5-2: Annual Maintenance Cost Estimate by Community – Alternative 2

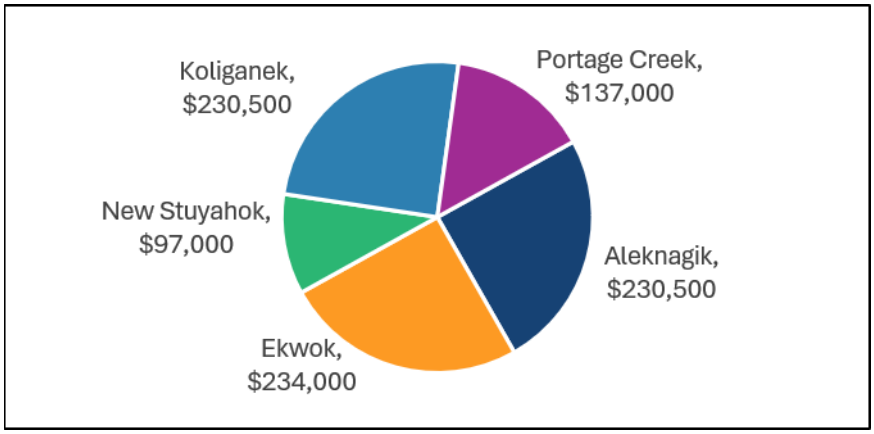
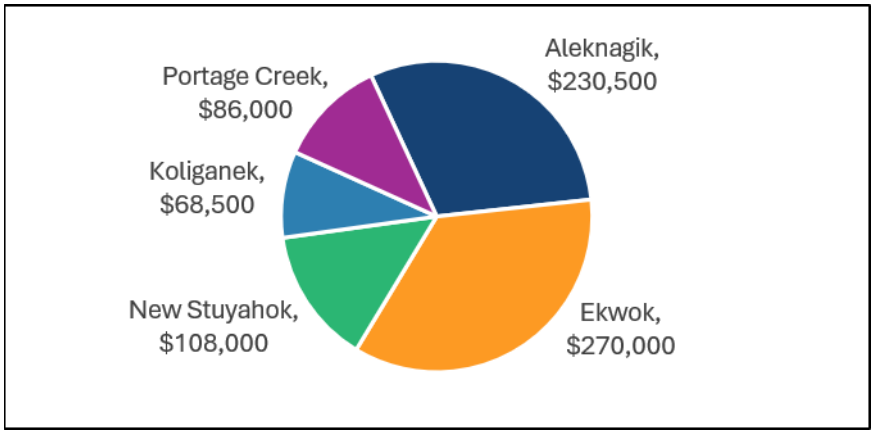


Table 5-14: Maintenance Cost Estimate Summary – Alternative 3

Route / Segment No.	Segment	Miles	Cost / Year	Assumed Maintenance Responsibility (nearest community)
Alternative 3 – Southern Route				
3A, 3B	Aleknagik to Ekwok	64.0	$461,000	Aleknagik/Ekwok split 50/50
3C	Ekwok to New Styuyahok	11.0	$79,000	Ekwok/New Stuyahok split 50/50
3D	New Stuyahok to Koliganek	19.0	$137,000	New Stuyahok/Koliganek split 50/50
R3-2	J3-1 to Portage Creek	12.0	$86,000	Portage Creek
	Total	**106.0**	**$763,000**	

Exhibit 5-3: Annual Maintenance Cost Estimate by Community – Alternative 3



At this time, communities likely do not have the funding and resources required to maintain route connections. Maintenance responsibility is assumed by nearest community; however, maintenance agreements would need to be established. Community responsibility would lessen if all or part of the routes were State-owned and maintained.

5.6.4 Life-Cycle Cost Considerations

Life cycle cost is the long-term cost of infrastructure including the capital (construction) cost and annual maintenance costs over the design life of the facility. The typical design life of a gravel road is 20 years, while bridges are designed to last 50 years or more. In addition to annual maintenance, gravel roads may need resurfacing, culvert repair, or major improvements after 20 years. Bridges should be inspected every 2 years for structural integrity. Long term resilience may depend on drainage and road structure design, construction quality, frequency of hazards such as major floods and erosion, freeze thaw cycles and permafrost conditions, and frequency of use.

A life cycle present worth cost analysis was performed for each of the route alternatives. The analysis converts all costs to present day 2026 dollars and uses a 20-year planning period. The net present value (NPV) was calculated as the sum of the capital cost (C) plus the present worth of the annual O&M. The life cycle cost comparison of the alternatives is summarized in Table 5-15.

Table 5-15: 20-Year Life Cycle Cost Analysis Summary

Alternative	ROM Capital Cost ($)	Estimated O&M Cost ($/Year)	Net Present Value ($)
1: Central Route	$1.14 Billion	$763,000	$1.16 Billion
2: Northern Route	$1.37 Billion	$929,000	$1.39 Billion
3: Southern Route	$1.10 Billion	$763,000	$1.11 Billion

ROM Capital Costs and Estimated O&M Costs were derived as discussed in Sections 5.6.2 and 5.6.3, respectively. The current federal real discount rate of 2.0% (March 6, 2026) was applied to

annual O&M costs, using a uniform series present worth (USPW) calculation. Major road resurfacing, culvert replacement, bridge repair, or hazard rehabilitation are not included as this type of work is assumed to be required after the 20-year design life.

5.6.5 Cost Uncertainty and Risk Ranges

Cost estimates are based on the preliminary route corridors considered in this study. Further refinement will be required, which may drastically affect route and bridge lengths. The following factors provide risks and uncertainties associated with the preliminary costs presented in this study:

- A contingency of 30% percent was applied to the ROM capital cost estimates to account for uncertainties and potential unforeseen costs.
- Costs do not include inflation. It may take years to decades to obtain funding and implement road projects of this magnitude. Any project phasing cost estimates should account for inflation of the timeline of the phase.
- The economic climate can change every year, but projects with a timeline greater than 3 years may experience significant cost impacts due to fuel prices, wages, housing, etc. Similarly, changes in administration and laws can impact costs, e.g. the Build America, Buy America Act (BABAA) and American Iron and Steel (AIS) Law.
- Preliminary routes and river/creek crossing locations are conceptual level only based on available aerial imagery and terrain data. Actual routes would be longer once refined based on terrain. Bridge locations would need to be refined with a hydrology study. Final bridges locations will drive route alignments and are likely to have a major affect on costs.
- Design alternatives and cost reduction strategies were not evaluated with this study. Road and bridge design and amenities may be reduced or increased based on need, community preference, and other factors. There may be opportunity to research and implement new and innovative materials, products, equipment, and methods.
- Force account local labor may be used for certain aspects of route construction. This should be considered for future cost estimating.
- Environmental impacts are unknown. At a minimum, an EA is anticipated; however, if an EIS or other mitigation activities are required, this could significantly impact project costs.
- Project phasing will affect mobilization costs. Construction crews and equipment may need to mobilize/demobilize multiple times.
- Inclement weather, river conditions, and seasonal limitations can cause delays in barges, flights, and overall construction schedule and cost.
- Climate change can affect long term permafrost conditions, wetlands function, and hazard frequency. These uncertainties should be considered for road design.

5.7 Comparison Summary

This section compiles all previous discussions and considerations for a high-level comparison of the alternatives.

5.7.1 Evaluation Criteria Matrix & Ranking

An alternative evaluation criteria matrix provides a scoring system to objectively rank the alternatives, as shown in Table 5-16.

Table 5-16: Alternative Evaluation Criteria Matrix

Evaluation Criteria	Best (3 points)	Medium (2 points)	Worst (1 point)
Life-Cycle Cost	Lowest Cost	Medium Cost	Highest Cost
Boggy Areas / Wetlands	0-30%	31-60%	61-100%
Major River / Creek Crossings – Bridges (≥ 20 feet wide)	0-4	5-8	9+
Moderate Stream Crossings – Culverts (< 20 feet wide)	0-7	8-15	16+
Permafrost Potential	0-30%	31-60%	61-100%
Number of Existing & Potential Material Sources within 5 miles	5+	3-4	0-2
Moderate to High Potential of Encountering Cultural Resources	0-30%	31-60%	61-100%
Community Support	Preferred	Neutral	Not Preferred
Length (Relative Travel Time / Overall Footprint of Disturbance)	Shortest Route	Medium Route	Longest Route

Table 5-17 shows the scoring of each route based on the criteria above. This ranking system is meant to be a simplified way to compare alternatives, but there are many other factors that may affect final decisions. The matrix also evaluates alternatives as a whole and does not compare individual route segments or community connections. Overall, Alternatives 1 and 3 have a matching high score of 17 points. Comparative scoring of alternatives is used as a planning tool and does not identify or select a preferred alternative.

Community preference is unknown at this time. It is important to note that ranked criteria have not been weighted. Some evaluation criteria may have a higher importance than others. Evaluation criteria may be added or adjusted for the Final-Draft A2K Study after further community input has been received.

Table 5-17: Alternative Ranking by Technical Score

Evaluation Criteria	Alternative 1: Central Route		Alternative 2: Northern Route		Alternative 3: Southern Route	
	Value	Points	Value	Points	Value	Points
Life-Cycle Cost	$1.14 B (Lowest)	3	$1.37 B (Highest)	1	$1.10 B (Medium)	2
Boggy Areas / Wetlands	61%	1	53%	2	53%	2
Major River / Creek Crossings – Bridges (≥ 20 feet wide)	6 each	2	12 each	1	7 each	2
Moderate Stream Crossings – Culverts (< 20 feet wide)	19 each	1	15 each	2	17 each	1
Permafrost Potential	35%	2	6%	3	8%	3
Number of Existing & Potential Material Sources within 5 miles	6 each	3	7 each	3	4 each	2
Moderate to High Potential of Encountering Cultural Resources	56%	2	52%	2	53%	2
Community Support	TBD	-	TBD	-	TBD	-
Length (Relative Travel Time / Overall Footprint of Disturbance)	106 mi (Shortest)	3	129 mi (Longest)	1	106 mi (Shortest)	3
Total Score	**17 Points**		**15 Points**		**17 Points**	

5.7.2 Alternatives Advantages and Disadvantages

Based on input received from the communities, the alternatives have several common advantages and disadvantages. These considerations are summarized below.

Advantages:

- Improved access to essential services for residents of the communities
- Reduced travel costs between local communities and improved transportation options
- Potential reduction in cost of goods and services including food, fuel, shipping, and more
- Potential reduction in development costs including housing
- Potential for improved access to employment opportunities

Disadvantages:

- Increased cost associated with roadway maintenance
- Impacts to wetlands, waters of the United States, and fish habitat

- Potential impacts on wildlife movement and migration patterns
- Potential social impacts associated with increased accessibility to prohibited material

The following effects may be controversial as they could be considered an advantage or a disadvantage depending on the perspective.

Consideration	Advantage	Disadvantage
Improved access for subsistence activities and resources	Supports local traditional subsistence lifestyle and improves travel safety	May encourage outside access to hunting and fishing, increasing pressure on local resources
Improved access to lands for development, including native allotments	May support housing development, allows locals to access their isolated allotments	May encourage mining or other development that can cause unknown environmental or social impacts
Potential to develop recreational sites and expand tourism industries	Revenue from locally owned and controlled recreational sites may help fund road maintenance and other community needs	Private development and increased tourist traffic may not be desired

5.7.3 Benefit-Cost Analysis (BCA)

A preliminary benefit cost analysis will be provided for alternatives that are preferred or desired for further evaluation by the communities in the Final-Draft A2K Study.

5.7.4 Engineering Findings of Alternatives

Engineering findings of alternatives are primarily based on the evaluation criteria discussed in Section 5.7.1 including technical advantages, constraints, and risks. Community preference may vary greatly from the preliminary engineering findings. Additionally, the engineering analysis evaluates complete route connections between all study communities, although not all route connections may be desired.

Overall, Alternative 2 is generally higher in both length and cost. Alternative 3 provides a comparatively direct connection between Aleknagik and Koliganek. Separately, initial community engagement identified strong opposition in Koliganek to a road connection. Alternatives 1 and 3 are similar in terms of length, cost, and score. However, if a connection to Portage Creek is not desired, removal of the route to Portage Creek would result in better length, cost, and score for Alternative 1. Additionally, the route connection specifically between Ekwok and New Stuyahok of Alternative 3 has fewer major stream crossings. This alignment also closely follows the traditional winter trail route.

6.0 IMPLEMENTATION CONSIDERATIONS

The potential implementation considerations described in this section are contingent upon future community and Tribal decisions. This section may be updated following public review and further stakeholder engagement.

6.1 INITIAL CONNECTION OUTLOOK

Based on initial public feedback and results of the feasibility analysis and alternative evaluation, below are is the preliminary outlook for potential route connections in the study area:

Ekwok to New Stuyahok – Initial Community Interest and Planning Considerations

A connection between Ekwok and New Stuyahok has been desired by the communities for many years and is listed in LRTPs for both Ekwok and New Stuyahok. Given the shorter length of the connection, this route is more feasible to fund, construct, and maintain. Additionally, the need is high as there are challenges accessing New Stuyahok year-round with poor runway conditions and challenging river navigation. A road to Ekwok would provide New Stuyahok residents with access to Ekwok's airport and barge landing, both of which are more consistently accessible.

Aleknagik to Ekwok – Unknown Community Support and Benefit

Further community input is required to understand if this connection is desired and needed. Additionally, a more detailed economic analysis is needed to determine if the benefits outweigh the costs of this connection. Road access to Dillingham may have significant economic benefits, but the environmental and social consequences, as well as high construction and maintenance costs, may be inhibiting factors.

Koliganek Connection – Initial Community Opposition

Initial engagement identified strong opposition in Koliganek to a road connection.

Portage Creek Connection – Limited Community Input

Minimal community input has been received about the potential for a route connection to Portage Creek. Since this connection does not appear to be strongly desired or needed at this time, and given the minimal year-round population of Portage Creek, this connection would likely not have a positive cost-benefit ratio.

6.2 PHASING OPTIONS

Due to the scale of the study area connections, phasing would be required for implementation of any or all routes. Below are phasing options for consideration.

Potential Phase I – Ekwok to New Stuyahok Road

The preliminary connection between Ekwok and New Stuyahok is approximately 11 miles. This road could be designed as a single phase, but given the short construction season in Alaska, building the road would likely take 2-4 years and may need to occur in sub-phases such as:

- Option 1:
  - Phase I-A – Clearing and pioneer road development
  - Phase I-B – Subbase and drainage culvert installation
  - Phase I-C – Bridge construction, if any
  - Phase I-D – Surface course installation, signage and amenities
- Option 2:
  - Phase I-A – Construct the first 4 miles from Ekwok.
  - Phase I-B – Construct the next 4 miles from Ekwok.
  - Phase I-C – Construct remainder of route to New Stuyahok.

Regardless of phasing plan, it is likely construction would begin in Ekwok due to improved barge and plane access for crew/equipment mobilization and the availability of a local gravel pit.



Example pioneer road; Ekwok Landfill Road 2012 (Bristol)

Potential Phase II – Aleknagik to Ekwok Road

If this route connection is pursued, the design may need to occur in multiple sub-phases due to the length of the route which varies from 59 to 75 miles, depending on the alignment alternative. Example phasing may include:

- Phase II-1: Aleknagik to Bridge 1 at Muklung River
- Phase II-2: Bridge 1 at Muklung River to Bridge 2 at Iowithla River
- Phase II-3: Bridge 2 at Iowithla River to Bridge 3 at Koklong Creek
- Phase II-4: Bridge 3 at Koklong Creek to Bridge 4 at Kokwok River
- Phase II-5: Bridge 4 at Kokwok River to Ekwok

It may be possible to construct segments of the road out of Aleknagik and out of Ekwok simultaneously to meet in the middle. It may also be economical to develop recreational sites along the route, which may act as the termination points for each phase. Further planning would be required to refine phasing of this route connection.

Other Potential Phases

Other phases do not seem to be desired at this time. However, this A2K Study can be used as a guide to inform community leaders if the need to pursue other route connections changes with time. Long-term (20+ years) future phases may include routes to Koliganek or Portage Creek. Considerations for potential future connections are as follows:

- Re-assess the feasibility and benefit-cost analysis of connections
- Proposed roads may be one-lane with turnouts if capital costs are prohibitive
- Since Portage Creek is located on the southeast side of the Nushagak River, it may not be economic to develop multiple long-span bridges to reach Portage Creek by road. Therefore, project phasing may need to include development of a public boat launch on the north shore of the river and/or a ferry terminal and seasonal ferry service to Portage Creek.
- Other public infrastructure improvements may be considered for all study communities such as runway expansion or improvements, public boat launch or moorage facilities, barge landing infrastructure development, and winter trail improvements.

6.3 POTENTIAL FUTURE NEXT STEPS

Potential future steps are contingent upon community and Tribal decisions and subsequent funding, environmental review, permitting, engineering, and other required project-development actions. If stakeholders wish to advance any route corridors, the following steps would be required.

1. **Tribal Consultation** – Continue tribal consultation and community engagement and obtain formal approvals (e.g. Tribal Resolutions) to pursue proposed project
2. **Project Scoping** – Outline the full scope and establish the budget required to complete design and permitting of the proposed project
3. **Funding Acquisition for Design** – Identify available funding and apply for supplemental funding, as needed, to advance project planning and design (does not include construction)
4. **Planning / NEPA Initiation** – Engage environmental agencies to determine anticipated NEPA / permitting requirements
5. **Preliminary Engineering** – Develop a Design Study Report to refine alignment alternatives, design criteria, and project requirements
6. **ROW Development** – Conduct initial landowner outreach, appraisals, and preliminary easement development alongside design development, and establish ROW ownership and maintenance agreements
7. **Data Collection** – Collect the information needed for design and permitting, including:
    - **Geotechnical Investigation** – Determine subsurface characteristics along the proposed alignment; may also include borrow site exploration
    - **Hydrology / Bridge Study** – Evaluate site drainage patterns, river / creek crossing locations, and structure sizing / design requirements

- **Land Survey** – Identify property boundaries and ownership, topography, and existing conditions along the proposed alignment
- **Cultural Resources Investigation** – Screen the project footprint for the presence of cultural and archaeological resources
- **Wetlands Delineation** – Conduct a field investigation for the location, type, and function of wetlands within the project area

8. **Design Development** – Advance the design in 35%, 65%, and 95% phases including project specifications and engineer's cost estimates, providing stakeholder review at each phase; may include public engagement
9. **Funding Acquisition for Construction** – Once the project reaches 95% to 100% design, project costs should be understood so communities can begin seeking construction funding
10. **NEPA / Permitting** – Complete NEPA documentation, agency consultation, and permitting applications, as required
11. **Final ROW** – Upon completion of design and NEPA, final ROW can be approved and recorded
12. **Final Design / Issued for Bid** – Project goes out to bid to select a construction contractor
13. **Construction** – Construction begins, but may take several years or require project phasing

Since land ownership and environmental constraints have a high potential to impact project alignment and design, coordination with landowners and environmental agencies early in the planning process is critical to avoid delays and cost overruns related to re-designs. Public engagement is a typical requirement of the NEPA process, but additional public, tribal, and stakeholder engagement is strongly encouraged from initial planning through final design.

6.4 FUNDING CONSIDERATIONS

The availability of funding will be the primary driver for project implementation. Although federal funding is likely to support the project, most federal grants require a 10-20% non-federal match. A preliminary funding strategy is to assess available local funding through the TTP, BBEDC, and other potential partners; establish a dedicated reserve of local funds to support project development and serve as matching funds where required; and pursue an aggressive grant acquisition strategy to capitalize on all applicable funding opportunities as they become available.

Table 6-1 is a summary of potential funding sources for proposed route connections available to Municipal and/or Tribal entities. Other grants and programs may be available to communities through the State. Funding opportunities vary by year, and some programs may become obsolete, while other new opportunities may arise. Known, current funding programs are listed in alphabetical order.

Table 6-1: Potential Funding Opportunities

Program	Type	Agency	Estimated Funding Availability	Eligible Projects
BBEDC Block Grant	Regional / Local	Bristol Bay Economic Development Corporation (BBEDC)	Approximately $600,000 per community budgeted in 2025	Eligible community infrastructure and economic development projects, subject to BBEDC guidelines
BUILD Grant (Better Utilizing Investments to Leverage Development)	Federal	FHWA	$1 million–$25 million per capital project; planning grants have no minimum award	Planning, design, and construction for road, rail, transit, and port projects that achieve national objectives
Alaska Community Development Block Grant (CDBG)	State / Federal	Alaska DCCED, funded by US Dpt. of Housing and Urban Development (HUD)	Varies by annual allocation; up to $850,000 per community in 2026	Variety of infrastructure projects focus on improving self-sufficiency, eliminating public health and safety hazards, and reducing the costs of essential community services
Community Transportation Program (CTP)	State / Federal	Alaska DOT&PF	Previous cycle federal share limited to $15 million per project	New or improved roads and bridges, multimodal connections, turnouts and scenic overlooks, stormwater, habitat connectivity, and more
Congressionally Directed Spending (CDS) / Federal Appropriations	Federal	U.S. Congress / Alaska Senator's Office	Determined through congressional appropriations	Discrete transportation projects or project phases supported through congressional funding
Denali Commission Rural Transportation Match and Gap Funding	Federal / Regional	Denali Commission	2026 opportunity: $50,000-$1 million per community	Eligible local match and construction funding gaps for rural transportation projects
Denali Commission Transportation Program	Federal / Regional	Denali Commission	Varies by solicitation; no standard project award range	Planning, design, and construction of rural Alaska roads, trails, bridges, and other transportation infrastructure

Program	Type	Agency	Estimated Funding Availability	Eligible Projects
Nationally Significant Federal Lands and Tribal Projects (NSFLTP)	Federal	FHWA	2026 opportunity: $12.5-25 million per project	Construction, reconstruction, or rehabilitation of nationally significant transportation facilities accessing or serving Federal and Tribal lands
PROTECT Grant (Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation)	Federal	FHWA	No minimum or maximum award size	Transportation resilience planning, and improvements to protect infrastructure from flooding, erosion, and other natural hazards
Sustainable Transportation Program (STP)	State / Federal	Alaska DOT&PF	Varies by funding source and solicitation	Projects that promote reduced emissions, energy independence, efficiency, low-cost transportation, and a healthy environment
Tribal, Municipal, and Regional Contributions	Tribal / Local / Regional	Participating Tribal governments, municipalities, and regional entities	Determined by participating entities and available resources	Local match, eligible in-kind services, land or easements, equipment, and other allowable project contributions
TTP Bridge Program	Tribal / Federal	BIA / FHWA	No known min. or max. award size; FY24 award range was $24,000 to $4.3 million	Planning, design, construction, rehabilitation, and replacement of eligible Tribal transportation bridges and qualifying culverts
TTP High-Priority Projects (HPP)	Tribal / Federal	BIA / FHWA	Maximum award amount is $1 million	Supplements insufficient TTP funding for high priority / emergency tribal transportation projects
TTP Tribal Shares	Tribal / Federal	BIA / FHWA	Individual Tribal allocations vary based on statutory formula	Planning, design, construction, reconstruction, and maintenance of eligible Tribal transportation facilities

Estimated funding availability is based on the most recent notice of funding opportunity or available data; program funding amounts are subject to change each year with new appropriations.

7.0 SUMMARY OF FINDINGS AND FUTURE CONSIDERATIONS

7.1 FEASIBILITY DETERMINATION

Overall, feasibility of route development will be driven by community desire to pursue the connection or not, maintenance of proposed routes, design / construction costs, and environmental / social impacts. Feasibility as determined in this report is planning level based on technical findings and does not constitute project selection, approval, or other community endorsement.

Community Support Determination – Partial

Not all connections are supported by communities at this time. The connection to Koliganek is strongly opposed and the need / desire for a connection to Portage Creek is unknown. There is a stronger necessity to develop a road between Ekwok and New Stuyahok. Further community engagement is necessary to confirm support.

Maintenance Determination – Partial

At this time, it does not appear study area communities have the resources (funding, labor, and equipment) to maintain all route connections; however, they may be able to maintain shorter segments of routes such as a 5-mile stretch immediately adjacent to each community. The only connection that may be feasible to maintain using local resources is the route between Ekwok and New Stuyahok which is approximately 11 miles. This will need to be confirmed with communities. Alternatively, there is potential for interconnecting corridors to be owned and maintained by the State of Alaska, similar to Aleknagik Lake Road between Dillingham and Aleknagik. Continued coordination with the Alaska DOT&PF is required to understand this process and determination.

Cost Determination – Partial

Capital costs will be a significant driver of overall feasibility as well. This includes development from planning, engineering, NEPA, and construction. It is not possible to obtain funding for any full alternative with connections to all study communities given the high total mileage. Route connections will need to be advanced individually and in phases. Therefore, prioritization of connections is important. Additionally, grant funding is highly competitive nationally and is not guaranteed to cover all or part of project costs. Many federal grants require a non-federal match. It may take years to save up local match funding and obtain one or more grant awards, even for just the design phase. A grant manager may be required to help communities monitor grant opportunities and submit multiple applications each year.

Alignment development would require careful planning and analysis to reduce costs. Ways to reduce constructions costs may include avoiding boggy areas, minimizing stream crossings, prioritizing proximity to borrow sources, and optimizing horizontal and vertical alignment.

Environmental / Social Determination – To Be Determined

New route corridors through undeveloped wilderness would have environmental consequences, while new travel patterns and improved access to communities would affect local way of life. Further studies and local engagement is required to understand potential impacts and determine if they outweigh the benefits. The Final-Draft A2K Study will include a preliminary Environmental Report and additional public surveys to help inform the Economic Analysis of route alternatives.

7.2 COMMUNITY OPPOSITION OR UNRESOLVED CONCERNS

After a second round of public / stakeholder engagement, a Final-Draft A2K Study will be issued which may address remaining data gaps, unknowns, and unresolved concerns listed in Table 7-1. Some topics may require additional planning or studies beyond the scope of the A2K Study.

Table 7-1: Community Opposition and Unresolved Concerns

Topic	Status	Required Action
Ekwok / New Stuyahok Connection	Desired, based on initial feedback	Additional public / stakeholder outreach; Tribal Resolutions to indicate support or opposition
Any connections to Aleknagik	Unknown community support	
Any connections to Koliganek	Opposed, based on initial feedback	
Any connections to Portage Creek	Unknown community support	
Impacts to Mulchatna Caribou Herd, fish habitat, and other environmental resources	Unknown	Environmental Report; additional studies may be needed
Impacts to subsistence resources	Unknown	Work with communities to map existing resources and determine impacts
Economic benefits such as reduced costs of fuel, housing, transportation, etc.	Unknown	Additional economic research, analysis, and benefit-cost ratio calculations
Recreation and tourism development	Unknown	Work with communities to identify potential sites and desire to develop
Cultural and social impacts	Unknown	Work with communities to compare social / cultural pros and cons
Maintenance responsibility	Unknown	Determine each community's maintenance capacity; coordinate with Alaska DOT&PF for potential State ownership / maintenance
Enforcement jurisdiction	Unknown	Coordinate with local law enforcement to determine jurisdiction boundaries and response capacity
Others	TBD	Additional public / stakeholder outreach to identify other concerns

7.3 Next Steps and Potential Path Forward

The next steps are to conduct additional community engagement and analyses driven by the communities and to finalize this report. Next steps after study completion will be at the discretion of communities and stakeholders; however, some considerations for a potential path forward are described below.

This Study

1. Conduct second round of community and stakeholder engagement to collect additional feedback on route preferences and concerns.
2. Develop preliminary Environmental Report and update the Economic Analysis based on community feedback.
3. Determine additional studies or data required to resolve outstanding concerns.
4. Confirm project support and/or opposition through Tribal Resolution.
5. Update A2K Study to a Final-Draft version and refine cost estimates and scope for preferred connections.

Beyond This Study

6. If desired, obtain funding for planning, design, and permitting of preferred connections.
7. If desired, begin planning, design, and permitting process of preferred connections.

7.4 Key Decisions Required by Stakeholders

Upon finalization of the A2K Study, BBNA will request Tribal Resolutions or letters from local Tribes and key stakeholders to provide formal documentation of community support or opposition of potential route connections. Stakeholders should indicate which alignments are preferred, describe support or opposition to any or all connections, and clarify desire to move forward with planning and design of any project phases.

Technical findings in this study may differ from community preference. Any future decisions to pursue route connections remain with Tribal governments and affected local stakeholders.

8.0 CONTRACTUAL FRAMEWORK AND FUNDING OF THIS STUDY

Bristol Engineering holds a term contract with BBNA, providing planning, engineering, and support services for Tribal Transportation Program activities which may serve any of the 31 Tribal communities in the Bristol Bay region. The A2K Study was issued as BBNA Work Order #30. This study is funded by two grants, as follows:

1. FY23 Rebuilding American Infrastructure with Sustainability and Equity (RAISE) Grant, Federal Highway Administration, awarded May 14, 2024, RAISE Agreement Number 693JJ32440138, BBNA Funding Code 700195, funding amount $380,000
2. Denali Commission Program Grant, awarded February 4, 2025, Denali Commission Agreement Number 1906-00, BBNA Funding Code 702125, funding amount $380,000

The total funding for this study is $760,000.

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