APPENDIX D:
ENVIRONMENTAL SETTING

ASTAR

TRIANGLE COMMUNITY ROAD PEL STUDY

ENVIRONMENTAL SETTING

Technical Memorandum

March 2026

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADF&G	Alaska Department of Fish and Game
AHRS	Alaska Heritage Resource Survey
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ANWR	Arctic National Wildlife Refuge
APDES	Alaska Pollutant Discharge Elimination System
ASRC	Arctic Slope Regional Corporation
ASTAR	Arctic Strategic Transportation and Resources
ATQ	Atqasuk
BCC	Bird of Conservation Concern
BCR	Bird Conservation Region
BLM	Bureau of Land Management
BMP	Best Management Practice
CAA	Clean Air Act
CCR	Capacitively-Coupled Resistivity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DCCED	Alaska Department of Commerce, Community, and Economic Development
DEC	Alaska Department of Environmental Conservation
DNR	Alaska Department of Natural Resources
DOT&PF	Alaska Department of Transportation & Public Facilities
EFH	Essential Fish Habitat
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAST	Fixing America's Surface Transportation
FHWA	Federal Highway Administration
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
LRRS	Long Range Radar Site
LWCF	Land and Water Conservation Fund
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NAAQA	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NPR-A	National Petroleum Reserve–Alaska

NPS	National Park Service
NSB	North Slope Borough
NWI	National Wetlands Inventory
OHA	Office of History and Archaeology
PEL	Planning and Environmental Linkages
PRPA	Paleontological Resources Preservation Act
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SNAP	Scenarios Network for Alaska and Arctic Planning
SRRS	Short Range Radar Site
TMDL	Total Maximum Daily Load
US	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTQ	Utqiaġvik
WAI	Wainwright
WOTUS	Waters of the United States
WQS	Water Quality Standards

1.0 INTRODUCTION

Arctic Strategic Transportation and Resources (ASTAR) is a partnership between the Alaska Department of Natural Resources (DNR), Alaska Department of Transportation and Public Facilities (DOT&PF), and the North Slope Borough (NSB). The ASTAR planning area includes the entire North Slope region, including State lands, the National Petroleum Reserve-Alaska (NPR-A), and the Arctic National Wildlife Refuge (ANWR). The ASTAR team is working with communities and regional stakeholders to identify which projects and study areas may offer the most cumulative benefit to the region by prioritizing community and cultural connectivity, regional support, reduced cost of living, increased safety, and responsible infrastructure development. One of the projects recommended for further exploration is a community road connection between Utqiaġvik, Atqasuk, and Wainwright (known as the Triangle Community Road). A Planning and Environmental Linkages (PEL) study is being conducted to further evaluate this potential road, receive stakeholder and community input and garner consensus on whether to further advance a road connection.

The purpose of the PEL study report is to describe key aspects of the Triangle Community Road project which, when considered together, enhances project delivery by improving timelines, strengthening interested party relationships, and identifying key environmental resources early for potential incorporation into National Environmental Policy Act (NEPA) and other related environmental review processes.

Under 23 USC 327, DOT&PF participates in the NEPA Assignment Program through a Memorandum of Understanding (MOU) with the Federal Highway Administration (FHWA). This agreement authorizes DOT&PF to assume FHWA's responsibilities for environmental review, consultation, and other actions required under federal environmental laws for certain federal-aid highway projects in Alaska. DOT&PF and FHWA first executed this MOU on November 3, 2017, and renewed it on April 13, 2023. The MOU specifically assigns FHWA's PEL responsibilities under 23 USC 139 and 23 USC 168 to DOT&PF, along with related statutes, regulations, policies, and guidance for implementing NEPA in federal-aid highway projects.

The PEL process provides opportunities for early public and agency input during planning to and to provide early insight into environmental requirements. The analysis conducted may be incorporated into future NEPA processes.

1.1 Previous Studies and Documentation

In 2018, DNR initiated several transportation and environmental studies through the ASTAR program, with the goal of identifying opportunities to enhance the quality of life and economic opportunities in NSB communities through responsible infrastructure development. The ASTAR program identified an initial project to connect the communities of Utqiaġvik and Atqasuk, which was later expanded to include Wainwright, through an all-season gravel road. Termed the "Triangle Community Road", this project would broaden and diversify the region's transportation system and create economic, cultural, and subsistence opportunities for residents of these communities through the construction of a two-lane gravel road which could be used year-round.

The DNR completed a desktop analysis of the road network in the NSB while ASRC Consulting & Environmental Services, LLC led subject matter experts in identifying feasible routes for connecting the communities by analyzing available information to characterize the study area and describes features and benefits of the project. The ASTAR team gathered spatial and non-spatial background data and analyzed it for key features (i.e., critical polar bear habitat and Alaska native allotments) and topics (i.e., subsistence patterns and cost) that could affect routing and design concepts. The analysis resulted in six potential road corridors for further consideration, as shown below in Figure 1.

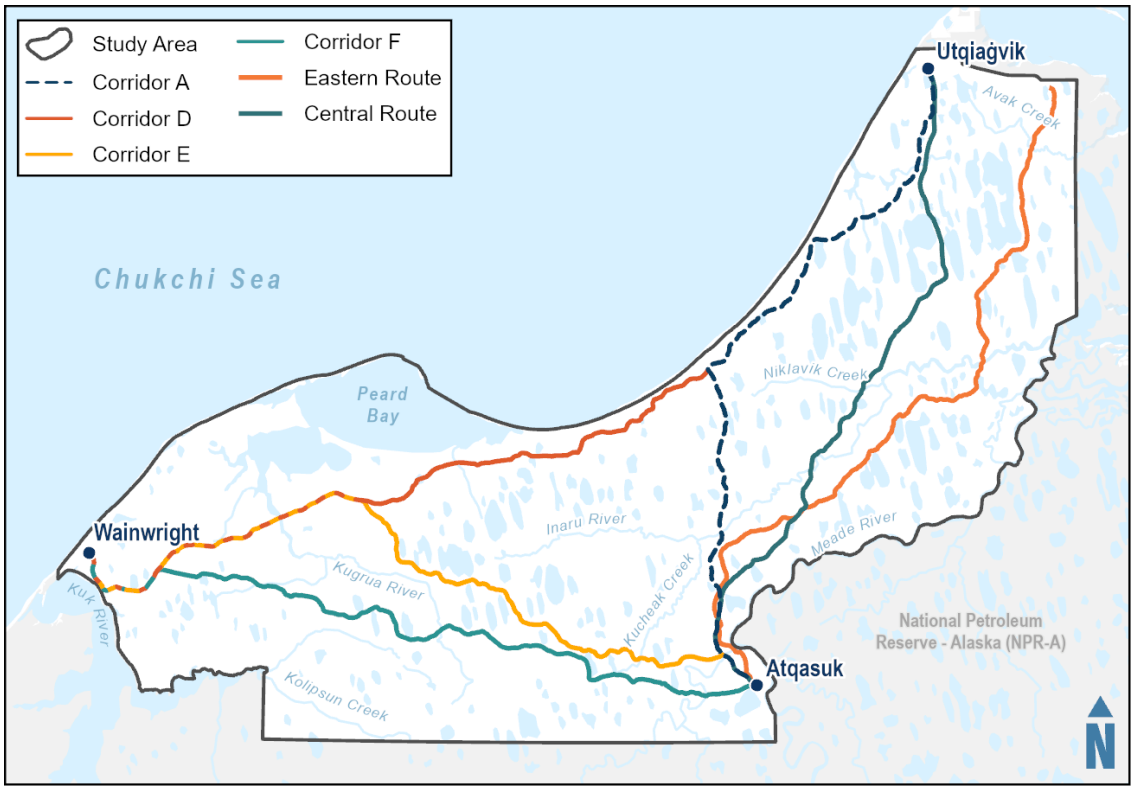

Figure 1: Triangle Community Road Corridor Options

During the initial phase of the project, the Central Route (later referred to as Corridor B) and Eastern Route (later referred to Corridor C) were removed from analysis, as the Coastal Route (later referred to Corridor A) was the recommended route between Atqasuk and Utqiaġvik.

Because corridors are not comparable as stand-alone options, six Road Network Alternatives were developed using sections of Corridor A, D, E, and F as shown in Figure 2. Travel distances between the communities are summarized in Table 1 below:

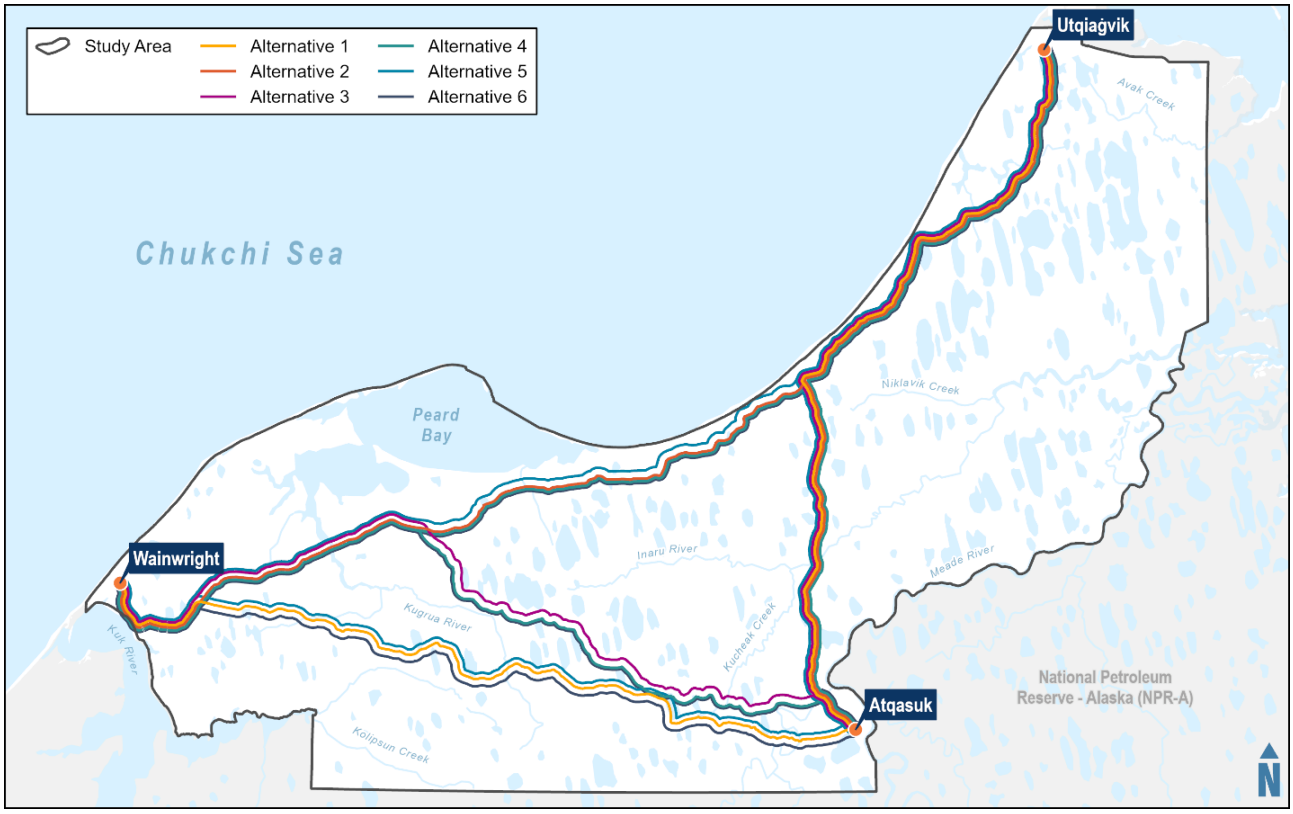

Figure 2: Road Network Alternatives

Table 1: Community Travel Distance

ROAD NETWORK ALTERNATIVE	DISTANCE BETWEEN COMMUNITIES (ROAD MILES)*			TOTAL NETWORK (ROAD MILES)*
	Utqiaġvik and Atqasuk	Utqiaġvik and Wainwright	Wainwright and Atqasuk	
1	67	135	69	135
2	67	101	95	131
3	67	132	73	136
4	67	101	73	171
5	67	101	69	190
6	116	101	73	144

* rounded to the nearest mile

2.0 ENVIRONMENTAL SETTING

2.1 Human Environment

2.1.1 Socioeconomics

2.1.1.1 Regulatory Framework

Transportation improvement projects have the potential to affect local communities indirectly through changing economic development patterns and land use or directly through impacts such as real estate acquisition for right-of-way. Understanding community, social, cultural, and economic conditions is critical to determine if proposed transportation improvements will affect local populations who live and work in the area (23 USC 109(h)).

2.1.1.2 Existing Conditions

The NSB is the second largest geographical government administrative unit in the US (second only to neighboring Yukon-Koyukuk Census Area), covering over 94,000 square miles with an estimated resident population of 11,031 people[1]. Residents of the region are predominantly Iñupiat Alaska Native, with other ethnicities making up a minority of the population.

The communities of Atqasuk, Utqiaġvik, and Wainwright, all located within the NSB and NPR-A, differ in size, economy, and demographic composition. Wainwright and Atqasuk are smaller, rural villages and both communities have a strong reliance on subsistence hunting, fishing, and small-scale services. The populations of these villages are young, with a large proportion of children and families involved in traditional practices. In contrast, Utqiaġvik, the largest community in the NSB, has a more diverse economy with oil-related industries, government jobs, and education serving as major sources of employment. Table 2 provides contrasting demographics for the three communities according to information from a 2019 study commissioned by the NSB (*2019 North Slope Borough Economic Profile and Census Report).*

[1] *According to the 2020 Census.*

Table 2: Community Snapshot

DEMOGRAPHIC INFORMATION	ATQASUK	UTQIAĠVIK	WAINWRIGHT
Total Population	261	5,256	555
Percent Female	46.20%	50.10%	47.50%
Percent Iñupiat	94.50%	69.80%	93.10%
Percent Caucasian	3.10%	11.60%	3.10%
Percent Other	2.30%	18.60%	3.80%
Number and Percent of Population ≤16 (Dependency Ratio)	87 (36.9%)	1469 (31.1%)	145 (33.3%)
Number and Percent of Population 16-64 (Labor Force)	138 (58.5%)	916 (62.4%)	263 (60.5%)
Number and Percent of Population ≥65 (Dependency Ratio)	11 (4.7%)	96 (6.5%)	27 (6.2%)
Median Age of Total Population	23	28	27
Number and Percent of Labor Force Unemployed	93 (35%)	699 (13%)	159 (29%)
Number of Vacant Units and Vacancy Rate	12 (15.4%)	68 (4.4%)	22 (12.0%)
Average Number of People Per Household	4.20	3.43	3.66
Percent of Iñupiat Households using Subsistence Foods	97.90%	96.30%	94.10%
Percent of Households Receiving Half or More of Diet from Subsistence Foods	55.20%	45.50%	69.00%

Source: 2019 North Slope Borough Economic Profile and Census Report

Population pyramids provide an at-a-glance overview of community population profiles with respect to age and gender. Within relatively small populations, population pyramids become less reflective of long-term trends because small changes in immigration/emigration may be exaggerated, however, they can be useful to identify cohorts within the population where trends can emerge. Figure 3 highlights the differences and similarities between these three communities. All three communities have a large proportion of children. Utqiaġvik has the highest proportion of labor force aged individuals. Atqasuk and Wainwright have a large proportion of males.

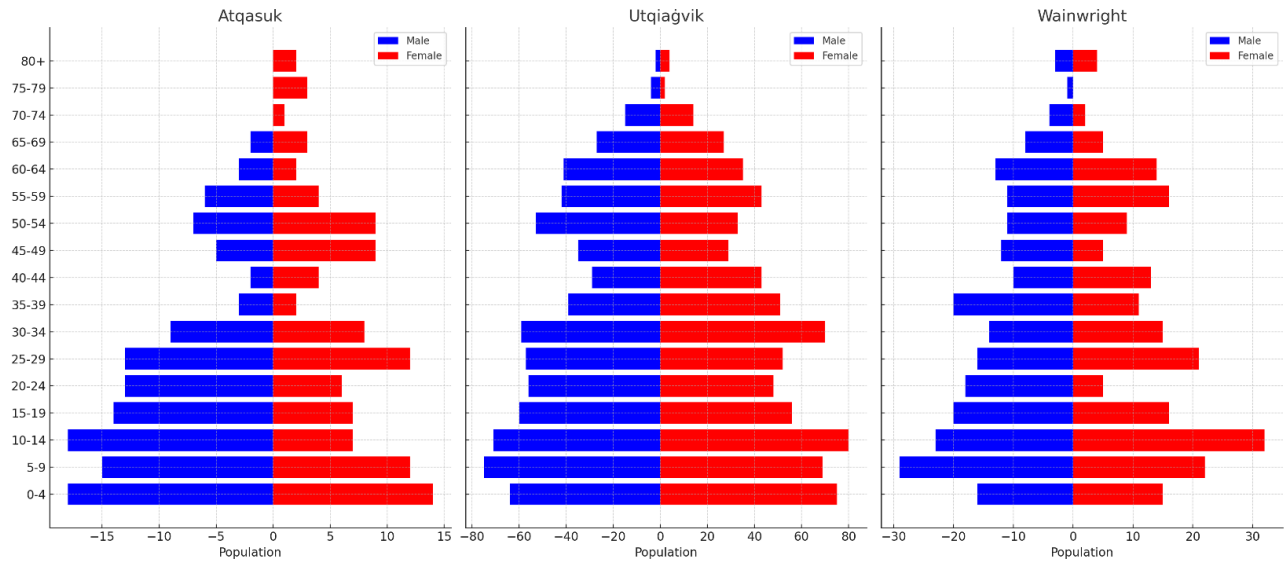

Figure 3: Community Population Pyramid

A review of community Comprehensive Plans (*North Slope Borough Comprehensive Plan: 2019–2039*) reveals that projected population growth is closely tied to oil and gas development in the area, or other employment opportunities. These employment opportunities contribute to retention and immigration, or, in the absence of employment, spur emigration as the disproportionately young population (compared to other census areas) seek employment opportunities elsewhere. According to the Comprehensive Plans, of the three communities, Atqasuk is the only community where the population is forecasted to decrease over the next decade. This decline is anticipated due to energy costs rise, subsistence activity declines, and a stable or reduction in government and construction jobs. These changes are expected to result in an overall population decline of one-half percent per year. For all three communities combined, the population is expected to grow. However, comparing the NSB Comprehensive Plan to the results of the US Census Bureau, conducted in 2010 and 2020, the population in Atqasuk is expected to increase by 0.42 percent annually (NSB Comprehensive Plan indicates a slight decrease), Utqiaġvik is expected to increase by 1.14 percent annually, and Wainwright is expected to increase by 1.22 percent annually.

2.1.1.3 Potential Impacts

Population projections to 2035 indicate continued growth under certain economic conditions which will likely be further influenced by ASTAR activities and the Triangle Community Road. Without additional oil and gas development, study area populations are projected to increase, requiring investment in housing, utilities, and public services. In the event of additional oil and gas development, the population is expected to grow more rapidly, intensifying demand for infrastructure and housing more quickly. The construction of year-round access to these communities will aid in the ability to deploy resources to these locations and mitigate impacts within the region stemming from the lack of interconnectivity.

All three communities identified employment and job creation, retention, and training as an area for attention and/or goal throughout their Comprehensive Plans:

- Atqasuk 2017 Comprehensive Plan Goal 5 and 6: 'Provide educational resources that prepare students for entering the workforce while also inspiring community participation and leadership' and 'Facilitate economic development'.
- Utqiaġvik 2015 Comprehensive Plan Goal 18: 'Ensure that Utqiaġvik has a strong and diversified local economy that provides employment opportunities for residents'.
- Wainwright 2014 Comprehensive Plan identified: 'Lack of job opportunities for young adults' as an issue.

Unemployment within these communities, and the NSB in general, has been historically higher than the national average with "Could not find a job" being the most frequent response for why individuals were unemployed.

2.1.2 Land Use and Ownership

2.1.2.1 Regulatory Framework

The Alaska Native Allotment Act of 1906 allowed individual Alaska Natives to apply for up to 160-acre parcels of land, similar to the Lower 48's allotment system under the Dawes Act. However, the application process was slow and complex, and many Alaska Natives were unable to secure their land claims before the Act was repealed in 1971 by the Alaska Native Claims Settlement Act (ANCSA) in response to longstanding Indigenous land claims and conflicts over land use in Alaska, especially following the discovery of oil in Prudhoe Bay.

ANCSA sought to resolve existing Alaska Native land claims in exchange for 44 million acres of land and $962.5 million in compensation, making it the largest land claims settlement in US history at the time. Instead of a reservation system, ANCSA created 12 regional Native corporations (with a 13th later added for non-resident Alaska Natives) and over 200 village corporations, which are responsible for managing land and financial assets for Native shareholders. These corporations hold land titles and conduct business ventures, ranging from resource development to tourism, to benefit their Native shareholders. The Act fundamentally altered land ownership and governance for Alaska Natives, leading to both opportunities and challenges in economic development, self-determination, and cultural preservation.

Together, ANCSA and the native allotment system have played a major role in shaping land ownership, indigenous governance, and resource management in Alaska. ANCSA provided economic and corporate structures for these communities, and these laws continue to influence Alaska today.

With the issuance of native corporations and their land holdings under ANCSA, 17(b) easements were established. These easements are public access routes reserved across privately owned Alaska Native corporation lands. Under Section 17(b), when Native Corporations selected land, the Federal government retained specific easements to ensure continued public access to important areas such as navigable waterways, public lands, subsistence hunting and fishing areas, and recreation sites.

2.1.2.2 Existing Conditions

With the exception of native holdings in the area, surrounding the communities of Atqasuk, Utqiaġvik, and Wainwright is the 23.1 million acres NPR-A managed by the Bureau of Land Management (BLM), making it the largest contiguous block of public lands managed by a single agency in the United States. The NPR-A is known for its significant oil and gas resources, as well as its ecological and cultural importance, supporting diverse wildlife and subsistence activities for local Indigenous communities. The study area represents the northwestern portion of the NPR-A which extends over a large portion of northwest Alaska. Land ownership surrounding the study area is shown in Figure 4 and further described in this section.

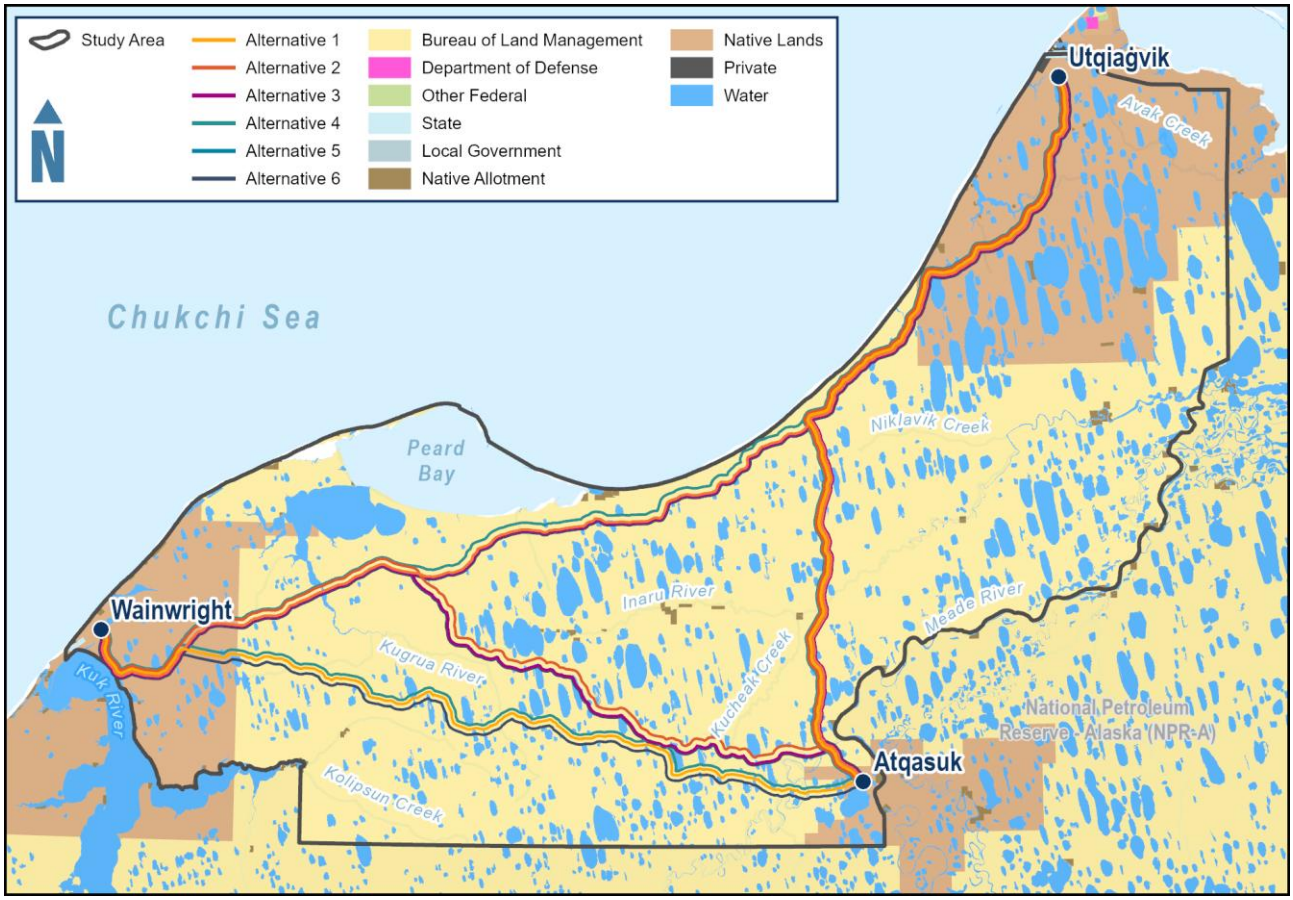

Figure 4: Land Management

2.1.2.2.1 Alaska Native Allotments

Within the NPR-A area are native allotments which are considered private property with special considerations called restrictions. These restrictions make these lands inalienable and non-taxable and are managed for the benefit of the allotee by the Bureau of Indian Affairs to protect these restrictions. Allotments occur sporadically throughout the study area and are primarily located along the shores of the many lakes and rivers within the area. Figure 5 shows the relative distribution of native allotments within the study area.

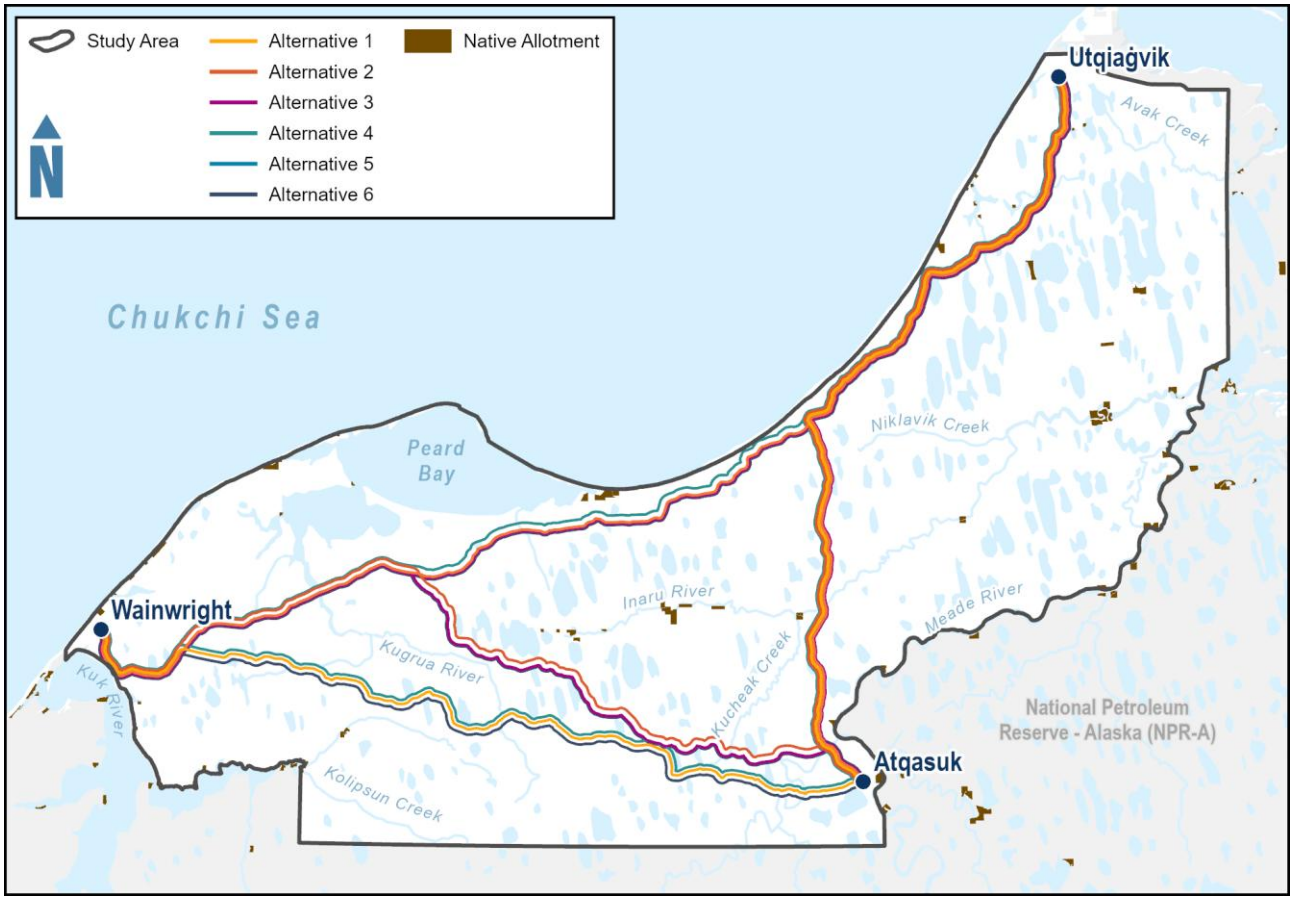

Figure 5: Alaska Native Allotments

2.1.2.2.2 Alaska Native Claims Settlement Act

Land ownership/management within the study area is comprised of BLM managed lands (public lands within the NRP-A) or ANCSA corporation lands (Native held private lands near the communities). Significant sections of the alignments pass through lands owned by the Ukpeaġvik Iñupiat Corporation for lands near Utqiaġvik (Figure 6); Atqasuk Corporation for lands near the village of Atqasuk (Figure 7); and Olgoonik Corporation for lands near the village of Wainwright (Figure 8).

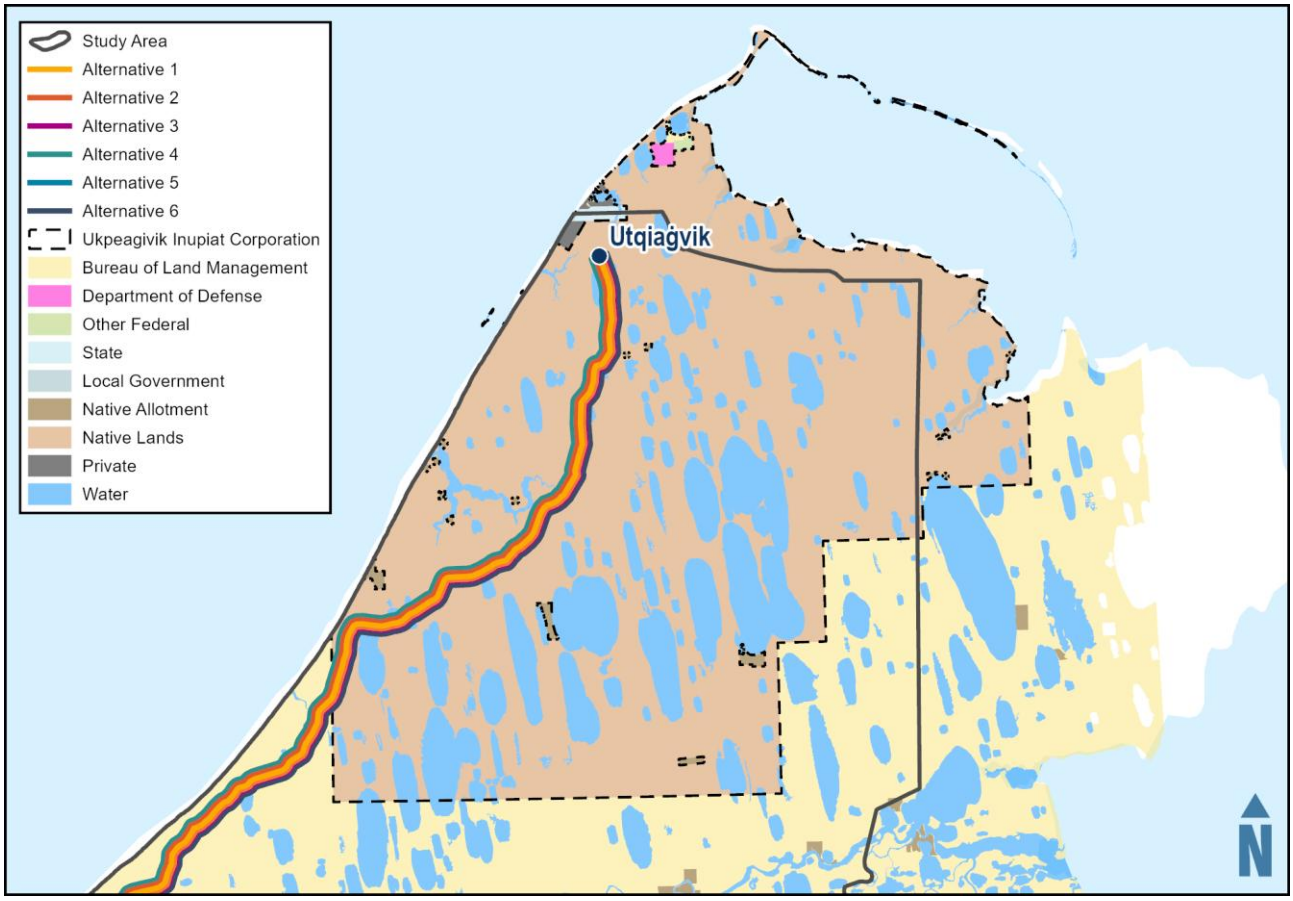

Figure 6: Utqiaġvik Inupiat Corporation Lands

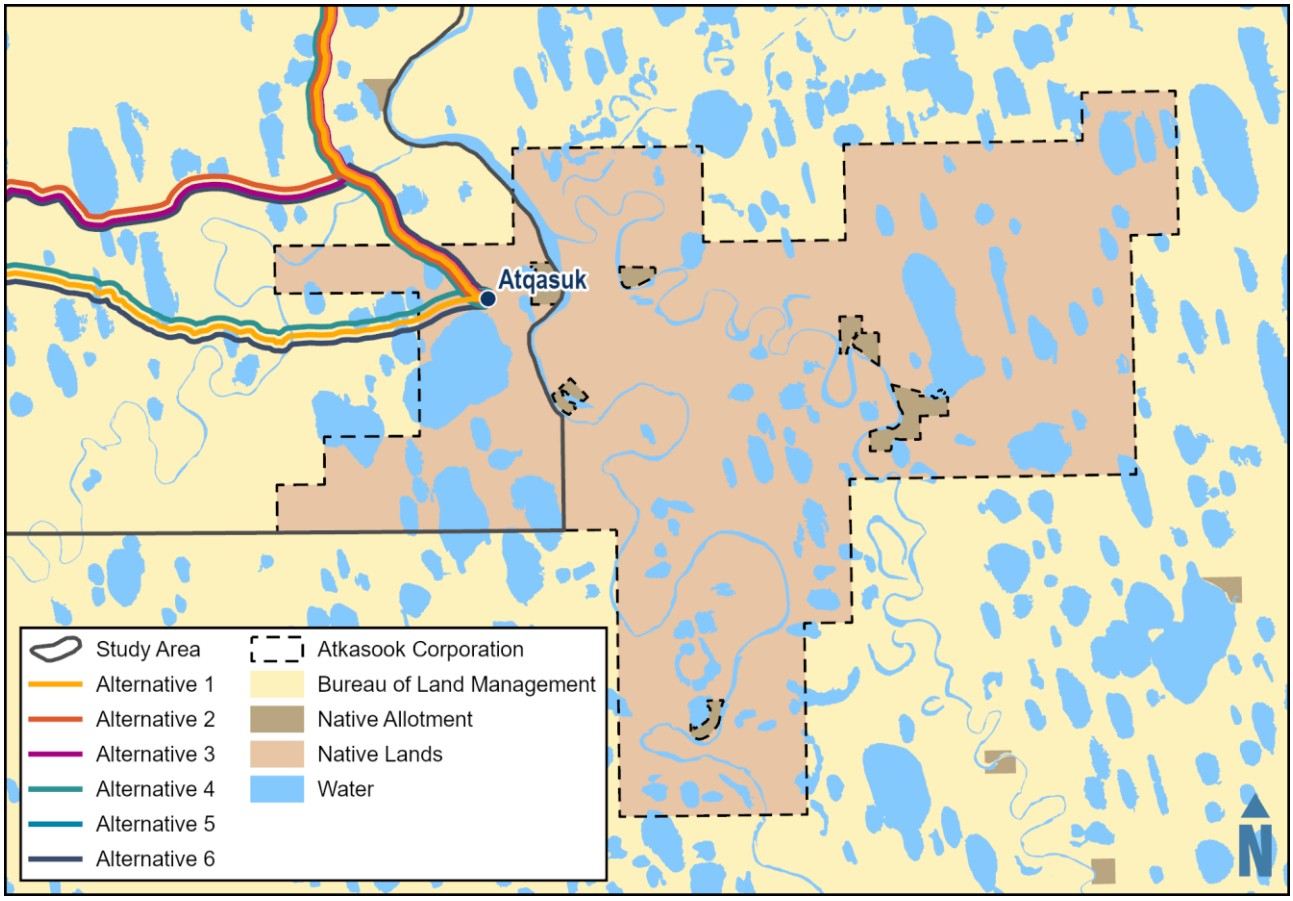

Figure 7: Atkasook Corporation Lands

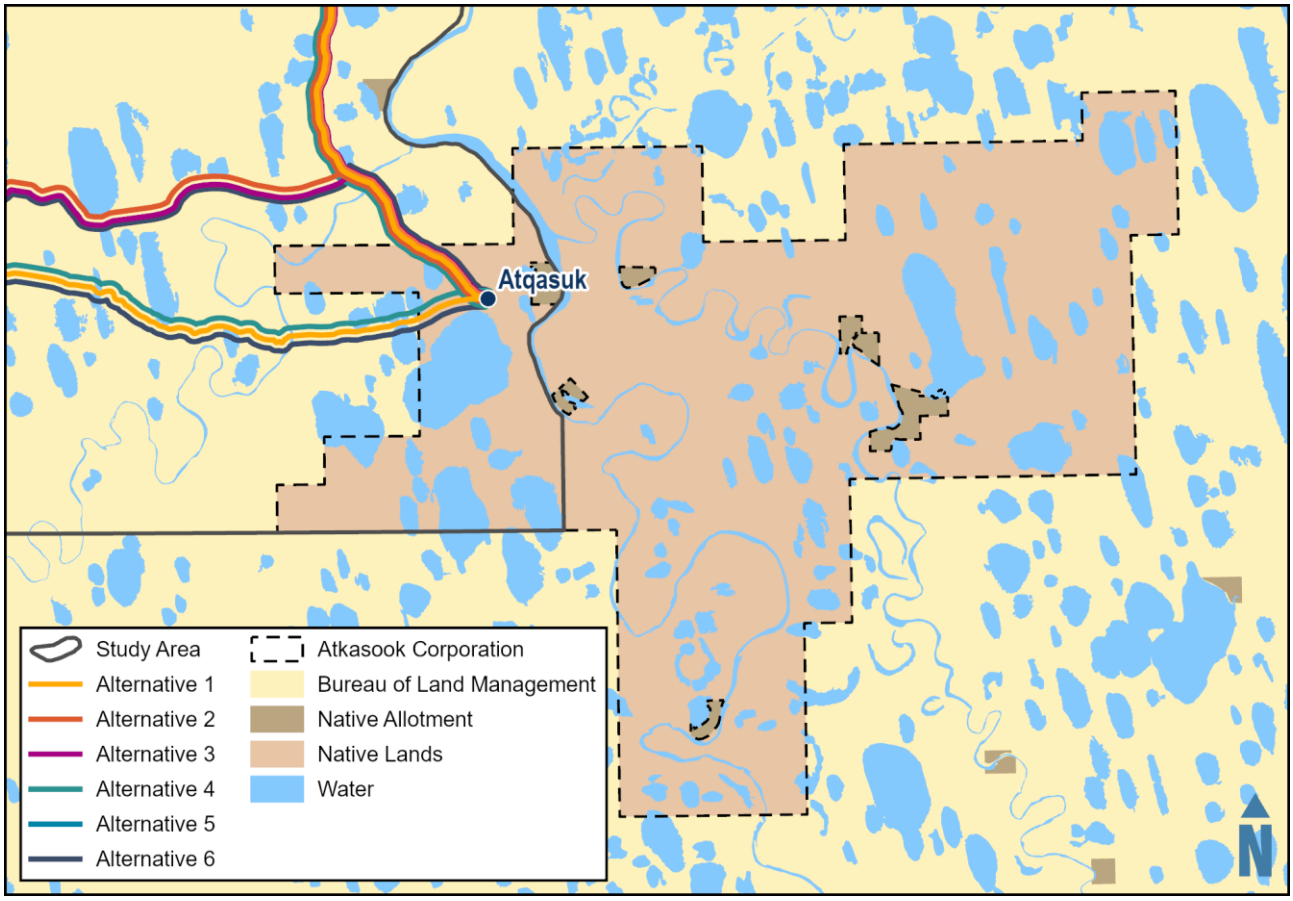

Figure 8: Olgoonik Corporation Lands

2.1.2.2.3 17(b) Easements

Land conveyed via allotments or under ANCSA are managed by the respective recipient and public access is limited. ANCSA section 17(b) established easements which allow for public access/transportation pathways but do not permit public use of surrounding private lands. The BLM is responsible for identifying, surveying, and managing 17(b) easements, which can vary in width from 25 to 60 feet for trails and roads, while sites for temporary allowed uses are typically one-acre in size. Using 17(b) easements does not allow the public to use the private lands these easements cross. It is very similar to the street in front of many homes; the public has the right to travel on the street, but they do not have the right to park their car in your driveway or explore your backyard without permission. Figure 9 shows 17(b) easements and the proximity to the road networks.

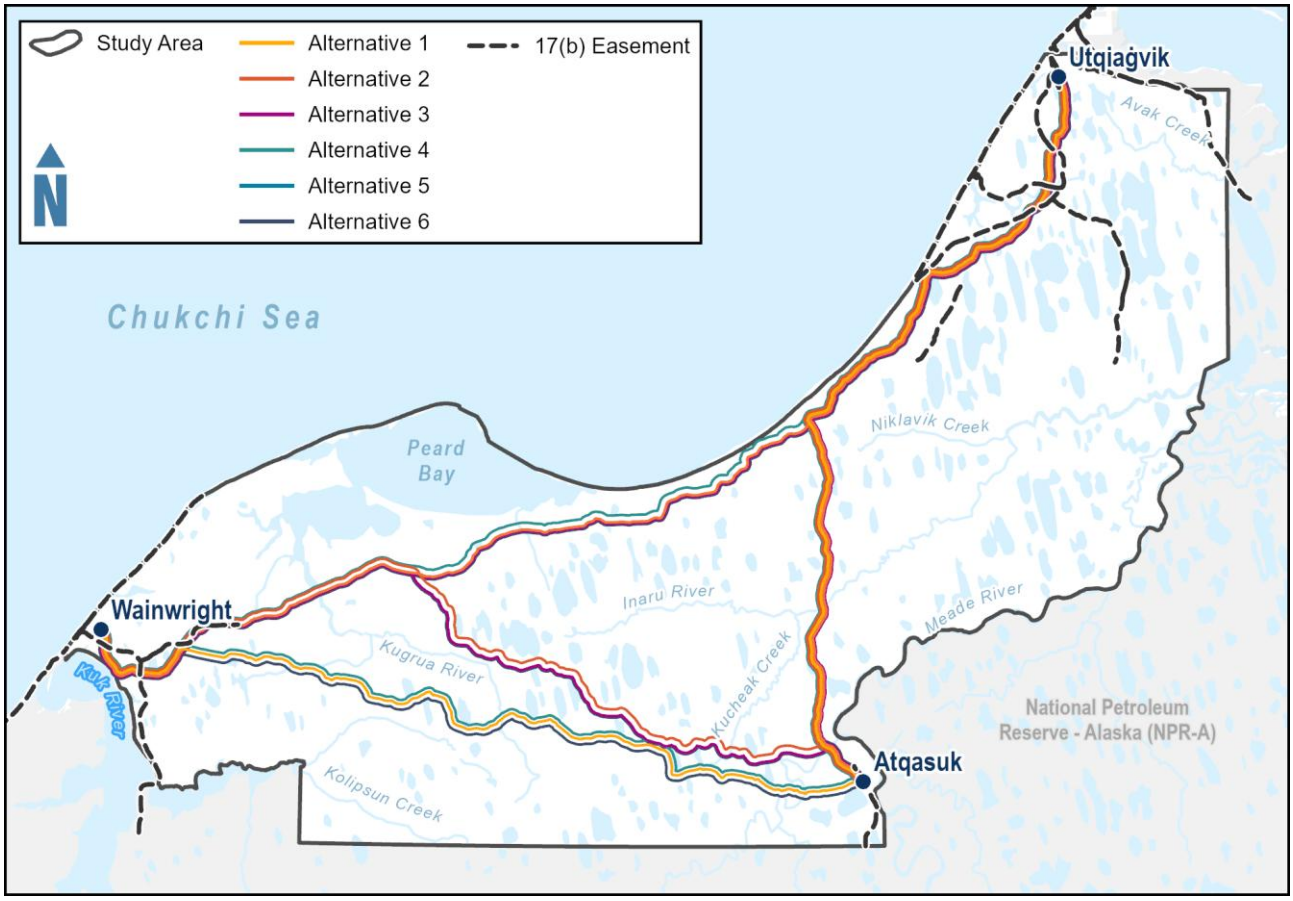

Figure 9: 17(b) Easements

2.1.2.2.4 Section 4(f)

Section 4(f) of the Department of Transportation Act (codified at 49 US Code (USC) 303 and 23 USC 138) states that the FHWA may not approve the use of land from a significant publicly owned public park, recreation area, wildlife and waterfowl refuge, or any significant historic site unless a determination is made that there is no feasible and prudent alternative to the use of land from the property and that the action includes all possible planning to minimize harm to the property resulting from such use, or unless the impact is determined to be a “de minimis” impact. Use is defined as permanently incorporating land into a transportation facility, or when proximity impacts are so severe that the protected activities, features, or attributes are substantially impaired, termed “constructive use”. Temporary occupancy can also be considered a use of 4(f) properties if it causes adverse effects which last long enough that they interfere with the property’s normal functions, or those impacts cannot be fully restored once construction is complete, such as through reclamation.

2.1.2.2.5 Section 6(f)

Section 6(f) of the Land and Water Conservation Fund (LWCF) protects lands acquired or improved with LWCF funds. It requires that if such lands are converted to non-recreational use, they must be replaced with land of equal or greater value and utility. The LWCF is a National Park Service (NPS) program, administered by the Alaska Department of Natural Resources. While public parks are protected under Section 4(f), only those parks which were improved using LWCF funds are additionally covered under Section 6(f) and the NPS.

2.1.2.3 Potential Impacts

There are no native allotments or 4(f) or 6(f) protected features near any alternative.

There are no identified parks, recreation areas, or refuges within the study area. There is, however, the Peard Bay Special Area north of Wainwright and other special areas near the study area as shown in Figure 10. The Peard Bay Special Area, considered a potential Aquatic Resources of National Importance, and the NRP-A Record of Decision (ROD) lease stipulations, were considered during initial corridor alignments. As such, the impacts to the Peard Bay Special Areas were totally avoided while others impacts addressed within the ROD are unavoidable such as *Stipulation K-1 River Setbacks* (no alternative totally avoided river setbacks or crossings as bridge construction was inevitable). The best management practices (BMP) within the ROD state that permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines, are prohibited in the streambed and adjacent to the rivers within the setback distance. However, on a case-by-case basis, essential pipeline and road crossings will be permitted through the setback areas. Although the proposed road network is not [directly] related to oil and gas development or facilities, the ROD also states BMPs in the ROD are applicable for all authorized (not just oil and gas) activities in the planning area.

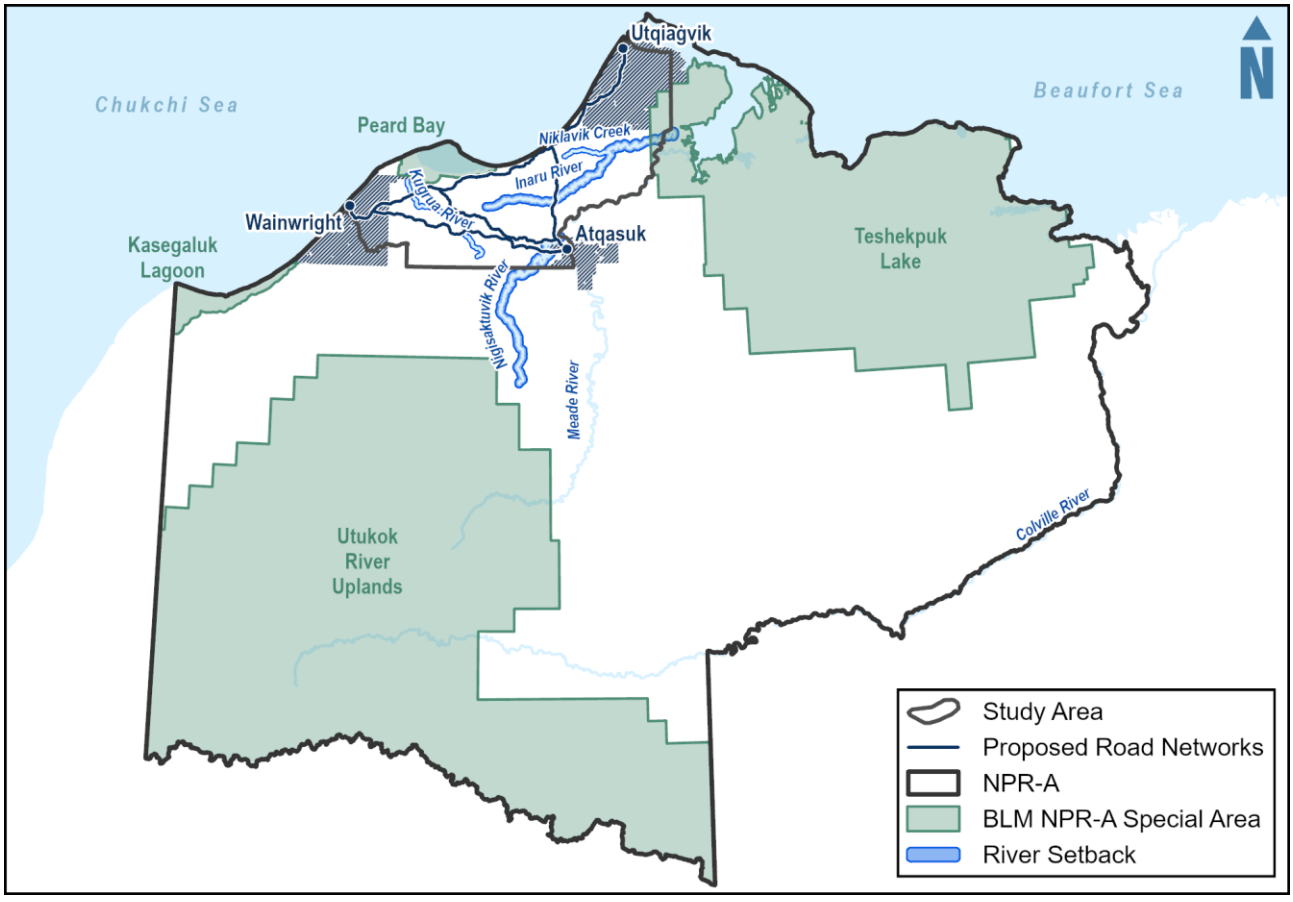

Figure 10: BLM NPR-A Special Areas

Source: BLM NPR-A Record of Decision

Land ownership between the communities is a combination of Tribal and Federal lands where the respective organizations will need to be consulted and construction approved and permitted. Depending on the final alignment, and road ownership, land conveyances will be required. Land requirements for the six road alternatives are provided in Table 3.

Table 3: Road Network Alternative Land Manager

ROAD NETWORK	LENGTH (MILES - ROUNDED)	LAND MANAGER		
		ALASKA NATIVE LANDS PATENTED OR INTERIM CONVEYED (ACRES)	BUREAU OF LAND MANAGEMENT (ACRES)	TOTAL AREA (ACRES)
Alternative 1	135	231.39	582.53	814.67
Alternative 2	131	222.95	521.92	745.74
Alternative 3	136	222.95	579.62	803.44
Alternative 4	171	222.95	776.19	1,000.01
Alternative 5	190	262.02	857.55	1,120.89
Alternative 6	144	262.02	946.05	1,209.39

The proposed networks intersect 17(b) easements at various points along their path, as Shown in Figure 8. 17(b) easements occur primarily south of Utqiaġvik within Ukpeaġvik Iñupiat Corporation lands and northeast of Wainwright within Olgoonik Corporation lands; with no easements occurring within BLM land as these lands are already public.

2.1.3 Historic and Cultural Resources

2.1.3.1 Regulatory Framework

Cultural resources are those that may have historical and/or traditional value. They are physical resources associated with people, society, or multiple societies. They consist of both built and natural parts of the physical environment and have some cultural value to one or more sociocultural groups. Cultural resources exhibiting evidence of past human activity include sites, features, or artifacts.

Historic properties are a special subset of cultural resources. A historic property is a cultural resource, generally 50 years of age or older, included in or eligible for inclusion in the National Register of Historic Places (National Register). A historic property may be a prehistoric or historic district, site, building, structure, or object. These criteria are:

- Association with one or more important historic events.
- Association with a person or people who are historically significant. The property illustrates the person's or people's importance or important achievements.
- Association with historically significant design, craftsmanship, or construction.
- Potential to provide information to answer important research questions regarding the understanding of the past (NPS 2002).

The project has potential to impact historic properties such as historic structures, archaeological sites, historic and prehistoric districts, traditional cultural properties, or traditional land use areas. Federal,

State, and NSB ordinances, laws, and policies are in place to protect historic properties as shown in Table 4.

Table 4: Historic Properties Protection

GOVERNMENT LEVEL	APPLICABLE LAWS, POLICIES, AND ORDINANCES
Federal	National Historic Preservation Act, Section 106 National Environmental Policy Act Archaeological Resource Protection Act Antiquities Act of 1906 Native American Graves Protection and Repatriation Act
State	Alaska Historic Preservation Act (AS 41.35) Alaska Administrative Code (11 AAC 16)
North Slope Borough	NSBMC § 19.50.030(F) and § 19.60.040(K)

The proposed project will likely fall under the purview of multiple organizations, as outlined above, such as Section 106, which states any federal undertaking must take into consideration its impacts on historic properties. A federal undertaking includes projects occurring on federal lands, requiring a permit from a federal agency, or obtaining funding from a federal source.

2.1.3.2 Existing conditions

The Alaska Heritage Resource Survey (AHRS) database, maintained by the State of Alaska, Office of History and Archaeology (OHA), identified 101 sites within the study area. Table 5 shows those sites near the road networks.

Table 5: AHRS Sites

SITE NUMBER	NAME	DESCRIPTION	NATIONAL REGISTER STATUS
XMR-00055	PA, M7175	Paleontological site consisting of gastropods, pelecypods	n/a
WAI-00082	LIZ-3	Auxiliary station of the Distant Early Warning	Eligible
WAI-00083	Gravel Structures Wainwright Long Range Radar System (LRRS) Road System	The road system at Wainwright Short Range Radar Site (SRRS) are 12 feet (ft) and cover 23,000 ft. The roadbed is raised about 5.5 ft above the surrounding elevation.	Eligible
WAI-00084	Gravel Structures/Wainwright LRRS Airfield	The Wainwright airfield is built up with gravel to provide insulation.	Eligible
WAI-00085	Gravel Structures/Wainwright LRRS Gravel Pad System	The Wainwright SRRS gravel pad system covers approximately 782,500 square (sq.) ft and was meant to provide dry frozen ground beneath site facilities.	Eligible
WAI-00123	Building 1	Building 1 was built in 1957 to provide both radar facilities and living quarters. The geodesic radar dome extends above the rectangular structure and is supported by a square platform.	Eligible
WAI-00125	Building 3	Building 3 was built in 1957 as a warehouse but has since been deactivated.	Eligible
WAI-00126	Building 3001	Building 3001 was built in 1957 as a supply and equipment shed. This 96 sq ft building has a rectangular plan.	Eligible
WAI-00127	Building 3009	Building 3009, a small 384 sq ft one story building, was built in 1985 to house the site's emergency generator. It is a metal skid-mounted structure supported by one layer of timber.	Not Eligible
WAI-00128	Building 3021	Built in 1985 for storage space, Building 3021 has a total area of 1,008 sq ft and has a typical Quonset hut style. The building has a steel frame covered with galvanized siding and a roll-up door on one end.	Not Eligible

Source: Accessed March 28, 2025

On Federal lands, such as those managed by the BLM between the communities, federal regulations establish a framework designed to protect paleontological resources while allowing for other permitted activities. Under these regulations, primarily derived from the Paleontological Resources Preservation Act (PRPA) as implemented through 43 CFR Part 49, any collection, excavation, or removal of fossilized remains requires a permit issued by the BLM. In addition, the regulations empower BLM to designate specific areas for closures or restrictions if significant fossil sites are present, thereby minimizing adverse impacts and ensuring that any potential disturbance is carefully managed. The BLM has also developed management practices to limit environmental impacts, such as those from sand and gravel mining, as outlined in the ROD specific to the NPR-A.

2.1.3.3 Potential Impacts

All road alternatives connecting Wainwright would come in close proximity to nine AHRS sites near the Short Range Radar site. Future route adjustments or other mitigation measures can be implemented to preserve cultural resources that are currently known or are identified during later project stages. Additionally, there is one known paleontological site near the road networks (XMR-00055), however, the subject of archaeological resources is poorly understood within much of Alaska due to inaccessibility and the geographic size of the region. If remains are discovered that would trigger consultation, such as the discovery of remains on BLM lands, PRPA consultation with the U.S. Department of the Interior (as delegated by the BLM) would be required. Tribal lands are specifically excluded from PRPA, however, if remains are found within BLM lands that are of significance to the communities, government-to-government consultation may be required.

2.2 Natural Environment

2.2.1 Geologic and Geotechnical Considerations

2.2.1.1 Regulatory Framework

Geologic and geotechnical investigations for federally funded transportation and infrastructure projects are guided primarily by FHWA policy and technical standards such as the Geotechnical Technical Guidance Manual, adopted in the DOT&PF Geotechnical Procedures Manual. This aligns with national specifications and adds Alaska-specific requirements for permafrost, frost heave, and cold-region soil behavior. The guidance documents outline the required processes for site characterization, materials testing, slope stability evaluation, and foundation design. These manuals establish minimum expectations for identifying and mitigating geologic hazards such as landslides, permafrost degradation, seismic activity, and soil instability.

2.2.1.2 Existing Conditions

The North Slope of Alaska is generally characterized by flat tundra underlain by continuous permafrost which can extend over a thousand feet below the grounds surface. The active layer (the area which seasonally thaws and freezes) varies in thickness but is typically less than three feet which poses geotechnical constructability challenges such as identifying suitable roadbed materials and drainage/materials to mitigate frost heave.

In addition to known material sources near the respective communities, shown in Figure 11, Figure 12, and Figure 13, additional roadway gravel mines would need to be established. Potential sources have been identified but are yet to be explored and confirmed. In 2021, geologists from Alaska DNR conducted field data at 99 sites in northwestern Alaska between the communities of Wainwright, Atqasuk, and Utqiaġvik in support of the ASTAR sand and gravel resource assessment project. In 2022, DNR returned to conduct Capacitively-Coupled Resistivity (CCR) surveys along the first 10 miles of roadway from Utqiaġvik. Possible gravel sources were identified near Utqiaġvik outside areas previously identified during the desktop analysis (Preliminary Interpretive Report 2023-1).

The U.S. Geological Survey (USGS) has prepared seismic hazard maps for Alaska that portray the probability of ground motion and peak ground acceleration due to an earthquake. For the NPR-A, the USGS estimates peak ground accelerations of 0.041g (where g equals the acceleration due to gravity). This indicates there is a five percent probability that this acceleration would be exceeded in 50 years and therefore, the NPR-A is in an area of relatively low seismic risk.

Figure 11: Wainwright Existing Gravel Source

Figure 12: Atqasuk Existing Gravel Source

Figure 13: Utqiaġvik Existing Gravel Source

2.2.1.3 Potential Impacts

The project proposes to use existing gravel sources, which will deplete their stockpiles and mine useful life. The construction of gravel mines along the alternatives will lessen these impacts, however, the establishment of a gravel mine brings ecological disturbances. Environmental impacts are expected from the establishment of gravel mines and the construction of the road through placement of that gravel. These impacts can be mitigated through establishing mines at sites with higher concentrations of quality material and through close-out stabilization efforts.

The typical section are provided in Figure 14, Figure 15, and Figure 16 and summarized in Table 6. Each alternative requires several million cubic yards of gravel, not including other features such as bridge embankments, pullouts, or culverts, significant gravel resources would need to be identified to complete the Triangle Community Road in addition to existing resources.

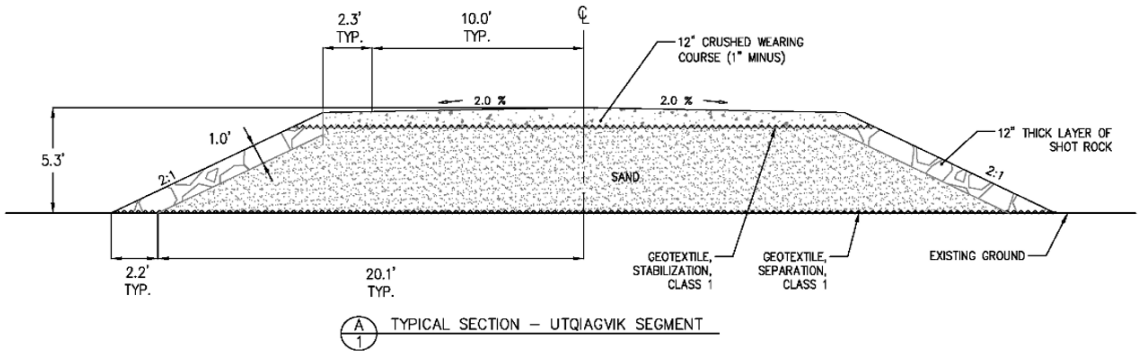

Figure 14: Utqiaġvik Typical Section

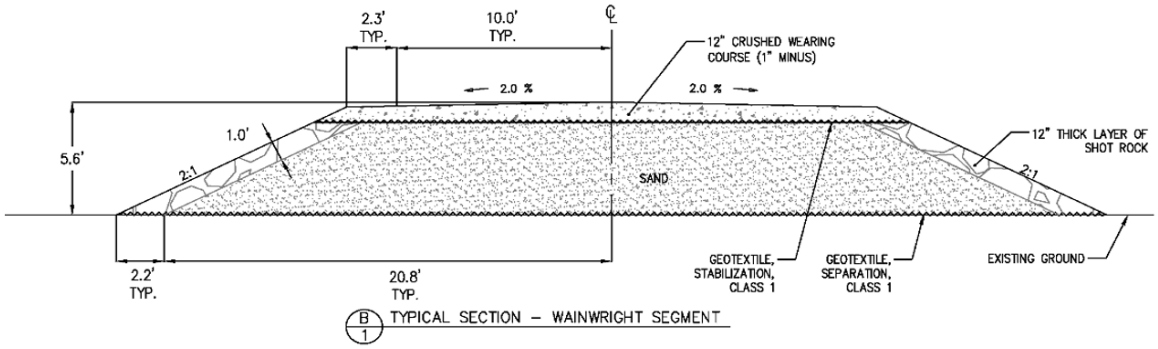

Figure 15: Wainwright Typical Section

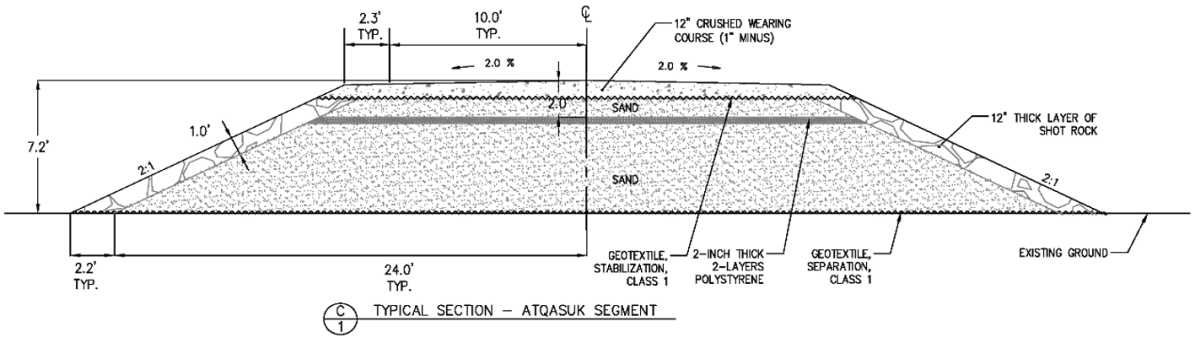

Figure 16: Atqasuk Typical Section

Table 6: Alternative Gravel Requirements

ALTERNATIVE	LENGTH (MILES)	VOLUME (CUBIC YARDS)
Alternative 1	135	6,716,818
Alternative 2	131	5,502,069
Alternative 3	136	6,400,965
Alternative 4	171	7,767,132
Alternative 5	190	8,842,357
Alternative 6	144	11,036,921

Additional investigation will be needed to determine whether viable gravel sources exist within or near the ASTAR study area in close proximity to the road network alternatives. The preliminary DNR Division of Geological and Geophysical Survey datasets (RDF 2023-4, 2023-5, 2023-12, and 2023-13) provide a useful foundation, documenting surface soil descriptions and limited geotechnical sampling from sites near Utqiaġvik, Atqasuk, and Wainwright. However, these data are largely reconnaissance-level and were not collected with the intent of confirming borrow suitability or volumetric availability. Many of the test sites indicate shallow permafrost, variable ice content, and limited surficial gravel deposits. As a result, focused subsurface exploration (such as drilling, test pitting, and laboratory materials testing) will be necessary to confirm grain size distribution, frost susceptibility, and thaw settlement potential.

2.2.2 Water Quality

2.2.2.1 Regulatory Framework

The State's Water Quality Standards (WQS) (found in the Alaska Administrative Codes (AAC) 18 AAC 70) are composed of waterbody use classifications and numeric and/or narrative water quality criteria and established by the Alaska Department of Environmental Conservation (DEC).

- The use classification system identifies the designated uses that each waterbody is expected to achieve.
- The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska also have site- specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

Any part of a waterbody for which the water quality does not, or is not expected to meet, applicable WQS is defined as a "water quality limited segment" and placed on the state's impaired waterbody list. For an impaired waterbody, Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan. The TMDL documents the amount of pollutants a waterbody can assimilate without violating a State's WQS and allocates that load to known point sources and nonpoint sources. Generally, TMDLs ensure that even areas affected by historical or ongoing pollution receive focused attention and remediation for the specific pollutants of concern.

Discharges to waterbodies are regulations under a dual framework of federal and state mandates designed to protect water resources for a variety of uses. The Clean Water Act (CWA) sets the overarching regulatory requirements, including Section 402 (National Pollutant Discharge Elimination System), Section 404 (dredge and fill), and Section 401 (State water quality certification), which ensures that projects comply with State and Federal standards.

2.2.2.2 Existing Conditions

Major receiving waters for this discharge (Neade River, Inaru River, Nigisaktuvik River, Kucheak Creek, Kunarak Creek, Papigak Creek, Walik Creek, Kugrua River, Kungok River, Sinaruruk River, and Kuk River) have not been reclassified, nor have site-specific water quality criteria been established. Therefore, existing uses and designated uses are the same and must be protected for all use classes as per 18 AAC 70.020(a)(2) and 18 AAC 70.050. The designated use classes for fresh water include: water supply for drinking, culinary, and food processing; water supply for agriculture, including irrigation and stock watering; water supply for aquaculture and industry; contact and secondary recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife. According to the DEC Integrated Water Quality Monitoring and Assessment Report, there are no 303(d) impaired waterbodies within the study area. As such, the Integrated Report does not list the study area as impaired or subject to a proposed or approved TMDL.

Water quality in the region is influenced seasonally as the active layer of the tundra thaws and spring break-up causes erosion. Due to the expansiveness of the wetlands and their capacity to filter surface waters, the water quality in the region would be expected to be representative of background levels with essentially no manmade impacts.

2.2.2.3 Potential Impacts

During construction, stormwater discharges would need to be evaluated for potential impacts to surrounding wetlands and waterbodies such that those impacts are limited to the extent practical. Construction stormwater best management practices should be installed as one of the first steps in construction and temporary and permanent stabilization implemented on portions of construction which have completed ground disturbing activities. DEC has assumed primacy of Section 402 of the CWA and implements the Alaska Pollutant Discharge Elimination System (APDES) program, which authorizes the discharge of construction stormwater to WOTUS (Waters of the United States) and Water of the State under the Construction General Permit.

During in water work, additional permits and controls would be required, such as US Army Corps of Engineers (USACE) 404 permits, Alaska DEC 401 Certificate of Reasonable Assurance, Alaska DNR Land and Water Land Use Permit, and Alaska Department of Fish and Game (ADF&G) Habitat Permits. Each permit/authorization can carry with it site specific or general requirements prior to, during, and post construction.

2.2.3 Hydrology

2.2.3.1 Regulatory Framework

Hydrology examines the means and method of water movement through an environment. Regulation of hydrologic resources (the physical water) is primarily managed by the Alaska DNR, particularly through its Division of Mining, Land and Water. This Division, including its Hydrologic Survey Unit, is responsible for collecting, analyzing, and distributing water data and for administering water rights under state laws such as the Alaska Water Use Act. These regulations ensure that water resources are allocated for industrial, agricultural, and municipal use while safeguarding water quality and maintaining necessary instream flows for environmental health. Federal agencies like the US Geological Survey and the Environmental Protection Agency (EPA) also contribute to the monitoring and regulatory framework, which makes sure that Alaska's hydrologic data supports both state and federal water quality standards and resource management goals.

Within the NPR-A, the BLM would examine the direct, indirect, and cumulative hydrologic impacts of the road networks to include:

- Changes in surface water coverage
- Reduced infiltration
- Increased run-off
- Drainage rerouting (ditches/culverts)
- Thermal disturbance in permafrost
- Surface impacts (such as new ponding areas)

2.2.3.2 Existing Conditions

The open-water hydrologic cycle in NPR-A is characterized by a short, intense break-up event followed by quickly receding flood levels and a prolonged period of low flows, with small occasional rain-induced flow events. In winter months, little to no flow occurs in most small streams. The spring breakup flood generally occurs between mid-May and mid-June. The flood peak magnitude and total volume depends on several factors: accumulation of winter snowfall, additional rainfall during breakup, ambient temperature, intensity of sunlight, and ice and snow jamming effects.

The region is broken into hydrologic unit codes (HUCs) by the US Geological Survey to specify specific watersheds. Within the study area, alternatives pass through distinct 10-digit watersheds identified within Figure 17, Figure 18, and Figure 19.

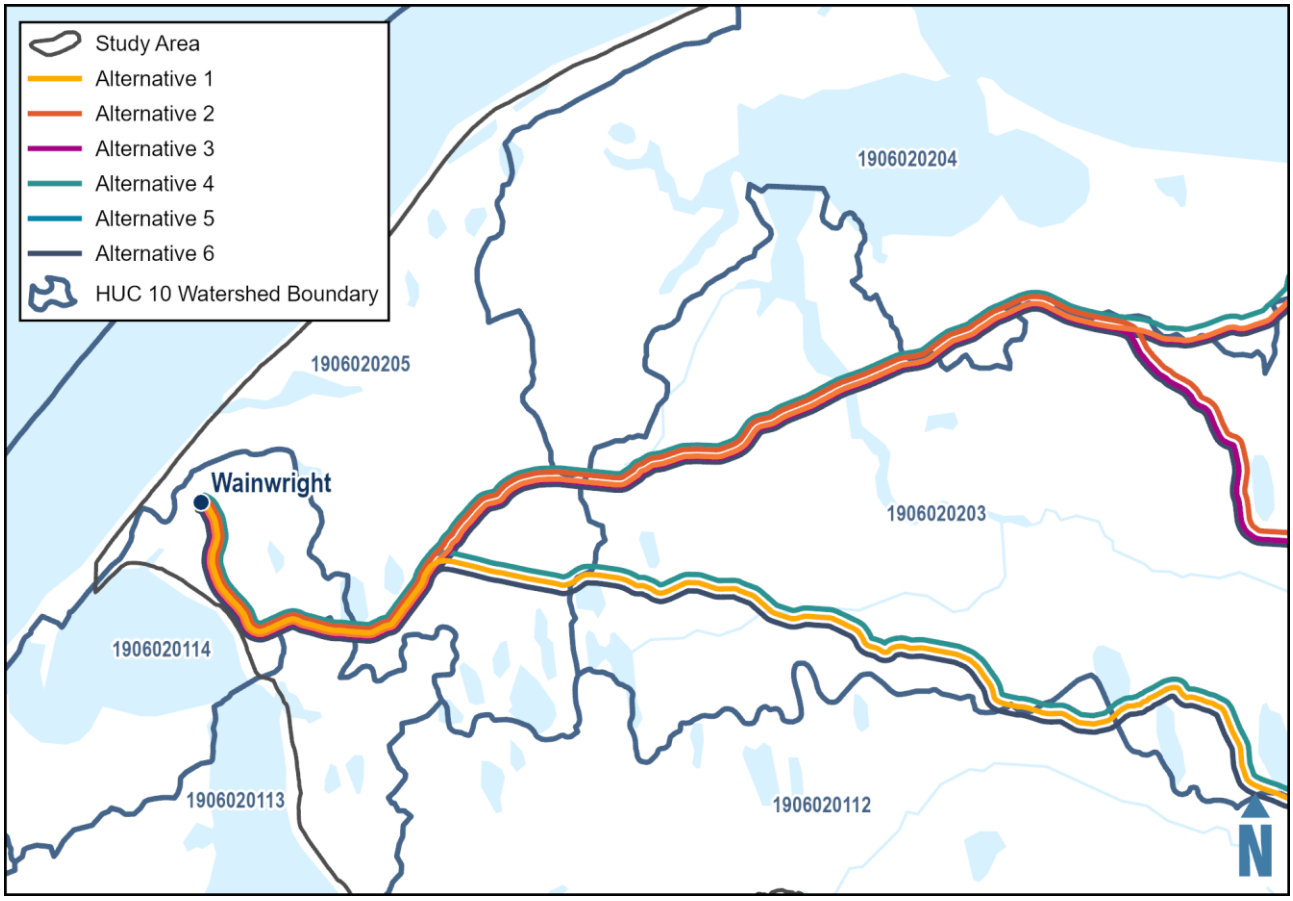

Figure 17: Wainwright Watershed District

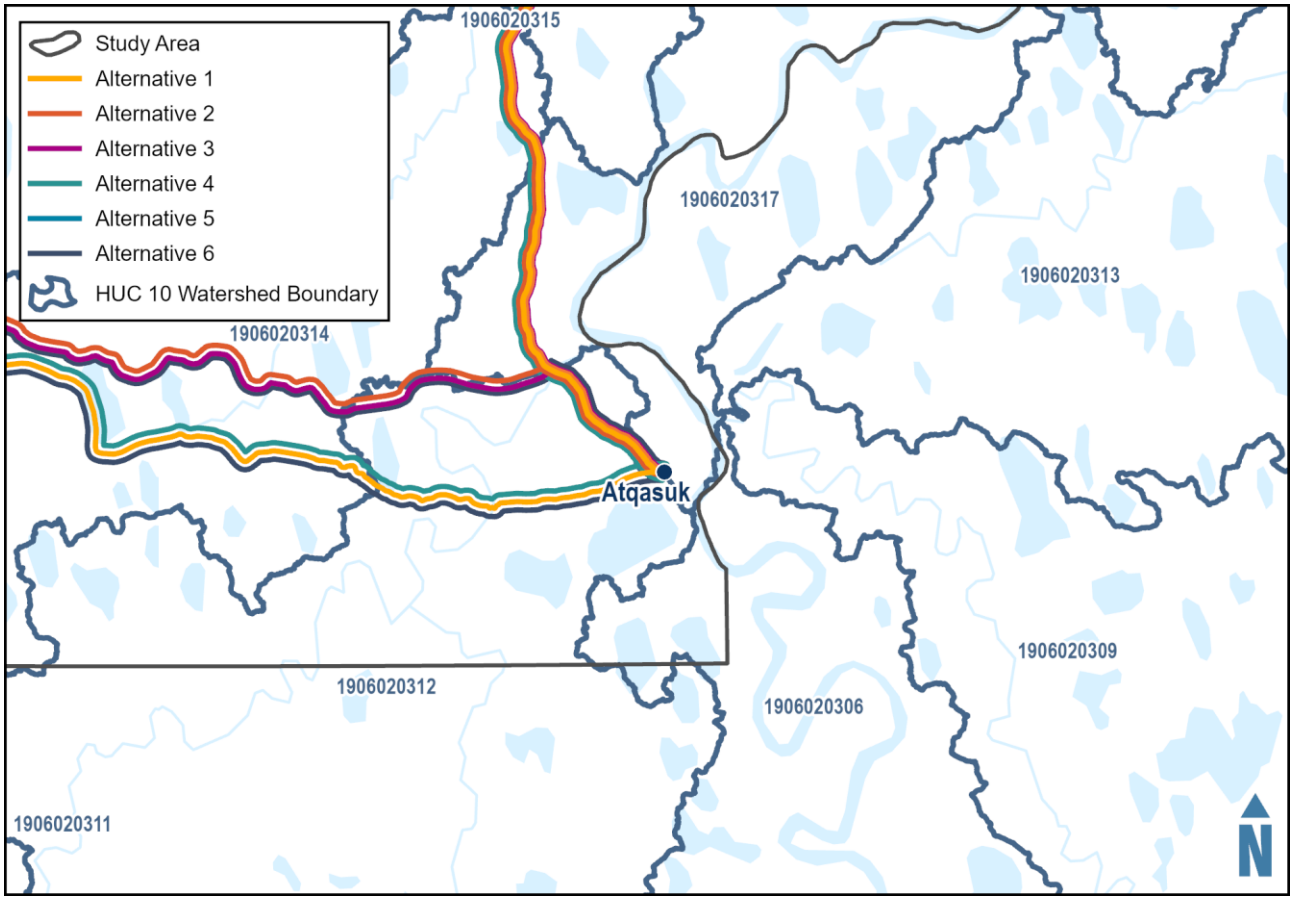

Figure 18: Atqasuk Watershed District

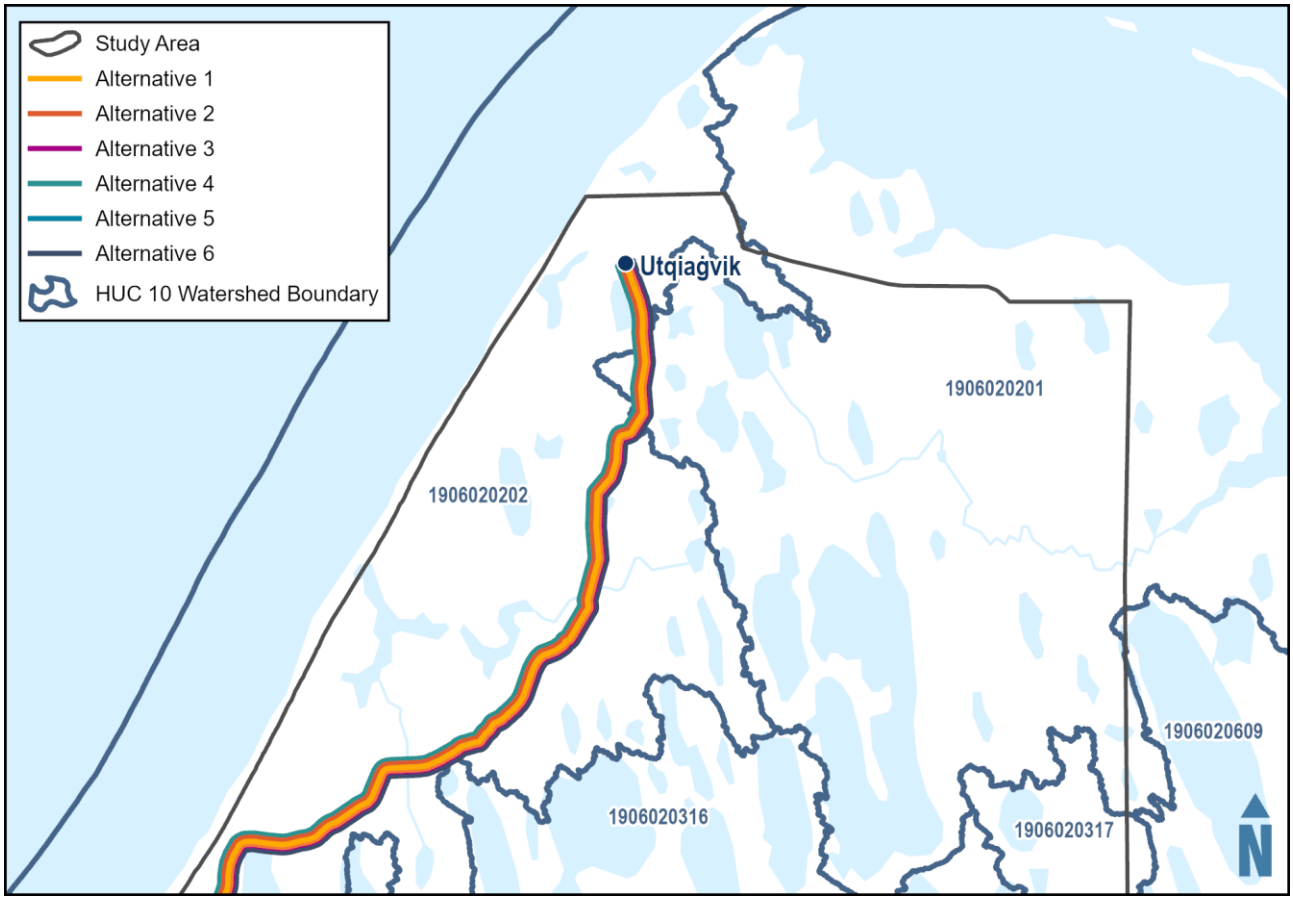

Figure 19: Utqiaġvik Watershed District

2.2.3.3 Potential Impacts

As the land manager for the NPR-A, BLM must ensure that the project design and permitting incorporates actions that avoid, minimize, or compensate for adverse effects to surface water, wetlands, permafrost, and tundra hydrology. These measures may include limiting construction during sensitive seasonal periods (such as spring break-up), maintaining natural drainage patterns, using appropriately sized culverts and erosion controls, and use of bridges where necessary to limit impediments to flowing water, and restoring disturbed areas to maintain hydrologic function. However, some level of impact is unavoidable.

Table 7 specifies the rivers which will require set-back waivers for river crossings, such as bridges, and development of the road which encroach on the set-back distances specified within the ROD.

Table 7: NPR-A 2025 Required Operating Procedures and Lease Notices

REFERENCE	WATERBODY	SETBACK DISTANCE
BMP/ROPs K-1 River Setbacks	Niklavik Creek	0.5 mile
	Inaru river	One mile
	Kugrua river	One mile
	Nigisaktuvik River	One mile

2.2.4 Wetlands

2.2.4.1 Regulatory Framework

The regulatory framework governing wetland disturbance during construction activities is primarily established under the CWA and enforced by the USACE and the EPA, along with state and local agencies, such as the Alaska DEC. As outlined within the CWA, wetlands under the jurisdiction of the USACE fall within a subset which are categorized as WOTUS. Both perennial and intermittent waterways are considered WOTUS if a bed, bank, or channel is present that clearly shows an ordinary high-water mark. The key regulations include:

- Section 404 of the CWA – Requires a permit from USACE for the discharge of dredged or fill material into WOTUS including navigable waters or wetlands. The permit process evaluates alternatives, minimizes impacts, and may require mitigation for unavoidable impacts. If wetland impacts are unavoidable, applicants may need to compensate for the loss by restoring, enhancing, or creating wetlands elsewhere. The USACE Mitigation Rule (33 CFR Part 332) outlines mitigation requirements, including the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation.
- Section 401 Water Quality Certification – Before a Section 404 permit is issued, the State must certify that the discharge will not violate the Alaska Water Quality Standards.
- Section 402 of the Clean Water Act – Within Alaska, DEC has been issued primacy to implement the Alaska Pollutant Discharge Elimination System program. Any activity that discharges water to a WOTUS (as opposed to placement of fill) is required to obtain authorization under the applicable DEC permit, which is often authorized under the DEC Construction General Permits. Many construction projects through the State have approval under both CWA Section 404 and 402.
- Local Wetlands Regulations – In addition to Federal and State requirements, local governments may have additional permitting requirements for wetland impacts, such as specified within a NSB Land Use Permits.

2.2.4.2 Existing Conditions

The NPR-A topography is comprised of a dimpled landscape covered with marshes, ponds, and braided river systems, especially during the summer when the top layer of permafrost melts, forming thermokarst lakes and wetlands. Essentially, the entirety of the NSB and NPR-A are wetlands dominated by palustrine wetlands underlain by permafrost. Wetlands within the NPR-A generally fall within one of two categories:

Freshwater emergent wetland which are:

- Not tidally impacted,
- Characterized by vegetation that is persistent (perennial plants), and
- Semi-permanently flooded.

Freshwater forested/shrub wetland in riparian areas which are:

- Not tidally impacted,
- Characterized by vegetation that is persistent including broad-leaved deciduous plantes (trees and shrubs), and
- Saturated at or near the surface for extended periods of time, but unsaturated conditions prevail.

2.2.4.3 Potential Impacts

Although all wetlands are important, not all wetlands are created equally. It is possible to estimate portions of the study area that would be more favorable, and less costly for construction or compensatory mitigation, such as those designated as “difficult to replace or threatened wetlands, or areas of designated critical habitat”. Accordingly, where possible the alternatives avoid areas which contain wetlands difficult to replace or expensive. In the scheme of permitting work within wetlands, the distinction between ‘expensive’ and ‘cheap’ would not meaningfully impact the requirements to obtain permits, only the cost or difficulty associated with use of those wetlands expressed as either cost (compensatory mitigation) or replacement (reconstruction elsewhere). It is unlikely that suitable habitat exists in the nearby area to recreate wetlands which are not already wetlands.

Large portions of the project would require permits under CWA Section 404 and 402 should onsite (jurisdictional) determinations conclude that they are WOTUS, which is overwhelmingly likely on portions of the project. According to Executive Order 11990, compensatory mitigation would be necessary to meet the national policy goal of no net loss of wetlands. Wetland impacts and type, according to the US Fish and Wildlife National Wetlands Inventory mapper, are summarized in Table 8 below.

Table 8: Wetland Type and Impacts

ALTERNATIVE	NWI WETLAND TYPE (ACRES)*							
	ESTUARINE AND MARINE DEEPWATER	ESTUARINE AND MARINE WETLAND	FRESHWATER EMERGENT WETLAND	FRESHWATER FORESTED/ SHRUB WETLAND	FRESHWATER POND	LAKE	RIVERINE	TOTAL
Alternative 1	0.00	0.00	794.26	7.72	2.18	0.18	1.32	805.65
Alternative 2	0.60	0.90	724.04	7.72	1.95	0.29	3.97	739.47
Alternative 3	0.58	0.90	780.41	8.62	1.71	0.18	0.84	793.24
Alternative 4	0.60	0.90	973.30	8.62	2.12	0.29	3.97	989.81
Alternative 5	0.60	0.90	1,095.26	7.72	2.58	0.29	4.51	1,111.87
Alternative 6	0.60	0.90	1,179.78	8.62	1.84	0.24	4.45	1,196.44

*Wetland acres differ from Table 4 as not all lands are classified as wetlands according to the NWI.

2.2.5 Threatened or Endangered Species

2.2.5.1 Regulatory Framework

Administered by the US Fish and Wildlife Service (USFWS) (terrestrial & freshwater species) and National Marine Fisheries Service (NMFS) (marine species), the Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544) provides protection for species that are either threatened or endangered. A threatened species is an animal or plant species that is "likely to become endangered within the foreseeable future throughout all or a significant portion of its range" while an endangered species is already "in danger of extinction throughout all or a significant portion of its range". This designation can apply to plants, animals, and invertebrates, however, it does not apply to pest insects or species outside their natural range (such as introduced populations for hunting/fishing).

2.2.5.2 Existing Conditions

Three species are listed as threatened within the study area: polar bears (*Ursus maritimus*), spectacled eider (*Somateria fischeri*), and Steller's eider (*Polysticta stelleri).*

2.2.5.2.1 Polar Bear

Polar bear critical habitat areas and no-disturbance zones exist within the study area, as shown in Figure 20. The road alternatives avoid these areas. Polar bear critical habitat in and around the NPR-A covers large portions of the North Slope coastal zone and adjacent nearshore marine areas. The USFWS designated this habitat in 2010 under the Endangered Species Act for the Southern Beaufort Sea population of polar bears, which are listed as threatened. The critical habitat is divided into three main units each supporting different essential life functions: terrestrial denning, barrier island, and sea-ice habitat.

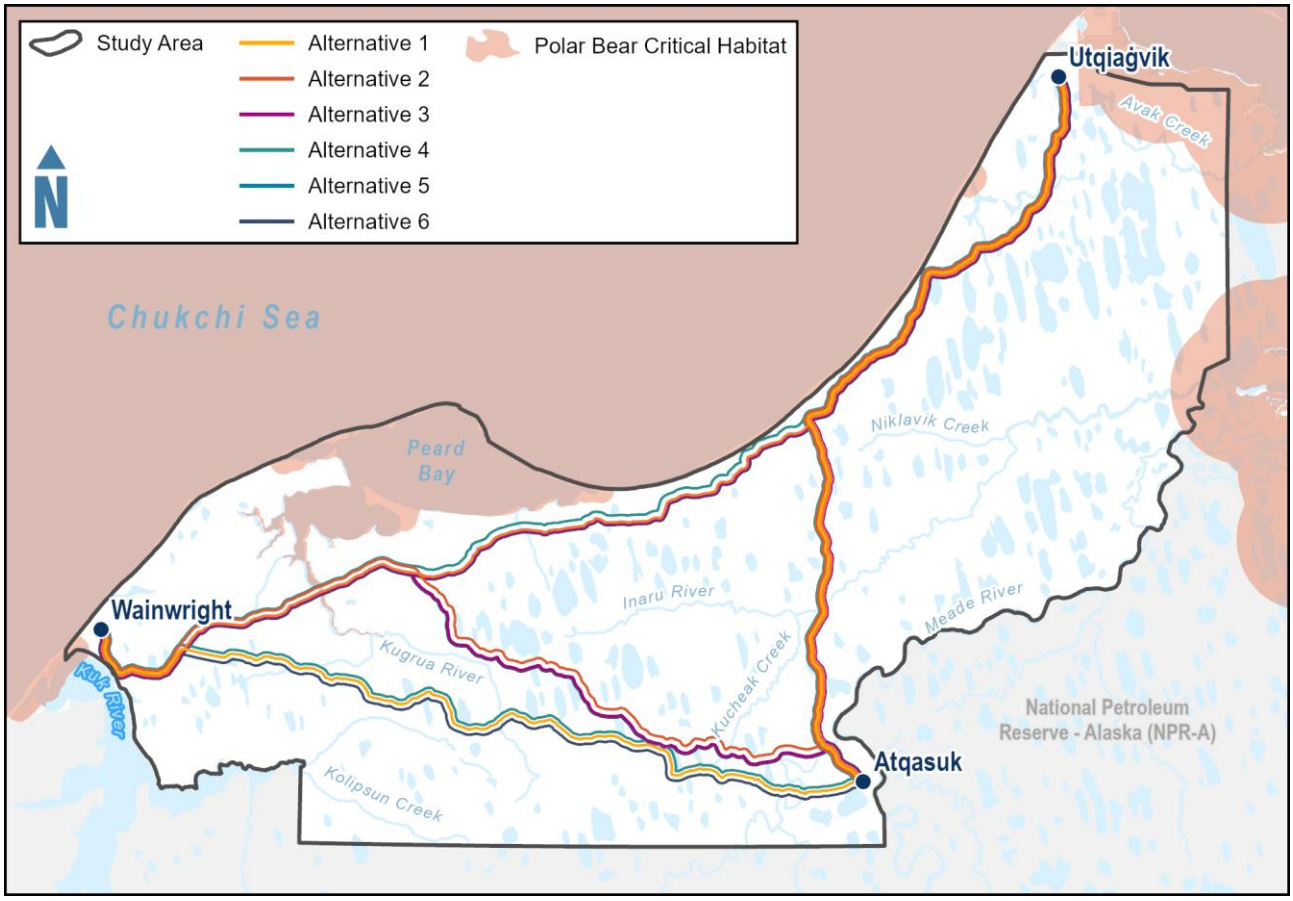

Figure 20: Polar Bear Critical Habitat

2.2.5.2.2 Eider

Steller's eider is a small sea duck listed as a threatened species under the Endangered Species Act on June 11, 1997, based on a decline in population possibly resulting from hunting, ingestion of lead shot, predation, and changes in the marine environment that may be affecting eider food resources.

In 2000, the USFWS proposed critical habitat for Alaska's breeding population which was later designated in 2001. The proposal established approximately 1.8 million acres of critical habitat on the Yukon-Kuskokwim Delta and Kuskokwim Shoals, Sea Islands, Nelson Lagoon, and Izembek Lagoon in western Alaska, as shown in Figure 21.

Spectacled eider nesting areas coincide closely with Steller's eider, occurring primarily around Utqiaġvik with essentially no nesting occurring beyond 10 miles south of the community.

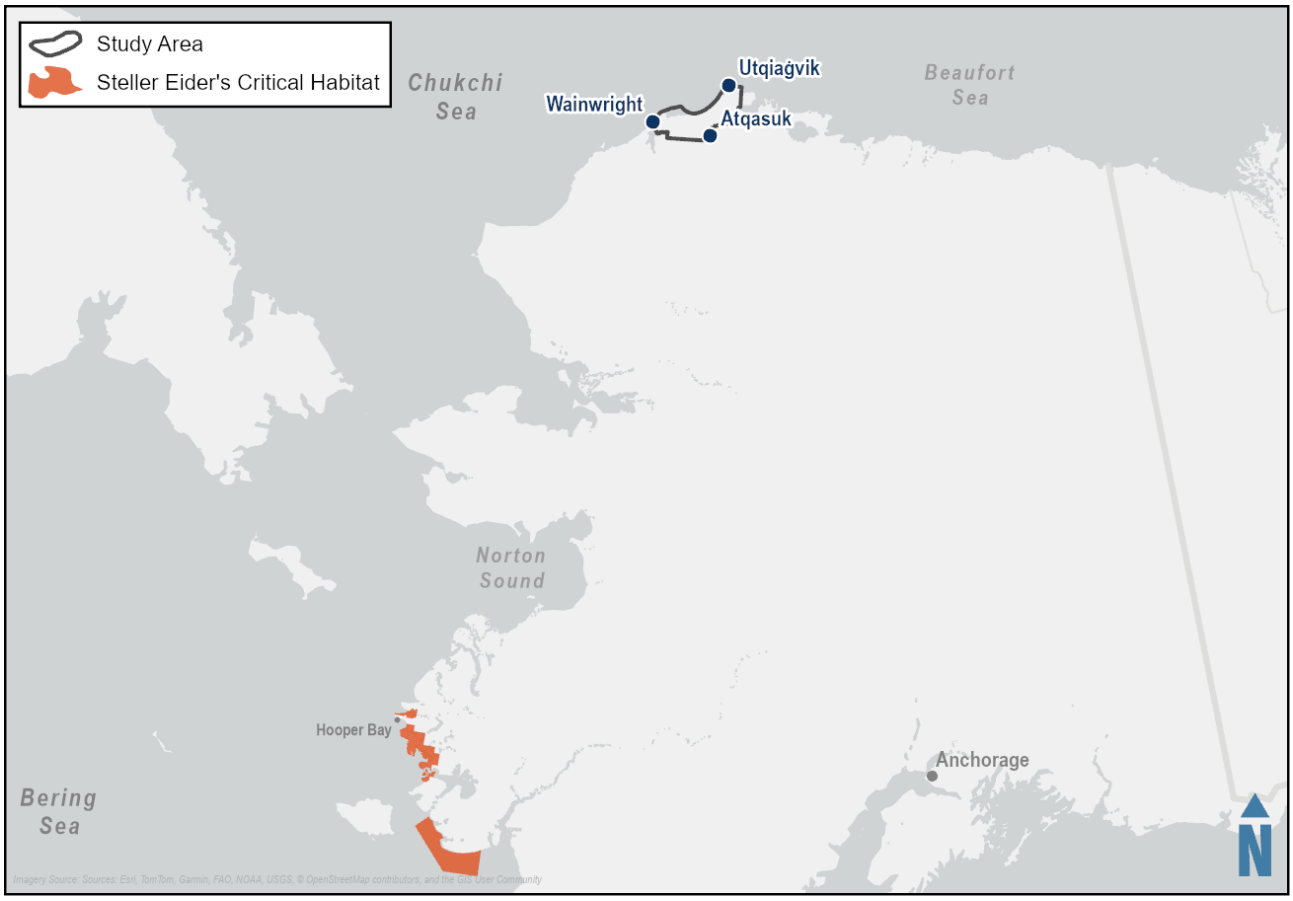

Figure 21: Steller's Eider Critical Habitat

2.2.5.3 Potential Impacts

The construction of roads, or any construction activity, within the NPR-A has the potential to alter polar bear habitat by increasing human access and disturbance in areas that have traditionally been remote and undisturbed. The presence of roads can fragment habitat by introducing linear features that polar bears must navigate around, potentially altering their natural movement patterns between denning sites, feeding areas, and travel corridors. Despite avoiding polar bear critical habitat, increased noise, vibration, and light from both construction and subsequent vehicular traffic may disturb polar bears during sensitive periods such as the denning season. Additionally, increased accessibility may result in more frequent human–polar bear interactions, which can have impacts on the species' behavior and overall fitness in the region. Critical habitat in the area has been avoided, however, polar bears are known to move throughout the region. Impacts to polar bear critical habitat does not automatically restrict activity but does require federal agencies to consult with USFWS under Section 7 of the Endangered Species Act for any actions that may affect these areas. For proposed development in or near the NPR-A, consultation typically focuses on avoiding den disturbance, managing human-bear interactions, and minimizing effects from noise, infrastructure, and marine traffic within designated habitat units.

Situated over 600 miles to the north of the Yukon-Kuskokwim Delta, there is not Steller's eider critical habitat designated within the study area. Despite critical habitat not being designated within the NPR-A, a comprehensive analysis of Steller's eiders on the Arctic coastal plain estimated an average population of 576 eiders from 1993 to 2008. The Utqiaġvik area is the birds' primary breeding area in North America which occurs primarily east of the community. After breeding, the birds distribute more broadly around the Utqiaġvik area where nesting begins in early June to July. Steller's eiders move to coastal marine water as broods fledge in mid-August to early September. Outside of Utqiaġvik, low densities of Steller's eiders are found within the study area. Active Steller's eiders nests are currently subject to a 660 ft buffer from June 1 through August 15 each year within the NPR-A.

Construction of roads can also affect eider habitat by disrupting the coastal and wetland ecosystems that are critical for their breeding, nesting, and staging. Gravel roads and associated infrastructure may alter natural water flows and sediment patterns in wetlands, potentially degrading the quality of habitats used by spectacled and Steller's eiders. Increased human activity and noise from construction and subsequent road traffic can disturb nesting eiders, reducing nesting success or causing birds to abandon their preferred nesting sites in favor of less optimal areas. Moreover, the presence of roads may facilitate further development and accidental pollution, such as fuel spills, that can degrade the water quality and vegetation structure essential for eider foraging and nesting. Although both eider species have been observed south of Utqiaġvik, the remaining portions of study area largely exclude known eider nesting habitat.

2.2.6 Fish and Wildlife

2.2.6.1 Regulatory Framework

With the passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980, the state of Alaska was mandated to maintain subsistence hunting and fishing preferences for rural residents on federal public lands. This was accomplished through the creation of local and regional advisory committees and by providing for state management of wildlife on federal land. Section 810(a) of ANILCA requires an evaluation of subsistence uses and needs be completed for any federal determination to "withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands." ANILCA requires that this evaluation include findings on:

- The effect of use, occupancy, or disposition on subsistence uses and needs
- The availability of other lands for the purpose sought to be achieved
- Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes

ANILCA §810(a) provides no "withdrawal, reservation, lease, permit, or other use, occupancy or disposition of the public lands which would significantly restrict subsistence uses shall be effected" until the federal agency gives the required notice and holds a hearing (16 USC §3210[a]).

Subsistence management regulations for public lands in Alaska are specified within 50 CFR Part 100, Subpart D, which outlines subsistence taking of fish and wildlife in Alaska by rural residents. This section establishes specific seasons, harvest limits, and methods for subsistence hunting, fishing, and trapping on federal public lands. It also includes provisions for special permits, customary and traditional use determinations, and community harvests. The regulations are designed to prioritize subsistence use by eligible rural residents while ensuring conservation of wildlife populations. The rules are reviewed and updated regularly by the Federal Subsistence Board, which may adjust harvest limits or restrict non-subsistence activities when necessary.

Subsistence, customary, and traditional use information within the study area is outlined in 50 CFR 100.26(n)(26).

2.2.6.2 Existing Conditions

Subsistence practices in communities are central to both cultural heritage and food security, with local Alaska Native peoples relying on the region's fish and wildlife as vital resources. In Atqasuk, Utqiaġvik, and Wainwright, traditional harvesting methods for species like Arctic grayling, whitefish, waterfowl, caribou, and even marine mammals form the backbone of nutritional and economic sustenance. These practices are not only a source of essential protein in remote areas where commercial food options are limited, but they also embody generations of traditional ecological knowledge that guides sustainable resource use and seasonal harvesting. Regulatory frameworks, such as ANILCA, aim to protect these critical resources from adverse impacts of industrial development and environmental change.

2.2.6.2.1 Aquatic Species

Fishing is one of the most popular subsistence activities among NSB residents given their access to both inland water sources and the ocean. Broad whitefish are the most commonly caught species, primarily during the fall, followed by Arctic grayling, char, flounders, northern pike, lake trout, burbot, smelt, halibut, least cisco, and chum, Chinook, pink, coho, and sockeye salmon.

2.2.6.2.2 Marine Mammals

Iñupiat communities have long maintained a sustainable subsistence harvest of marine mammals that is integral to their cultural identity and food security. Annually, between 14 and 72 bowhead whales, 300 to 500 beluga whales, and walrus and various species of seals provide not only food but also raw materials for traditional handicrafts and clothing. This harvest level makes sure that the take remains within sustainable limits while providing essential nutrition and cultural continuity. The harvesting of marine mammals is regulated by the Marine Mammal Protection Act, which provides a legal framework that exempts Alaska Natives from its general prohibitions.

2.2.6.2.3 Land Mammals

Located within Game Management Unit 26 (referencing the ADF&G hunting manual), residents routinely use local resources and subsistence practices to support both themselves and their families. Historic harvest of wildlife species includes brown bear, caribou, moose, musk ox, sheep, and wolves. According to the 2015 and 2019 North Slope Borough Social and Economic Profile and Census, nearly all NSB households' diets included at least some subsistence foods (97.3 percent of residents reported having at least some subsistence foods in their diet) with a majority reporting their diets consisted of half or more of subsistence foods (63.7 percent of households reported).

Caribou are one of the most consistently eaten subsistence foods within each community and more residents participate in caribou hunting than any other hunting activity. Both the Western Arctic Herd and the Teshekpuk Herd migrate through the study area, and substance users in the area are particularly sensitive to potential disruptions of caribou movements. The Western Arctic Herd is the largest caribou herd in Alaska, and one of the largest in the world, with an estimated 152,000 caribou according to the ADF&G 2023 census while the Teshekpuk Herd was estimated at 41,500 in 2015.

Caribou have among the largest ranges and migration patterns of any terrestrial mammals. Brown bear, arctic and cross fox, ground squirrel, weasels, wolves and wolverines are also taken for subsistence purposes.

2.2.6.2.4 Amphibians

According to the ADF&G, six species of amphibians are considered native to Alaska. These are the western toad (Bufo boreas), wood frog (Rana sylvatica), Columbia spotted frog (Rana luteiventris), rough-skinned newt (Taricha granulosa), long-toed salamander (Ambystoma macrodactylum) and northwestern salamander (Ambystoma gracile). Of the six species native to Alaska, only two have been documented outside the southeast regions of the state. The wood frog, which is the most hardy and widespread species of frog in North America, has been found from the mainland of southeast Alaska northward to the Brooks Range. Alaska's single toad species, the western toad, has been recorded throughout the southeast panhandle and along the mainland coast to Prince William Sound. Alaska populations of all but wood frogs are near the northern edges of their geographic ranges.

Amphibians and snakes are absent from northern Alaska due to extreme cold, permafrost, and a short summer season that limits their ability to survive and reproduce. As ectothermic animals, they rely on external temperatures to regulate their body heat, but the Arctic's harsh winters and frozen ground make it impossible for them to hibernate effectively. The tundra also lacks suitable wet habitats for amphibian breeding, and reptiles, like snakes, require deep frost-free burrows that do not exist in permafrost-covered landscapes. Additionally, geographic barriers, such as the Brooks Range, further prevented their spread into the northern region.

2.2.6.2.5 Birds

The Arctic Slope of Alaska covers a vast area of 82,000 square miles north the Brooks Range with about 26,000 square miles of waterfowl habitat, plus several thousand square miles of habitat used mainly as feeding, resting and staging areas. Each year over one million geese, 12 million ducks, 70,000 swans and 50,000 cranes use Alaskan habitat. The ADF&G has identified 120 waterfowl and seabirds that are known to occur in Alaska. Many of these species use the tundra of the North Slope before migrating south during the fall. Major flyways for geese and ducks begin on the North Slope and travel the entirety of North America ending as far away as Mexico or the Caribbean.

Large proportions of the NPR-A and study area consist of poorly drained elongated lakes. The coastal areas in the region have deceptively poor productivity, primarily due to the small tides which are insufficient to create wide intertidal flats.

Resident bird hunting occurs primarily in the spring and early summer with both rock and willow ptarmigan and owls being a source of subsistence resources, but waterfowl is the dominant avian resource in all three communities.

The Migratory Bird Treaty Act (MBTA) prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the USFWS. The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose of, an activity. The USFWS interprets the MBTA to prohibit incidental take. Birds of Conservation Concern (BCC) in the study area are described in Table 9.

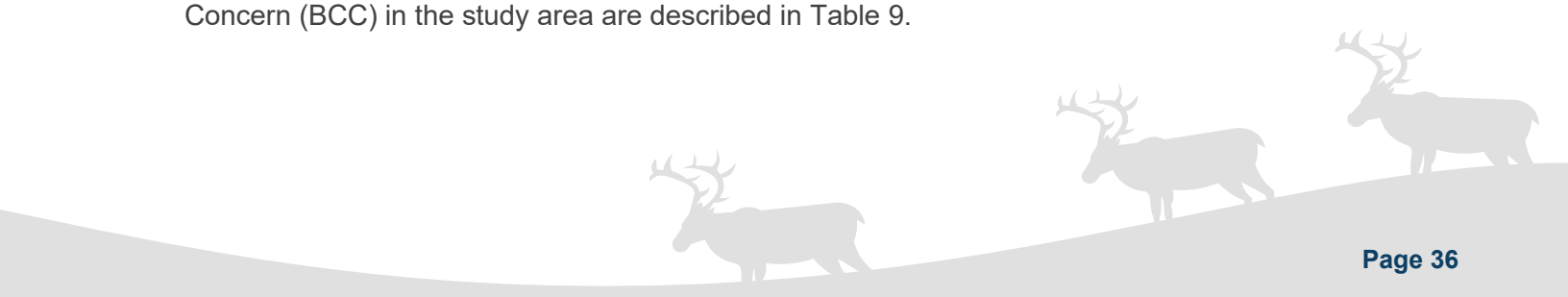

Table 9: Birds of Concern

SPECIES	LEVEL OF CONCERN
Bald Eagle	This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
Northern Alaska Dunlin	This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
American golden-plover **Pectoral Sandpiper** **Red Knot** **Snowy Owl** **Yellow-billed Loon**	These are Birds of Conservation Concern (BCC) throughout their range in the continental USA and Alaska.

Source: Information for Planning and Consultation (IPaC) Birds of Concern Resource List

2.2.6.2.6 Invasive Species

According to a 2018 North Slope Plant Invasion Vulnerability examination, the North Slope is generally considered resistant to invasion by all but the most cold-tolerant non-native plant species and current information on the Alaska Exotic Plants Information Clearinghouse does not identify exotic or invasive species within the study area. The establishment, or transportation of, invasive plant species is unlikely due to the extreme climactic nature of the study area and the proposed use of local resources (such as gravel sites along the proposed alternatives or from existing sources within Atqasuk, Utqiaġvik, and Wainwright).

2.2.6.3 Potential Impacts

Abundant subsistence hunting and fishing opportunities exist along the proposed alternatives. This expansion of the road network will provide access to areas for subsistence and recreational harvesting and gathering which may enhance the community's resilience from future economic and socioeconomic impacts.

All road alternatives cross cataloged anadromous streams (such as the Inaru River and Kugrua River). However, fish surveys will be required at other streams to assess the presence or absence of anadromous and resident fish, as many areas within the project scope are uncatalogued/unknown. A Fish Habitat Permit from ADF&G is required for any activity using or changing the natural flow of a lake or stream that ADF&G has specified as supporting fish species.

Caribou within the study area are primarily from the Western Arctic and Teshekpuk caribou herds. Calving, insect-relief areas, and late-summer and fall migration zones overlap alternatives to varying degrees.

Construction activities will likely fall within the timeframe that many birds are present in the area, however, due to the relatively vast amount of undisturbed habitat, impacts are not expected to be significant and displaced resident individuals will likely find new homes or return once construction has concluded. Waterfowl like eiders, loons, and geese prefer nesting near ponds, lakes, and coastal wetlands where there is abundant food and protection from predators. Built infrastructure will likely provide additional hunting opportunities after construction as alternatives transect historical waterfowl hunting areas.

Road construction activities are expected to have intermediate impacts on fish and wildlife which can be mitigated through staging construction where possible. Bridge construction which requires pilings or in-water work may be disruptive to fish.

2.3 Built Environment

2.3.1 Transportation Infrastructure

2.3.1.1 Regulatory Framework

Land use and transportation directly affect one another for several reasons. Community development locations and density directly affect travel demand, while the number and location of transportation access points influences land development patterns and growth. Additionally, changing land use patterns can alter travel demand and, therefore, transportation infrastructure needs. Construction activities within the study area are authorized/prioritized under Federal, State, and local planning documents and permits.

2.3.1.2 Existing Conditions

Community infrastructure within Atqasuk, Utqiaġvik, and Wainwright consists of almost exclusively unpaved roads with limited access outside the confines of the community footprint. Depending on immediate access to gravel, most roads are dirt that is graded periodically. All three communities, however, have an airfield which aids in transportation of goods to and from the community. Atqasuk and Wainwright are serviced by local airlines, while Utqiaġvik, the transportation hub for the area, has regular service from Anchorage.

2.3.1.2.1 Transportation Network

Over the past few decades, North Slope communities in Alaska have relied on the Community Winter Access Trail, seasonal ice roads, and rollagons for trade and supplies, with goods like food and fuel typically flown in during ice-free months. However, the ice road season is shortening, reducing the time for surface-based freight transport. As sea ice diminishes, marine shipping is increasing, and ports are becoming key for regional connectivity. To support community growth and stability, North Slope communities have recognized the need for an all-season land transportation system.

2.3.1.2.2 Aviation

The Wiley Post–Will Rogers Memorial Airport in Utqiaġvik acts as a hub for North Slope communities. While carriers such as Alaska Airlines have daily Utqiaġvik flights to and from Anchorage, Wright Air Service and other regional airlines fly between the village such as Atqasuk, Deadhorse, Nuiqsut, Point Lay and Wainwright. Travel to Anchorage is a necessity for many rural residents for medical appointments or to shop for household goods and food. With the construction of the road network, areas such as Atqasuk (where gravel is scarce) may benefit from trucking gravel for expansion or improvements to the airport and community roads.

2.3.1.3 Potential Impacts

One purpose of the Triangle Community Road is to address the longstanding need for accessible year-round interconnectivity between northern communities. Each alternative requires the construction of bridges crossing major waterways. While larger crossings will likely require bridges, culverts will be needed for minor drainages along the route and in low-lying areas to facilitate cross drainage during runoff events. Preliminary planning indicates that approximately 1,000 culverts will be needed to cross smaller streams using either single culverts or multiple culverts beside one another (i.e., culvert batteries).

Aviation transportation is typically one of the most ways to travel between communities. While flying is generally considered to be one of the 'safest' methods of transportation, it comes with the expense of significant financial costs and limited transportation capacity. Fuel in NSB communities, and Alaska in general, is significantly more expense than elsewhere in the US and typically gets more expensive the farther north you go. According to the Alaska Department of Commerce, Community, and Economic Development's 2024 Alaska Fuel Price Report, northern communities typically saw around double the national average price for gasoline as shown in Table 10.

Table 10: Fuel Price Comparison

COMMUNITY	FUEL PRICE
Atqasuk	$8.80
Utqiaġvik	$7.15
Wainwright	$6.89
Juneau	$3.86
Nationwide	$3.39

Source: July 2024 Alaska DCCED 2024 Alaska Fuel Price Report

Despite the high cost of fuel, there are potential benefits to driving between communities such as:

- Driving has a lower cost with multiple occupants traveling as a group or family.
- Ability to transport a larger quantity of goods as opposed to only those which fit within airline baggage.
- Driving can be the only option when emergencies occur with time-sensitive needs. Driving can be the only option available depending on weather conditions.
- It is easier to cancel travel at short notice if plans change.

- Some weather cancellations which affect air flights do not affect vehicles (such as low fog).
- Greater flexibility in scheduling arrival and departure times, which can be limited to a few options with air travel.

However:

- Flying is generally faster.
- There are fewer unknown/unforeseen risks such as washed-out sections of the road or excessive bumpiness (although turbulence can be significant at times).
- Not everyone has access to a vehicle or can drive.
- A pilot is flying the plane freeing your attention to other matters.
- Vehicles have other costs that can be difficult to address such as parts and maintenance.
- Flying is generally safer with fewer risks, such as flat tires or animal collisions.
- Current lack of emergency services along long roadways.

2.3.2 Contaminated Sites

2.3.2.1 Regulatory Framework

Prior to any construction project, due diligence is needed to identify the risk of encountering hazardous materials to avoid soil excavation within prohibited areas and to avoid unknowingly subjecting a contractor to hazardous materials. To estimate these risks, established databases that track spills, contaminated soils and groundwater and other pollutants are used to understand and characterize the types of hazardous materials within the study area. Contaminated sites can threaten public health or the environment and can cause economic hardship to people and communities. The regulatory framework for the management of hazardous materials, hazardous wastes, and contamination is complex, with both federal and state components.

The DEC uses the following regulatory definitions:

- Hazardous material is any material that, because of its quantity, concentration, or physical and chemical characteristics, poses a significant presence or potential hazard to human health and safety, or to the environment, if released into the workplace or the environment.
- Hazardous waste is a hazardous material that can pose a substantial or potential hazard to human health or the environment when improperly managed.
- Contaminated sites (DEC database) consist of a location where hazardous substances, including petroleum products, have been improperly disposed of, spilled, or leaked from their containers. Solid waste includes solids, liquids, and gases and must be discarded to be considered waste.
- A regulated hazardous waste site is a location where a known hazard material has been generated, transported, treated, stored, or disposed of and is tracked in an EPA or an DEC database.
- A non-regulated waste site is a location where the disposal of solids, liquids, and gases occur. These sites are not tracked through an EPA or DEC database but may receive low quantities or unknown quantities of hazardous materials.

The Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) are two key federal environmental laws aimed at managing hazardous waste and protecting human health and the environment. While both laws address hazardous substances, they serve different purposes. The RCRA, enacted in 1976, focuses on the management of hazardous and non-hazardous waste from generation to disposal, ensuring waste is handled safely to prevent contamination. It applies to active facilities, regulating waste generators, transporters, and disposal sites under a “cradle-to-grave” system. The RCRA also includes a Corrective Action program, which requires companies to clean up contamination at operational sites.

The CERCLA, commonly known as Superfund, was enacted in 1980 to respond to and clean up hazardous waste sites that are abandoned, uncontrolled, or pose significant risks. Unlike RCRA, which prevents contamination, CERCLA is focused on remediation of past pollution. It allows the federal government to identify and prioritize contaminated sites, conduct clean-ups, and recover costs from responsible parties. If responsible parties cannot be found or are unable to pay, the Superfund trust fund finances the clean-up. The CERCLA also has a strict liability framework, making past and present site owners, operators, and polluters financially responsible for contamination, even if they did not directly cause it.

Despite their differences, RCRA and CERCLA share similarities in their goal of hazardous waste management and environmental protection. Both laws are administered by the EPA and provide enforcement mechanisms to ensure compliance (Alaska is one of only two states without an approved RCRA program; the other being Iowa). However, RCRA primarily regulates active waste management, while CERCLA deals with historical contamination at abandoned or uncontrolled sites. Additionally, RCRA compliance is industry-funded through waste management practices, whereas CERCLA relies on the Superfund trust and cost recovery from liable parties.

In practice, these laws often work together, as CERCLA may address contamination at sites that were once regulated under RCRA. The RCRA helps prevent pollution before it occurs, while CERCLA ensures that past contamination is properly cleaned up.

2.3.2.2 Existing Conditions

Atqasuk, Utqiaġvik, and Wainwright all have contaminated sites within their city limits, as identified by Alaska DEC, that are classified as active. There are very few contaminated sites between the communities, and due to the road alignment, no part of the project is expected to come within 1,500 feet of a contaminated site.

There are two RCRA sites that fall within close proximity to the roadways.

- The Atqasuk landfill will be just north, roughly 1,000 feet, of where roads connect to the existing Landfill Access Road.
- The United States Air Force Wainwright Short Range Radar Station at the DEW Line Site is located north of all alignments as they enter Wainwright.

There are no CERCLA sites within the NSB.

2.3.2.3 Potential Impacts

The alternatives are not expected to impact known contaminated sites. Despite close proximity to the RCRA site in Atqasuk, the road alignment will not be affected by the RCRA designation of the landfill and the road alignments as they enter Wainwright will avoid the Short Range Radar Station site. However, it is crucial to recognize potential environmental risks associated with road construction, particularly concerning fuel spills and the facilitation of oil and gas extraction activities. Construction projects often involve the use of heavy machinery powered by diesel or gasoline, increasing the risk of fuel spills. Such spills can lead to soil contamination, water pollution, and harm to local vegetation and wildlife. Proper BMPs, such as duck-ponds during equipment during fueling or BLM ROD buffer zones around sensitive habitats, can help minimize environmental degradation.

Alaska DEC manages the clean-up of contaminated soil and groundwater to protect human health and the environment. It oversees the entire clean-up process, from site assessment and planning to the final "Clean-up Complete" determination. Due to the remoteness of the project, and lack of prior development in the area, there are no contaminated sites or underground storage tanks near the alignments. Should contaminated soil or water be encountered during construction, DEC should be notified.

2.3.3 Noise

2.3.3.1 Regulatory Framework

Unlike many other environmental concerns, noise pollution is typically managed on the local level. The BLM has identified BMPs to minimize the impacts noise will have. Due to the road alignment avoiding polar bear critical habitat or special use areas (such as Peard Bay Special Area which contains high densities of polar bears, seals, and migratory waterfowl), eiders are the primary concern regarding noise pollution with specific BMPs by the BML such as E-17 which states:

Ground-level activity (by vehicle or on foot) within 660 feet of occupied Steller's or spectacled eider nests, from June 1 through July 31, would be restricted to existing thoroughfares, such as pads and roads. Construction of permanent facilities, placement of fill, alteration of habitat, and introduction of high noise levels within 660 feet of occupied Steller's or spectacled eider nests would be prohibited. In instances where summer support/construction activity must occur off existing thoroughfares from June 1 through July 31, USFWS-approved nest surveys must be conducted during the approved survey window prior to the BLM approval of the activity. Collected data would be used to evaluate whether the action could occur, based on deployment of a 660-foot buffer around nests, or if the activity would be delayed until after mid-August, once ducklings are mobile and have left the nest site.

2.3.3.2 Existing Conditions

Noise generation during construction can have varying levels of disturbance on the surrounding environment. Similar to other environmental concerns, these impacts can be mitigated through road alignment selection to avoid sensitive areas (such as caribou migration corridors or known nesting/breeding locations for eiders) and during construction through attention to the presence of sensitive species. Some animals are less sensitive to noise disruptions than others, such as ptarmigan who are relatively indifferent to noise or caribou who can be displaced with relatively little disruption.

With the exclusion of the communities themselves, the landscape between them is essentially devoid of man-made infrastructure which would generate noise. Within the communities, the proposed roadways join existing roads which are outside residential areas, however, construction activity typically generates noise impacts.

2.3.3.3 Potential Impacts

Unlike oil and gas production activities which generate noise impacts throughout their entire service-life, noise generated from construction activities would be comparatively short lived and the most significant impacts would be limited to the construction phase of the project. Maintenance related disturbances (such as grading or snow removal) would occur after construction activities have concluded. According to BLM research, noise from construction activities is considered 'intrusively' annoying and can have impacts up to four miles away before reaching a 'very quiet' level of 35 decibels. General vehicle traffic can have impacts between 0.2 and 1.4 miles before reaching the same level.

Noise sources associated with construction activities may be impulsive or non-impulsive. Sound levels generated by impulsive noise, such as pile driving or blasting, may significantly exceed the ambient sound level for a very short duration. Non-impulsive, more continuous noise sources, such as well production, typically emit lower levels of noise and are less likely to be audible at a distance. Noise impacts during construction can be mitigated through hours of operation to limit impacts to residential areas and seasonally through adherence to seasonal breeding windows for birds, fish, and mammals.

2.3.4 Air Quality

2.3.4.1 Regulatory Framework

Transportation conformity is required by the Clean Air Act (CAA) (42 U.S.C. 7506(c)) to make sure that federal funding and approval is only given to highway and transit projects that are consistent with air quality goals established by a state air quality implementation plan. Conformity means that transportation activities will not cause or contribute to new violations of air quality standards or delay the attainment of national ambient air quality standards. NEPA guidelines issued by the US Department of Transportation outline federal requirements for air quality analyses for transportation projects. Where applicable, other requirements derive from the federal transportation conformity rule (40 CFR Parts 50 and 93). NEPA guidance for air quality analyses for transportation projects is found on the FHWA Office of Planning, Environment, and Realty website.

Per the CAA, National Ambient Air Quality Standards (NAAQS) have been established for six criteria pollutants by the EPA and communities that do not meet NAAQS are listed as "non-attainment areas." States are required to develop a plan to control source emissions and ensure future attainment of NAAQS.

2.3.4.2 Existing Conditions

In Alaska, non-attainment areas are regions where air quality does not meet the NAAQS set by the CAA for certain pollutants. Currently, only the Fairbanks North Star Borough is designated as a non-attainment area for fine particulate matter ($PM_{2.5}$) based on the 2006 24-hour standard. This includes the cities of Fairbanks and North Pole.

2.3.4.3 Potential Impacts

This project will not have impacts on NAAQS non-attainment areas, so no evaluation of conformity is required, however, road construction can have local impacts through an increase of construction related dust. Dust can have impacts on surrounding wetlands and water quality. These impacts can be mitigated through responsible BMPs such as dust mitigation through water applications.

Road construction also contributes to greenhouse gas emissions. The threshold for considering greenhouse gas emissions is set at 25,000 metric tons CO_2 equivalent (CO_2e). As this project is a two-lane gravel road over a hundred miles long, it is not unreasonable to think that the project may approach or exceed the 25,000 metric ton CO_2e threshold. For gravel roads, the majority of emissions come from excavating, hauling, and processing aggregates. Estimates for earthworks in road construction can vary drastically though and depends on factors like distance, equipment efficiency, and local fuel characteristics. For example, if suitable gravel sources are not located along the roadways and trucking distances increase, this can have significant impacts on CO_2e emissions. Without knowing the specifics of the construction and support equipment that will be used onsite or distance required for transportation purposes, it is not possible to accurately estimate CO_2e emissions from road construction.

Initial estimates would suggest that, under ideal situations (without accounting for engine idle or loading/unloading times) around a million gallons of diesel would be required for gravel placement alone. Using EPA emissions estimates, a gallon of diesel equates to around 10 kilograms CO_2e/gallon, for a total CO_2e from gravel placement of 10,000 metric tons. With nearly half the CO_2e being accounted for within this single phase, a more detailed examination of air emissions may be required in the future.

2.3.5 Visual Effects

2.3.5.1 Regulatory Framework

The regulatory framework for assessing visual impacts is guided primarily by the FHWA's Guidelines for Visual Impact Assessment for Highway Projects (FHWA, January 2015). These guidelines establish a consistent, systematic process for evaluating potential changes to visual quality that may result from transportation projects. The FHWA framework emphasizes early coordination, clear identification of viewer groups and visual resources, and integration of visual considerations into the broader environmental review process under NEPA.

Federal surface transportation legislation also provides policy direction that shapes how visual quality is addressed in project planning and design. The *Fixing America's Surface Transportation (FAST) Act* of 2015 reaffirmed the importance of context-sensitive and multimodal planning. It directed agencies to consider community values, natural features, and aesthetic character when developing transportation projects. The Act encouraged flexibility in design to preserve or enhance visual quality, particularly for projects located in or near scenic, historic, or environmentally sensitive areas.

Several Presidential Executive Orders also provide direction for maintaining and enhancing the visual quality of federal lands and public projects, including those that encourage protection of scenic values, community character, and the built environment in federal decision-making.

2.3.5.2 Existing Conditions

The NPR-A is characterized by broad, open tundra landscapes with minimal topographic relief and limited evidence of human development. The visual environment consists of extensive low-lying terrain interspersed with lakes, wetlands, and braided river systems that create a uniform horizontal composition. Vegetation is generally low-growing and homogeneous, producing subtle seasonal variations in color and texture. The region's flat to gently rolling topography provides long-distance visibility and unobstructed horizons, resulting in a consistent visual openness.

2.3.5.3 Potential Impacts

The construction of the Atqasuk to Utqiaġvik and Wainwright road network will introduce significant visual changes to the Arctic Coastal Plain. The gravel roads will create a distinct linear feature, disrupting the natural terrain and introducing visible embankments, culverts, and bridges that contrast with the surrounding environment. For local residents and travelers, the road will be a noticeable addition, particularly from elevated areas or open tundra viewpoints. Aircraft overflights will further emphasize the presence of the road, altering the visual integrity of an otherwise pristine Arctic setting.

In addition to the road itself, supporting infrastructure such as gravel pits, material stockpiles, construction staging areas, and maintenance facilities will contribute to the visual transformation. Seasonal changes will also have a role in visual impacts, while snow cover in the winter may help the road blend into the landscape, the exposed dark gravel during the summer will contrast against the lighter tundra vegetation.

Areas considered particularly sensitive to visual impairment from road construction include disturbances along rivers where visually the landscape changes from the surrounding tundra to riparian vegetation. Disturbances along stream corridors should be limited to the extent possible, however, ground disturbance and stabilization is a critical component to responsible bridge construction and some impact will be unavoidable.

3.0 POTENTIAL IMPACTS SUMMARY

Table 11 provides a summary of project impacts on the human, natural, and built environment.

Table 11: Potential Impacts Summary

HUMAN ENVIRONMENT	IMPACT SUMMARY
Socioeconomics	Population projections suggest continued growth under certain economic conditions (net benefit).
Land Use and Ownership	Tribal and Federal lands. Potential land conveyances.
Historic and Cultural Resources	10 AHRS Sites along all alternatives. Consultation is likely required in addition to field investigation.
NATURAL ENVIRONMENT	
Geologic and Geotechnical Considerations	Gravel resources must be identified along roadways. Bridge and culvert infrastructure installed.
Water Quality	Short-term impacts from road and infrastructure placement.
Hydrology	Long-term impacts from culvert and road placement.
Wetlands	Long-term from wetlands use for road basin. Mitigation and/or recreation of wetlands required.
Threatened or Endangered Species	Section 7 consultation required for ESA species.
Fish and Wildlife	Anadromous fish impacts and construction permits required.
BUILT ENVIRONMENT	
Transportation Infrastructure	Long-term from road and infrastructure placement.
Contaminated Sites	No impacts.
Noise	Temporary impacts from construction activities.
Air Quality	Temporary impacts from construction activities.
Visual Effects	Long-term from road and infrastructure placement.

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