

Environmental Assessment
Northwest Arctic Borough
High Penetration Solar and Battery Energy, Ambler, Alaska



Village of Ambler <https://www.nwabor.org/village/ambler/>



U.S. Department of Energy
1000 Independence Ave SW
Washington, D.C. 20585

September 2025

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ACRONYMS AND ABBREVIATIONS

AK	Alaska
ADF&G	Alaska Department of Fish and Game
AHRS	Alaska Heritage Resource Survey
AVEC	Alaska Village Electric Cooperative
BESS	Battery Energy Storage System
CFR	Code of Federal Regulations
dB	Decibel
dBA	Decibel (A-weighted)
DOE	United States Department of Energy
EA	Environmental Assessment
ERA	Energy Improvements in Rural or Remote Areas
FEMA	Federal Emergency Management Agency
IPP	Independent Power Producer
IPAC	Information for Planning and Consultation
NAB	Northwest Arctic Borough
NEPA	National Environmental Policy Act
OSHA	Occupational Safety and Health Administration
O&M	Operation and Maintenance
PPA	Power Purchase Agreement
PPV	Peak Particle Velocity
PV	Photovoltaic
REPOP	Renewable Energy Performance Optimization Program
SAR	Search and Rescue
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States
USFWS	United States Fish and Wildlife Service

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SECTION 1 INTRODUCTION

1.1. Background

The Northwest Arctic Borough (NAB) High Penetration Solar and Battery Energy Project was competitively selected for a U.S. Department of Energy (DOE) financial assistance award under the “Energy Improvements in Rural or Remote Areas Program” and the Clean Energy Technology Development on Tribal Lands funding opportunities, OCED-FOA-0003045, OCED-FOA-0002970, and OIE-FOA-0002975. The Project and award would assist with deploying and integrating high-penetration solar Photovoltaic (PV) and battery energy storage systems (BESS) into the existing microgrid in the remote tribal community of Ambler, Alaska (AK) currently relying on diesel for 100 percent of their electrical production. This Environmental Assessment (EA) prepared pursuant to National Environmental Policy Act (NEPA) covers the systems planned for the village of Ambler, Alaska (Figure 1).

DOE is relying on the National Environmental Policy Act Implementing Procedures issued via interim final rule and published by the Department on July 3, 2025 (90 FR 29676). In accordance with the interim final rule and new procedures, DOE incorporates the certifications that the page limits and deadlines were met for the EA as stated in the FONSI. DOE reviewed the proposed project against the list of categorical exclusions (CXs) in Appendix B of the NEPA implementing procedures and found that the proposed project would not meet the conditions of a CX (in particular CXs B4.14 and B5.16) because the proposed project would not be located on previously disturbed lands.



Figure 1: Ambler, AK

1.2. Purpose and Need for Action

The purpose and need for agency action is to comply with the DOE's statutory mandates in the Fiscal Year 2020 Further Consolidated Appropriations Act (H.R. 1685) and the Infrastructure Investment and Jobs Act (H.R. 3684) (IIJA) to select and fund energy projects.

The Office of Clean Energy Demonstration's Energy Improvements in Rural or Remote Areas (ERA) program gives communities with 10,000 or fewer people the tools and resources they need to improve the resilience, reliability, and affordability of their local energy systems. These community-driven projects enable residents to make decisions about their own energy, economic, cultural, and geographic needs.

The Office of Indian Energy Policy and Programs is authorized to fund and implement a variety of programs and projects that promote Tribal energy development, efficiency and use, reduce or stabilize energy costs, enhance and strengthen Tribal energy and economic infrastructure, and electrify Indian lands and homes.

The NAB High Penetration Solar and Battery Energy Project was competitively selected for DOE financial assistance awards under both Office's programs (referred to as DOE throughout the EA).

DOE's purpose is to select projects that:

- Fund tribal development projects that demonstrate energy efficiency,

- Partner with Indian Tribes and Alaska Native Corporations to catalyze Tribal energy development,
- Deliver measurable and sustained benefits to people who live in areas with fewer than 10,000 people, and
- Build energy knowledge, capacity, and self-reliance.

The need is to respond to NAB's request for financial assistance to complete the construction and operation of solar PV and BESS projects in the Village of Ambler, AK, which would modernize and improve reliability of grid infrastructure, offset diesel consumption, lower and stabilize energy costs, and reduce emissions.

1.3. DOE's Proposed Action

DOE's Proposed Action would be to authorize the expenditure of federal funding for NAB to design, construct, operate, and maintain high-penetration solar PV arrays and battery energy storage systems as part of the existing microgrids in Ambler, Alaska. Section 2 of this EA describes the Proposed Action in detail.

1.4. Cooperating Agencies

No cooperating agencies are involved in this effort.

1.5. Public Involvement

As outlined in DOE's NEPA implementing procedures, DOE may engage in public scoping or public involvement opportunities; however, they are not required. NAB has engaged with the City, Tribal councils, and local community to facilitate project understanding and gather input on potential project locations and operations following construction since December 2021. The Tribal Council signed the Tribal Energy Development Organization Memorandum of Understanding on June 30, 2025.

SECTION 2 PROPOSED ACTION AND NO-ACTION ALTERNATIVE

2.1. Proposed Action

The Ambler, AK, solar PV array and battery sites would include clearing of up to eight acres of land and site preparation for the PV racking foundation and an equipment pad.

The proposed solar array and battery energy storage system (BESS) consists of two discontinuous segments. The solar array would consist of a 570 kilowatt PV system utilizing bifacial solar modules encompassing an approximately 8-acre area which would be located on land owned by the NANA Regional Corporation. The proposed location is largely undeveloped; however, approximately 1.5 acres was the location of an old dump site that has previously been cleared and graveled and has existing vehicle access along Waring Street. Tree and shrub clearing along with leveling and grading would be required as part of the proposed activities for the solar array. The solar modules would be positioned in three sub-arrays facing south, southeast, and southwest each consisting of two-five rows of modules measuring no greater than 4.9 meters (16 feet) in height. The modules would be connected via a conduit placed 0.6 meters (2 feet) below the ground surface in a trench of the same width. The project would install a new overhead 480 V secondary electrical line to interconnect existing nearby distribution system to solar array, install 2 additional power poles to support secondary line, install 4 new ground-mount transformers at solar array, and install 1 new power meter at solar array. The solar array would be located within 100 feet of the existing distribution system. No laydown areas would be required. A perimeter chain link fence would be constructed around the solar array for site safety.

The PV racking foundation would consist of 10 feet deep ground screws which are driven into the ground by a hydraulic or handheld driving machine requiring no boring, fill, or additional concrete. The ground screws would be installed in three rows with approximately 40 feet spacing between the rows with two 3-1/2-inch diameter ground screws driven for each eight feet span of solar panels. Approximately 600-800 ground screws would be driven to support the solar PV array, which would occupy approximately half of the solar PV array site.

The proposed BESS encompasses approximately 1.5 acres of land owned by the City of Ambler. The majority of the 1.5-acre parcel where the BESS is proposed has previously been cleared and graveled with existing vehicle access located on Schwatka Street. No additional site clearing activities for the proposed BESS would be needed. Approximately 114 cubic yards of fill would be required for the BESS site. Two 6 meter (20 foot) long by 3 meter (10 feet) tall containers along with a small power skid would be located on a previously cleared

and graveled parcel of land. The project would install a new overhead 480 V secondary electrical line to interconnect power plant to battery power skid, install 1 additional power pole to support secondary line, install new ground-mount transformer at battery power skid, install 2 new power meters at battery power skid. The battery containers and power skid would be located across the street from the power plant, less than 200 feet away. A perimeter chain link fence would be constructed around the BESS for safety and security.

The proposed BESS would be equipped with a fire suppression system that would be designed, installed and tested in accordance with NFPA 855-2023. Additionally, only systems that are tested to UL9540A at the cell, modules, and unit level will be considered acceptable. Full enclosure testing is not required, if approved by owner based on acceptable limited fire scenario in UL9540A testing. UL 9540 listing is preferred, if available. There is no available water source at the installation location. NFPA 13 water-based sprinkler systems will not be allowed. The BESS enclosures should incorporate all fire/life safety and fire protection system equipment as part of the packaged product.

The proposed power plant upgrades would include replacing the switchgear, replacing the 4 ground-mount plant transformers, and installing an electric boiler. The electric boiler would be located in the Alaska Village Electric Cooperative (AVEC) power plant and would be designed to meet the heating loads required by the gensets and cooling system to ensure the gensets are not being cold started. Design parameters would be determined by AVEC. A similar solution is installed in Buckland at a non-AVEC power plant. The electric boiler in Buckland is Chromalox NWHB-45-075P-E1XX/TMB-45-075P-E1XX. Operation of the electric boiler would be controlled by the micro gird controller during diesels-off operation to provide heat to the gensets. All activities would occur in and around the AVEC-owned power plant.

At completion of the project, ownership of the solar PV array would be transferred to the Tribe, allowing the Tribe to become an independent power producer (IPP) and sell power to the local utility under a power purchase agreement (PPA), thereby owning and controlling the benefits of the solar resource and solar PV infrastructure on their land. The Tribal IPP would control how the revenue from solar PV power sales is spent to best offset the high cost of energy for the local population which is mostly Alaska Native.

The Northwest Arctic Borough has developed the Renewable Energy Performance Optimization Program (REPOP) which is supported by one full-time employee as well as contracted technical expertise to train, troubleshoot, and support the operation and maintenance (O&M) of the system. REPOP is currently supporting solar/BESS installations in 4 other villages in the region.

2.2. Alternatives Carried Forward for Detailed Analysis

The only action alternative carried forward is the Proposed Action as presented in Section 2.1.

2.3. Alternatives Considered but Eliminated for Further Analysis

No other alternatives were considered.

2.4. No-Action Alternative

An evaluation of a No-Action Alternative is required under DOE's NEPA implementing procedures (Section 6.2(b)). Under the No-Action Alternative, DOE would not authorize expenditure of federal funds for NAB to design, construct, operate, the solar array and battery energy storage in Ambler, AK. Any potential beneficial or adverse effects to the physical, biological, cultural or socioeconomic resources from the Proposed Action would not be realized.

DOE has assumed, for the purposes of comparison in this EA, the Project would not proceed without its assistance. If the Project proceeded without DOE assistance, the potential impacts essentially would be identical to those under the DOE Proposed Action.

2.5. Permitting and Authorization Summary (if applicable)

No additional permits or authorizations are anticipated.

2.6. Applicant Voluntary Measures

This section summarizes the measures NAB has stated it will undertake to reduce or avoid potential impacts that were

identified during the development, permitting, and consultation processes for the Proposed Action.

These measures are incorporated into the Proposed Action. Although the measures would reduce the overall impact of the Proposed Action, they are not included to decrease the level of impact below significant.

The following measures are identified in this EA:

- A visual inspection of the proposed solar PV array sites would be conducted prior to construction to determine whether any nesting owls may be present. If active Great Gray Owl (*Strix nebulosa*), nests are present, monitoring of the birds' activities should be conducted and tree clearing should be on-hold until it is determined that identified nests are inactive.
- An existing road would be used for construction access. No new roads would be constructed.
- A storm water pollution prevention plan (SWPPP) would be used for sediment and erosion control and mitigate storm water pollutants discharged from the cleared sites.
- Nearby residents would be notified prior to construction activities, particularly commencement of hydraulic or handheld driving. Limit such activities to daytime hours to the extent possible. Coordinate hydraulic or handheld driving activities at the proposed solar PV array site with the local community so meetings and events can be scheduled around times when the loudest construction activities (hydraulic or handheld driving) would occur.
- Inspection of construction activities should be conducted by the contractor to ensure proper installation of the proposed systems to reduce fire risks.
- Construction personnel should be provided with and required to wear hearing protection.
- Ensure construction equipment is fitted with properly functioning emission and noise control systems.
- Do not permit construction equipment to idle, to the extent possible.
- A proper O&M plan, that includes vegetative maintenance, especially during warm, dry weather conditions, to further reduce the risk for fires.
- Vegetative cover would be allowed to grow back after the sites are constructed to reduce soil erosion.
- Post-construction, when determined necessary, ensure disposal of solar panels in accordance with DOE Photovoltaic End-of-Life Plan (SETO 2022).

SECTION 3 AFFECTED ENVIRONMENT AND IMPACTS ANALYSIS

3.1. Background

This section discusses the existing conditions of the physical, biological, cultural, and human environment (affected environment) that could be affected by the alternatives described in Section 2. Following the description of the affected environment, potential impacts from each alternative are analyzed.

The identification and description of activities that have the potential to create impacts on natural and human resources in areas proposed for use by the Proposed Action have been divided into two phases: (1) construction and (2) O&M phase of the solar arrays, BESS building, and associated power plant updates. The activities occurring during each phase were used, as appropriate, to evaluate resource specific impacts.

The following terms were used to characterize adverse impacts from the Proposed Action:

(1) Negligible:

- Impacts would be at the lowest levels of detection, barely or not measurable, with no perceptible consequences.

(2) Minor:

- Impacts would result in a detectable change, but the change would be slight or could be avoided with proper mitigation, or
- Impacts would not disrupt normal or routine functions of the affected resource, or
- Once the impacting agent is eliminated (i.e., construction activity), the affected resource would return to a condition with no measurable effects from the Proposed Action without requirement for any mitigation.

(3) Moderate:

- Unavoidable impacts would result in a detectable change with measurable effects and proper mitigation would reduce impact substantially during the life of the Proposed Action, or
- The affected resource would have to adjust somewhat to account for disruptions due to impacts of the Proposed Action, or
- Once the impacting agent is eliminated, the affected resource would return to a condition with no measurable effects from the Proposed Action if proper remedial action is taken.

(4) Major:

- Impacts would be unavoidable with substantial consequences, or
- Proper mitigation would reduce impacts somewhat during the life of the Proposed Action, or
- The affected resource would experience unavoidable disruptions to a degree beyond what is normally acceptable, and once the impacting agent is eliminated, the affected activity or community may retain measurable effects of the Proposed Action indefinitely, even if remedial action is taken.

3.2. Identification of Resources and Affects

Indigenous Knowledge, also known as Traditional Ecological Knowledge or Native Science, refers to the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes, and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry. NAB applied for a DOE financial assistance award to pursue deploying high-penetration solar PV and BESS into an existing microgrid. NAB used their knowledge of the Project areas to select a site for the proposed solar PV arrays and associated infrastructure in locations that would avoid adverse impacts to the extent practicable to the natural, cultural, and social environments of the Project areas.

The following tables present a research-based, sliding-scale analysis on what resources are not present in the Project areas, what resources are present but not likely to be affected, and what resources are present and potentially affected. DOE describes the sliding-scale approach to impact analyses in their NEPA implementing procedures (DOE 2025). For those resources that are present and potentially affected, the table includes information on effects that are readily determined as negligible or minor. For resources that require more discussion to determine the significance of the impact, additional discussion is provided in Section 3.3.

Table 1: Ambler, AK site Resources Not Present; Present, not Affected; and Present, Potentially Affected				
Impact Topic	Not Present	Present		Rationale
		Not Affected	Potentially Affected	
Geology / Seismic		X		The proposed solar PV array would be installed with an estimated range of 600-800 ground screws to a 10 feet depth. The Project area is located within an area of moderate potential for a damaging earthquake (Alaska Science Center 2024). Due to the minimal excavation and use of shallow (less than 10 feet deep) driven ground screws, negligible to minor impacts to geology would result. The Proposed Action would have no impact on seismic potential in the Project area during construction or the O&M phase.
Soils			X	The solar PV array would be installed with ground screws, minimizing disturbed areas and soil impacts. Two concrete pads, one at the solar PV array site and one for the BESS building, would be installed within minimal to no excavation. Negligible to minor impacts to soils would result during construction.

Table 1: Ambler, AK site Resources Not Present; Present, not Affected; and Present, Potentially Affected				
Impact Topic	Not Present	Present		Rationale
		Not Affected	Potentially Affected	
				None of the impacted soils are used for agricultural purposes. The O&M phase would not impact soils.
Groundwater		X		Information provided by the NAB noted that the potable water source in Ambler is ground water from a well at the edge of the Ambler River. The well depth is 222 feet with a static water depth of 12 feet. Thus, groundwater within 10 feet of the ground surface, where disturbance would occur, is not anticipated. No impacts to groundwater resources, including the potable water wells, are anticipated. The potable wells are substantially below site activities. Contamination of a shallow groundwater aquifer by O&M is not anticipated.
Wetlands	X			No wetlands are present in the Project area. USFWS mapping shows no potential wetlands in the area (USFWS n.d.1).
Surface Waters		X		The closest surface water, approximately 0.2 miles to the south, is the Ambler and Kobuk Rivers (Google 2025). The surface waters would not be directly impacted, there would be no discharges, and a SWPPP would be implemented during construction to prevent construction related discharges to any surface water.
Floodplains	X			The Federal Emergency Management Agency (FEMA) does not have floodplain mapping available in Ambler (FEMA 2025). Both the solar PV array site and the BESS site would be outside and above any floodplains.
Oceanic resources and coastal zones	X			The Project area is not located along the ocean or a coastal area (Google 2025).
Wildlife & Habitat			X	The solar PV array would impact between 6-8 acres of boreal forest. Alaska's boreal forests are important habitats for wildlife species. In addition, per the State Wildlife Action Plan, there is one species of concern in Alaska – the Great Gray Owl (ADF&G n.d.3). It is noted that the proposed power poles and the BESS building would be located in already disturbed areas with minimal to no wildlife habitat value. This topic is discussed in more detail in Section 3.3 of this EA.
Threatened and Endangered Species	X			Based on information available from the Alaska Department of Fish and Game (ADF&G) the following, non-marine and non-aquatic, threatened and endangered species exist in Alaska (USFWS n.d.2) Wood bison (<i>Bison bison athabasca</i>) – use meadows and riparian areas along rivers (ADF&G n.d.2). No meadows or riverine riparian areas would

Table 1: Ambler, AK site Resources Not Present; Present, not Affected; and Present, Potentially Affected				
Impact Topic	Not Present	Present		Rationale
		Not Affected	Potentially Affected	
				be impacted. No suitable habitat for wood bison exists in the Project area.
Cultural Resources			X	One recorded Alaska heritage resources is nearby the project area. This topic is discussed further in Section 3.3.
Air Quality	X			The Project area is an air quality attainment area (EPA 2025). The General Conformity review (40 CFR Part 51 and 93) only applies to non-attainment and maintenance areas and is therefore not applicable to this Project. Additional information on the Proposed Action's potential for impact on air quality emissions is discussed further in Section 3.3.
Socioeconomics		X		No displacements would occur. No change in social cohesion (i.e., the community would not be divided by any infrastructure) and no impact to any community facilities would occur. There would be no adverse impacts to socioeconomics. The Proposed Action would result in more reliable and lower-cost energy, which would result in a moderate to major beneficial impact.
Environmental Contamination and Waste Management		X		A portion of the solar array site is the old dump site. Gravel has been added on top of the old dump site to cover and level the area. The remainder of the solar array is forested with no known contamination or waste issues. At the BESS site there are no known contamination or waste issues. The site has previously been leveled with gravel. Minimal to no excavation would occur for the solar PV array and BESS pad. Post construction, the eventual disposal of solar panels would be a waste concern. Disposal of solar PV panels would be handled in accordance with DOE's Photovoltaic End-of-Life Plan (SETO 2022). Disposal in accordance with this plan would result in a negligible to minor impact.
Noise and Vibration			X	This proposed solar and BESS locations are near residences and community buildings. This topic is discussed further in Section 3.3.
Recreation	X			No recreational resources exist in the Project area (Google 2025).
Land Use and Aesthetics		X		The Proposed Action would clear between 6-8 acres of forested area and convert the site to a solar PV array. While a change in land use would occur at the solar PV site, impacts to the forested area are discussed further in Section 3.3 as part of the wildlife resource discussion. The change in land use would be negligible.

Table 1: Ambler, AK site Resources Not Present; Present, not Affected; and Present, Potentially Affected

Impact Topic	Not Present	Present		Rationale
		Not Affected	Potentially Affected	
				The proposed solar PV array site is not easily visible from the center of the village due to the presence of extensive areas of forested land that would remain post-construction. No visually sensitive areas have been identified based on information provided by the Applicant or through a view of aerial maps (NAB 2025 and n.d.2 and Google 2025). No aesthetic impacts are anticipated.
Utilities and Infrastructure			X	Three new power poles would be installed within an existing cleared areas. The new BESS building would be added nearby the existing power plant site. Once constructed, O&M of the proposed solar PV array and associated infrastructure would be minor and funded as discussed in Section 2.1. The Proposed Action would have a moderate to major beneficial impact on the utility provider due to providing a more reliable and less expensive energy source.
Transportation and traffic		X		No changes to the transportation network would result from the Proposed Action.

3.3. Affected Environment and Impacts Analysis

This section describes the affected environment for those resources identified in Table 1 as needing additional analyses, including Wildlife and Habitat, Cultural Resources, Air Quality, and Noise and Vibration. This section documents anticipated impacts to those resources from the Proposed Action.

3.3.1. Wildlife and Habitat

3.3.1.1. Description of the Affected Environment

The uncleared portion of the project area is an immature boreal (northern) forest with black spruce (*Picea mariana*) and Alaska paper birch (*Betula neoalaskana*) and balsam poplar (*Populus balsamifera*). The understories are mixed grasses and other broadleaf plants.

Most of Interior Alaska is boreal forest with around 107 million acres of such forest (ADF&G 2025). Nearly 40 percent of Alaska's boreal forests are in protected or conservation areas. Birds represent the largest class of vertebrates (animals with a backbone) in the boreal forests. According to the State Wildlife Action Plan, Alaska's boreal forests are considered healthy (ADF&G 2025).

Alaska's boreal forests are important breeding grounds for many migratory songbirds (ADF&G 2025). Bird species dependent on terrestrial habitats are the largest and most ecologically diverse component of Alaska's bird populations. Most landbird species are migratory, and four major global migration flyways merge in Alaska. As a result, birds travel to breed in Alaska from all over the world, and reproductive success in Alaska affects bird populations in both North and South America. Alaska's largest area of terrestrial habitat is interior boreal forest (ADF&G 2025). Migratory birds are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-711).

The largest owl in the world, the Great Gray Owl, is found, in part, throughout the boreal forests of Interior Alaska and is a Species of Conservation Need in Alaska per the State Wildlife Action Plan (ADF&G 2025). It hunts in openings, such as meadows or fields, adjacent to the forest. Depending on the practices used, tree clearing can impact owls positively (by creating small openings in which they hunt) or negatively (by creating openings too large for hunting or removing snags used for nesting and perching).

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d).

Alaska has the largest population of bald eagles in the U.S. (ADF&G 2025). The highest number of nesting bald eagles are found in the islands of Southeast Alaska, but bald eagles are often found around interior lakes and rivers. According to the USFWS Information for Planning and Consultation (IPAC), there are no bald or golden eagles within the project area (USFWS n.d.2).

Wood Bison (*Bison bison athabasca*) are a listed threatened species found within the Interior and Southcentral Alaska. The wood bison was extirpated by the early 1900's in Alaska. In 2015, 130 wood bison were released into the wild along the Innoko River near the community of Shageluk in Southwest Alaska. Estimates for population growth state that by 2021 the herd would grow to about 250 and to 500 by 2030. The range is expected to be along the Lower Yukon and Innoko Rivers (ADF&G n.d.2).

There are no critical habitats for threatened and endangered species located within the project area (USFWS n.d.2).

3.3.1.2. Impact Analysis of the Proposed Action

As noted, the Proposed Action includes installation of power poles within existing cleared areas and installation of a concrete pad and BESS building at the existing power plant sites, which are also cleared and developed. The construction and O&M activities at the existing already cleared utility easements and power plant sites would have no or negligible impacts on wildlife and habitats.

The clearing of eight acres of forested land each at the proposed solar PV array site would result in impacts to boreal forest habitat and temporary disturbance to species that occur within the Project area. The loss of eight acres of forestland is negligible to minor when compared to the vast amount of healthy boreal forests that exist within Interior Alaska (107 million acres). Because extensive habitat area would remain for songbirds, the Great Gray Owl, negligible impacts to habitat for such species would be anticipated. During construction, noise and the presence of humans may displace bird and other wildlife species temporarily. DOE reached a finding of no effect for potential impacts to listed threatened and endangered species under the Endangered Species Act (USFWS n.d.2).

The greatest concern for displacement would be to nesting species that are rearing young. Most bird species, including the Great Gray Owl, nest and rear young in the spring to early summer months (ADF&G n.d.3). NAB would conduct a visual inspection of the proposed solar PV array sites just prior to construction to determine whether any nesting owls may be present. If active Great Gray Owl nests are present, monitoring of the birds' activities should be conducted and tree clearing should be on-hold until it is determined that identified nests are inactive. With these measures in place, the Proposed Action's impact on wildlife, including the in need of conservation Great Gray Owl would be minor.

During the O&M phase of the Project, wildlife, including birds, would be expected to adjust to the presence of the solar PV array and no impact on wildlife would be anticipated. It is noted that solar PV panels have been of concern related to migrating birds and bats, including concerns over glare and potential disruption to wildlife flight patterns (Hathcock 2018). However, more recent research has shown that birds use solar fields for habitat and do not seem to be impacted by the presence of the solar panels (SETO 2024). While research is ongoing, it appears that the presence of the solar PV array would have a negligible impact on birds. As noted, the addition of power poles and the BESS building within existing cleared and developed areas would have no impact on wildlife during the O&M phase.

The State Wildlife Action Plan mentions that wildfire concerns are growing with continual warming of the climate (ADF&G 2025). Research is ongoing into the emerging issue of the role of solar panels and solar fields on the potential for fires. Some research shows that the primary concern for fires is improperly installed and maintained solar panel systems (Vaverková 2022). As discussed in 2.1, the proposed BESS would be equipped with a fire suppression system that would be designed, installed and tested in accordance with NFPA 855-2023. Additionally, only systems that are tested to UL9540A at the cell, modules, and unit level will be considered acceptable. Additionally, proper inspections and oversight of construction activities should be conducted to ensure proper installation of the proposed systems. The same research indicates that maintenance of vegetation under and around the solar PV field is also important, especially during dry, warm weather conditions. As

mentioned in Section 2.1, NAB has a plan for funding and continuing O&M after the Proposed Action would be constructed. The O&M plan should include periodic and ongoing maintenance of vegetation under and near the solar PV array to reduce the risk of fire. Careful adherence to construction specifications during installation and a proper O&M plan after construction would reduce the risk for fires and would result in a negligible impact on fire risks in the Project areas.

3.3.1.3. Impact Analysis of No-Action Alternative

The No-Action Alternative would result in no change from existing conditions and would not contribute to any reasonably foreseeable impacts to wildlife or wildlife habitat.

3.3.2. Cultural Resources

3.3.2.1. Description of the Affected Environment

A review of the Alaska Heritage Resource Survey (AHRS) database identified one archaeological site within 1.6 kilometers (1 mile) of the project: the Tommy Lee Site (AMR-00028), located approximately 215 meters (705 feet) southeast of the proposed BESS. The Tommy Lee Site was first identified by the Alaska State Historic Preservation Office in 1980 and further investigated in 1994 and is situated within a five-acre parcel on the north bank of the Kobuk River. Based on the results of the 1994 survey, the site was recommended to be not eligible for inclusion in the National Register of Historic Places. No official determination of eligibility was made by the Office of History and Archaeology.

No archaeological sites have been identified within the project area.

3.3.2.2. Impact Analysis of the Proposed Action

No above-ground cultural resources are located in the vicinity of either proposed solar PV array. No aboveground cultural resources would be directly impacted by the Proposed Action. The proposed solar PV array and BESS are located in vacant partially forested areas. Three proposed utility poles are within existing utility easements and would not substantially change the appearance of or to the easement areas. The proposed BESS building is located within previously disturbed areas already in use as power plants. The addition of the BESS building would be consistent with the current land use and would not substantially alter the view of or from the existing power plant site. For these reasons, no above ground cultural resources would be impacted.

Recent historic occupation of Ambler, beginning in the 1950s, was concentrated along the Kobuk River, with expansion in the direction of the project area not occurring until subsequent decades. As such, the likelihood of identifying archaeological resources dating to this early historical occupation of the area remains low. Though both the BESS and solar array facilities constitute a visual impact to the immediate area, no historic resources have been identified within 152 meters (500 feet) of the project area, with the closest resource being the Tommy Lee site (AMR-00028), located 215 meters (705 feet) southeast of the BESS project area. USGS topographic maps and historic atlases of the area show no previously documented structures within the project area.

DOE received concurrence from AK SHPO on January 13, 2025, on DOE's finding of no historic properties affected by the activities proposed in the Village of Ambler.

3.3.2.3. Impact Analysis of No-Action Alternative

The No-Action Alternative would result in no changes in the Project area and would have no impacts on any cultural resources.

3.3.3. Air Quality

3.3.3.1. Description of the Affected Environment

As noted in Table 1, the Project areas are in air quality attainment and do not require a Conformity Analysis.

As mentioned in Section 2.1, the current source of electric power for Ambler is from three diesel generators which consumes approximately 377,908 Liters of fuel annually and produces air emissions. The proposed project is estimated to reduce the amount of fuel used by approximately 78,000 Liters per year. Air emissions from diesel

generators include carbon monoxide (CO), nitrogen oxides (NO_x), Sulfur Dioxide (SO₂), Volatile Organic Compounds (VOCs), and Particulate Matter (PM).

3.3.3.2. Impact Analysis of the Proposed Action

During construction of the Proposed Action, the operation of construction equipment would have a temporary negligible to minor impact on air quality, which would return to no measurable adverse effects following completion of construction. The contractor should ensure that construction equipment is fitted with properly functioning emissions controls and limit vehicle idling to the extent possible.

Following construction, during the O&M phase, generation of electricity using solar power would reduce the use of diesel fuel. Reduced use of diesel fuel would reduce air emissions from Ambler power plants. The following are estimated reductions in air emissions per year: 2,340 kg CO, 2,340 kg NO_x, 156 kg PM, 0.39 kg SO₂, and 273 kg VOC. moderate beneficial impact through the reduction of air emissions would result.

3.3.3.3. Impact Analysis of No-Action Alternative

The No-Action Alternative would result in continued use of diesel fuel to produce electrical power for Ambler. No reduction in air emissions would result.

3.3.4. Noise and Vibration

3.3.4.1. Description of the Affected Environment

The human ear can hear a wide range of sound levels, and as a result, noise levels are described on a logarithmic scale and are quantified in terms of decibels (dB), a unit that is typically adjusted to dBA. “dBA” is the decibels on an A-weighted scale to account for the sensitivity of the human ear. Sounds at or below 70 dBA are generally considered safe (CDC 2022). The U.S. Environmental Protection Agency and the World Health Organization recommend maintaining environmental noises below 70 dBA over 24 hours and below 75 dBA over eight hours to prevent noise-induced hearing loss. Over two hours of continuous noise levels between 80 to 85 dBA has the potential to lead to hearing damage (CDC 2022).

The Occupational Safety and Health Administration (OSHA) noise standard (29 CFR 1910.95) establishes minimum workplace noise requirements and states that constant noise exposure must not exceed 90 dBA over an eight-hour period. The highest allowable sound level for constant exposure is 115 dBA, which must not exceed 15 minutes within an eight-hour period. The standards limit instantaneous exposure (impact noise) to 140 dBA. If noise levels are exceeded, employers must provide hearing protection equipment (OSHA 2008).

The project area is adjacent to the airport road, the sewer lagoon, forested areas, and three houses at the end of a neighborhood.

Table 2. Noise Levels of Common Construction Equipment.			
Equipment	Typical Noise Levels (dBA) at varying distances ^a		
	50 feet	500 feet	1,000 feet
Backhoe	80	60	54
Concrete mixer	85	65	59
Loader	80	60	54
Truck	84	64	58
Hydraulic or Handheld Driver (impact)	101	77	70

^a. Source: FTA 2018

Vibration can lead to disturbance or structural damage to nearby facilities. Vibration can be caused by operating heavy construction machinery and ground-breaking construction activities (e.g., excavation or hydraulic or handheld driving). The effects of vibration range from feeling the floor shake and experiencing rumbling sounds to structural damage. Vibration is expressed in terms of the peak particle velocity (PPV), in inches per second, when used to evaluate human annoyance and building damage impacts. Vibration levels are highest closest to the

source and dissipate with increasing distance, generally at a rate of D_{ref}/D , where D is the distance from the source in feet, and D_{ref} is the reference distance of 25 feet. Other factors that affect vibration include soil conditions and the type of equipment and vibration (i.e., continuous or transient). There are no federal standards for vibrations; however, various researchers and organizations have published guidelines.

For historic buildings, appropriate vibration limits vary. A conservative PPV limit of 0.1 inch per second may be used, while 0.5 inch per second or even 0.2 inch per second may be considered appropriate (Wilson Ihrig 2012). For structures not designated as historic, typical PPV vibration thresholds are 0.5 inch per second for buildings structurally sound and designed to modern engineering standards and 0.3 inch per second for buildings that are found to be structurally sound but where structural damage is a major concern. For the purposes of this analysis, conservative PPV limits of 0.1 inch per second and 0.3 inch per second are used to determine potential vibration impacts to historic structures and non-historic structures, respectively.

Humans are generally considered less sensitive to transient (impulsive) vibration, than to similar vibration from continuous (steady state) sources. For this analysis, a PPV limit of 0.2 inch per second was used for potential human response to vibration.

3.3.4.2. Impact Analysis of the Proposed Action

Noise levels from multiple sources combine logarithmically, with increases depending on the difference in decibels. Near-equal sources result in a combined increase of about 3 dBA, whereas differences of over 10 dBA result in no increase over the higher noise source (NRC 2012).

Typical noise levels of various construction equipment that is anticipated to be utilized during construction of the Proposed Action is shown in Table 2. During construction the proposed solar PV array site would be cleared with (likely equipment) chainsaws, a backhoe, and a truck. Trucks would bring the solar panels to the site where a hydraulic or handheld driver would be used to install the panel foundations. It is anticipated that the only equipment operating during the hydraulic or handheld driving operation would be the hydraulic or handheld driver (101 dBA), which is the loudest noise source in Table 2 (even if other equipment operated simultaneously as the dBA from that piece of equipment is more than 10 dBA higher than noise from other equipment). Due to the loudness of the hydraulic or handheld driver, construction personnel on site during the hydraulic or handheld driving operation should be provided with and wear hearing protection. A concrete mixer and other trucks would likely be operating during installation of the pads. However, as mentioned, even with this equipment operating simultaneously, the hydraulic or handheld driving operation would still produce the loudest and most intrusive noise during construction.

The closest residences are around 350 feet from the proposed solar PV site (Google 2025). Based on Table 2, an extrapolated exterior noise level at the residence during the hydraulic or handheld driving operation would be about 84 dBA.

Standard buildings typically provide ten dB of noise reduction between exterior and interior noise levels with windows open, and 20 dB with windows closed (FHWA 2018). Therefore, inside the residences noise would be at approximately 74 dBA with windows opened. With closed windows, the temporary construction noise during the hydraulic or handheld driving operation would be approximately 64 dBA, respectively. Noise from the hydraulic or handheld driver would not be continuous but would instead be an impact source that occurred sporadically while ground screws were being driven. Approximately 600-800 ground screws would be driven at each site. The time it would take to install the ground screws would vary depending on site conditions. However, it is expected that nearby residences would be moderately impacted by construction noise for several months. Nearby residences should be notified prior to the start of construction activities, particularly during any hydraulic or handheld driving operations. Events and meetings scheduled to be held in the community should be coordinated with the contractor to avoid hydraulic or handheld driving operations during the times the meetings and events are held.

Installation of the three power poles would be a short-term operation, anticipated to be less than one day each, occurring within an existing cleared area. Some minor to moderate temporary increase in noise levels near where the poles would be installed would occur. Construction at the power plant sites for installation of the pads and

placement of the BESS buildings, along with other electrical and infrastructure connections, would be anticipated to be completed with trucks to haul equipment to the site, a concrete mixer, and a backhoe or similar machine (i.e., forklift) to place the BESS building. The noise level with all of the equipment operating simultaneously would be approximately 86 dBA. The closest residence to the proposed BESS site is about 350 feet away. Exterior noise levels at these locations would be estimated at 80 dBA. Interior noise levels with windows open would be 70 dBA, respectively, and 60 dBA with windows closed. During the construction operations, a minor to moderate noise impact would occur. Again, nearby residences should be notified prior to construction commencing. Construction equipment should not be allowed to idle to reduce continuous noise sources and should be fitted with properly functioning mufflers.

While minor to moderate noise impacts would be expected during construction operations, these impacts would be temporary in nature, lasting only as long as construction. Elevated noise levels would dissipate once construction operations ceased. To minimize disruptions to nearby residences, construction should be limited, to the extent possible, to daylight hours.

During the O&M phase, there would be no noise impacts caused by operations or maintenance of the solar PV system and associated equipment. However, noise levels in the village may decrease due to reduced operation of diesel-powered generator for electric production. A minor reduction in noise levels may result during the O&M phase.

Adverse impacts from construction vibration may occur due to the operation of heavy machinery. The primary construction activity with the Proposed Action that could result in vibration impacts would include potential installation of the solar PV array foundation (ground screws). Table 3 presents average source PPVs at varying distances for the types of construction equipment most likely to be used during construction of the Proposed Action. These values are compared to the PPV limits discussed previously to evaluate potential for structural damage and the effects of human response from vibration.

Table 3. Vibration Levels for Construction Equipment at Various Distances from the Source							
Construction Equipment	PPV (inches per second) at						
	25 feet ^{a,b}	50 feet	70 feet	100 feet	150 feet	200 feet	400 feet
Large bulldozer	0.089	0.045	0.032	0.022	0.015	0.011	0.006
Loaded trucks	0.076	0.038	0.027	0.019	0.013	0.010	0.005
Small bulldozer	0.003	0.002	0.001	0.001	0.001	0.0004	0.0002
Hydraulic or Handheld Driver (impact)	0.644	0.322	0.230	0.161	0.107	0.008	0.004
^a Source of PPV at 25 feet: FTA 2018							
^b Estimated vibration levels are highest closest to the source and dissipate with increasing distance at a rate of D_{ref}/D .							

As noted earlier, PPV values potentially causing structural impacts are 0.1 inch per second for historic structures and 0.3 inch per second for non-historic structures. Vibration levels causing a human response (annoyance) are approximately 0.2 inch per second. The closest residences to the proposed solar panel site are about 350 feet away. Based on Table 3, and assuming operation of an impact hydraulic or handheld driver, the residences would not be impacted by vibration.

In the areas where the proposed power plant modifications would occur, including installation of the pad for and placement of the BESS building, the closest building is 50 feet away from the construction area. As mentioned, at this construction site, loaded trucks and a small bulldozer (forklift) would be operating. The PPV levels for this type of construction equipment are well less than the PPV levels that would cause impact (0.1 inches per second for historic buildings, 0.3 inches per second for non-historic, and 0.2 inches per second for human annoyance).

No vibration impacts to nearby buildings or in terms of human annoyance would be anticipated during construction.

During the O&M phase, there would be no vibratory impacts caused by operations or maintenance of the solar PV system and associated equipment.

3.3.4.3. Impact Analysis of No-Action Alternative

No construction would occur with the No-Action Alternative. There would be no change in noise levels from existing and no vibratory impacts.

3.4. Relationship of Short-Term Uses and Long-Term Productivity

Short-term use of the environment, as the term is used in this document, is during construction of the Project, whereas long-term productivity refers to when the solar PV array and associated infrastructure are operational and in-use. The short-term use of the Project site for the Proposed Action would not affect the long-term productivity of the Project area.

SECTION 4 LIST OF AGENCIES AND PERSONS CONSULTED AND PREPARERS

List of Agencies and Persons Consulted

Name	Title	Organization	Role
Judith Bittner	Chief, State Historic Preservation Officer	Alaska Department of Natural Resources, Office of History and Archaeology	Section 106 NHPA

List of Preparers

Name	Title	Organization
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SECTION 5 APPENDICES

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