DRAFT THRESHOLD DETERMINATION DOCUMENT

Painted Desert Power Solar Project

Cameron & Coalmine Canyon Chapters
Navajo Nation, Arizona

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Prepared for the
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Window Rock, AZ

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EXECUTIVE SUMMARY

For decades, electric generation providers have relied on non-renewable energy resources on the Navajo Nation and have profited tremendously. Now, with fossil-fuel industries in decline, the Navajo Nation is seeking to facilitate development of new solar energy generation projects to support a transition to renewable energy. Navajo Power, a majority Native-owned public benefit corporation, has established Painted Desert Power LLC to develop the Painted Desert Power Solar Project as a model for renewable energy development that promotes long-term community development for the residents of the Former Bennett Freeze Area and the Navajo Nation as a whole.

Navajo Power develops competitive utility-scale solar projects in close partnership with communities, tribes, and Nations to catalyze economic empowerment for Native families and communities. Communities where projects are sited receive fair compensation for usage of their land. In accordance with their covenant, Navajo Power reinvests 80% of its profits, partially in community benefits and predominantly in new projects designed to help close the gap in project development financing in Indian Country. Navajo Power believes there is immense opportunity to drive sustainable economic development in Native communities with clean energy projects.

The authority of the Navajo Nation to issue leases and permits pursuant to the Navajo Nation Trust Land Leasing Act of 2000 promotes the self-determination and self-sufficiency of the Nation. These processes protect and preserve Navajo Nation trust land and provide data for trust asset management and accounting, accurate record keeping, and title recording. The Navajo Nation Trust Land Leasing Act authorizes the Nation under 25 United States Code § 415(e) to issue leases for land held in trust for the Nation by the federal government. The Navajo Nation General Leasing Regulations of 2013 under Title 16 Navajo Nation Code §§ 2301 et seq. require an environmental review process consistent with the regulations set forth in Title 25 Code of Federal Regulations Part 162 as amended.

Navajo Power is jointly developing the Painted Desert Power Solar Project with AES Clean Energy, a leading independent power producer that owns and operates more than 400 renewable generation systems across the United States. AES Clean Energy is expected to be the owner and operator of the Painted Desert Power Solar Project.

The Painted Desert Power Solar Project is a proposed 750-megawatt photovoltaic solar generating and battery energy storage system facility to be developed on 5,163 acres in the Cameron and Coalmine Canyon chapters of the Navajo Nation, approximately 4 miles east of Cameron, Arizona. The Painted Desert Power Solar Project is planned in two distinct areas, Solar Array Areas 1 and 2, separated by a floodplain and presumed United States Army Corps of Engineers jurisdictional wash excluded from the project footprint. Included as part of the Painted Desert Power Solar Project are the three roads running east from Bureau of Indian Affairs Route 6730 to provide access to the solar array areas and the improvement and expansion of its existing intersection on United States Route 89. A generation intertie would connect the Painted Desert Power Solar Project to the Moenkopi Substation. The generation intertie alignments are mostly outside of the Navajo Nation 4,563-acre lease area being requested. The 224 acres for the proposed generation intertie right-of-way interconnection to the existing Moenkopi Substation and the permit for the improvement and widening of Bureau of Indian Affairs Route 6730 are being requested under a separate authorization from the Bureau of Indian Affairs. The United States Bureau of Reclamation must complete an environmental review of the proposed interconnection into the Arizona Public Service Moenkopi Substation as a coordinating agency, in cooperation with the Bureau of Indian Affairs as lead agency.

Applicant proposed and agency required design features and additional proposed mitigation measures will minimize or avoid impacts on the community, environment, and biological and cultural resources while delivering socioeconomic benefits and supporting the Navajo Nation's transition to renewable energy in accordance with the Navajo Háyoołkáál Proclamation. The Navajo Nation Department of Fish and Wildlife has determined that the Painted Desert Power Solar Project is in compliance with tribal and federal laws protecting biological resources. The Navajo Nation Heritage & Historic Preservation Department determined that the Painted Desert Power Solar Project as proposed will have no adverse effect on historic properties identified. Additionally, the Navajo Environmental Protection Agency and the United States Army Corps of Engineers have determined that no Clean Water Act permits are needed to develop the Painted Desert Power Solar Project.

Painted Desert Power asks that the Navajo Nation issue the Finding of No Significant Impact required for Painted Desert Power to obtain a lease from the Navajo Nation as authorized by Title 25 United States Code §§ 415(a), (e) and authorization from the Navajo Nation to construct or improve, and maintain, the access roads required so that a solar generating and battery energy storage solution facility, from which the Nation will benefit, can be built in the chapters of Cameron and Coalmine Canyon on the Navajo Nation. This threshold determination document provides the Navajo Nation with a summary of the environmental review conducted for the 5,163-acre area for which grazing consents have been received and for which Painted Desert Power is seeking a lease from the Navajo Nation. As required by the Navajo Nation Heritage & Historic Preservation Department and the Navajo Nation Department of Fish and Wildlife, more than 5,650 acres and 7,000 acres, respectively, were surveyed for cultural and biological resources, including buffers beyond the requested lease area. The three access roads providing access to the Project Site from Bureau of Indian Affairs Route 6730 and the improvement and expansion of its existing intersection on United States Route 89 are all included in the environmental review summarized in this threshold determination document for evaluation by the Navajo Nation.

Table ES-1 lists potential environmental impacts from the Project, design features provided by Painted Desert Power to reduce impacts, and additional mitigation measures, which are all described in more detail in **Section 3.3**.

Table ES-1 Potential Environmental Issues, Design Features, and Mitigation Measures

RESOURCE TOPIC	POTENTIAL ENVIRONMENTAL ISSUES	DESIGN FEATURES / MITIGATION MEASURES
Geology, Mineral Resources, Soils, and Paleontology	• Access restriction to potential future abandoned uranium mine reclamation areas • Impacts on buried paleontological resources	• AIR-1: Dust Control Plan • CULTURAL-2: Tribal Cultural and Paleontological Worker Training • GEO-1: Access to Neighboring Abandoned Uranium Mines for Potential Future Reclamation • GEO-2: Geotechnical Evaluation to Inform Design • PALEO-1: Paleontological Pre-Construction Survey and Unanticipated Discovery Plan • WATER-2: Stormwater Pollution Prevention Plan • AIR-1A: Dust Control Plan for the Alternative Solar Generating Facility
Air Quality and Noise	• Dust during construction • Vehicle and equipment emissions • Construction/operation noise impacts on sensitive receptors	• AIR-1: Dust Control Plan • NOISE-1: Noise-Reducing Practices and Work Hour Restrictions • AIR-1A: Dust Control Plan for the Alternative Solar Generating Facility
Biological Resources	• Impacts on special status species and habitat • Vegetation loss during construction • Impacts on wildlife • Impacts on avian species, including migratory birds • Noxious weeds, invasive plant control	• BIO-1: Noxious Weed Control and Vegetation Management, Revegetation, and Monitoring • BIO-2: Pre-Construction Clearance Surveys and Monitoring • BIO-3: Migratory Bird Treaty Act Compliance • BIO-4: Golden Eagle Protection • BIO-5: Limitation of Herbicide Use to Non-Persistent, Immobile Substances • BIO-6: Raptor Electrocution Prevention
Cultural and Historic Resources	• Impacts on historic properties • Impacts on tribal cultural resources	• CULTURAL-1: Site Avoidance, Monitoring, Discovery, and Treatment Plan • CULTURAL-2: Tribal Cultural and Paleontological Worker Training • CULTURAL-3: Native American Graves Protection and Repatriation Act Compliance

RESOURCE TOPIC	POTENTIAL ENVIRONMENTAL ISSUES	DESIGN FEATURES / MITIGATION MEASURES
Hazards, Hazardous Materials, and Waste	• Exposure to hazardous materials from handling or spills • Proper disposal of waste materials from construction • Avoidance of abandoned uranium mines	• HAZMAT-1: Hazardous Material Handling and Spill Prevention and Response Plans • HAZMAT-2: Waste Disposal • HAZMAT-3: Avoidance of Abandoned Uranium Mines • HAZMAT-4: Refining Abandoned Uranium Mine Exclusion Areas as Needed • HAZMAT-5: Health and Safety Plan • HAZMAT-6: Dust Suppression Measures
Land Use, Tribal Trust Lands, Grazing, and Agriculture	• Impacts on transportation, utilities, recreation, and any potential mine reclamation activities • Impacts on tribal trust lands held in trust by the United States government for the benefit of the Navajo Nation • Impacts on local grazing and small-scale agriculture	• LAND USE-1: Fencing Improvements • LAND USE-2: Road Design to Minimize Impacts on Grazing • LAND USE-3: Coordination with Grazing Permit Holders
Socioeconomics	• Beneficial Impacts: • Local job training and employment opportunities • Impacts on local businesses and tax revenues	None listed
Visual Resources	• Impacts on rural residences east of Cameron near the Project Site • Impacts on views from United States Route 89 • Impacts on views from Bureau of Indian Affairs Route 6730 and rural residences	• VISUAL-1: Height Restrictions and Site Maintenance • VISUAL-2: Minimization of Lighting Impacts • VISUAL-3: Material Reflectivity and Color Treatment

RESOURCE TOPIC	POTENTIAL ENVIRONMENTAL ISSUES	DESIGN FEATURES / MITIGATION MEASURES
Public Health and Safety	• Potential for health effects to sensitive populations from dust or air emissions, including uranium exposure • Potential for public exposure to hazardous materials, including those associated with the battery energy storage system • Risks of fire or other emergencies during construction and operation	• AIR-1: Dust Control Plan • GEO-1: Access to Neighboring Abandoned Uranium Mines for Potential Future Reclamation • HAZMAT-1: Hazardous Material Handling and Spill Prevention and Response Plans • HAZMAT-3: Avoidance of Abandoned Uranium Mines • HAZMAT-5: Health and Safety Plan • HAZMAT-6: Dust Suppression Measures • PUBLIC HEALTH-1: Safety, Emergency Preparedness, Fire, and Site Security Plans • AIR-1A: Dust Control Plan for the Alternative Solar Generating Facility
Traffic and Transportation	• Impacts of construction and operation traffic on roads, including on United States Route 89 and around Cameron, Arizona • Impacts on military or civilian aviation • Impacts from road repair and improvement	• TRANSPORTATION-1: Transportation Plan to Reduce Impact on Traffic • TRANSPORTATION-2: Road Repair and Restoration • TRANSPORTATION-3: Temporary Access Road Reclamation
Water Resources	Impacts on surface and ground water quality, water use	• WATER-1: Minimization of Project Impacts on Surface Waters and Obtainment of Relevant Permits • WATER-2: Stormwater Pollution Prevention Plan • WATER-3: Water Source Review • WATER-4: Minimization of Impacts on Area Drainage Patterns and Floodplains • WATER-5: Reclamation and Decommissioning

1.0 INTRODUCTION

Navajo Power PBC (Navajo Power) has established Painted Desert Power LLC (PDP) to develop the Painted Desert Power Solar Project (Project) as a model for renewable energy development that promotes community engagement and benefits to the Navajo Nation and the local community.

Navajo Power and AES Clean Energy (AES) are jointly developing the Project. AES is a leading independent power producer that owns and operates more than 400 renewable generation systems across the United States (US) with a wind, solar, and battery energy storage portfolio of 4.4 gigawatts (GW) and 40 GW under development. AES is expected to be the owner and operator of the Project.

The Project is a proposed 750-megawatt (MW) photovoltaic (PV) solar generating and battery energy storage system (BESS) facility in the Cameron and Coalmine Canyon chapters of the Navajo Nation Reservation, approximately 4 miles east of Cameron, Arizona. The Project would be constructed within a 5,163-acre area that includes 4,563 acres to be leased from the Navajo Nation under the provisions of the Navajo Nation General Leasing Regulations of 2013. The solar generating facility and ancillary facilities would be constructed and operated within the proposed lease area. The three access roads running east from Bureau of Indian Affairs Route (BIA RT) 6730 and the improvement and expansion of BIA RT 6730's existing intersection on US Route 89 (US 89) [1] are included as part of the environmental review summarized in this threshold determination document (TDD) for evaluation by the Navajo Nation. An approximately 4.2-mile, 500kV generation intertie (gen tie) line would run west from the Project substation to interconnect directly with the existing Moenkopi Substation operated by Arizona Public Service (APS). The 224-acre gen tie corridor is outside of the Navajo Nation solar lease boundary being requested and would necessitate a right-of-way (ROW) grant issued by the Bureau of Indian Affairs (BIA).

The APS Moenkopi Substation is part of the Navajo Southern Transmission System (NSTS), of which the US government is a partial owner. The US Bureau of Reclamation (USBR) is the representative of the federal government's interest in the NSTS and thereby must approve proposed interconnection into the substation. USBR must complete an environmental review of the proposed interconnection as a coordinating agency, in cooperation with the BIA as lead agency.

This TDD is structured as follows:

- Section 1.0 Introduction
- Section 2.0 Proposed Action and Alternatives
- Section 3.0 Affected Environment and Compliance Evaluation
- Section 4.0 Cumulative Impacts
- Section 5.0 Consultation Record

1.1 PROJECT BACKGROUND

PDP proposes to develop the Project in accordance with the Navajo Háyoołkáál Proclamation (**Appendix B**). On April 2, 2019, the Office of the President and Vice President of the Navajo

[1] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.

Nation issued the Navajo Háyoołkááł Proclamation, also known as the Navajo Sunrise Proclamation, which "creates a new economic vision for the Navajo people through healing the land, fostering clean energy development, and providing leadership for the energy market for the Navajo people." The proclamation is based on four principles, excerpted here:

1. A diverse energy portfolio, creating workforce development and job creation for the Navajo People from focused carbon-based energy to renewable energy development, including workforce,
2. Restoration of land and water after decades of uranium and coal mining,
3. Rural electrification of homes that lack access to electricity,
4. Utility-scale renewable energy development, to supply electricity to the Navajo Nation and Western United States. (Navajo Háyoołkááł Proclamation, para 2)

PDP is committed to the principles of the proclamation and to working with the Navajo Nation to ensure that the Project maximizes the positive impact on the local Navajo communities and Navajo economy. In adherence to the proclamation, the Project would re-utilize lands impacted by historic uranium mining; focus on developing a strong local workforce; address the electrification needs of areas affected by the Bennett Freeze and other infrastructure challenges; and expand the energy portfolio of the Navajo Nation while providing renewable electricity to the region.

In 2019, PDP approached the Navajo Nation Division of Natural Resources (NNDNR) for guidance on the leasing and environmental review processes under the General Leasing Regulations of 2013 (**Section 1.2**). In early 2020, PDP initiated the biological, cultural, and aquatic resource surveys, among others, required by NNDNR for project clearances. In May 2020, the assigned environmental reviewer from the Navajo Nation General Land Development Department (GLDD) began bi-monthly meetings with the PDP team to track Project progress.

1.2 PURPOSE AND NEED

This section outlines the NNDNR process for evaluating a proposed lease under the Navajo Nation Trust Land Leasing Act and describes the purpose and need of the Project.

1.2.1 Navajo Nation Division of Natural Resources

The purpose of submitting this TDD is to obtain a lease from the Navajo Nation as authorized by 25 United States Code (USC) §§ 415(a), (e) and authorization from the Navajo Nation to construct or improve, and maintain, the access roads required so that a solar generating and BESS facility from which the Nation will benefit can be built on Navajo land. The NNDNR's role is to respond to PDP's lease request for the purpose of developing a solar facility on Navajo Reservation lands.

1.2.1.1 Navajo Nation Leasing Regulations

The authority of the Navajo Nation to issue leases and permits pursuant to the Navajo Nation Trust Land Leasing Act promotes the self-determination and self-sufficiency of the Nation. These processes protect and preserve Navajo Nation trust land and provide data for trust asset management and accounting, accurate record keeping, and title recording. The Navajo Nation Trust Land Leasing Act of 2000 authorizes the Nation under 25 USC § 415(e) to issue leases for land held in trust for the Nation by the federal government. The Navajo Nation General Leasing Regulations of 2013 under Title 16 Navajo Nation Code (NNC) §§ 2301 et seq. require an environmental review process consistent with the regulations set forth in Title 25 Code of Federal Regulations (CFR) Part 162 as amended.

For the Navajo Nation to grant a right to possess Navajo Nation trust land for a specific purpose and limited duration, the regulations require the Nation to review and approve a TDD for the project, with modifications if necessary. A TDD should document the applicant's fulfillment of the environmental review requirements set forth in the Navajo Nation General Leasing Regulations. The TDD is provided to the environmental compliance officer for the Navajo Nation and the Navajo Nation Resources and Development Committee (NNRDC) and relevant sections go to the cognizant agencies identified by the Navajo Nation Leasing Regulations, the Navajo Nation Environmental Protection Agency (NNEPA), the Navajo Nation Heritage & Historic Preservation Department (NNHHPD), and the Navajo Nation Department of Fish and Wildlife (NNDFW). Under the regulations, the NNRDC must summarize the environmental review findings and compliance determinations and complete an environmental review record, providing the applicant with technical assistance if necessary.

The TDD for this Project documents PDP's fulfillment of the Navajo Nation General Leasing Regulations' environmental review requirements. The proposed safety policies for the Project conform to applicable federal, tribal, state, and local laws, regulations, and policies. The Project will comply with all federal and tribal historic and cultural preservation laws; specifically, in order to prevent unauthorized destruction of resources pursuant to 16 USC § 470(e), all work on the Project will cease and the Nation will be notified if artifacts are discovered. In no circumstances shall policies be construed so as to waive any requirement of federal law.

1.2.2 Painted Desert Power

The Navajo Nation has been providing electricity to the Western US for many years, but several of its coal plants have recently closed or are soon slated to close. The Navajo Generating Station (NGS), located near Page, Arizona, closed in November 2019. The closures of NGS and the Kayenta Mine, which supplied NGS with coal, resulted in significant job losses for Navajo workers and reduced revenues to the Navajo Nation. However, these planned closures have also created an opportunity for the Navajo Nation to diversify its energy portfolio by encouraging renewable energy development on tribal lands for the benefit of the Navajo people. The Navajo Háyoołkááł Proclamation outlines support for these efforts. Furthermore, the Project location is within the Former Bennett Freeze Area (FBFA), an area in significant need of economic development and job opportunities.

The goals of the Project are:

- Improve the economic condition of the Navajo Nation with job opportunities and income for the community.
- Facilitate and support the Navajo Nation's energy transition through the development of renewable energy resources as directed by the Navajo Nation leadership and promoted in the Navajo Háyoołkááł Proclamation.
- Allow increased economic power generation, transfers, sales, and purchases by providing a new source of renewable energy, up to 750MW, to assist the Navajo Nation in achieving its renewable energy development goals and to support power generation needs in the Southwest.

- Install commercially proven, financeable solar and battery storage technology that is readily available, efficient, and environmentally friendly to generate cost-competitive and reliable renewable energy.
- Replace power previously generated by the now-retired coal-fired NGS.
- Locate the Project in a rural setting within the Cameron and Coalmine Canyon chapters on the Navajo Nation.
- Locate the Project near an existing electric transmission system for ease of interconnection and in order to minimize impacts associated with the expansion of transmission infrastructure.
- Minimize or avoid potential impacts on the local community, environment, and biological and cultural resources by locating the Project on underutilized, previously disturbed, or degraded land.

1.3 PROJECT LOCATION

The Project Site and surrounding area are part of the Navajo Nation on tribal trust lands. The legal description for the Project Site is Sections 7-9, 16-22, and 27-32 in Township 29 North, Range 10 East, Gila and Salt River Meridian, in the Coalmine Mesa Chapter[2], Coconino County, State of Arizona, on the Navajo Nation. The gen tie ROW is located within the Cameron and Coalmine Mesa chapters on tribal trust lands. The legal description for the gen-tie ROW is Sections 22, 23, 25, and 26, Township 29 North, Range 9 East, and Sections 30 and 31, Township 29 North, Range 10 East, Gila and Salt River Meridian, Coconino County, Arizona, within the Cameron and Coalmine Mesa chapters of the Navajo Nation. The BIA RT 6730 ROW is also on tribal trust lands. The legal description of the BIA RT 6730 ROW is Tribal Tract T5033, Sections 22, 23, 25, and 26, Township 29 North, Range 9 East, and Section 31, Township 29 North, Range 10 East, and Tribal Tract 12075, Section 30, Township 29 North, Range 10 East, Gila and Salt River Meridian, Coconino County, State of Arizona, in the Coalmine Mesa Chapter, on the Navajo Nation. US 89 is the main highway used to access the Project Site and the nearest town is Cameron, Arizona, located approximately 4 miles to the west of the Project Site.

Figure 1.3-1 is an overview map of the Project Site.

[2] The prior name for the Coalmine Canyon Chapter, Coalmine Mesa, is used in the legal description; throughout the rest of this document, we use the chapter's current name.

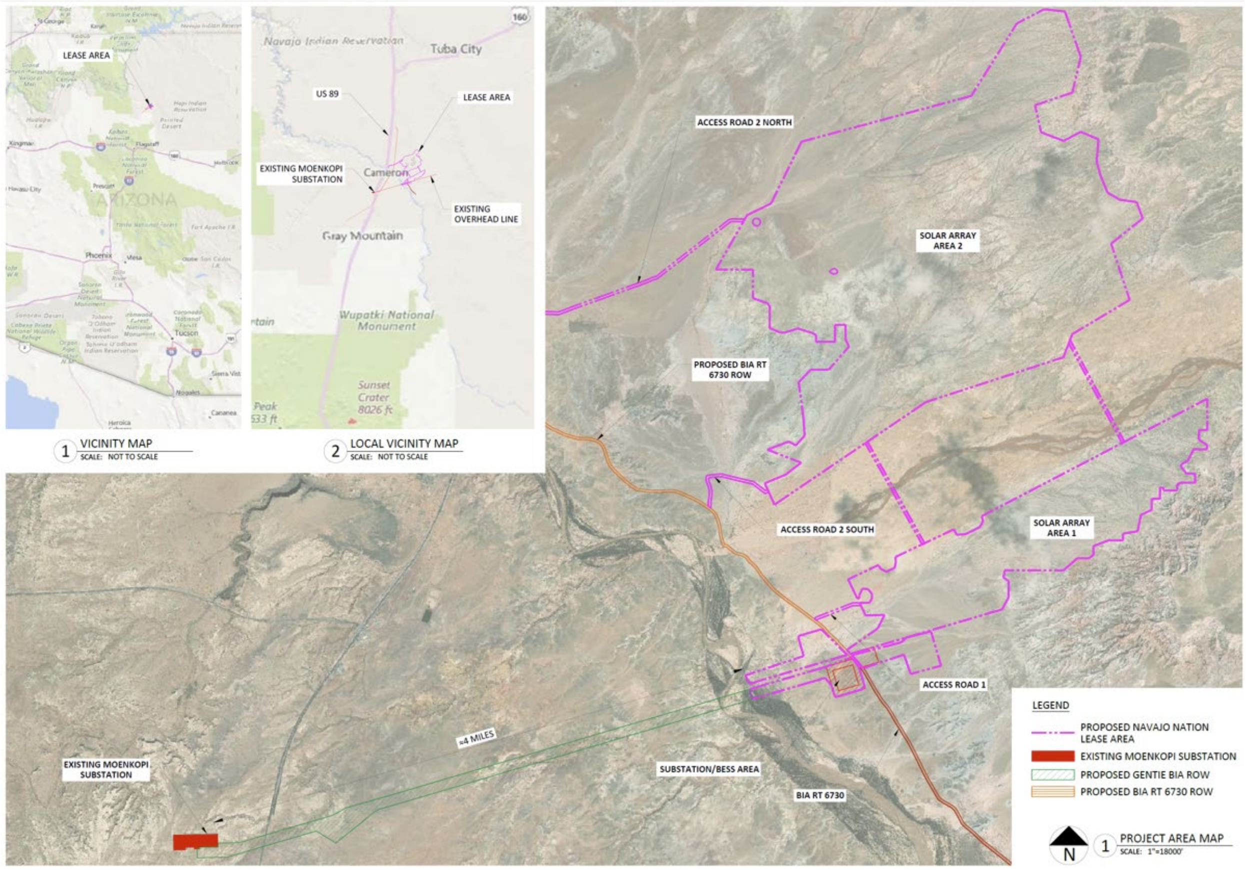

Figure 1.3-1 Proposed Project Overview

1.4 CHAPTER AND GRAZING PERMIT HOLDER CONSENTS

The Project location was chosen in consultation with local chapter officials and grazing permit holders to minimize impacts on grazing and other community land uses. Chapters on the Navajo Nation are certified local government entities vested with the authority and responsibility to advocate on behalf of their constituents. Grazing permit holders have been granted permits by the BIA to graze their livestock on their ancestral lands.

Between August 2018 and February 2022, PDP held dozens of meetings with Navajo families who hold grazing permits in the Cameron and Coalmine Canyon chapters. At these meetings, PDP educated local grazing permit holders about solar power and the development steps required for a large solar project. PDP worked with these grazing permit holders to select a Project Site that did not disturb traditional ceremonial areas or areas currently used for grazing activities. Before entering into agreements with grazing permit holders for rights to their grazing land, legal representation was provided to ensure that the grazing permit holders fully understood the agreements and that the agreements addressed the concerns of the grazing permit holders. All affected grazing permit holders have signed consents supporting development of the Project on the Project Site. PDP has assigned a representative to provide updates to grazing permit holders on a regular basis.

PDP has secured resolutions supporting land withdrawal from the Cameron and Coalmine Canyon chapters (**Appendix N**; **Appendix O**) and has committed to providing revenues from the Project to the chapters once the Project is built. Both chapters plan to use these revenues for the provision of essential community services. These agreements give PDP the exclusive right to develop a utility-scale solar project within the chapters.

The Project site control milestones to date are listed in **Table 1.4-1**.

Table 1.4-1 Site Control Milestones[3]

MILESTONE	DATE ACHIEVED
Coalmine Canyon Chapter approves resolution supporting land withdrawal for a portion of the solar array	February 26, 2020
Grazing permit holders consent to development, construction, and operation of the Project on 5,163 acres	February 3, 2022
Cameron Chapter approves resolution supporting the grant of right-of-way for the Project (**Appendix N**)	June 26, 2022
Coalmine Canyon Chapter approves resolution supporting land withdrawal for the entire solar array (**Appendix O**)	TBD
Navajo Nation approves final Coalmine Canyon Chapter land withdrawal	TBD

Once the Project is decommissioned and reclamation has been completed, the Navajo Nation, possibly in collaboration with the BIA, could reinstate grazing and recreation at the Project Site. During Project operation, sheep grazing would be a compatible land use to provide vegetation control within the solar arrays.

1.5 PERMITS, SURVEYS, AND STUDIES

The Project is complying with the Navajo Nation's General Leasing Regulations of 2013 by preparing this document. Following the issuance of a Finding of No Significant Impact (FONSI), the Navajo Nation Tribal Council can issue a lease decision for the Project.

In parallel, as noted above, a proponent-prepared environmental assessment (EA) for the gen tie ROW across tribal trust lands will be prepared under the National Environmental Policy Act (NEPA) and reviewed by the BIA as the lead agency in accordance with 25 CFR 169. Under 42 USC §§ 4321 et seq., the BIA must respond to any ROW application over or across lands held in trust for the benefit of the Navajo Nation and, pursuant to 25 USC § 415, deny, grant, or grant with modifications the ROW agreements between the Navajo Nation and PDP. It is expected that the BIA's review would result in a grant of easement for the gen tie ROW if the Project is approved. A Section 106 review would be conducted by the NNHHPD. A Phase I Environmental Site Assessment (Phase I ESA) has been prepared and subsequently updated. All versions will be submitted to the NNEPA. The USBR must complete an environmental review of the proposed interconnection into the APS Moenkopi Substation as a coordinating agency, in cooperation with the BIA as lead agency. BIA and ADOT permits would also be required for improvements to BIA RT 6730 and to the US 89 turnout and for the gen tie crossings of these roads. Short-term closures of up to 1 day may be needed for the stringing and energization of high voltage (HV) cable.

[3] Upon the Coalmine Canyon Chapter's approval of the resolution supporting land withdrawal, this table will be updated in the plan of development.

To ensure Project compliance with CWA Section 404/401, a request for a jurisdictional determination (JD) was submitted to the United States Army Corps of Engineers (USACE) Phoenix Regulatory Office on November 13, 2020. The JD request was supplemented with the Project Aquatic Resources Delineation Report prepared by Ecosphere Environmental Services Inc. (Ecosphere). Ecosphere concurrently submitted a CWA Section 401 Water Quality Certification (WQC) application to the NNEPA. Supplemental wash crossing design plans were submitted to NNEPA on February 5, 2021. On March 18, 2021, in anticipation of a similar determination from the USACE, the NNEPA informed PDP no CWA 401 WQC would be required for the Project as no jurisdictional waters of the US occur within the Project area (**Appendix R**). On March 29, 2021, the USACE issued to PDP a "no permit required" letter regarding compliance with CWA Section 404 (**Appendix Q**).

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF PROPOSED PROJECT AND ALTERNATIVES

This section describes the elements of the Proposed Project (**Section 2.1.1**; **Section 2.1.3**) and alternatives (**Section 2.1.2**; **Section 2.1.4**). This document evaluates all these elements except the gen tie alternatives and the Moenkopi Substation, which will be evaluated separately in a BIA-led NEPA EA.

2.1.1 Proposed Solar Generating Facility

The Proposed Solar Generating Facility is a 4,563-acre solar PV facility arranged in two distinct solar generating areas, Proposed Solar Array Area 1 (Area 1) and Proposed Solar Array Area 2 (Area 2). These areas are separated by a floodplain featuring an unnamed USACE jurisdictional wash (not included in the Project footprint). To the south of the wash lies Area 1, consisting of a large area of contiguous solar arrays and related facilities (such as pad mounted inverters and transformers). The larger Area 2 is located north of Area 1 by approximately 0.9 miles and features additional solar arrays. Area 2's northern and southern portions are separated by a slurry pipeline and historic cultural corridor. Within the southern portion of Area 2 lie several areas of rugged topography that the Proposed Facility would not disturb. The Proposed Facility (**Figure 2.1-1**) avoids grading in this rugged central portion of Area 2 by packing the rows of north-south oriented trackers more tightly throughout the remainder of Area 2.

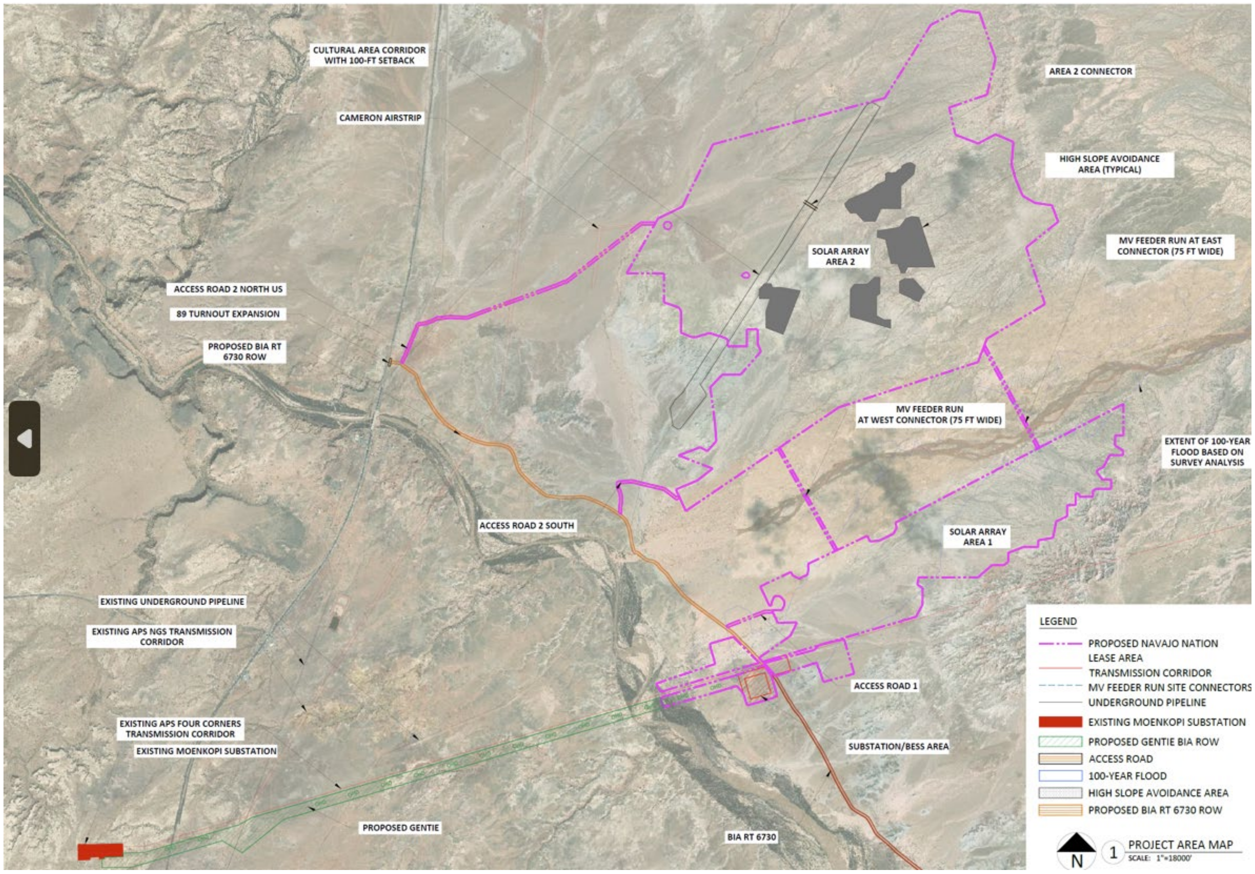

Figure 2.1-1 Proposed Solar Generating Facility Site Plan

Fully built out, Area 2 would be approximately 3.5 times the size of Area 1. Operations and maintenance (O&M) facilities would be located within Areas 1 and 2 (**Table 2.1-1**).

Table 2.1-1 Proposed Facility Components

PROPOSED FACILITY COMPONENTS	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
Proposed Solar Array Area 1	54.7	888.1
Proposed Solar Array Area 2	325.7	4,013.9

2.1.2 Alternative Solar Generating Facility

Like the Proposed Solar Generating Facility, the Alternative Solar Generating Facility (**Figure 2.1-2**) is a 750MW solar PV facility arranged in two distinct solar generating areas, Alternative Solar Array Area 1A (Area 1A) and Alternative Solar Array Area 2A (Area 2A), but the Alternative Facility would require significantly more grading work (**Appendix K**) to accommodate the increased tracker row spacing that would allow for greater annual energy production relative to the Proposed Facility.

As in the Proposed Facility, the solar array areas are separated by a floodplain featuring a USACE jurisdictional wash (not included in the Project footprint). To the south of the wash lies Area 1A, consisting of a large area of contiguous solar arrays and related facilities (such as pad mounted inverters and transformers). Alternative Area 1A occupies almost exactly the same area as Proposed Area 1 but the distance between the solar arrays within Area 1A would be approximately 10% greater, allowing for slightly more energy production from each row due to the reduction in inter-row shading at certain times of day.

The larger Area 2A is located north of Area 1A by approximately 0.9 miles and features additional solar arrays. Area 2A's northern and southern portions are separated by a slurry pipeline and historic cultural corridor. Within the southern portion of Alternative Area 2A, several areas of rugged topography would be graded or otherwise leveled to create more usable area relative to the Proposed Area 2. These flattened areas would allow Area 2A to accommodate inter-row spacing similar to that of Area 1A, allowing the Alternative Facility to produce more energy by reducing row-to-row shading at dawn and dusk.

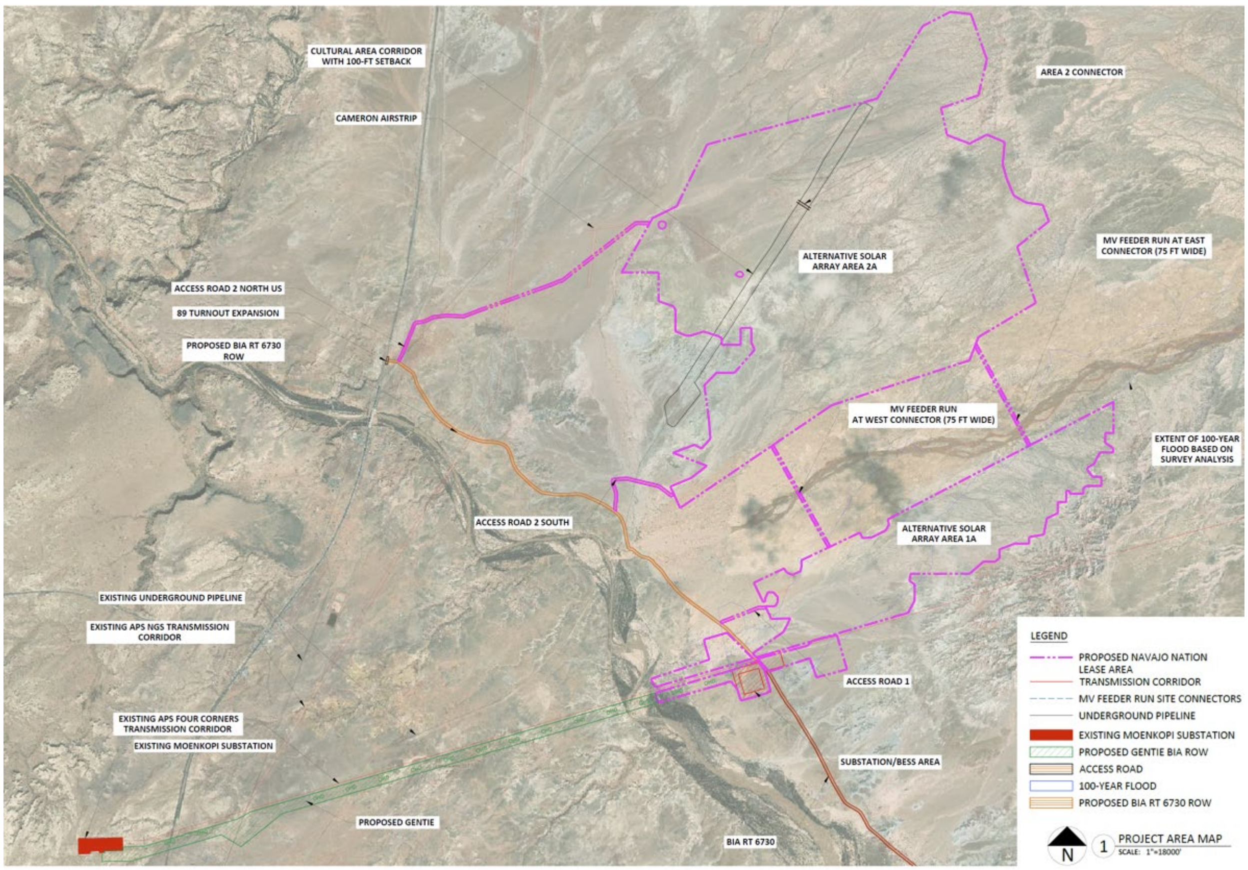

Figure 2.1-2 Alternative Solar Generating Facility Site Plan

Fully built out, Area 2A is about 3.5 times the size of Area 1A. O&M facilities would be located within Areas 1A and 2A (**Table 2.1-2**).

Table 2.1-2 Alternative Facility Components

ALTERNATIVE FACILITY COMPONENTS	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
Alternative Solar Array Area 1A	59.4	883.35

ALTERNATIVE FACILITY COMPONENTS	PERMANENT IMPACTS	TEMPORARY IMPACTS
Alternative Solar Array Area 2A	528.85	3,810.7

2.1.3 Proposed Project Access Roads and Electrical Connectors

The site plans for both the Proposed Solar Generating Facility (**Figure 2.1-1**) and the Alternative Solar Generating Facility (**Figure 2.1-2**) include the Proposed Project Access Roads and Electrical Connectors, the Proposed Substation/BESS Area, and the Proposed Gen Tie corridor to the Moenkopi Substation. The Proposed Substation/BESS Area, Area 2 Connector, the East and West Connectors, the improvement and expansion of BIA RT 6730's existing intersection on US 89[4], and Access Road 1, Access Road 2 South, and Access Road 2 North are all included in the environmental review summarized in this TDD for evaluation by the Navajo Nation. The Proposed Gen Tie, Proposed Moenkopi Substation Expansion, and Proposed BIA RT 6730 ROW will be evaluated separately in a BIA-led NEPA EA.

Area 1 or Area 1A would be accessed via Access Road 1 running east from BIA RT 6730. Area 2 or Area 2A would be accessed via Access Roads 2 South and 2 North running east from BIA RT 6730. The two portions of Area 2 or 2A would be connected by a single access road crossing the cultural corridor and slurry pipeline with alternating current (AC) medium voltage (MV) cables running overhead. The gap between Areas 1 and 2 or Areas 1A and 2A would be connected via the East and West Connectors. These corridors would contain MV circuits (above ground, on poles, or underground), temporary access roads (except for areas within the seasonal wash), and overhead or underground communications (fiber-optic) cable.

The Proposed Project components and the number of acres permanently or temporarily impacted by each component are listed in **Table 2.1-3**.

Table 2.1-3 Proposed Project Components

PROPOSED PROJECT COMPONENTS	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
Proposed Substation/BESS Area	14.7	2.6
Proposed Gen Tie	1.4	18.8
Proposed Moenkopi Substation Expansion	1.3	0.8
Access Road 1	1.0	2.1
Access Road 2 South	2.1	4.1
Access Road 2 North	6.2	13.2
Area 2 Connector	0.4	0.7
BIA RT 6730 Improvement and Widening	11.4	22.9
US 89 Turnout Improvement and Expansion[5]	0.5	0.2

[4] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.
[5] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.

PROPOSED PROJECT COMPONENTS	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
East Connector	2.6	5.2
West Connector	2.6	5.2
Total	44.2	75.8

The proposed and alternative gen tie ROWs outside the proposed lease area are being evaluated by the BIA as a separate ROW action.

2.1.4 Alternative High-Voltage Project Components

Several alternative HV Project components are described here for consideration for either the Proposed Solar Generating Facility or the Alternative Solar Generating Facility. There are two alternative substation and BESS area locations, Alternative Substations/BESS Areas 1A and 1B. Alternative Substation/BESS Area 1A would require an additional access road, Alternative Access Road 1A. Alternative Substation/BESS Areas 1A and 1B and Alternative Access Road 1A are being evaluated by the Navajo Nation in this TDD, but the other alternative HV components will be evaluated separately in a BIA-led NEPA EA.

Table 2.1-4 Substation Alternatives

SUBSTATION COMPONENT	GEN TIE COMPONENT(S)	OTHER REQUIRED COMPONENTS
Alternative Substation/BESS Area 1A	Proposed Gen Tie	Proposed Moenkopi Substation Expansion, Alternative Access Road 1A
Alternative Substation/BESS Area 1B	Gen Tie Alternative 1: runs parallel to the existing APS Four Corners transmission corridor on its north side before crossing under it just east of the APS NGS transmission corridor and running parallel to the APS Four Corners transmission corridor on its south side	Proposed Moenkopi Substation Expansion
Alternative Substation/BESS Area 1B	Gen Tie Alternative 2: runs parallel to the APS Four Corners transmission corridor on its north side	Alternative Moenkopi Substation Expansion

The alternative components are shown in **Figure 2.1-3**.

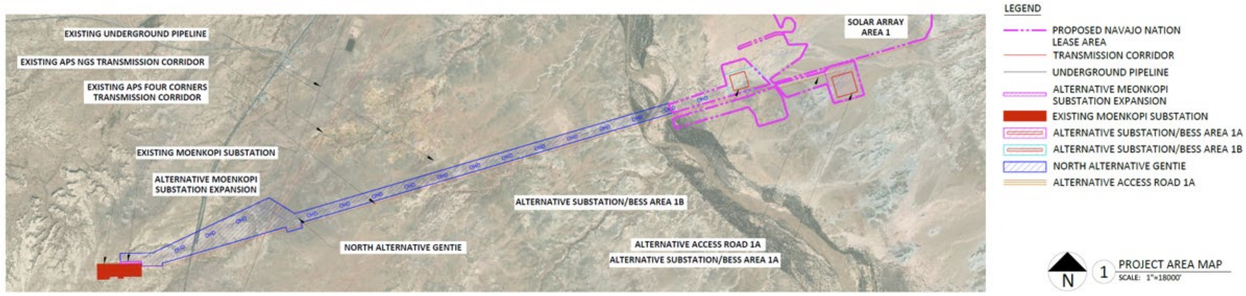

Figure 2.1-3 Substation and Gen Tie Alternatives

Additional alternative Project components and the number of acres permanently or temporarily impacted by each component are listed in **Table 2.1-5**.

Table 2.1-5 Additional Components for Project Alternatives

ADDITIONAL COMPONENTS FOR PROJECT ALTERNATIVES	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
Alternative Substation/BESS Area 1A (including Alternative Access Road 1A)	16.5	2.9
Alternative Substation/BESS Area 1B	15.5	2.5

2.1.5 Alternatives Considered but Dismissed from Further Analysis

Several possible solar array locations with a history of uranium mining immediately adjacent to Areas 1 and 2 were considered but excluded to avoid limiting the access needed for long-term studies, characterizations, or potential future reclamation activities conducted by other parties. Nearby abandoned uranium mine (AUM) sites were identified in the February 2022 Phase I ESA prepared by SWCA Environmental Consultants Inc., or SWCA (SWCA 2022), but all are avoided by the Proposed Project and by alternative Project elements.

2.2 DETAILS OF PROPOSED ACTION

2.2.1 Site Plan

At full build-out, most of the Project Site (**Figure 2.1-1**) would be occupied by solar panels mounted on single-axis trackers (solar panel mounting structures) and related equipment. Temporary construction laydown or on-site assembly facility areas, construction trailers, and parking areas would be provided within the Project Site. Due to the size of the Project Site, one or more of the laydown or on-site assembly facility areas would be relocated periodically within Areas 1 and 2 as construction progressed.

2.2.2 Solar Array and Generation System

PV panels would produce all electricity generated by the Project. PV panels convert sunlight into direct current (DC) electricity. The major equipment in the solar field includes the:

- PV solar panels
- single-axis trackers
- inverters

- BESS
- three-phase pad-mounted transformers and circuit breakers

The current design groups the PV panels, inverters, and MV transformers into approximately 4MW of direct current (MWdc) blocks that, when combined, would produce the Project output. MWdc block, inverter, and transformer sizes would be finalized closer to the time of construction.

The degree of tilt for the trackers would change over the course of each day. The peak height of a solar tracker would be approximately 7 to 13 feet (ft), reached during the morning and evening hours when the panels are tilted to face the rising or setting sun.

The trackers would be mounted on driven piles, ground screw, or cast-in-drilled-hole (CIDH) foundations to support the panel mounting system. The electrical equipment (inverters and transformers) would be housed in containers or in small shelters or skid platforms approximately 8 to 10 ft tall. The Project would also include small meteorological monitoring stations to track solar insolation, temperature, and wind direction and speed from a height of approximately 30 ft.

The PV panels utilize non-reflective surfaces to maximize efficiency and convert sunlight into direct current (DC) electricity. The DC output of multiple rows of PV panels is collected through one or more combiner boxes and directed to an inverter that converts the DC electricity to AC electricity. From the inverter, the generated energy flows to a transformer where it is stepped up to distribution-level voltage, approximately 34.5 kilovolts (kV). Multiple transformers are connected in parallel via 34.5kV lines (installed either overhead or below ground) to a single 34.5/500kV substation.

2.2.3 Substations, BESS, Gen Tie, and Telecommunications

A new collector substation located at the southwest corner of the Project Site would step up power from 34.5kV to 500kV for transmission. The Project substation would consist of one or more general step-up transformers, a control house, and a substation superstructure within an approximately 8-ft tall fence enclosure. Location options for the Project substation appear in the maps of the Proposed Solar Generating Facility Site (**Figure 2.1-1**), the Alternative Solar Generating Facility Site (**Figure 2.1-2**), and the substation and gen tie alternatives (**Figure 2.1-3**).

Certain phases of the Project may include a BESS that would store electricity for dispatch into the transmission grid via the gen tie. At complete buildout, PDP anticipates that the BESS could consist of approximately 75 to 150 enclosed battery storage containers. Each container would house battery modules mounted in racks (akin to server racks) and associated electrical equipment. PDP anticipates that the battery storage containers would be built using standard International Organization for Standardization (ISO) shipping containers and would each measure approximately 53 ft in length, 8 ft in width, and 9 ft in height, though other form-factor structures may be used. Each storage container would be completely outdoor accessible (with no internal access). The ultimate number of enclosed battery storage containers and their associated dimensions may vary based on final design and in conformance with current industry codes and safety standards.

The combined substation and BESS area is expected to cover approximately 15 acres and may be distributed throughout the site.

An approximately 4.2-mile, 500kV gen tie line would run west from the Project substation near Area 1 to interconnect directly with the APS-operated Moenkopi Substation on the west side of US 89 (35°49'57"N 111°26'47"W). The gen tie would support one circuit of suspended 500kV electrical conductors and one or two communications lines. The communications lines would be either suspended overhead and/or buried in a trench within the gen tie corridor.

The gen tie's approximately 28 towers would be steel monopole (**Figure 2.2-1)**, steel lattice, or steel H-frame structures. The towers' maximum height would be approximately 140 ft. Tower structure designs would be finalized after further geotechnical and engineering studies. The proposed transmission lines would span 900 to 1,400 ft; however, crossing the LCR floodplain may require a span of up to 2,800 feet. The gen tie would largely parallel the existing 500kV APS Four Corners transmission corridor to minimize visual impacts and would need to cross the Little Colorado River, the APS NGS transmission corridor, and US 89. The gen tie's crossings of these obstacles are expected to take place adjacent to, and in a similar fashion to, those already engineered for the APS Four Corners transmission corridor. Stringing circuits and cabling across the Little Colorado River canyon would likely require the use of a helicopter.

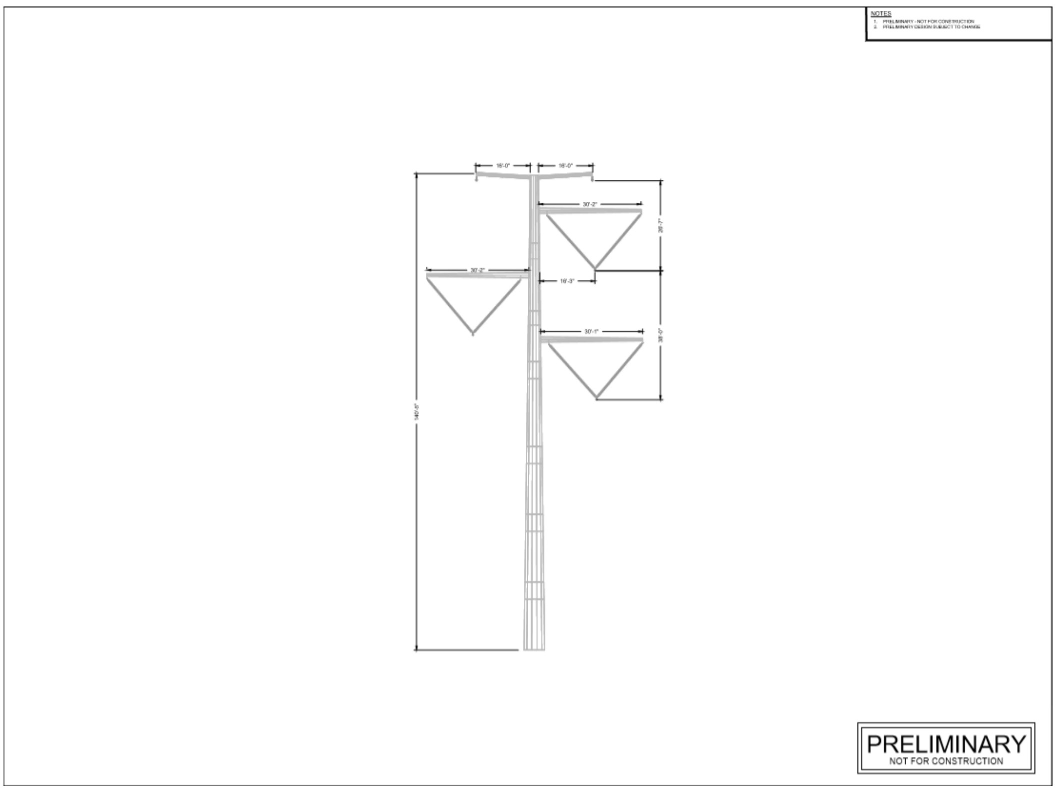

Figure 2.2-1 Steel Monopole Structure

It is expected that the gen tie would enter the Moenkopi Substation from either a northern or southern approach, requiring expansion of the Moenkopi Substation in the corresponding direction. The final approach to the Moenkopi Substation and the configuration of required upgrades would be determined by APS as part of its interconnection study process. Preliminary conversations with APS defined the southern approach into Moenkopi and some expansion of the substation to the south as the preferred options and these are therefore included as part of the Proposed Gen Tie and Alternative 1. The northern approach to the Moenkopi Substation is included only in Alternative 2.

If the interconnection to the Moenkopi Substation were made through an existing open bay to the south, it is expected that only a new set of 500kV breakers and disconnect switch and additional bus, conduit, conductor, and cable would be required; if the interconnection were made from the north, it is expected that an additional 500kV backbone would also be required.

2.2.4 Grading, Excavations, and Drainage

A light-on-land approach would be adopted to minimize impacts. Grading would be required for the construction of access roads and AC stations, for any temporary or permanent structures, and for the substation/BESS area. Single-axis trackers with relatively high slope tolerance would be selected for the Project and arrays would be sited to avoid the most prominent topographic features. The plan of development (POD) includes a section on Topography, Soils, and Preliminary Geotechnical Information (Terabase Energy 2022). There is a paucity of vegetation on the Project Site. Where necessary, vegetation would be cleared. Grading would be employed where necessary to smooth or flatten the terrain to give trackers sufficient ground clearance.

Trenching to a depth of 3 to 5 ft would be required for the placement of DC cables, AC MV cables, and communications lines throughout the Project Site. Multiple direct bores under the main wash between Areas 1 and 2 are expected to be used to allow these two connectors to cross the wash without surface disturbance. Cables would also run over the sole access road crossing the cultural corridor and slurry pipeline, the Area 2 Connector.

Any civil work on the Project Site (**Table 2.2-1**) is expected to balance on site with no import or export of material. **Section 2.2.12.9** describes planned Project Site restoration and reseeding. The dirt roadways within and around the Project Site would be graded and compacted. Some roads, including BIA RT 6730 and access roads serving the O&M facilities and the Project substation, would be covered with aggregate base course.

Table 2.2-1 Ground Disturbing Activities and Impacts for the Proposed Project

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Proposed Solar Array Area 1	Road	Clear[6] and Grade[7]	13.07	16"
	AC Station	Clear and Excavate[8]	0.12	10-18'
	Pile	Ground Penetration	0.11	8-10'
	Trench	Trenching[9]	8.41	3-5'
	Grading	Clear and Grade	41.28	1'
	Facilities	Clear	0.11	10"

[6] Land clearing is the process of removing trees, stumps, brush, stones, and other obstacles from an area as required.
[7] Land grading is a leveling of the surface: dirt from higher up is moved into lower-lying areas to create a level surface to serve as a foundation.
[8] Land excavation is the clearing of all vegetation, brush, rocks, and debris.
[9] Trenching is digging a narrow trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Proposed Solar Array Area 2	Road	Clear and Grade	43.31	16"
	AC Station	Clear and Excavate	0.43	10-18'
	Pile	Ground Penetration	0.38	8-10'
	Trench	Trenching	37.56	3-5'
	Grading	Clear and Grade	281.55	3'
Proposed Substation / BESS Area	Substation	Clear and Excavate	14.7	10-18'
	Road	Clear and Grade	0.43	16"
	MV Connector	Ground Penetration	0.001	10-14'
Proposed Gen Tie	Tower Footings	Clear, Grade, and Ground Penetration	0.1	8-10'
Proposed Moenkopi Expansion Area	Substation Expansion	Clear and Excavate	1.3	10-18'
Access Road 1	Road	Clear and Grade	1.0	16"
Access Road 2 South	Road	Clear and Grade	2.1	16"
Access Road 2 North	Road	Clear and Grade	6.2	16"
Area 2 Connector	Road	Clear and Grade	0.4	16"
BIA RT 6730 Improvement and Widening	Road	Clear and Grade	11.4	16"
US 89 Turnout Improvement and Expansion[10]	Road	Clear, Grade, and Pave[11]	0.5	16"
West Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4'[12]
East Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4'[13]

[10] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.
[11] Paving is the use of material such as stone, tar, or concrete to form the hard surface of a road, driveway, etc.
[12] Drilling a horizontal underground bore will avoid any surface disturbance. The expected diameter of the conduit to be placed within each bore hole is approximately 8 inches.
[13] Drilling a horizontal underground bore will avoid any surface disturbance. The expected diameter of the conduit to be placed within each bore hole is approximately 8 inches.

As it is currently configured, most of the Project Site would be drained by sheet flow to on- and off-site drainages. Detailed grading and drainage plans for the Project would be developed in the detailed design phase prior to construction.

Standard secondary containment would be provided around the transformers within the Project substation to prevent release of any transformer oil or lubricants.

2.2.5 Temporary On-Site Facilities

Some temporary facilities would be deployed on-site during construction of the Project. These facilities would include office trailers; laydown yards with assembly areas, fabric buildings, and tents; generators; and bathrooms.

2.2.6 Water Supply and Use

During construction and operation, the Project would use water trucked to the Project Site or pumped from on-site or nearby wells. Any water from the Navajo Nation would be utilized in accordance with the Navajo Nation Water Code. Characterization of groundwater resources near the Project Site, and potentially of well data near the Project Site, would need to be collected and/or assessed for thorough documentation. Potentially viable existing wells in the vicinity of Cameron are in the process of being identified while Project water needs and access are being assessed and issues with groundwater rights, permitting requirements, and safety addressed.

The entire buildout of the Project Site would be expected to require approximately 750 acre-feet (ac ft) of water. Depending upon climatic conditions during construction, actual use could be much lower. Construction water use would be limited to soil conditioning and dust suppression. Potable water would be transported to the Project Site for drinking and domestic needs.

During the operational phase, solar PV plants use minimal water. The annual water consumption for operation of the facility would be expected to be approximately 30 ac ft. This includes the water required for washing the PV panels as many as four times per year using a manual cleaning system. Dirt and gravel roads and access points may require maintenance and reconstruction after major storm events. Minor water usage is expected for use in dust abatement and soil compaction.

The Technical, Construction and Operations Branch (TCOB) of the Navajo Nation Department of Water Resources (DWR) is responsible for reviewing and responding to applications for the water use permits required for the Project. Construction water use permit applicants estimate the volume of total project water to be used from each source for which a water use permit is requested. The TCOB Water Code Section staff verifies the estimates.

Prior to construction, PDP will prepare a water use plan. Options for the Project water supply are outlined in a technical memorandum from C2 Environmental LLC, or C2 Environmental (**Appendix H**). C2 Environmental evaluated the potential effects on local water resources of the Project's anticipated direct non-potable water uses during construction and operation, including compaction, cleaning, repairs, and dust abatement.

Potential water supply options considered for the Project include:

- two large production wells available to lease for construction water and located 15 miles from the Project Site at Babbit Ranches LLC

- 140 existing wells identified by the Navajo Nation Water Management Branch within a 10-mile radius of Cameron, all of which are unlikely to support high-production water needs
- Well 3T-551 located within the Cameron Chapter and in need of study to determine whether it has the capacity to support both Project needs and community demand
- development of a new well, regulated by the Navajo Nation Water Management Branch, that could support Project needs and other community uses

The highest water-use functions of the Project include dust abatement for Project Site access roads and therefore two alternatives to traditional soil and gravel road construction are being considered. Preliminary estimates indicate that the water consumption required by a traditional road over a two-year construction period could be reduced with the application of a polymer treatment to the road base and surface. PDP will consider applying a polymer treatment to the road to reduce Project water usage.

2.2.7 Temporary and Permanent Access Roads

Access to the Project Site would be via US 89 and BIA RT 6730. Primary access would be controlled through a security gate at the main entrance to Area 1 located at the southwest corner of the Project Site. The Project substation would have its own separate access and secured gate off of BIA RT 6730. Two secondary access roads are proposed for access to Area 2. Access Road 2 South would provide access to the southwest corner of Area 2, while Access Road 2 North would provide access to the northwest corner of the Project Site via the Cameron airstrip. The two portions of Area 2 would be connected by a single access road crossing the cultural corridor and slurry pipeline, the Area 2 Connector. All these access roads would be used during Project construction. During Project operation, Access Road 2 North may only be used for emergencies. All the access roads (**Table 2.2-2**) would be graded and improved to appropriate construction standards (widened, compacted, covered with gravel, or paved, etc.) due to the increased traffic volume and heavy loads transported on these roads during construction. In addition, BIA RT 6730, a public road, would need to be widened and resurfaced to appropriate construction standards to handle the Project construction traffic during all weather conditions. Finally, the existing access to BIA RT 6730 from US 89 may need to be enlarged, improved, or paved to appropriate construction standards. Detailed specifications for improvement and expansion of the existing US 89 access to BIA RT 6730 would be defined through coordination through applicable agreements with the Navajo Nation Division of Transportation (NDOT) and consultation with the Arizona Department of Transportation (ADOT) and the BIA.[14]

Temporary construction access routes would be established along the East and West Connectors to allow for placement of the MV structures and connection of the MV wiring and any communications lines and for the direct bore under the jurisdictional wash. Minimal grading work is expected to be done to establish these routes.

Multiple temporary construction access routes would also be established between US 89 and the west rim of the Little Colorado River canyon and on the east side between BIA RT 6730 and the east rim. In these areas, construction crews would use existing jeep tracks to the extent feasible

[14] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.

but might need to widen or improve these routes to afford access and allow for the delivery of equipment and structures for gen tie construction.

There is currently very little traffic on any of the roads (other than US 89) in the vicinity of the Project.

Table 2.2-2 Permanent and Temporary Access Roads for the Proposed Project

ROAD	LENGTH TO BE IMPROVED *(in ft)*	PERMANENT IMPACTS *(in acres)*	TEMPORARY IMPACTS *(in acres)*
BIA RT 6730	20,000	11.4	22.9
US 89 Turnout Improvement and Expansion[15]	300	0.5	0.2
Access Road 1	1,900	1.0	2.1
Access Road 2 South	3,700	2.1	4.1
Access Road 2 North	11,600	6.2	13.2
Area 2 Connector	600	0.4	0.7
East Connector	4,500	2.6	5.2
West Connector	4,500	2.6	5.2
Alternative Access Road 1A (if needed)	2,600	1.5	3.0

2.2.8 Project Support Systems

The following Project systems would control, protect, and support the Project and its operations.

2.2.8.1 Security

During construction and operation, the Project may be monitored by on-site security staff and/or security cameras monitored remotely. An appropriate security fence, approximately 8 ft tall with signage, would be placed around the perimeter of the Project and all electrical equipment would be locked and could be topped with barbed wire per applicable electrical and safety code requirements. PDP would coordinate with the Navajo Nation Department of Fire & Rescue Services (NNFD) Fire Chief, or the appropriate county or state representative designated by the Navajo Nation, to ensure that access to the Project Site is maintained in a manner consistent with emergency services requirements. The Project would use inward-facing, low-level security lighting at ingress and egress points.

2.2.8.2 Fire Protection

Fire protection in the Project area would be provided by the NNFD. A fire protection plan (FPP) would be developed based on National Fire Protection Association (NFPA) standards. It is expected to be reviewed by the NNFD and approved by the appropriate county or state representative designated by the Navajo Nation. The Project would utilize equipment that is

[15] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.

Underwriters Laboratories (UL) Listed and/or Factory Mutual (FM) Approved. The Project would be designed in accordance with NNFD requirements for access and would not hinder access to neighboring properties.

2.2.8.3 Control System

A microprocessor-based plant control system (PCS) would provide control, monitoring, alarm, and data storage functions for plant systems as well as communications with the solar field Supervisory Control and Data Acquisition (SCADA) system over a fiber-optic network. Redundant capability would be provided for critical PCS components so that no single component failure would cause a facility outage. All field instruments and controls would be hard-wired to local electrical panels. Local panels would be hard-wired to the Project PCS. Communications within the facility would be transmitted over the fiber-optic network and external communications would use local area networks or wireless technology in areas with no existing network or for redundancy.

2.2.8.4 Lighting System

The Project's lighting system would be limited to hooded, shielded illumination aimed downward to focus only on chosen locations near the main entrance, parking area, and Project substation. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives. There would be no lighting in the solar field. Therefore, light trespass on surrounding properties would be minimal.

2.2.8.5 Solar Array Corrosion Protection

Steel piles in solar arrays are typically protected using a hot-dipped galvanization coating. Soil corrosivity and resistivity would be studied during the geotechnical investigation and based on soil properties a galvanization thickness would be determined and specified to the pile and racking manufacturer.

2.2.9 Waste Generation and Management

Construction waste would be generated from installation of the solar arrays and related facilities. Construction waste is expected to be minimal and consist mostly of recyclable materials, such as cardboard, steel, and electrical wiring. The engineering, procurement, and construction (EPC) contractor responsible for daily on-site management of construction would carefully disassemble and recycle shipping containers and solar panel packaging to minimize solid waste impacts. The EPC contractor would contract with a waste and recycling service provider to ensure all waste generated from Project construction is disposed of in accordance with applicable regulations. The EPC contractor would store, collect, and dispose of solid waste in such a manner as to prevent fire and health hazards, rodent harborage, insect breeding, accidents, and odor. The EPC contractor would ensure that no littering on the Project Site or neighboring properties would occur during construction.

There are two facilities potentially able to accept waste from the Project. The first is Blanding Landfill in San Juan County, Utah, which currently accepts most of the waste from the western region of the Navajo Nation. Navajo Sanitation would provide roll-off bin services at the Project Site. A second waste disposal facility option closer to the Project Site is Flagstaff Landfill, which is run by the city of Flagstaff and provides services to Flagstaff and Coconino County residents and businesses. Republic Services (formerly Allied Waste), located in Page, Arizona, may be able to provide commercial waste disposal services with delivery to this facility.

Hazardous materials on the Project Site are expected to be limited to fuels and transformer fluids and would require monitoring. A hazardous material handling plan would be developed for the Project. Solid and/or hazardous material waste from the Project is expected to be generated by isolated fuel spills or PV modules damaged during shipping or construction. Contaminated soils from isolated spills are unlikely to exceed 150 pounds (lbs) and would be disposed of in steel drums. Any damaged modules would be removed from the Site by the EPC contractor and recycled or disposed of according to Navajo Nation, state, and federal regulations.

2.2.10 Interconnection Plan

This document evaluates the Project area and a separate BIA EA will evaluate the Proposed Gen Tie and alternatives. The EA will be incorporated into this document by reference and respond to PDP's application for a ROW on the Navajo Nation to interconnect the Project at the Moenkopi Substation (**Section 1.5**).

2.2.11 Construction

2.2.11.1 Site Preparation

Construction of the Project would begin with the clearing and grading (as necessary) of staging areas. Access to the Project Site would be improved to appropriate construction standards. Staging areas typically include temporary construction trailers, worker parking, truck loading and unloading facilities, and fabric buildings and areas for assembly. Road corridors would be surveyed, cleared, and graded to bring equipment, materials, and workers to the locations under construction. Existing buried electrical lines or pipelines, PV array locations, and locations of other facilities could be flagged and staked to guide construction activities. Cultural sites and other sensitive resources would be permanently fenced or temporarily roped off prior to construction activity in their vicinity. Best management practices for stormwater and erosion control would be put in place during the site preparation phase and prior to significant grading activities.

Two temporary water tanks would be established to store water for use during construction. Diesel and gasoline fuel tanks would be set up and operated on the Project Site in accordance with Navajo Nation, state, and federal regulations.

2.2.11.2 Solar Array Construction

PV system installation would include earthwork, grading, and erosion control, as well as erection of the trackers, PV panels, foundations, and associated electrical equipment. System installation would begin with teams installing the single-axis trackers and steel pile support structures. Their exact design would be determined by the specific soil conditions but would likely include pneumatically driven steel beams (W, C, or Sigma profiles) attached to a tracker racking system. Panel installation and electrical work would follow.

Concrete may be required for the footings and foundations and would be required for the pads for the inverters, transformers, and BESS. Concrete would be produced at an off-site location by a local provider and transported to the Project Site by truck. Final concrete specifications would be determined during detailed design engineering and would meet applicable building codes. Inverter and MV transformers are typically delivered on prefabricated skids (or placed on skids assembled on-site) then lifted onto concrete foundations via crane.

The trackers require a moderately flat surface for installation. Some minor earthwork—including grading, fill, compaction, and erosion control—will be required to accommodate the placement of trackers, foundations or footings, access roads, and drainage features. Construction of the solar arrays would include installation of trackers, PV panels, inverters, transformers, buried electrical cables, and other related equipment. Some parts of the solar field might be assembled in the vicinity of the laydown yard rather than in the field.

Trackers would generally follow existing land contours with localized grading where necessary to address major variations in topography and in areas where it would not significantly impact existing vegetation or surface hydrology. Grading within the Project Site would be limited to the locations of access roads, inverter pads, laydown areas, some trackers where topography requires it, internal and external transmission poles, and ancillary facilities (including the parking and material storage areas, the O&M facilities, and the Project substation).

Across most of the Project Site, a low-impact mow and disc-and-roll technique would be used to remove surface vegetation and keep root balls in place. This practice minimizes dust generation and water usage related to dust suppression and promotes faster regeneration of vegetation cover than re-seeding alone. Grubbing and grading would be required to level particularly rough areas of the Project Site and to prepare the ground for concrete foundations for substation equipment and inverters. Access roadbeds would also be grubbed, graded, and compacted. The fenceline would be grubbed and graded to create a level surface for proper fence installation.

Recycling would be conducted during construction in compliance with the Coconino County Engineering Design and Construction Manual and any other Navajo Nation or county requirements.

2.2.11.3 Substation and Gen Tie Construction

Medium-voltage collection circuits would be routed to the Project substation at the southwestern corner of the Project Site. The main components of the substation are the steel riser structures, electrical bus work, circuit breakers, main power transformer, pad transformers, switches, reactive power equipment, and electronic cabinets. All are installed on poured concrete pads or column foundations. As many as three step-up transformers would be installed within concrete oil containment basins to prevent environmental spills. Capacitor banks might also be installed to provide the reactive power required by the grid. The control building of the substation would be prefabricated and installed on-site on a poured concrete pad. A copper wire grounding network consisting of wire and driven grounding rods would connect all substation components to facilitate electrical grounding of the substation. Electrically rated rock gravel would be spread within the substation area and for approximately 2 ft outside the substation area to prevent potential step/touch voltage hazards for workers.

Gen Tie Line

As discussed in **Section 2.2.4**, the 500kV transmission line structures, whether steel monopole (**Figure 2.2-1**), steel lattice, or steel H-frame structures, would be anchored to poured concrete column or footing foundations.

2.2.11.4 Road Construction and Improvement

Prior to beginning road work, PDP would document the conditions of all access roads and turnoffs to the Project Site by video, showing the full width of the roadway plus a 5-ft buffer in preparation for the restoration work required at completion of the full-scale Project build-out (**Section 3.3.11**). All the access roads (**Table 2.2-2**) would be graded and improved to appropriate construction standards (widened, compacted, covered with gravel, or paved, etc.) due to the increased traffic volume and heavy loads transported on these roads during construction in all weather conditions (**Table 2.2-1**).

The dirt roadways within and around the Project Site would be graded and compacted. Minimal grading work is expected to be done to establish these routes. Some roads, including BIA RT 6730 and access roads serving the O&M facilities and the Project substation, would be covered with aggregate base course. The turnout from US 89 onto BIA RT 6730 would likely need to be enlarged, improved, or paved to appropriate construction standards. Detailed specifications for improvements to the US 89 turnout and BIA RT 6730 would be defined through coordination through applicable agreements with NDOT and consultation with ADOT and the BIA.

Multiple temporary construction access routes would also be established between US 89 and the west rim of the Little Colorado River canyon and on the east side between BIA RT 6730 and the east rim. In these areas, construction crews would use existing jeep tracks to the extent feasible but might need to widen or improve these routes to afford access and allow for the delivery of equipment and structures for gen tie construction.

2.2.11.5 Construction Schedule

Construction would be expected to require approximately 12 to 36 months from the beginning of site preparation to the completion of a commercially operational facility. The full 750MW Project could be constructed in approximately three phases. Construction of Area 1 is expected to begin first, but construction of Area 2 could precede, overlap with, or follow construction of Area 1. The schedule would depend on future commercial arrangements.

2.2.11.6 Traffic and Circulation

The number of workers expected on the Project Site during construction would vary over the construction period. If the full 750MW Project is built in a single phase, peak daily workforce is expected to average approximately 500 workers, generating about 70 daily round trips (**Table 2.2-3**). The number of deliveries of equipment and supplies per day would also vary over the construction period (**Table 2.2-4**), with an estimated average of 48 trips per day and a total of approximately 7,000 trips over a material delivery period of 12 months. Depending on the phasing of construction, more or fewer daily deliveries could be required. All Project-related parking during construction would be on-site, moving within the solar field as it is developed. Off-site parking and worker shuttling could also be considered. A traffic and transportation plan would be prepared for the Project and would include detailed worker and delivery trip estimates.

Table 2.2-3 illustrates the likely requirements for worker transportation to the Project Site during construction, which may vary based on the phasing of construction. An estimated 10% of the drive would be on unpaved road.

Table 2.2-3 Construction Workforce Transportation Requirements

TYPE	MONTHS	HOURS PER DAY	QUANTITY OF VEHICLES	TOTAL *(in hours)*	NOTES
Buses	12	2	5	3,100	Busing from neighboring towns and cities
Vanpools	12	2	20	12,500	Vanpools from neighboring towns and cities
Cars	12	2	40	25,000	85% of workforce commuting from the south[16]
Project Support	12	2	5	3,100	From airport
			Total	43,700	

Table 2.2-4 lists the distances likely traveled by construction materials and equipment.

Table 2.2-4 Construction Material and Equipment Transportation Needs

TYPE	MONTHS	HOURS PER DAY	QUANTITY OF VEHICLES	TOTAL *(in hours)*	NOTES
General (Phoenix)	12	8	2	4,200	Mostly electrical supplies
General (Flagstaff)	12	4	4	4,200	
General (Utah)	12	2	4	2,100	
Modules (Long Beach, CA)	3	16	14	14,600	
			Total	25,100	

Table 2.2-5 lists the number of water trips during construction expected to be required if water is sourced outside the Project Site.

Table 2.2-5 Water Trips Required for Project Site Construction

TYPE	MONTHS	HOURS PER DAY	QUANTITY OF VEHICLES	TOTAL *(in hours)*
Dust Mitigation	12	10	4	12,500
Civil Usage	3	10	4	3,100
Logistics	12	6	2	3,700
Other (Parking)	12	4	2	2,500
			Total	21,800

[16] Chuck Howe, C2 Environmental Engineering

Table 2.2-6 lists the expected number of fuel trips needed during construction.

Table 2.2-6 Fuel Trips Required During Construction

TYPE	MONTHS	REFILLS	QUANTITY OF VEHICLES	TOTAL *(in hours)*	NOTES
Gasoline	12	52	1	208	200-gallon tank
Diesel	12	52	1	208	1,500-gallon tank
HV Breaker Gas	3	0	3	12	Limited to Cx storage tanks
			Total	428	

2.2.11.7 Construction Workforce Estimates and Housing

In compliance with the Navajo Preference in Employment Act (15 NNC 7) and the Navajo Nation Business Opportunity Act (5 NNC 2), PDP will make efforts to hire qualified Navajo professional employees and/or contractors. To maximize the number of Western Navajo residents able to take advantage of this opportunity, PDP will make efforts to work with Navajo colleges, universities, and others to create a workforce development and training program to build capacity for Navajos to work on the Project. In addition, the Project will aim to hire relevant Navajo-owned businesses. Job fairs would be advertised and hosted on the Navajo Nation well in advance of the commencement of construction.

Construction of Area 1 would be expected to require approximately 200 to 300 on-site construction workers at peak workforce. For the construction of Area 2, an average of approximately 500 construction workers could be required each day at peak workforce depending on the duration of the construction schedule and phasing of the buildout.

To prepare for Project construction, PDP would work with the Navajo Nation to develop a workforce housing plan that incorporates local hotel, motel, recreational vehicle (RV) park, and temporary rental resources in nearby towns and cities, including Cameron, Tuba City, and Flagstaff. No on-site housing facilities are expected to be built.

2.2.11.8 Construction Equipment List

Table 2.2-7 is a list of typical construction equipment expected to be required for the Project.

Table 2.2-7 Project Construction Equipment List

ITEM OF CONSTRUCTION EQUIPMENT	NUMBER REQUIRED
Off-Highway Trucks	12
Skid-Steer Loaders	20-30
Rubber-Tired Dozers	12
Tractors/Loaders/Backhoes	16
Excavators	20-30
Graders	12

ITEM OF CONSTRUCTION EQUIPMENT	NUMBER REQUIRED
Rollers	8
Bore Drill Rigs	32
Forklifts	30-40
Reach Stackers	16
Gantry Cranes	16
Trailers	16
Generator Sets	16
Pile Drivers	48
Helicopter	1
Mini/Large Trenchers	20-30
Large Dump Trucks	20-30

A construction work week would consist of up to seven 10- to 12-hour days with vehicles expected to be required for construction operating on the schedule outlined in **Table 2.2-8**.

Table 2.2-8 Construction Vehicle Quantities and Schedules

TYPE	MONTHS	HOURS PER DAY	QUANTITY	TOTAL *(in hours)*	NOTES
Civil Equipment	3	8	10	6,300	Including blades, scrapers, loaders, dozers, rollers, etc.
Post Machines	9	8	10	18,800	
Forklifts	12	8	14	35,000	For off-loading and logistics
Vehicles	12	8	12	30,000	
Buggies	12	8	40	99,900	
Vans/Buses	12	2	10	6,300	For transporting personnel to work areas
Cranes	3	6	1	500	For PCS skid off-loading
Module Trucks	3	8	14	7,300	May be exempt as delivery vehicles
Generators	3	10	20	15,600	For inverter Cx, if needed
			Total	219,700	

2.2.11.9 Site Restoration and Reseeding

To minimize dust, erosion, and weed infestations, Project areas graded or cleared of vegetation to allow for construction may be reseeded at the direction of the NNDFW with a native seed mix developed in coordination with the NNDFW botanist, including appropriate grasses and pollinator plants. Potential for the introduction of new weeds or spread of existing weeds because of Project development would be minimized through the implementation of a weed management plan and any use of herbicides would be coordinated with the NNDFW and would follow guidelines and measures contained in the Navajo Nation Integrated Weed Management Plan, Appendix E Mitigation Measures. Specifically, PDP would follow the US Fish and Wildlife Service Recommended Protection Measures for Pesticide Applications in Region 2 (April 2007).

2.2.12 Operations and Maintenance

Upon commissioning, the Project would enter the operational phase. For the duration of the operational phase, the Project would be operated remotely and monitored by on-site staff for security and maintenance purposes. As the Project's PV arrays produce electricity passively with a minimal number of moving parts, maintenance requirements would be limited. Any required planned maintenance would be scheduled to avoid peak load periods and unplanned maintenance would typically be performed as needed. An inventory of spare components would be maintained on-site or in a nearby warehouse facility. Visual inspections of cables and towers would be conducted periodically and failures, such as those due to unforeseen weather events, would be repaired.

2.2.12.1 O&M Activities

It is expected that a small warehouse and a modular office trailer would be located either near the Project substation or centrally on the Project Site. The location of the O&M facilities would be determined after further on-site studies and detailed design, but would be within the area surveyed for biological, cultural, and other resources. Potable water would be available on-site and the trailer may include a septic system for sanitary facilities. Electricity would be available on-site via backfeed power or on-site generators. The total footprint of the O&M facilities should be no greater than 7,000 square feet (sq ft). A small parking area would be contiguous to the O&M facilities. The design and construction of the solar arrays (panels, inverters, etc.) and the warehouse would be consistent with Navajo Nation building standards.

Standard operational activities to ensure maximum efficiency include:

- responding to automated alarms based on monitored data, including actual versus expected tolerances for system output and other key performance metrics.
- communicating with customers, transmission system operators, and other entities involved in facility operations.
- designating a site supervisor to monitor and implement emergency and normal shutdown procedures.

2.2.12.2 O&M Workforce and Circulation

When fully operational, the Project could require as many as approximately 15 to 20 on-site technicians and personnel. Additional O&M personnel would travel to the Project Site on a regular basis to perform specialized preventive maintenance or respond to unplanned outages.

During Project operation, primary access to the Project Site would be via the gate off of BIA RT 6730, with access off the Cameron airstrip available for emergencies. Operation of the Project could generally be expected to generate approximately 15 to 20 trips per day by maintenance and security personnel (**Table 2.2-9**).

Table 2.2-9 O&M Workforce Transportation Needs

TYPE	MONTHS	HOURS PER DAY	QUANTITY	TOTAL *(in hours)*	NOTES
Trucks	420	2	15 - 20	273,000 - 364,000	Based on 15-20 maintenance and security personnel

Each panel cleaning period could require an average of up to 100 water truck deliveries per day. Other deliveries of supplies or equipment could be necessary to support O&M. There would be no significant impact on current local traffic patterns during the operation of the Project.

2.2.12.3 O&M Equipment

Equipment required for operation includes:

- inverters (daytime use only)
- MV transformers (24/7)
- solar tracker motors (daytime use only)
- HV transformer (24/7)
- emergency diesel backup generator at the substation (monthly maintenance operation for thirty minutes to one hour; emergency backup power typically required less than annually)
- substation MV and HV circuit breakers (very infrequent operation one second in duration)
- only if needed, tractors with scrapers for mowing and vegetation management (annual 20-day event requiring 10 tractors eight hours per day, five days per week)
- basic utility and pickup trucks for general security patrols and maintenance

Table 2.2-10 is a list of typical operating equipment expected to be required for the Project and the sound power level of each item.

Table 2.2-10 Project Operation Equipment Sound Power Levels

ITEM OF OPERATION EQUIPMENT	SOUND POWER LEVEL *(in dBA)*
Solar Tracker Motor	58
MV Transformer	66
HV Transformer	89
BESS	75
Inverter	65-75
Generator	73
Hand Power Tools	109
Light Vehicles/Pick-Up Trucks	88

Inverters and MV transformers would be located throughout the solar arrays, but would be placed interior to the arrays, at least 300 ft from the Project Site boundary in all cases.

The HV equipment (HV transformers, BESS, and backup generator) would be located only in the substation/BESS area, more than 1 mile from the nearest residence. The backup generator is for emergency use only in the event of an outage to the gen tie.

The Project would reduce potential for greenhouse gas (GHG) emissions using best management practices, including recovery, recycling, and safe handling of sulfur hexafluoride (SF_6), 1,400 lbs of which may be used in each 500kV circuit breakers' gas-insulated switchgears. SF_6 leakage rates are below 0.5% per year and each circuit breaker would be equipped with an SF_6 gas density monitoring system to indicate loss of SF_6 and trigger a lock-out function if levels drop.

2.2.12.4 Site Maintenance

Project maintenance performed on-site would consist of equipment inspection and replacement. Maintenance would occur during daylight hours. Maintenance program elements include:

- managing a group of prequalified maintenance and repair firms to meet the O&M needs of the facility throughout its life.
- implementing a responsive, optimized cleaning schedule.
- responding to plant emergencies and outages in a timely manner.
- maintaining an inventory of spare parts to ensure timely repairs and consistent plant output.
- maintaining a log to effectively record and track all maintenance problems.
- performing maintenance on the Project Site as required to clear obstructive ground cover.

The energy production of the proposed solar power plant would be optimized by periodic cleaning. It is not anticipated that the Project would experience high levels of dust accumulation on panels, but several cleanings per year may be conducted depending on weather conditions. Cleanings would occur as many as four times per year. Manual cleaning requires a water truck with attached sprayers and brushes that drives down the solar panel rows washing the panels. The water consumption is approximately 3 cups per panel and a crew of 30 people with trucks can clean the array in approximately 3 weeks.

2.2.12.5 Road Maintenance

Road maintenance up to and including full reconstruction or adjustment of the elevation/location of access roads may occur to provide adequate access for workers, deliveries, vehicles, and emergency vehicles, as needed. Best practices in road maintenance would be implemented to repair damaged features following storm events and between rainy seasons. Road maintenance would be minimized by conducting regular inspections and by maintaining site drainage features. Wet season closures of unpaved internal roads will also be employed to minimize the need for heavy maintenance and reconstruction.

2.2.12.6 Remote Monitoring

The Project would be monitored 365 days a year from a remote location utilizing a SCADA system. Safe, effective, and efficient operation of the Project would be dependent upon the operator receiving accurate information on all environmental measurements that affect production, including solar irradiation, ambient temperature, back-of-panel temperature, and wind speed. These environmental characteristics would be reported by sensors: pyranometers measuring irradiance, thermometers measuring temperatures, and anemometers measuring wind speed. Other characteristics of the Project would also be reported in real time, including the current production, voltage, amperage, power quality, and status of all circuit protection devices.

Signals from all sensors, meters, and circuit protection devices would be accumulated in one or more data loggers, which would report via secure internet connections to the monitoring provider. The monitoring system would be set up to send alarms when one or more conditions compromise the safe and efficient operation of the Project. If an emergency should arise in the off-hours, on-call personnel would be assigned to immediately report to the Project Site.

2.2.13 Decommissioning and Reclamation

The Project is expected to have a useful life of at least 35 years, subject to extension with component upgrades and system replacements. PDP would decommission and remove the system and its components at the end of the Project's useful life. The Project Site could then be converted to other uses or be restored to sheep grazing property. All decommissioning, system removal, and Project Site restoration activities would adhere to the requirements of appropriate governing authorities, including requirements set forth in the lease and real estate agreements with the Navajo Nation.

As part of decommissioning, Project Site restoration activities are likely to include the removal of permanent access roads, including Access Road 1, Access Road 2 South, and Access Road 2 North and the Area 2 Connector, according to the requirements of the appropriate governing authorities, including requirements set forth in the lease and real estate agreements with the Navajo Nation. Prior to construction, PDP would document the conditions of all access roads and turnoffs to the Project Site by video, showing the full width of the roadway plus a 5-ft buffer. Any public street surfaces damaged by Project construction traffic would be restored to their pre-existing condition within 6 months of completion of the full-scale Project build-out (**Section 3.3.11**). Upon completion of the full-scale Project build-out, the temporary access roads used during construction would be reclaimed to as close as possible to pre-construction function and conditions (**Section 3.3.11**).

3.0 AFFECTED ENVIRONMENT AND COMPLIANCE EVALUATION

3.1 INTRODUCTION

This section describes the existing environmental, social, and economic conditions in the Project area and the surrounding region, as well as a compliance evaluation of the potential environmental impacts of implementing the proposed action, alternatives, and mitigation.

3.1.1 Environmental Issues to Be Analyzed

Table 3.1-1 Environmental Topics and Relevant Regulations

RESOURCE TOPIC	REGULATIONS LISTED UNDER NAVAJO NATION LEASING REGULATIONS
Geology, Mineral Resources, Soils, and Paleontology	• Clean Water Act • Indian Mineral Leasing Act • Indian Mineral Development Act • Paleontological Resources Preservation Act
Air Quality and Noise	• Navajo Nation Air Pollution Prevention and Control Act • Navajo Nation Environmental Policy Act • National Ambient Air Quality Standards • Noise Control Act • Clean Air Act
Biological Resources	• Endangered Species Act • Navajo Endangered Species List • Biological Resource Land Use Clearance Policies and Procedures • Bald and Golden Eagle Protection Act • Navajo Nation Golden and Bald Eagle Nest Protection Regulations • Migratory Bird Treaty Act • Federal Noxious Weed Act • Navajo Nation Pesticide Act • Noxious Weed Control and Eradication Act • Noxious Weed Coordination and Plant Protection Act
Cultural and Historic Resources	• National Historic Preservation Act • Navajo Nation Cultural Resources Protection Act • National Environmental Policy Act • Archaeological Resources Protection Act • American Indian Religious Freedom Act • Native American Graves Protection and Repatriation Act
Hazards, Hazardous Materials, and Waste	• Navajo Nation Solid Waste Act • Navajo Nation Underground and Aboveground Storage Tank Act • Navajo Nation Pesticide Act
Land Use, Tribal Trust Lands, Grazing, and Agriculture	• Local Governance Act • Navajo Nation Trust Land Leasing Act • 25 CFR 167 and 3 NNC (agricultural activity) • 16 NNC §§ 1402 et seq. (grazing permits)
Socioeconomics	None listed
Visual Resources	None listed
Public Health and Safety	None listed
Traffic and Transportation	None listed
Water Resources	• Clean Water Act • Navajo Nation Surface Water Quality Standards • Navajo Nation Environmental Policy Act • Navajo Nation Safe Drinking Water Act • Navajo Nation Clean Water Act

3.1.2 Resources Dismissed from Further Analysis

Table 3.1-2 lists resources dismissed from further analysis because they are absent from the Project area, no measurable impacts would occur, or only short-term minor or negligible impacts would occur.

Table 3.1-2 Resources Dismissed from Further Analysis

RESOURCE	RATIONALE FOR DISMISSING ISSUE
Recreation	No formal recreation opportunities exist on Navajo trust lands in the Project area, so the Project would not impact recreation opportunities in the region, but access to the lands may be impacted during construction.
Climate Change	Installing up to 750MWs of solar energy would result in an overall net benefit to GHG emissions because no air emissions are produced by solar PV generation and the renewable energy produced by the Project would replace other energy sources that burn fuels and release GHGs. This Project does not plan to use equipment that contains SF_6. Project construction activities would result in short-term, minor levels of GHG emissions and during Project operation GHG emissions would be negligible.
Environmental Justice	Low-income and minority populations are present in the vicinity of the Project area, but no adverse impacts would disproportionately burden low-income or minority populations. The proposed lease is intended to benefit low-income, minority populations. The Project would have a negligible to minor impact on tribal resources, including visual setting, wildlife, and vegetation; however, the Project is located in an area already heavily disturbed by historic uranium mining and the habitat types in the Project area are abundant throughout the rural region.

3.2 BASELINE CONDITIONS

The existing environmental baseline conditions are summarized in the following subsections, which together form the baseline for the impact analysis provided in **Section 4.0**.

3.2.1 Geology, Mineral Resources, Soils, and Paleontology

3.2.1.1 Regulatory Environment

Geology, Mineral Resources, and Soils

There are no Navajo Nation regulations that expressly protect geologic or soil resources on the Navajo Nation. Indirectly, stormwater regulations under the Clean Water Act (**Section 3.2.11**) require that mobilization of soils during construction from wind or water be controlled/minimized to protect water quality. Mineral resources are administered by tribes under the Indian Mineral Leasing Act of 1938 and the Indian Mineral Development Act. These congressional acts increased the amount of control tribes have over extraction and development of mineral resources on tribal lands.

Paleontology

The Paleontological Resources Preservation Act of 2009 (16 USC § 470aaa 1-11) directs the Department of the Interior, including the BIA, to manage and protect paleontological resources on federal land using scientific principles and expertise. As there is no BIA action associated with the proposed land lease, the act does not apply to the proposed lease. Paleontological resource inventories are not required by Navajo Nation legislation. The Navajo Nation Minerals Department issues fossil collection permits, but only for scientific research or impact mitigation.

3.2.1.2 Baseline Conditions

Geology

The Project Site is on the Colorado Plateaus Province in a landscape of plateaus, mesas, deep canyons, and barren badlands. Tohnali Mesa and the Moenkopi Plateau rise above the Project Site to the east, above the Ward Plateau and erosional scarp of the Adeii Eichii Cliffs. The Project Site is on the Ward Terrace, which flanks the plateau and slopes gently toward the edge of the steep canyon of the Little Colorado River. The terrace is dissected by drainages that contribute to the Little Colorado River. The geological structures of the Colorado Plateaus Province constitute "a high standing block of relatively undeformed rocks" in contrast to the highly deformed and faulted structures of neighboring provinces (Foos 1999).

The strata beneath the Project Site are composed of Mesozoic sedimentary rocks, including the Lower Triassic Moenkopi Formation and the Upper Triassic Chinle Formation (Billingsley, et al 2007). Impacts from the Project would only extend to the uppermost of these strata. Erosion of these sedimentary formations in the area has generated abundant sand susceptible to transport by wind. These Pleistocene and Holocene surficial eolian sand deposits cover much of the older Chinle Formation throughout the Project Site (Billingsley, et al 2007). Geological mapping by the US Geological Survey (USGS) shows Triassic sedimentary bedrock identified as mudstone, siltstone, and sandstone of the Petrified Forest Member of the Chinle Formation; Pleistocene and Holocene sand and sand sheets; Pleistocene and Holocene alluvial fan deposits; and Pleistocene and Holocene mixed alluvium (Billingsley, et al 2007). The results of preliminary on-site geological investigations for the Project were consistent with this mapping, identifying Quaternary dune sand and Triassic Chinle Formation mudstone (Stantec 2020).

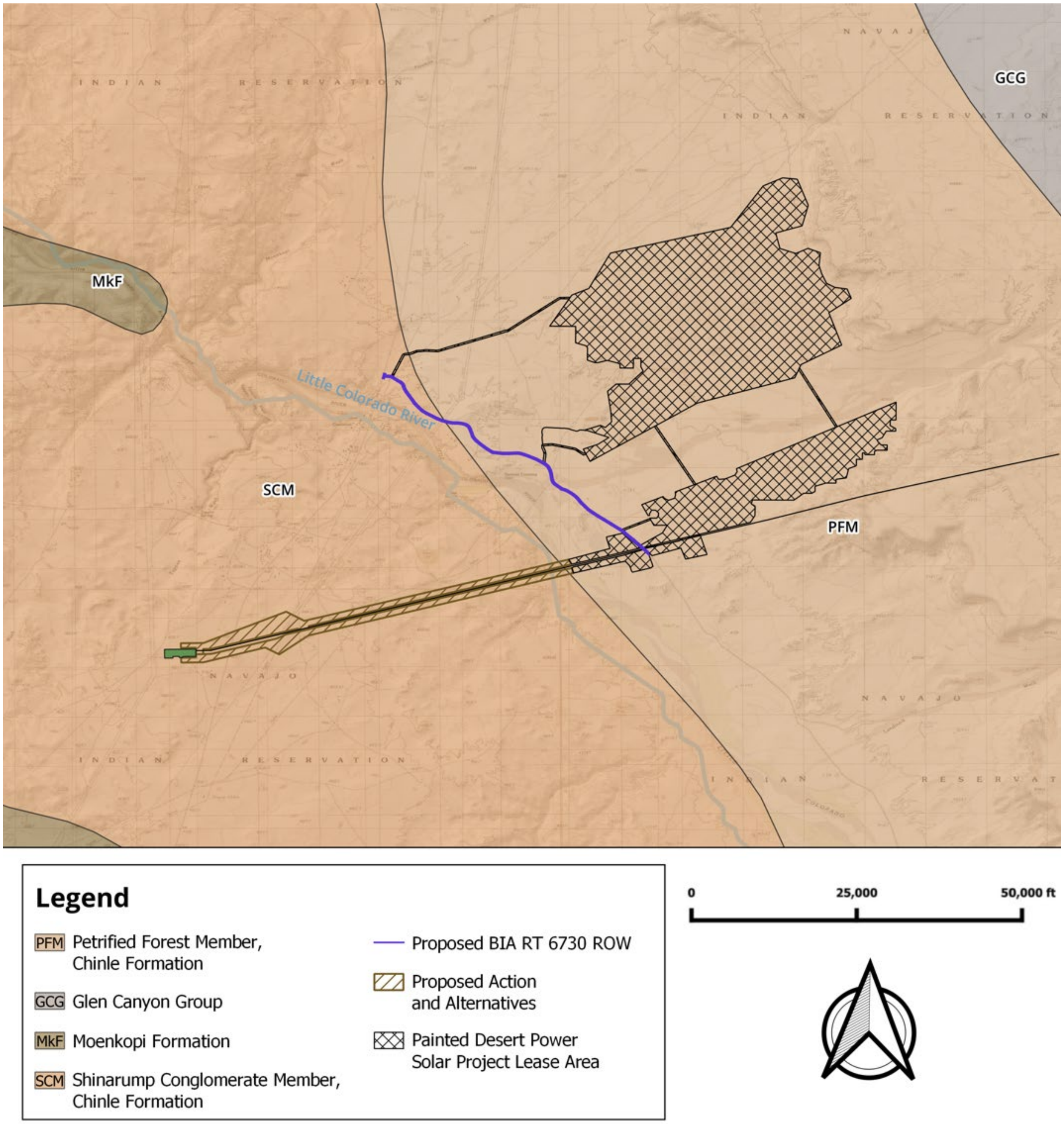

Figure 3.2-1 Map of Geologic Formations in the Project Area

Mineral Resources

AUMs are located within the vicinity of the Project but excluded from the Project footprint (**Figure 3.2-2**). Uranium was found near Cameron in 1950, a time when it was highly sought after for national defense purposes and energy development. Economic production began in 1951 and peaked in 1956, although mining continued until 1963 (Chenoweth 1993). The deposits were primarily found in the Petrified Forest Member of the Chinle Formation although there were minor discoveries in other formations. The mines were typically small, relatively shallow open pits. The deposits were not substantial enough to justify the expense of extensive overburden removal.

Mining companies struggled to maintain the grade of ore in later years of mining, resulting in production that was uneconomic to process. A review of historic mining activities concluded that past exploration precluded the discovery of additional deposits equivalent to those that had already been mined, although ore could be present in deeper deposits (Chenoweth 1993). Little or no reclamation work was completed when most of the mining sites were abandoned, resulting in hazardous conditions. Some mitigation of hazards has been completed subsequently by the Navajo Abandoned Mine Lands Reclamation Department and other agencies but the work has not been completed across the Navajo Nation. The Diné Natural Resources Protection Act of 2005 made uranium mining and processing illegal on the Navajo Nation and potential deposits of uranium are currently perceived as an environmental hazard rather than an economic resource. The Project is designed to avoid the locations of AUMs to avoid disturbing these areas during construction and maintain their accessibility for potential future reclamation efforts.

No other mineral resources have been identified at the Project Site. The Gray Mountain Pit is the active mine closest to the Project Site, 9 miles to the southwest (USGS 2003). The mine is categorized as a sand and gravel source. A geotechnical desktop study characterized sediments within the Project Site as having poor potential as a gravel source (ATEK Engineering Consultants 2019) and it is therefore assumed the Project would not preclude development of a potential materials source.

Soils

Soils at the Project Site are mapped as Rock outcrop-Needle-Epikom Association in the northern part of the Project Site and Sheppard-Joraibi-Jocity Association in the southern part (SWCA 2022; USGS 2021). Soil associations are made up of two or more geographically associated soils or miscellaneous areas not considered practical or necessary to map separately. Rock outcrop, mapped in the northern part of the Project Site, is an example of a miscellaneous area: an area with little or no soil material and supporting little or no vegetation (Natural Resources Conservation Service 2012). The rock outcrop is mapped in association with Needle and Epikom soils, which are shallow or very shallow. The Sheppard-Joraibi-Jocity Association soils in the south of the Project Site are deeper. These soils formed in eolian and alluvial deposits that include alluvium from sandstone, mudstone, and shale; sand sheets; sand dunes; and stream alluvium, which are some of the deeper soils. These soils support vegetation suitable for livestock grazing and irrigated Jocity soils could also support cultivated crops. There is no agricultural development within the Project Site and proximity to the AUMs limits the value of these soils as natural resources. The soils in the Project Site have minor limitations for successful Project construction. The sandy soils identified in the Site are not likely to be expansive but preliminary geotechnical studies suggest that silty and clay-rich material derived from the Chinle Formation could be subject to expansion (Stantec 2020b). Also, the limited soil cover in the northern part of the Project Site may necessitate some excavation of bedrock deposits.

Paleontology

Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and provide information about the history of life on earth. Paleontological resources are considered nonrenewable resources because the organisms they represent no longer exist and such resources, if destroyed, cannot be replaced. Although all fossils offer scientific information, not all provide important scientific information.

Fossils are generally considered scientifically important if they are unique, unusual, rare, or diagnostically or stratigraphically important, or in any other way add to the knowledge in a specific area of science. The types of fossils that might be present in a specific area can generally be predicted in advance of a field survey based on the age of the rock formations and depositional environment. Most fossils are found in sedimentary deposits.

The Project Site, as defined in the plan of development (Terabase Energy 2022), is entirely composed of sedimentary geologic strata. Surficial eolian dune sands and alluvial stream deposits with low potential to contain important paleontological resources cover approximately two-thirds of the Project Site. The remaining one-third of the Project is mapped as Shinarump and Petrified Forest Members of the Chinle Formation, which are considered to have high potential to contain important paleontological resources (Billingsley, et al 2007). Additional, unmapped fossiliferous Chinle Formation members are known to occur in the Project Site, but these geologic units are not individually mapped (Billingsley, et al 2007; Heckert, et al 2002).

Exposures of the Chinle Formation are visible within the Project Site. Chinle Formation fossils are very important for studying ecosystem recovery from the Permian Mass Extinction event and for preserving some of the earliest known dinosaurs and Triassic ecosystems from North America. The first paleontological investigations of the Arizona Chinle Formation occurred near the Project Site in 1899 and many vertebrate fossils, including the first described Chinle Formation specimen, are from the Ward Bone Bed east of Cameron (Parker 2005). This Ward Bone Bed spans multiple stratigraphic units and geographic locations in the vicinity of the Project Site (Heckert, et al 2002; Irmis 2005). Exposures of the Chinle Formation contain a diversity of fossils in addition to vertebrate fossils, including an array of fossil leaves and wood (e.g., ferns, conifers, horsetails, cycads, ginkgoes); invertebrates (bivalves, insect eggs); insect feeding traces on plants near Cameron and in Dinnebito Wash; and reptilian tracks and swimming traces (Ash 2005, 2009; Heckert, et al 2005; Parker 2005).

3.2.2 Air Quality and Noise

3.2.2.1 Regulatory Environment

Air Quality

The NNEPA has the authority to regulate sources of air pollution in the Navajo Nation through its Navajo Air Quality Control Program. There are two local laws that apply to the Project area: the Navajo Nation Air Pollution Prevention and Control Act and the Navajo Nation Environmental Policy Act.

The Navajo Nation Air Pollution Prevention and Control Act states that it is “the policy of this Nation that no further significant degradation of the air in the Navajo Nation shall be tolerated, and that economic growth will occur in a manner consistent with the preservation of existing clean air resources.”

The US Environmental Protection Agency (USEPA) regulates criteria pollutants using the National Ambient Air Quality Standards (NAAQS), which establish ambient levels for each criteria pollutant using health- and welfare-based criteria. There are two series of NAAQS (USEPA 2021a): the primary standards are designed to provide an adequate margin of safety essential to protecting public health and the secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of a criteria pollutant in the ambient air. The Navajo Nation is designated as Class II and therefore “unclassifiable/attainment” for the NAAQS for criteria air pollutants within Arizona. A Class II designation allows some deterioration of air quality while a Class I designation allows significantly less air quality deterioration.

Noise

Growing concerns over uncontrolled noise impacts on public health and welfare led Congress to pass the Federal Noise Control Act of 1972 and subsequent amendments (42 USC §§ 4901 et seq.), establishing a national policy for noise research and noise control. The 1974 USEPA Noise and Noise Control Act identifies requisite environmental noise levels for the protection of public health and welfare against hearing loss, annoyance, and activity interference. The level of environmental noise that would prevent measurable hearing loss over a lifetime is identified as a 24-hour exposure level of 70 A-weighted decibels (dBA). The USEPA recommends a 24-hour average exposure limit of 55 dBA outdoors and 45 dBA indoors to prevent activity interference and annoyance in residential areas, permitting spoken conversation and other daily activities such as sleeping, working, and recreation.

Standards have not been established for undeveloped lands. There are no state-level noise regulations for Arizona, nor has Coconino County established any noise ordinances or regulations. Additionally, the NNEPA does not currently have any regulations or guidance regarding noise pollution; therefore, the Project noise levels would be compared with the USEPA-recommended 24-hour average of 55 dBA outdoors to prevent activity interference or annoyance.

Greenhouse Gases and Climate Change

The Council on Environmental Quality GHG guidance states that agencies should consider the potential effects of a proposed action on climate change by assessing GHG emissions. Agencies should also consider the effects of climate change on the proposed action and its environmental impacts (Council on Environmental Quality 2016). While there is no federal nexus with respect to the proposed lease, it would be prudent for the Navajo Nation to also consider the potential effects of the land lease on climate change by assessing GHG emissions. In fact, to combat climate change, the NNDFW established the Navajo Nation Climate Change Program and developed the Climate Adaptation Plan for the Navajo Nation. The purpose for the program and the plan is to spread awareness of climate change among the Navajo people.

3.2.2.2 Baseline Conditions

Air Quality

Air quality within a region can be measured in comparison to the NAAQS set by the USEPA Office of Air Quality Planning and Standards. The USEPA has set air quality standards for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter smaller than 10 microns in aerodynamic diameter (PM_{10}), particulate matter smaller than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), ozone (O_3), and lead (Pb). The state of Arizona has incorporated the NAAQS (**Table 3.2-1**) by reference and does not have any additional ambient air quality standards.

Table 3.2-1 National Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	PRIMARY STANDARDS	SECONDARY STANDARDS
CO	1 hour[17] 8 hours[18]	35 parts per million (ppm) 9 ppm	– –
Pb	3 months (rolling)[19]	0.15 micrograms per cubic meter ($\mu g/m^3$)	Same as primary
NO_2	Annual mean 1 hour[20]	0.053 ppm 0.100 ppm	Same as primary –
O_3	1 hour[21] 8 hours[22]	– 0.07 ppm	– Same as primary
PM_{10}	24 hours[23]	150 $\mu g/m^3$	Same as primary
$PM_{2.5}$	24 hours[24] Annual mean[25]	35 $\mu g/m^3$ 12 $\mu g/m^3$	Same as primary 15 $\mu g/m^3$
SO_2	1 hour[26] 3 hours[27]	0.075 ppm –	– 0.5 ppm

Source: USEPA 2021a

The USEPA assigns classifications to geographic areas based on monitored ambient air quality. Attainment is achieved when the existing background concentrations for criteria air pollutants are less than the NAAQS. As of August 31, 2021, the USEPA designates Coconino County as in attainment or unclassified for all criteria pollutants, meaning that the air in Coconino County meets the NAAQS (USEPA 2021b).

The National Emissions Inventory (NEI) is a detailed annual estimate of criteria pollutants and hazardous air pollutants (HAPs) from air emission sources maintained by the USEPA. Emission inventories provide an overview of the types of pollution sources in the area and the amount of pollution emitted on an annual basis. Emission inventories are useful in comparing emission source categories (agriculture, biogenic, dust, fire, fuel combustion, industrial process, and mobile) to determine which industries or practices are contributing to the general level of pollution in an area. **Table 3.2-2** summarizes the emissions inventory data for Coconino County from the most recent NEI, conducted in 2017.

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[17] Not to be exceeded more than once per year
[18] Not to be exceeded more than once per year
[19] Not to be exceeded
[20] The 3-year average of the 98th percentile of the daily maximum 1-hour average must not exceed this standard.
[21] Not to be exceeded more than once per year
[22] The 3-year average of the 4th highest daily maximum 8-hour average O_3 concentration measured at each monitor within an area over each year must not exceed this standard.
[23] Not to be exceeded more than once per year on average over 3 years
[24] The 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed this standard.
[25] The 3-year average of the annual arithmetic mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed this standard.
[26] The 3-year average of the annual 99th percentile of the 1-hour daily maximum must not exceed this standard.
[27] Not to be exceeded more than once per year

Table 3.2-2 2017 Emissions Inventory for Coconino County in Tons per Year

SOURCE	CO *(in metric tons)*	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOCs	HAPs	CO_2e *(in metric tons)*
Agriculture	No data	No data	No data	486	99	95	14	No data
Biogenics[28]	16,496	3,856	No data	No data	No data	89,321	14,731	No data
Dust	No data	No data	No data	9,323	1,081	No data	No data	No data
Fires	171,506	1,888	1,150	17,044	14,444	40,337	5,648	1,757,463
Fuel Combustion	578	1,086	10	80	79	93	22	No data
Industrial Processes	No data	No data	No data	357	49	29	4	No data
Misc.[29]	515	19	5	259	226	2,437	279	No data
Mobile	28,574	9488	29	441	332	3,021	914	1,775,637
Total	217,671	16,341	1,194	27,990	16,310	135,336	21,612	3,533,109

Source: USEPA 2017a

Fire sources are the biggest contributors to PM_{10} (61% of emissions), $PM_{2.5}$ (89% of emissions), and CO (79% of emissions). Biogenic sources are the biggest contributors to volatile organic compounds, or VOCs (66% of emissions), and HAPs (68% of emissions). Mobile sources are the biggest contributors of nitrogen oxides, or NO_x (58% of emissions), and carbon dioxide equivalents, or CO_2e (50.2% of emissions).

Air quality in a given region can also be measured by its Air Quality Index (AQI) value (USEPA 2021c). The AQI is used to report daily air quality information in an easy-to-understand way by explaining how local air quality relates to human health. Part of Coconino County is located within the NNEPA Air Quality Control Region, which includes tribal land in Arizona, Utah, and New Mexico. The NNEPA's official website has not been updated in approximately 10 years and therefore the most recent AQI data provided by the NNEPA are from November 2011. The data indicate the AQI values in this region are generally classified as good to moderate, but without current data it is difficult to determine whether these values are still representative of the air quality at the Project Site.

Class I federal lands include areas such as national parks, national wilderness areas, and national monuments. These areas are granted special air quality protections under Section 162(a) of the federal Clean Air Act. The Project is located approximately 35 kilometers southeast of the Grand Canyon National Park, which is classified as a National Park Service Class I area.

Climate

The Project area is classified as part of the Southwest, a region known for its arid landscapes and scarce water supplies. Average annual precipitation is approximately 1.43 inches in Coconino County. September is the wettest month, on average, with most of the year tending to be quite dry.

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[28] Biogenics include those emissions derived from natural processes (such as vegetation and soil).

[29] Miscellaneous categories include bulk gasoline terminals, waste disposal, commercial cooking, gas stations, miscellaneous non-industrial (not elsewhere classified), and solvent use.

Workman Creek holds the statewide record for the greatest daily rainfall with a total of 11.4 inches on September 5, 1970 (National Climatic Data Center 2021a).

The National Climatic Data Center's (NCDC's) 1981-2010 Climate Normals (NCDC 2021b) were evaluated from the meteorological station with complete meteorological data nearest to the Project Site, approximately 20 miles northwest in Tuba City, Arizona. Temperatures near the Project area are generally highest in July and lowest in December. Maximum temperatures of 90 degrees Fahrenheit (°F) or higher occur approximately 77 days per year on average, whereas minimum temperatures of 0°F or lower occur less than 1 day per year on average. The mean annual precipitation is approximately 6.74 inches, with monthly average precipitation ranging from a minimum of approximately 0.17 inches in June to a maximum of 1.13 inches in September. Precipitation of 0.01 inches or greater occurs on 40 days per year on average. Precipitation of 1.0 inch or greater occurs less than 1 day per year on average.

Table 3.2-3 provides a summary of the monthly average temperatures and precipitation as well as monthly ranges for minimum and maximum temperatures and frequency of heavy rain events from the Tuba City, Arizona, meteorological station.

Table 3.2-3 Representative Climate Data

MONTH	AVERAGE TEMPERA-TURE *(°F)*	DAILY MINIMUM TEMPERA-TURE *(°F)*	DAILY MAXIMUM TEMPERA-TURE *(°F)*	AVERAGE PRECIPI-TATION *(in inches)*	AVERAGE NUMBER OF DAYS WITH PRECIPITA-TION > 1.0 INCH
January	35.7	23.6	47.8	0.67	0.1
February	41.1	28.0	54.1	0.47	0.0
March	48.3	34.4	62.2	0.53	0.0
April	55.5	39.9	71.2	0.46	0.0
May	64.6	48.2	80.9	0.41	0.0
June	73.5	56.1	90.9	0.17	0.0
July	79.0	63.0	95.1	0.64	0.0
August	77.1	62.1	92.2	0.84	0.0
September	69.7	54.1	85.3	1.13	0.3
October	57.6	42.4	72.9	0.66	0.1
November	44.9	31.2	58.6	0.46	0.0
December	35.1	23.3	46.9	0.30	0.0

Source: NCDC 2021b

Greenhouse Gases and Climate Change

Gases that trap heat in the atmosphere are called GHGs. Adverse health effects and other impacts caused by elevated atmospheric concentrations of GHGs occur via climate change. Climate impacts are not attributable to any single action but are exacerbated by diverse individual sources of emissions that each make relatively small additions to GHG concentrations. GHGs absorb heat and slow the rate at which energy escapes to space.

The 2013 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report states that the atmospheric concentrations of well-mixed, long-lived GHGs, including CO_2, CH_4, and N_2O, have increased to levels unprecedented in at least the past 800,000 years. Further human influence has been detected in warming of the atmosphere and the ocean, changes in the global water cycle, reductions in snow and ice, global mean sea level rise, and changes in some climate extremes. It is extremely likely (95-100% probability) that human influence has been the dominant cause of the warming observed since the mid-twentieth century (IPCC 2013).

The most recently available data on GHG emissions in the US indicate that annual GHG emissions in 2019 were an estimated 6,558 million metric tons of GHGs, or 5,769 million metric tons of CO_2e after accounting for sequestration from the land sector (USEPA 2021d). The most recent NEI data (USEPA 2017a) show there were an estimated 85 million metric tons of GHG emissions in the state of Arizona and an estimated 19 million metric tons of GHG emissions in Coconino County in 2017. An analysis of regional climate impacts prepared by the Fourth National Climate Assessment (US Global Change Research Project 2018) recognizes that the Southwest region encompasses diverse ecosystems, cultures, and economies, reflecting a broad range of climate conditions, including the hottest and driest climate in the US. Water for people and nature in the Southwest region has declined during droughts, due in part to human-caused climate change. The reduction of water volume in various lakes increases the risk of water shortages across much of the Southwest. Local water utilities and governments have voluntarily developed and implemented solutions to minimize the possibility of water shortages for cities, farms, and ecosystems. Exposure to hotter temperatures and heat waves already leads to heat-associated deaths in Arizona. Mortality risk during a heat wave is amplified on days with high levels of ground-level O_3 or particulate air pollution. Extended drought due to climate change also raises concerns about maintaining Navajo Nation water-based ceremonies essential for spiritual health, livelihoods, cultural values, and overall well-being. In response to climate change, Indigenous peoples in the region are developing new adaptation and mitigation actions (US Global Change Research Project 2018).

Noise

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and interfering with or disrupting normal activities. Although prolonged exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise; the perceived importance of the noise and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Noise can also disrupt wildlife life cycle activities of foraging, resting, migrating, and other patterns of behavior. Wildlife already existing in proximity to human development may be habituated to noise from land use and human disturbance; however, changes to these baseline activities may still result in wildlife disruption. Additionally, sensitivity to noise varies from species to species, making it difficult to identify how a noise source would affect all flora and fauna in an area.

The American National Standards Institute (ANSI) published a standard (Acoustical Society of America S12.9 2013 Part 3) with estimates of energy-averaged sound levels (L_{EQ}) and day-night average sound levels (L_{DN}) based on detailed descriptions of land use categories (**Table 3.2-4**).

Table 3.2-4 Noise Levels Based on Land Use

CATEGORY	LAND USE	DESCRIPTION	EST. EXISTING DAYTIME L_{EQ} *(in dBA)*	EST. EXISTING NIGHTTIME L_{EQ} *(in dBA)*
1	Noisy commercial and industrial areas	Very heavy traffic conditions, such as in busy downtown commercial areas, at intersections of mass transportation and other vehicles, including trains, heavy motor trucks, and other heavy traffic, and at street corners where buses and heavy trucks accelerate	69	61
2	Moderate commercial and industrial areas and noisy residential areas	Heavy traffic areas with conditions similar to Category 1 but with somewhat less traffic, such as bus routes and routes with relatively heavy or fast automobile traffic but where heavy truck traffic is not extremely dense	64	56
3	Quiet commercial, industrial areas, normal urban, and noisy residential areas	Light traffic conditions where no mass transportation vehicles and relatively few automobiles and trucks pass and where these vehicles generally travel at low speeds	58	52
4	Quiet urban and normal residential areas	Similar to Category 3 but with background noise that is either distant traffic or unidentifiable	53	47
5	Quiet suburban residential areas	Isolated areas, far from significant sources of sound.	48	42
6	Very quiet, sparse suburban or rural areas	Similar to Category 5 but usually in sparsely populated unincorporated areas	43	37

Source: ANSI 2013

The Project Site is located in a rural, undeveloped area. Low-density residential areas are located west of the Project Site. Existing sources of noise emissions in the general vicinity of the Project Site include vehicular traffic, livestock grazing, transmission lines, mining, and commercial and residential development. Background noise includes environmental sources such as wildlife and weather. Therefore, the Project Site can be classified as ANSI's Category 6 with an estimated existing daytime L_{EQ} of 43 dBA and an existing nighttime L_{EQ} of 37 dBA.

Noise-Sensitive Receptors

Noise-sensitive receptors are generally defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Noise-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature and wildlife preserves, recreational areas, and parks. The majority of the Project Site consists of open space, but multiple residences are located near the Project. The closest Noise Sensitive Area (NSAs) that would potentially be most impacted as a result of Project construction and operation is a residence (NSA 1) approximately 0.42 miles (2,200 ft) southwest of the closest Area 1 Project boundary.

3.2.3 Biological Resources

3.2.3.1 Regulatory Environment

Threatened and endangered species are protected by the Endangered Species Act of 1973 (16 USC §§ 1531 et seq.), which requires federal agencies to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of their critical habitat.

Administered by the Navajo Natural Heritage Program (NNHP), 17 NNC § 507 requires applicants proposing actions on tribal lands to consult with the NNDFW concerning species on the Navajo Endangered Species List (NESL). NESL groups are defined as follows:

- Group 1 (G1): Species that are extirpated on the Navajo Nation
- G2: Endangered species whose prospects of survival or recruitment are in jeopardy
- G3: Endangered species whose prospects of survival or recruitment are likely to be in jeopardy in the foreseeable future
- G4: Species for which the NNDFW does not currently have sufficient information to support their listing in G2 or G3. G4 species have no legal protection under section 507

The Resources Committee of the Navajo Nation Council provides legislative oversight of the NNDNR, including the NNDFW. In 2008, the Resources Committee approved the Biological Resource Land Use Clearance Policies and Procedures (RCP). The RCP was developed to assist the Navajo Nation central government and chapters in complying with federal and Navajo laws that protect wildlife resources, including plants and their habitat.

The NNDFW has identified and mapped wildlife habitats and sensitive areas across the entire Navajo Nation. The Navajo Nation has been divided into six areas to provide a framework for planning specific development projects:

- Area 1: High Sensitivity. This area contains the best habitat for endangered and rare plant, animal, and game species and has the highest concentration of these species on the Navajo Nation. This area aims to protect these valuable and sensitive biological resources to the maximum extent practical. Restricted development is allowable only if it is not within or close enough to the habitat to cause significant impacts and no reasonable alternatives exist outside the area.
- Area 2: Moderate Sensitivity. This area has a high concentration of rare, endangered, sensitive, and game species occurrences or has a high potential for these species to occur

throughout the landscape. This area aims to minimize impacts on these species and their habitats and ensure the habitats in Area 1 do not become fragmented. All development must be sited to avoid species and their habitat.

- Area 3: Low Sensitivity. This area has a low, fragmented concentration of species of concern. If the NNHP provides a data response for a project in Area 3 that states that there are no known or potential species of concern for a specific project, then a BE does not need to be prepared: the project complies with the Endangered Species Act and the NESL. The project sponsor can receive a Biological Resource Compliance Form by requesting concurrence from the NNDFW that the project would not affect species of concern.
- Area 4: Community Development. The NNDFW has determined that areas around certain communities do not support the habitat for species of concern; therefore, development can proceed without further biological evaluation. For project approval of all developments that are completely contained within Area 4, documentation should be submitted to the NNDFW director for concurrence.
- Area 5: Biological Preserves. These areas contain excellent, or potentially excellent, wildlife habitat and are recommended by the NNDFW for protection from most human-related activities and, in some cases, are recommended for enhancement. To date, only a few of these areas have been identified or designated. No new activity or development is allowed within these Biological Preserves unless it is compatible with management goals for the area.
- Area 6: Recreation Areas. These areas are used for recreation that involves wildlife or has potential for development for this purpose. Unless it is compatible with management goals for the area, no new development is allowed within Recreation Areas.

The Bald and Golden Eagle Protection Act (16 USC §§ 668 et seq.) is a federal statute that protects two species of eagle by prohibiting disturbing an eagle to the extent that it causes or is likely to cause injury to the eagle; substantial interference with its lifestyle, including sheltering, breeding, and feeding; or nest abandonment.

The Navajo Nation Golden and Bald Eagle Nest Protection Regulations protect eagles and their nests by regulating human activities associated with land use and development and other activities. The regulations establish a buffer around eagle nests and designate the types of permanent structures constructed within those buffers.

Federal agencies are directed under the Migratory Bird Treaty Act (16 USC §§ 703-712) and Executive Order (EO) 13186 Responsibilities of Federal Agencies to Protect Migratory Birds, Volume 66 Federal Register (FR) Page 3853, to consider impacts on migratory birds from land management and planning activities.

Other tribal regulations or policies that protect bird species include the Navajo Nation Ferruginous Hawk Management Guidelines and the Navajo Nation Raptor Electrocution Prevention Regulations.

The Federal Noxious Weed Act of 1974 (7 USC 61 §§ 2861 et seq.) and EO 13112 Invasive Species (64 FR 6183) established a federal program to control the spread of noxious weeds and created a Council of Departments to deal with invasive species. Other regulations related to noxious/invasive weeds include:

- Navajo Nation Pesticide Act (4 NNC § 3)
- Noxious Weed Control and Eradication Act (Public Law 108-412; 7 USC § 7781)
- Noxious Weed Coordination and Plant Protection Act (Public Law 106-224; 7 USC § 7701)

3.2.3.2 Baseline Conditions

Ecosphere conducted biological resources surveys of the Project area and prepared a biological evaluation (BE) that provides details, mapping, and photographs of the area and its vegetation and wildlife.

As classified by the NNDFW, approximately 30% of the Project area is designated as a High Sensitivity Area (Area 1), nearly 60% as a Moderate Sensitivity Area (Area 2), 10% as a Low Sensitivity Area (Area 3), and 1% as a Community Development Area, or Area 4 (NNHP 2020). As required by the RCP regulations for projects proposed in a High Sensitivity Area, PDP completed an alternatives analysis that was presented to the NNDFW.

In the Project area, vegetative ground cover is sparse, ranging from 0-25%. Most of the area is dominated by desert pavement with gravel, pebbles, or cobble covering much of the surface. Inclusions of sandy areas, or dunes, are also present. The area is located within the Great Basin Desert scrub vegetation community (Brown 1982). Vegetation is scattered and separated by large swaths of desert pavement. Plants typical of this community were observed during biological resources surveys. Two BIA Navajo Region Class B noxious weeds were also observed. Animals common to the area and habitat were observed but are not abundant in the area. A single raptor (red-tailed hawk) nest was observed in the Project area. The nest is on an existing transmission line steel tower west of the Little Colorado River, outside of the proposed Navajo lease area.

According to the US Fish and Wildlife Service (USFWS), there are five threatened, endangered, or experimental, non-essential species that have the potential to occur within the Project area (USFWS 2020). There is no proposed or designated critical habitat present (USFWS 2020). The NNHP data request identified six species on the NESL known to occur in or near the Project area and nine additional NESL species with the potential to occur in the area (NNHP 2020). A detailed evaluation of the potential for the Project to impact USFWS- and NNHP-listed species is provided in the BE.

Of the listed species with the potential to occur in the Project area, the NNDFW review of the BE determined that the Project area provides suitable habitat for only the golden eagle, ferruginous hawk, peregrine falcon, Peebles' blue-star, and Beath's milkvetch. These are all NESL G3 (endangered) or G4 (candidate level) species or species of sensitive raptors.

3.2.4 Cultural and Historic Resources

3.2.4.1 Regulatory Environment

Cultural and historic resources are protected by section 106 of the National Historic Preservation Act, or NHPA (54 USC § 306108) and other applicable tribal, state, and federal regulations, including the Navajo Nation Cultural Resources Protection Act, or NNCRPA (Tribal Council Resolution CMY-19-88), the Archaeological Resources Protection Act (ARPA) of 1978 (16 USC

§§ 470aa-mm), the American Indian Religious Freedom Act (AIRFA) of 1978 (42 USC § 1996), and the Native American Graves Protection and Repatriation Act, or NAGRA (25 USC 32).

Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such projects. In addition, federal agencies are required to consult with State Historic Preservation Offices (SHPOs), Tribal Historic Preservation Offices (THPOs), Indian Tribes (including Alaska Natives), and Native Hawaiian Organizations.

The purpose of ARPA is "to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals" (16 USC § 470aa(b)). Section 4 of the statute and Sections 16.5-16.12 of the uniform regulations describe the requirements that must be met before federal authorities can issue a permit to excavate or remove any archaeological resource on public or Indian lands.

The NNCRPA delegates cultural resource compliance authority to the Navajo Nation THPO at the NNHHPD and outlines the permitting procedures and process by which cultural resources are governed on the Navajo Nation. The NNHHPD is the agency responsible for cultural resource protection, preservation, and management planning on Navajo Nation lands. The guiding principle of the NNCRPA is that the spirit and direction of the Navajo Nation are founded upon and reflected in its cultural heritage and that heritage should be preserved as a living part of community life and development.

AIRFA was enacted to return basic civil liberties to Native Americans and protect and preserve their freedom to exercise their traditional religions. This act also ensures Native Americans have access to religious sites and possession of sacred objects.

NAGPRA provides a process for federal agencies to address new discoveries of Native American human remains, funerary objects, sacred objects, and objects of cultural property intentionally excavated or inadvertently discovered on federal or Indian lands. This act also provides a process by which agencies or museums that receive federal funds repatriate or transfer from their collections certain Native American cultural items—including human remains, funerary objects, sacred objects, and objects of cultural patrimony—to lineal descendants and Indian tribes, Alaska Native Corporations, and Native Hawaiian Organizations.

3.2.4.2 Baseline Conditions

Between March 4 and July 7, 2020, SEAS conducted a cultural resource inventory of the proposed Project area under NNHHPD Survey Permit No. B20075. The area of potential effect (APE) is 5,283.68 acres (2,138.23 hectares) and the total area surveyed is 5,653.26 acres (2,298.79 hectares).

The cultural resource inventory encountered and documented sixty newly recorded sites (AZ-N-5-48 through AZ-N-5-53; AZ-N-6-5 through AZ-N-6-18; AZ-N-11-22 through AZ-N-11-39; and AZ-N-12-82 through AZ-N-12-103), 108 Isolated Finds, and four Current Cultural Properties. In addition, several unmarked human burials and other concerns were identified during the ethnographic interviews for this Project. These resources are described in detail in the inventory report submitted to the NNHHPD. The NNHHPD reviewed the report and provided a Cultural Resources Compliance Form for the Project (**Appendix E**). The isolated finds are not considered eligible for the National Register of Historic Places (NRHP) given their limited remains and lack of cultural context. Detailed field recording of the isolates has adequately characterized their limited information potential in archival form. The unmarked human burials would all be avoided by the Project and would not be impacted. Twenty-three sites are recommended NRHP eligible under Criterion D and/or Criterion C. Eight additional sites are recommended NRHP undetermined under Criterion D as a surface inspection alone in the absence of subsurface investigations was not adequate for assessing their data potential. The remaining 29 sites are recommended not eligible to the NRHP under any criteria due to excessive erosion and/or lack of further data potential.

3.2.5 Hazards, Hazardous Materials, and Waste

3.2.5.1 Regulatory Environment

Three local laws regarding hazards, hazardous materials, and waste apply to the Project Site: the Navajo Nation Solid Waste Act, Navajo Nation Underground and Aboveground Storage Tank Act, and Navajo Nation Pesticide Act. The NNEPA is responsible for overseeing compliance with these local laws as well as the Navajo Nation Superfund Program (NNSP), which is funded under a grant through the USEPA Comprehensive Environmental Response, Compensation, and Liability Act, or CERCLA (42 USC 103). The NNSP is responsible for conducting site assessments where hazardous substances may have been used in past development activities, such as uranium mining and milling. The Navajo Nation Abandoned Mine Lands Reclamation Program was established under the NNDNR prior to the establishment of the NNEPA. The purpose of the program is to fulfill the abandoned mine reclamation requirements of the Surface Mining Control and Reclamation Act of 1977, 30 USC 25 §§ 1201 et seq. (TerraSpectra Geomatics 2007).

3.2.5.2 Baseline Conditions

The Project Site is almost entirely vacant rangeland east of US 89. The Project is located on Navajo Nation land and BIA-managed lands in a region where many uranium mines operated in the 1950s and 1960s. Several AUMs adjoin the subject property but do not fall within the Project footprint with the exception of one AUM located underneath the proposed overhead transmission line (**Figure 3.2-1**). Existing electrical transmission lines run parallel to the proposed gen tie corridor; the gen tie corridors cross the Little Colorado River and US 89 before terminating at the Moenkopi Substation just west of US 89. Most of the proposed access roads are existing dirt roads that would be improved for access to the Site from US 89.

The following observations were made during SWCA's site reconnaissance visit on August 19, 2021, for the Phase I ESA (SWCA 2022). A few two-track roads are present, as well as a corral and several water detention berms in various washes. An approximately 1-acre cemetery is located 0.35 miles west-southwest of the abandoned airstrip. No trash, debris piles, or marked landfills were noted on the Project Site.

Electrical transmission lines run along the west of the Project Site. These gen tie corridors cross the Little Colorado River at a location where the river corridor appears typical. The gen ties cross US 89 in a location without development. The Moenkopi Substation appears to be in good general condition and contains what appears to be typical equipment.

Except for the AUMs, no evidence of past industrial activity and no evidence of spills, ground staining, unusual odors, or potential contamination were observed on or adjacent to the Project Site during the site reconnaissance.

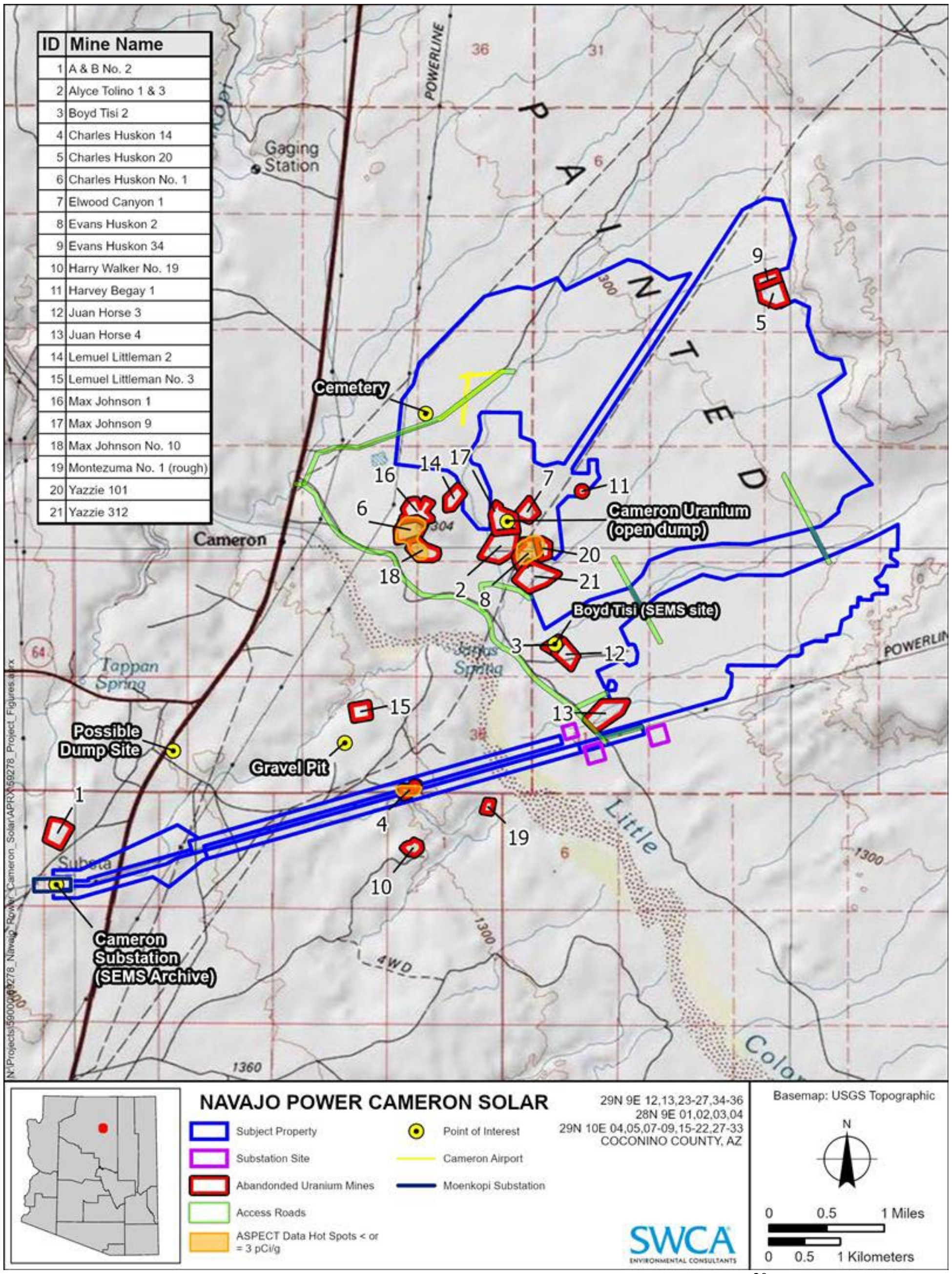

Figure 3.2-2 Map of the Project Site and Features of the Surrounding Area[30]

Most of the AUMs, all of which are off-site, are inconspicuous and exhibit only faint evidence of past ground disturbance, such as grading scars or small depressions. The Max Johnson No. 9 AUM is the exception: this area appears to include a low mound approximately 11 acres in size, with

[30] This map shows the original project scoping area.

evidence of having been capped. This location is also mapped as the Cameron Uranium Landfill. The Cameron Landfill is mapped 900 ft northeast of the Cameron Uranium Landfill, but no past ground disturbance is evident at that location.

Abandoned Uranium Mines

Fifty-seven AUMs occur within 5 miles of the Project Site. Based on USEPA site assessment reports, 14 are unreclaimed or their status unknown. The ground surface extent of the unreclaimed Charles Huskon No. 14 AUM is located beneath the proposed gen tie (**Figure 3.2-1**).

According to local grazing permit holders, uranium mining began in the Cameron Chapter in 1950 and continued until roughly 1963, supporting the Cold War nuclear weapons buildup and contributing to nuclear energy production. SWCA's review of historical aerial photographs and topographic maps found that the subject property was historically vacant rural grazing land until uranium mining began in the vicinity (SWCA 2022).

Some of the AUMs are said to have been reclaimed, but it is not clear that the reclamation work adhered to USEPA standards. However, gamma radiation and bismuth measurements at all the unreclaimed mines are notably higher than those of naturally occurring radioactive material (NORM) as compared to the reclaimed mines, indicating that past reclamation practices were successful in limiting surface radiation.

In March 2020, Stantec evaluated radiological external exposure levels to ensure they were acceptable for survey staff during on-site work. Radiological survey locations were chosen so as to include areas most at risk for elevated external radiation levels according to aerial maps of hot spots and historic mine locations. Based on their results, Stantec determined that the as low as reasonably achievable (ALARA) control threshold would not be reached for any solar power construction workers or plant operators (Stantec 2020c).

In 2020, Haley and Aldrich Inc. (H&A) assessed the potential health risks from uranium to on-site workers during construction. H&A assumed a solar array installation worker would be working on-site 10 hours per day for 30 continuous days. Radiation measurements collected at AUMs and for NORM throughout the Project Site were consistently below the trigger levels for worker safety, which are four times more stringent than those for the general public. Therefore, H&A concluded that AUM exclusion areas are not required to protect workers from radiation, but they did recommend maintaining a 100-ft buffer around AUM boundaries to maintain access for any potential future assessment and mitigation of AUMs and to ensure that construction activities do not impact known AUMs and possibly create CERCLA liability (H&A 2020).

The USEPA Airborne Spectral Photometric Environmental Collection Technology (ASPECT) team performed flyovers of an area including the Project Site in 2020. Their data appear to show that surface equivalent uranium (eU) concentrations not higher than NORM values within the Project Site (USEPA ASPECT 2020).

According to the Phase I ESA for the Project Site, 14 different uranium mines operated in the immediate vicinity (**Figure 3.2-2**) and are now in various states of reclamation (SWCA 2022).

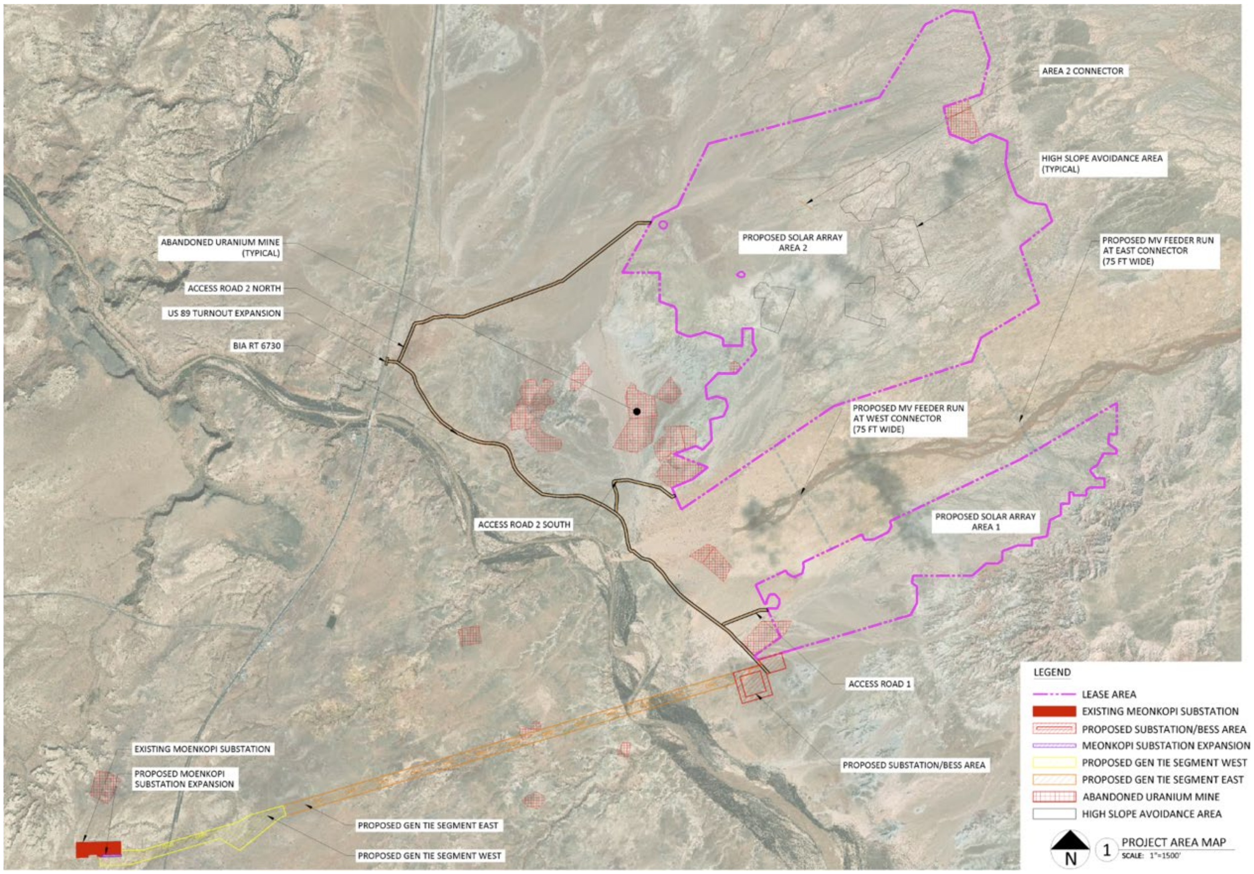

Figure 3.2-3 Abandoned Uranium Mines in the Project Area

South of the Project Site, the Juan Horse No. 4 Mine, ownership unknown, has been identified by the Navajo Abandoned Mine Lands (NAML) Reclamation Department. The Juan Horse No. 3 Mine, located just southwest of the Project Site and owned by Wells Cargo, has received Superfund monies for reclamation, but the USEPA is currently reassessing this site. The Boyd Tisi No. 2 Mine, ownership unknown, is just northwest of the Juan Horse No. 3 Mine and subject to trust funding from a settlement. It is a Superfund Enterprise Management System (SEMS) site. West of the Project Site is the Yazzie No. 312 Mine. This mine contains six sites, owned by El Paso Natural Gas, Wells Cargo, and other unknown operators. These six sites are in various states of reclamation, subject to Superfund and settlement trust funding. West of the Yazzie No. 312 Mine is the Max Johnson No. 10 Mine, which contains four sites, owned by El Paso Natural Gas and other mine operators. Like the sites in the Yazzie No. 312 Mine, the Max Johnson No. 10 Mine sites are in various states of reclamation. Because none of these abandoned uranium mines are located on the Project Site, development of the Project is not expected to impact any of these historic mining areas.

3.2.6 Land Use, Tribal Trust Lands, Grazing, and Agriculture

3.2.6.1 Regulatory Environment

There are several types of land status on the Navajo Nation: tribal trust lands held by the BIA for the beneficial interest of the tribe; tribal fee lands owned by the tribe or tribe members; and allotted land given to individual members of the tribe (and their heirs) by the federal government. The Project Site is located entirely on tribal trust lands.

The BIA is primarily responsible for the stewardship of tribal trust lands, specifically their conservation and protection. The BIA Navajo Region works in partnership with the Navajo Nation government, its officials, and decision-makers on a government-to-government basis with their respective roles and responsibilities defined in the federal regulations and tribal codes.

The authority of the Navajo Nation to issue leases and permits pursuant to the Navajo Nation Trust Land Leasing Act promotes the self-determination and self-sufficiency of the Nation. These processes protect and preserve Navajo Nation trust land and provide data for trust asset management and accounting, accurate recordkeeping, and title recording. The Navajo Nation Trust Land Leasing Act of 2000 authorizes the Nation under 25 USC § 415(e) to issue leases for land held in trust for the Nation by the federal government. The Navajo Nation General Leasing Regulations of 2013 under Title 16 NNC §§ 2301 et seq. require an environmental review process consistent with the regulations set forth in Title 25 CFR Part 162 as amended.

On tribal trust lands, leases are made to customary land users (for home sites, grazing, and other uses) and organizations, including the BIA and other federal agencies, churches and other religious organizations, and private and commercial businesses.

In 1998, the Navajo Nation Council passed the Local Governance Act recognizing local governmental authority over local matters and requiring local officials and administrators to govern responsibly and accountably. Under this act, chapters can authorize the issuance of home, business, and other site leases by resolution. Chapters wanting to administer land are required to develop a community-based land use plan certified by the Navajo Nation Transportation and Community Development Committee.

The Navajo Nation and BIA are responsible for managing all agricultural activity on the Navajo Nation as regulated by 25 CFR 167 and 3 NNC. These regulations are designed to preserve natural resources on the Navajo Nation. The management of rangeland resources and dryland farms is supported by the District Grazing Committee, and the management of irrigated farms/croplands is supported by the Navajo Nation Western Farm Board. These two entities are comprised of elected community members who serve as conduits between the government and agricultural producers.

The Navajo Nation currently has twenty Land Management Districts (LMDs) for grazing and agriculture that are further divided into units and compartments. Grazing on the Navajo Nation requires a grazing permit issued by the BIA superintendent based on the recommendations of the District Grazing Committee.

Every individual, chapter, or entity desiring a land withdrawal designation on the Navajo Nation (2 NNC § 501) must submit an application to the Navajo Land Department (NLD). The NLD acquires the necessary consents from all grazing permittees with valid grazing permits and an interest in the land as applicable and required under 16 NNC §§ 1402 et seq.

3.2.6.2 Baseline Conditions

Land Use

The Project area is subject to several land uses.

Transportation

US 89 is a north-south highway running from Flagstaff, Arizona, to the Canadian border. Sometimes called the National Park-to-Park Highway, US 89 links seven national parks across the Mountain West. Approximately 7 miles of US 89 run west of the Project area. State Route (SR) 64, which serves as the entrance road to the South Rim of Grand Canyon National Park, terminates at US 89 approximately 1.7 miles south of Cameron, Arizona (**Figure 3.2-1**). US 89 is operated and maintained by ADOT. BIA RT 6730 provides access to the Navajo Nation interior and the easternmost portion of the Little Colorado River Navajo Tribal Park. It serves as the unofficial boundary between the Cameron and Coalmine Canyon chapters. BIA RT 6730 terminates at US 89, approximately 0.4 miles north of Cameron, Arizona, and is operated and maintained by the BIA Division of Transportation.

An abandoned Navajo Nation Secondary Airport is located within the Project area. The abandoned airstrip (formerly Cameron Airport) consists of a 4,000-ft by 75-ft dirt runway in poor condition without supporting facilities; it receives no maintenance (NDOT 2009).

Section 3.2.10 focuses entirely on traffic and transportation.

Utilities

Overhead transmission lines and associated infrastructure occur adjacent to the Project area in two locations: the APS NGS transmission corridor parallels the east side of US 89 in this area and the APS Four Corners transmission corridor is situated along the proposed gen tie corridor. The Moenkopi Substation is located at the terminus of the proposed gen tie. APS operates the existing electrical facilities under a lease agreement with the Navajo Nation and a ROW permit issued by the BIA.

Underground natural gas pipelines are located west of the Project area near US 89, SR 64, and BIA RT 6730. Three pipelines cross beneath the gen tie corridor at approximately 0.54, 0.85, and 1.42 miles east of US 89. The pipeline that crosses the gen tie at 1.42 miles continues northeast under the Little Colorado River and would travel beneath the center of Area 2 for 2.05 miles (**Figure 3.2-1**).

Recreation

Approximately half of the proposed Project is within the Little Colorado River Navajo Tribal Park, a 363,574-acre recreational area featuring the deep narrow gorge of the Little Colorado River with a visitor center in Cameron, Arizona. The Navajo Nation Parks and Recreation Department manages the tribal parks in the Navajo Nation. The Little Colorado River Navajo Tribal Park does not charge a standard entrance fee but generates revenue primarily from donations from park visitors. Permits are required for all park uses and fees for backcountry access and commercial uses such as food and craft vendors and film and commercial photography are collected during the permit process. During the 2016 fiscal year, the Little Colorado River Navajo Tribal Park collected a total of $144,706, $101,891 in donations and $42,815 in permit fees (Navajo Nation Office of the Auditor General 2018). The boundaries of the park are not defined or indicated by any signage in the Project area. Due to the absence of unique landscape features or trails in the Project area, it is unlikely to be a destination for tourists or tribal members interested in visiting the park. The Little Colorado River canyon, particularly as it extends north from Cameron, represents the park's most likely recreational use area near the Project area.

Historic and Current Mining and Reclamation

AUMs are discussed in **Section 3.2.6.2**.

Tribal Trust Lands

The Project Site is located entirely on tribal trust lands held by the BIA for the beneficial interest of the tribe. The BIA has primary responsibility for the conservation and protection of tribal trust lands (**Section 3.2.6.1**).

Grazing

The Project Site is located entirely within BIA LMD 3, a 1.2 million-acre area in north-central Arizona that encompasses a diversity of habitats and eco-sites, from semi-arid grasslands to mixed-shrub communities, to woodlands, forests, and riparian wetlands.

The Project area is split between LMD 3 Unit 1, Coalmine Canyon, and LMD 3 Unit 4, Cameron. Most of the Project's facility components are located in LMD 3, Unit 1, Compartment 10, or LMD 3-1-10 (**Figure 3.2-3**). The proposed gen tie is in LMD 3-1-10, but also crosses LMDs 3-1-12, 3-4-8, and 3-4-5. The proposed Moenkopi Substation expansion is in LMD 3-4-5.

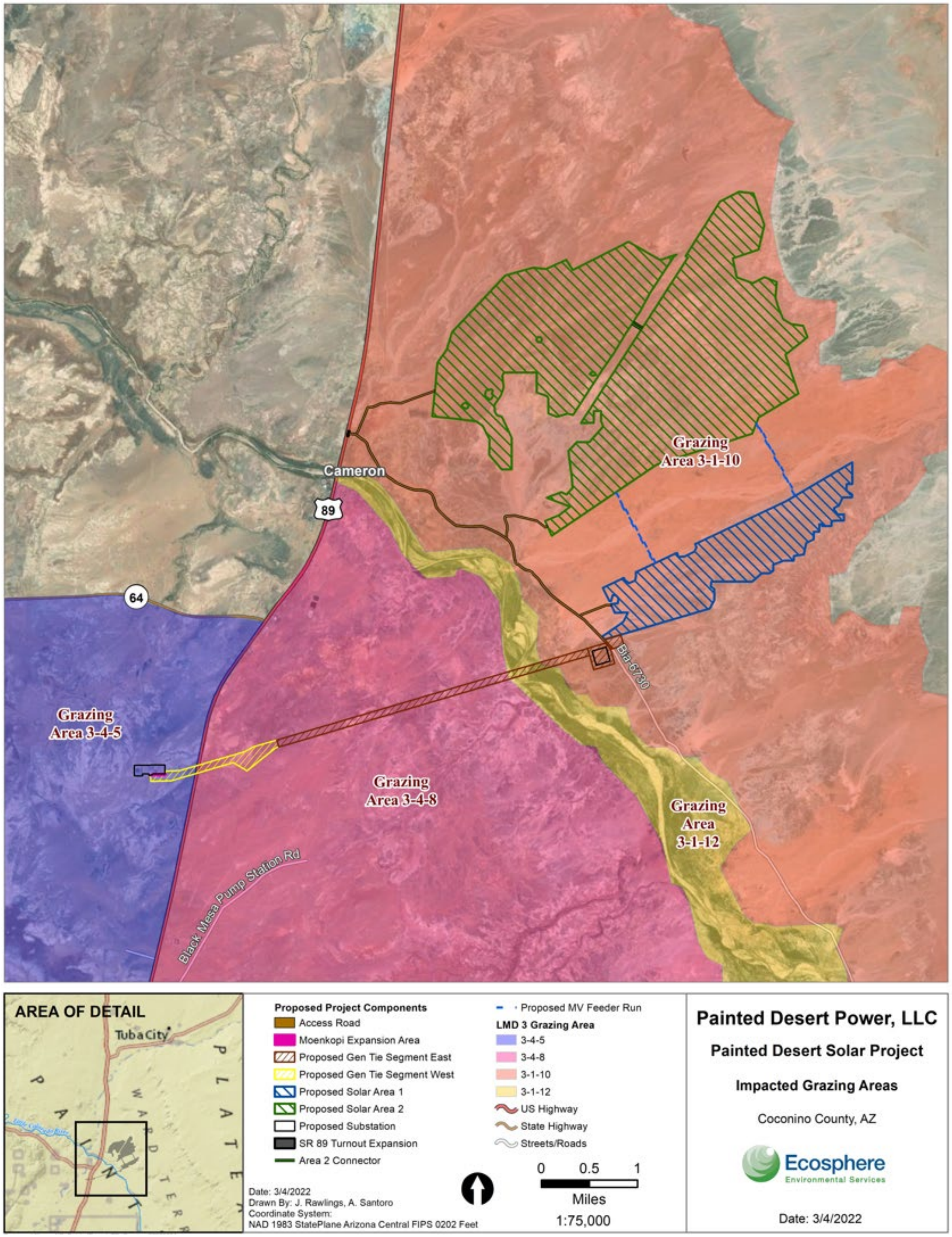

Figure 3.2-4 Map of Impacted Grazing Areas[31]

[31] This map shows the original project scoping area.

Within the Project area, vegetative ground cover is very sparse overall, ranging from 5-26% (BIA 2019). The Navajo people have traditionally used the area surrounding the Project Site for sheep grazing (**Table 3.2-6**).

Table 3.2-5 Grazing Area Sizes and Carrying Capacities for Cattle, Sheep, and Goats

GRAZING AREA	GRAZEABLE ACRES *(all livestock[32])*	CATTLE *(in year long[33])*	CATTLE *(in unit month[34])*	SHEEP *(in year long)*	SHEEP *(in unit month)*	GOATS *(in year long)*	GOATS *(in unit month)*
3-1-10	37,740	70	845	255	3,060	278	3,331
3-1-12	3,457	4	49	16	189	28	332
3-4-8	24,977	64	771	224	2,685	417	4,999
3-4-5	30,221	214	2,572	862	10,344	1,483	17,793
Total	96,395	353	4,238	1,357	16,277	2,205	26,455

Source: Parametrix 2014

Tables 3.2-7 and **3.2-8** show permit enforcement activities and compliance tallies in grazing units 3-1 (Coalmine Canyon) and 3-4 (Cameron) from 2013 through 2018 (NNDNR and BIA 2020). In Coalmine Canyon, there are 82 grazing permits; by 2018, all existing grazing permits had been checked for compliance (**Table 3.2-7**).

Table 3.2-6 Land Management District 3 Unit Grazing Permits Checked for Compliance, 2013-2018

LMD 3 UNIT	NO. OF PERMITS	YEARLY TALLY COMPLIANCE CHECKS FOR GRAZING PERMITS *2013*	*2014*	*2015*	*2016*	*2017*	*2018*
3-1 Coalmine Canyon	82	39	41	24	24	66	82
3-4 Cameron	201	65	57	77	59	78	101

Sources: BIA and NN 2020

According to the Draft Integrated Resource Management Plan (NNDNR and BIA 2020), Coalmine Canyon was grazing fewer sheep than were permitted (**Table 3.2-8**). Though there has been an increase in the number of permits checked over time, less than 50% of the 201 existing permits in the Cameron LMD 3 unit were checked for compliance. Nevertheless, in 2018, it appears that fewer sheep were grazed in Cameron than are permitted, although these data are incomplete. Current and historical BIA permit data for the compartments within the Project area, including permittee names and/or identification numbers and quantities of permitted animals, are not available without a Freedom of Information Act (FOIA) request and are not included here.

[32] Number of acres with slopes less than or equal to 30% considered accessible to all livestock
[33] Year long represents the maximum number of animal units that can be grazed for one year.
[34] Unit month represents the maximum number of animal units that can be grazed for one month.

Table 3.2-7 Land Management District 3 Unit Annual Grazing Tally Counts, 2013-2018

LMD 3 UNIT	TOTAL SHEEP UNITS YEAR LONG (SUYL) PERMITTED	YEARLY COMPLIANCE TALLY FOR SUYL					
		2013	*2014*	*2015*	*2016*	*2017*	*2018*
3-1 Coalmine Canyon	5,282	1,851	1,853	1,144	1,448	3,434	3,216
3-4 Cameron	11,585	2,765	3,067	3,194	2,736	3,644	3,219

Sources: NNDNR and BIA 2020

Agriculture

Approximately 1,030 acres of croplands in 218 plots (0.25 to 85 acres) in LMD 3 are leased to 183 permittees to grow corn, squash, melons, and hay (BIA 2019). The proposed gen tie would cross a 413.1-acre plot of BIA-designated cropland situated along approximately 1.75 miles of the Little Colorado River floodplain (**Figure 3.2-4**).

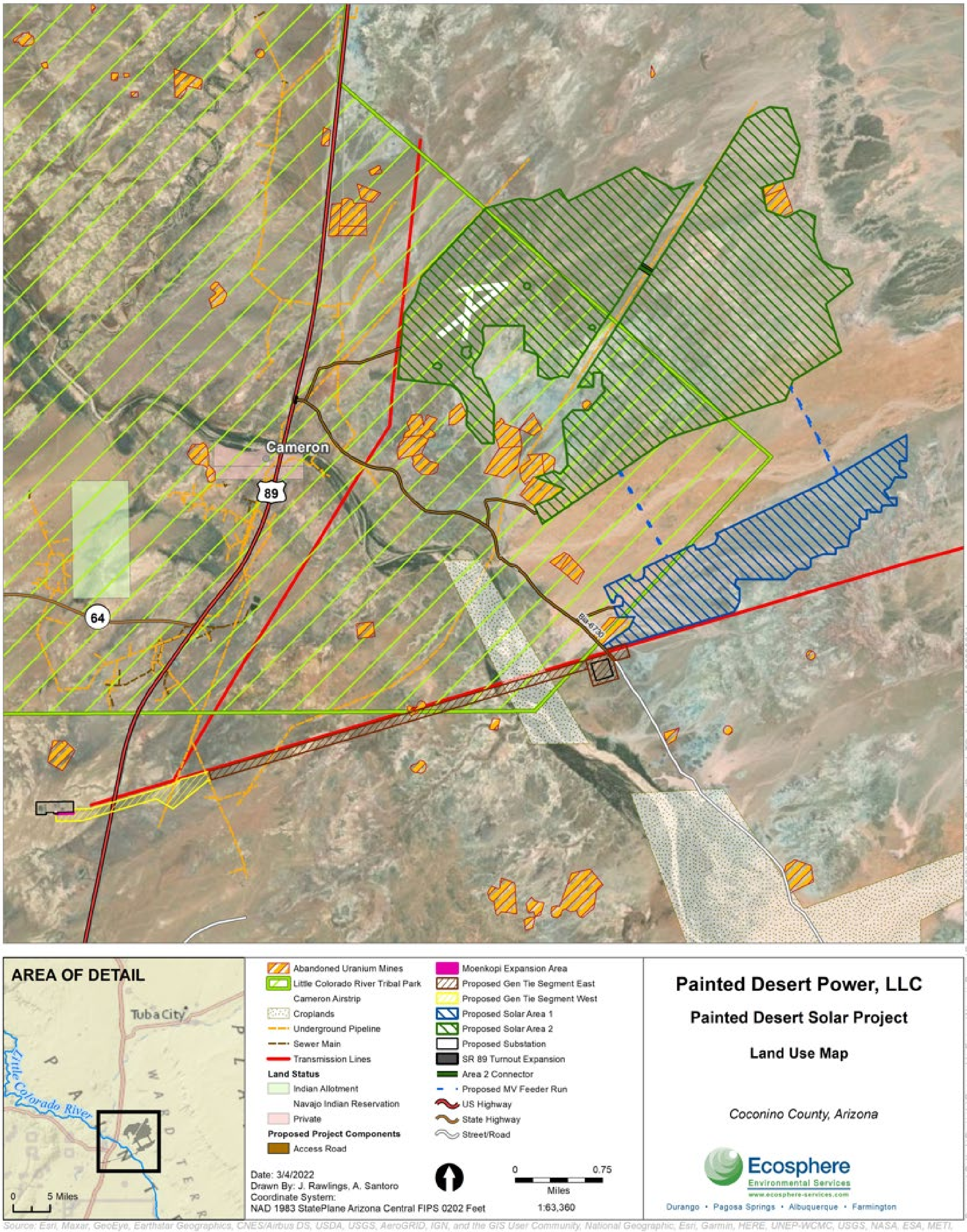

Figure 3.2-5 Land Use Map[35]

[35] This map shows the original project scoping area.

3.2.7 Socioeconomics

This section describes the baseline socioeconomic conditions in the Cameron and Coalmine Canyon chapters.[36]

3.2.7.1 Regulatory Environment

In 1966, Commissioner of Indian Affairs Robert Bennett put in place an order halting economic development within 1.6 million acres of the Navajo Nation. The order was an attempt to pressure the Navajo and Hopi into resolving a land dispute and effectively "froze" all forms of development—from fixing roofs to constructing waterlines and repairing roads—in what became known as the Bennett Freeze Area. In 2006, President Obama lifted this development ban. Approximately 7,000 people live in the FBFA within Coconino County, Arizona, which covers almost 12 million acres with a population of about 144,000. The Project is located entirely within the FBFA and the Cameron and Coalmine Canyon chapters.

The 2008 Former Bennett Freeze Area Recovery Plan, a $1 million study, detailed the economic development necessary to mitigate the impacts of the Freeze within each of the nine chapters with land included in the FBFA (WHPacific 2008). Recovery plan projects ranged from housing construction to infrastructure development to community recreational facilities. However, little development has taken place during the past 12 years.

More recent studies regarding land use planning (Coalmine Canyon Chapter 2017) and economic feasibility (Indigenous Design Studio + Architecture 2018) offer general objectives, insightful background, and detailed resource inventories and assessments, but lack project-specific financial information and investment projections. The Former Bennett Freeze Area Economic and Market Feasibility Study provides detailed generic financial models and promotes a residual land value approach (Indigenous Design Studio + Architecture 2018).

The Navajo Thaw Implementation Plan was launched to diversify the economy and address the dire need for economic development and infrastructure investment in the FBFA. The Navajo Thaw Regional Recovery Plan seeks economic development investment by itemizing actionable development projects. The plan identifies renewable energy generation as a priority to both create jobs and improve the environment (Native Builders and Building Communities 2020c).

Defined within the Navajo community planning process as an update to the 2008 Recovery Plan, the BIA's FBFA Integrated Resource Management Plan (IRMP) is a tribal strategic, vision-based, long-term management plan based on Navajo Nation members' interests, needs, and concerns for their lands and natural and cultural resources. In October 2020, the Navajo Nation Resources Development Committee and the Navajo-Hopi Land Commission approved the draft IRMP through resolutions. According to the IRMP, "new development within the renewables sector is anticipated in the near future."

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[36] Mangum Economics Consulting LLC's Painted Desert Power Economic and Fiscal Contribution to Coconino County, Arizona and the Navajo Nation is dated April 7, 2022. Triple Point Strategic Consulting LLC's Review of Mangum Economics 2022 Report is dated May 2022.

The Nez-Lizer Administration is working to position the Navajo Nation to determine its own energy future consistent with the Navajo Háyoołkááł Proclamation (**Appendix B**). The Navajo Nation Renewable Energy Policy seeks to increase utility-scale solar energy development to help achieve its goals of workforce development, carbon reduction, and improvement in the standard of living for many in the Navajo Nation. Both the Cameron and Coalmine Canyon 2020 Recovery Plans prioritize solar farm development. The Coalmine Canyon plan specifically prioritizes utility-scale solar development: "Coalmine Canyon will welcome the planning, construction and operations of a new solar facility as a result of implementing this Energy Development strategy" (Native Builders and Building Communities 2020b).

Political Support for Alternative Energy

Currently, Arizona's investor-owned utilities are required to obtain renewable energy credits (RECs) from eligible renewable resources to meet 15% of their retail electric load by 2025. This RPS was established in 2006 under Arizona Administrative Code §§ 14-2-1801 et seq. While Arizona's RPS is not currently one of the most progressive standards in the nation, it may soon change. According to a news release from the Arizona Corporation Commission (ACC) dated March 20, 2020, ACC Commissioner Lea Márquez Peterson issued a letter calling on her fellow commissioners to support requiring regulated utilities to generate 100% of their power from clean energy resources by 2050. In January 2020, Commissioner Sandra Kennedy filed a letter supporting 50% renewable generation by 2028 and 100% clean energy by 2045. Commissioner Boyd Dunn has also expressed support for more stringent standards in recent months. On January 22, 2020, APS, the largest electric utility in Arizona, announced that it has voluntarily set a target of switching to 100% clean energy by 2050 with a goal of 45% renewable energy by 2045. With consumer demand for renewable energy increasing, one of Arizona's largest utilities, Salt River Project, announced in May 2021 plans to add 2.025GW of utility-scale solar energy to its power system by 2025, more than doubling its November 2018 commitment of 1GW by 2025 (Salt River Project 2021).

Because the Moenkopi Substation and the transmission system in the vicinity of the Project is co-owned by several Nevada- and California-based utilities, the Project is uniquely situated to export electricity to these adjacent states, as well. Nevada passed its most recent RPS bill in April 2019, requiring the state to procure 50% of its power from renewables by 2030 and 100% by 2050. In 2018, California enacted Senate Bill 100, which requires utilities and other power providers to achieve 60% renewables penetration by 2030 and 100% by 2045. Under these laws, power buyers in both states could be customers for energy delivered by the Project.

3.2.7.2 Baseline Conditions

Population and Demographic Characteristics

Together the Cameron and Coalmine Canyon chapters cover almost 1,000 square miles and yet are very sparsely populated, with fewer than 2,000 residents. The population of Cameron is about double that of Coalmine Canyon with a median age in Cameron of 34.3 and in Coalmine Canyon of 33.2 (**Table 3.2-9**). By comparison, the median age of the US population overall is 38.1.

The US per capita and household incomes are $34,103 and $62,843, respectively, as compared to the Cameron Chapter per capita and household incomes of $13,453 and $34,853 and those of the Coalmine Canyon Chapter, which are lower still at $11,653 and $26,875 (**Table 3.2-9**). At 31 percent, the number of people in Cameron living below the poverty line is more than double the overall US rate of 13.4 percent. At 46 percent, the number of people in Coalmine Canyon living below the poverty line is more than triple the overall US rate.

Table 3.2-8 Population and Demographic Characteristics

CATEGORY	CAMERON	COALMINE CANYON
Population	1,122	672
Households	328	185
Persons Per Household	3.4	3.5
Median Age	34.3	33.2
Per Capita Income	$13,453	$11,653
Median Household Income	$34,853	$26,875
Persons Below Poverty Line	31%	46%
Children Under 18 Below Poverty Line	37%	50%
Percent with High School or Higher Degree	75%	79%
Percent with Bachelor's or Higher Degree	3%	7%
Mean Travel Time to Work (in minutes)	32	32

Sources: US Census Bureau 2019a and 2019b

Housing Resources and Conditions

As a result of the Bennett Freeze, housing conditions in the Cameron and Coalmine Canyon chapters are very poor. In general, housing units have not been adequately maintained and may not be fully developed. The median home values in Cameron and Coalmine Canyon are $54,100 and $41,300, respectively (**Table 3.2-10**). In comparison, the median home value in the US is $217,500 (US Census Bureau 2019c).

Table 3.2-9 Cameron and Coalmine Canyon Housing Inventory

CATEGORY	CAMERON	COALMINE CANYON
Total Units	431	271
Vacancy Rate	24%	32%
Occupied Units	328	184
Habitable Units (estimated)	103	65
People Per Occupied Unit	3.4	3.6
Ownership of Occupied Units	85%	85%
Median Value of Owner-Occupied Units	$54,100	$41,300

Sources: US Census Bureau 2019a and 2019b; Cameron and Coalmine Canyon Chapter Community-Based Land Use Plans 2008

Currently, only 24% of houses in this region are habitable, almost 60% lack electricity, and many do not have access to running water (Native Builders and Building Communities 2020c). As part of the 2008 Recovery Plan, detailed housing surveys of the nine chapters associated with the FBFA were conducted. Field teams visited approximately 4,400 single family residences and counted an additional 2,400 using aerial photography for a total of 6,898 single-family houses. Of those, 2,391 were in the FBFA. Forty-five percent of all residences surveyed met the established standard for a habitable dwelling, but only 24% of homes within the FBFA met that standard. A building is considered habitable if it is in at least fair condition, has indoor plumbing, and is fewer than 25 years old (WHPacific 2008). Based on this standard, only 3,110 of the 6,898 dwellings surveyed and 585 of the 2,391 dwellings within the FBFA were determined to be habitable and worth repairing.

Most of the housing units within Cameron are in either very poor or poor condition (**Figure 3.2-5**).

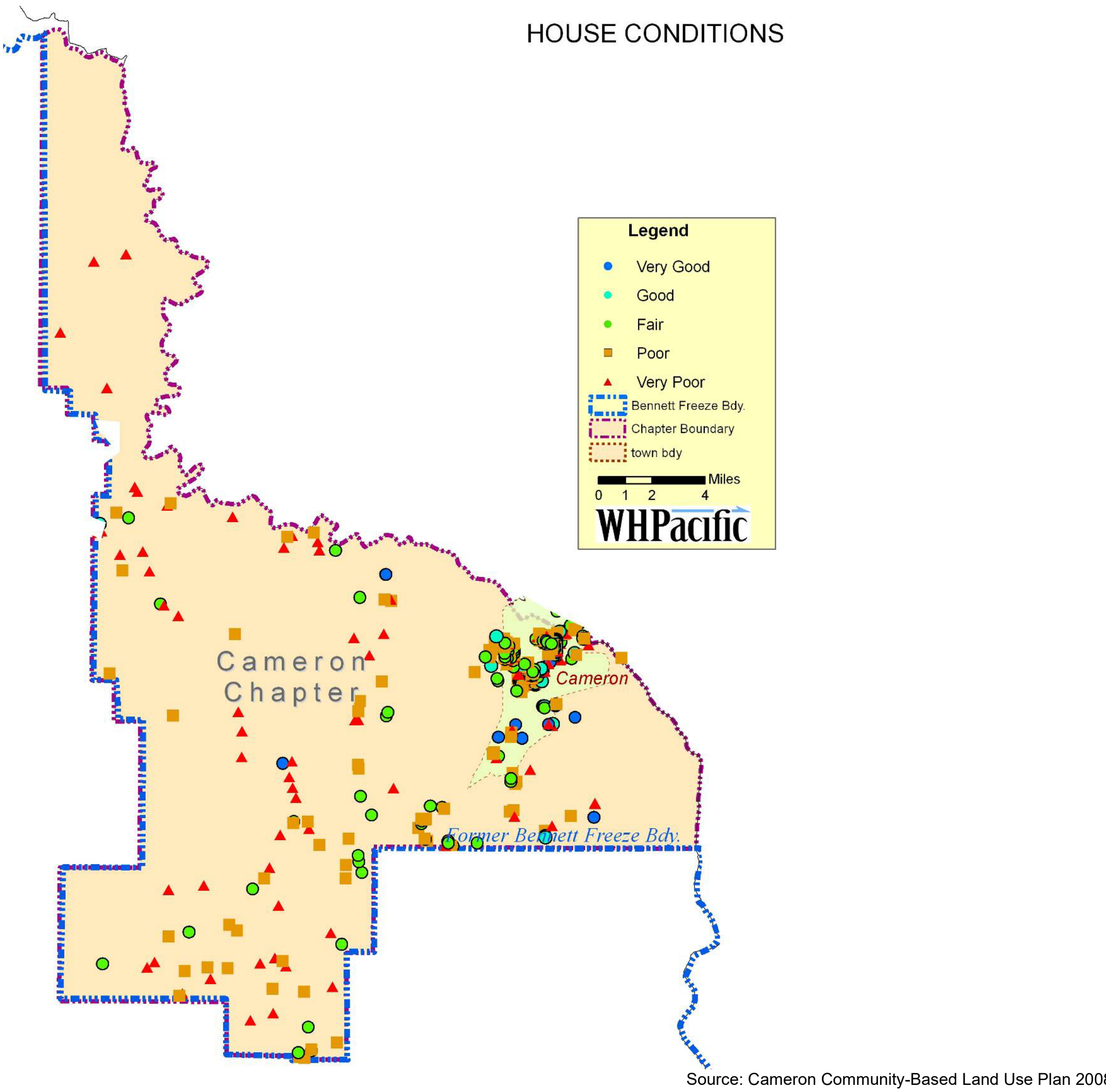
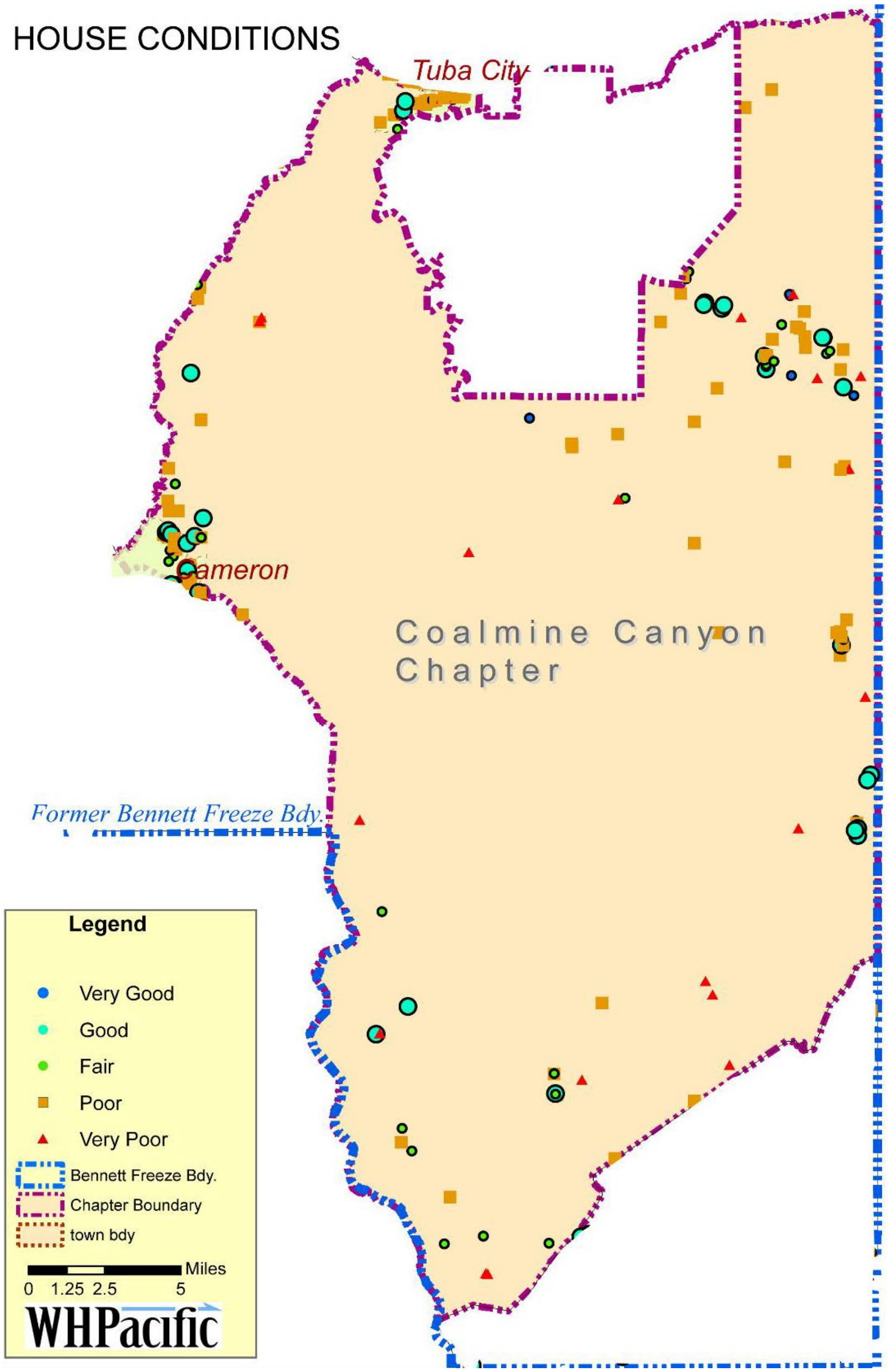


Figure 3.2-6 Survey of Cameron Chapter Housing by Condition

There are not as many housing units in Coalmine Canyon, where the units are predominately in poor condition (**Figure 3.2-6**).



Source: Coalmine Canyon Community-Based Land Use Plan 2008

Figure 3.2-7 Survey of Coalmine Canyon Chapter Housing by Condition

As part of the 2008 Recovery Plan, the number of housing units in need of development and repair was estimated for each FBFA chapter as part of developing Chapter-Specific Plans, or CSPs (**Table 3.2-11**). Due to the remoteness of some scattered-site housing, some people rely on windmills for drinking water that may contain bacterial and air-borne contaminants due to the presence of livestock and vandalism in their remote, unsupervised locations.

Table 3.2-10 Housing Units in Need of Development and Repair

CHAPTER-SPECIFIC PLANS' PROPOSED HOUSING UNITS	CAMERON	COALMINE CANYON
Scattered Housing Units	207	80
Multifamily Housing Units	147	92
Housing Units to Repair	149	96

Sources: Cameron and Coalmine Canyon Chapter Community-Based Land Use Plans 2008

Employment and Unemployment

In March 2021, the unemployment rates in Coconino County and the state of Arizona were 8.0% (Bureau of Labor Statistics 2021b) and 6.5% (Bureau of Labor Statistics 2021a), respectively. As recovery from the Coronavirus Disease 2019 (COVID-19) pandemic continues, these rates dropped to 5.1% (Bureau of Labor Statistics 2021b) and 5.7% (Bureau of Labor Statistics 2021a), respectively, as of December 2021.

Because Cameron is a census designated place (CDP), detailed estimates are available regarding employment in Cameron (**Table 3.2-12**; **Table 3.2-13**; **Table 3.2-14**).

Table 3.2-11 Cameron Census Designated Place Labor Force

CAMERON CENSUS DESIGNATED PLACE	POPULATION
Population 16 Years and Over	724
In Labor Force	415
Employed	380
Unemployed	35
Not in Labor Force	309
Unemployment Rate	8.4%

Source: US Census Bureau 2019a

Table 3.2-13 lists the number of people holding jobs in each of five categories.

Table 3.2-12 Cameron Census Designated Place Employment by Sector

CAMERON CENSUS DESIGNATED PLACE	POPULATION
Management, Business, Science, and Arts Occupations	52
Service Occupations	82
Sales and Office Occupations	106

CAMERON CENSUS DESIGNATED PLACE	POPULATION
Natural Resources, Construction, and Maintenance Occupations	65
Production, Transportation, and Material Moving Occupations	75

Source: US Census Bureau 2019a

Table 3.2-14 lists median incomes.

Table 3.2-13 Cameron Census Designated Place Labor Incomes

CAMERON CENSUS DESIGNATED PLACE	EARNINGS
Median Earnings for Workers	$20,300
Median Earnings for Male Full-Time, Year-Round Workers	$27,500
Median Earnings for Female Full-Time, Year-Round Workers	$28,438

Source: US Census Bureau 2019a

Chapter Financials

In the 1990s, the Navajo Nation began to transition from funding governmental operations with tax and royalty revenue associated with coal production to generating revenue from a broader sales and consumption tax base (Harvard Project on American Indian Economic Development 2008). Portions of these revenues are earmarked for local chapters that are Local Governance Act (LGA) certified. To date, only 44 of the Navajo Nation's 110 chapters have been certified and neither Cameron nor Coalmine Canyon are among them (Navajo Nation Office of the Auditor General 2021).

Each of the 110 chapters provides program budget summary information to the Navajo Nation Division of Community Development. The budgets for administering the chapters are modest and resemble those of small neighborhood property owners' associations. Thus, chapters lack the capacity to provide workforce training and incentivize other means of economic development.

Table 3.2-15 features the Cameron Chapter budget.

Table 3.2-14 Cameron Chapter Budget

FUNDING SOURCE	AMOUNT *(in dollars)*	PERCENTAGE OF TOTAL
Chapter Non-administrative Costs	98,369	37.7
Company Stipends	27,991	10.7
General Liability	271	0.1
Personnel	90,369	34.7
Special Revenue	42,871	16.4
Workers Compensation	544	0.2
Workers Compensation Chapter Offices	336	0.1

FUNDING SOURCE	AMOUNT *(in dollars)*	PERCENTAGE OF TOTAL
Total	260,751	100

Source: Cameron Recovery Plan 2020

Table 3.2-16 features the Coalmine Canyon Chapter budget.

Table 3.2-15 Coalmine Canyon Chapter Budget

FUNDING SOURCE	AMOUNT *(in dollars)*	PERCENTAGE OF TOTAL
Chapter Non-administrative Costs	93,924	36.9
Company Stipends	27,991	11.0
General Liability	271	0.1
Personnel	90,369	35.5
Special Revenue	40,934	16.1
Workers Compensation	544	0.2
Workers Compensation Chapter Offices	336	0.1
Total	254,369	100

Source: Coalmine Canyon Recovery Plan 2020

The 2020 Coalmine Canyon Recovery Plan also includes this list of priorities related to the impacts of COVID-19:

1. replacement of the Chapter Building with a meeting hall, senior center, youth recreation facility, and veterans' office
2. water/powerline extension in the Kerley Valley serving 18 families and Office of Environmental Health (OEH) waterline serving 24 families
3. development of a campground and private solar project
4. progress of priority transportation projects by NDOT
5. development of a Navajo Housing Authority (NHA) project providing 20 units of housing

Infrastructure Capital Improvement Projects

Navajo Nation chapters are among the entities eligible to participate in the Navajo Nation Infrastructure Capital Improvement Plan (CIP) process. The CIP is a six-year plan updated annually. Projects identified in the CIP process typically have high-dollar values and are not included in the annual operating budgets of Navajo governmental units. As such, the projects identified within the CIPs are not annual expenses and not part of the responsibility of local governments. Infrastructure projects typically include roads, bridges, and water, wastewater, power, and telecommunications infrastructure.

The infrastructure projects identified in **Table 3.2-17** would improve the standard of living (residential sewer and power lines) and support economic development (demo farm and cultural center) in the Cameron Chapter.

Table 3.2-16 Cameron Capital Improvement Plans by Category and Budget

EVENT	CATEGORY	CAPITAL EXPENSE BUDGET *(in dollars)*
Upgrade Head Start w/Cooling, Heating, Roof	Head Start	42,827
Upgrade Chapter Sewer line	Water System	138,678
North Cameron Powerline extension	Single Phase	892,232
E911 Addressing System	Economic Development	0
New Demo Farm	Economic Development	458,862
New Cameron Cultural Center	Economic Development	645,806
Upgrade Solid Waste Transfer Station	Solid Waste	2,549,234
New Chapter House	Chapter House	2,671,598
South Powerline Extension Project	Single Phase	892,232
	Total	8,291,469

Source: Cameron Recovery Plan 2020

The infrastructure projects identified in **Table 3.2-18** would improve the standard of living (residential water and power lines) and support economic development (road improvements and solar generation) in the Coalmine Canyon Chapter.

Table 3.2-17 Coalmine Canyon Capital Improvement Plans by Category and Budget

EVENT	CATEGORY	CAPITAL EXPENSE BUDGET *(in dollars)*
Coalmine Scattered Powerline	Single Phase	92,619,800
Water/Sewer Phase II w/Booster Station	Water System	774,967
Land Line Phone	Chapter House	2,039,387
Chapter Facility Audit and Repair	Chapter House	768,169
Kerley Valley Electrical Hookup	Single Phase	141,901
Assisted Living Home	Senior Citizens	1,019,694
Pave N Route 6720	Roads/Streets	30,590,811
Construct Coalmine Cemetery	Cemetery Tract	101,969
Install Scattered Solar System	Econ Development	305,908
	Total	128,362,607

Source: Coalmine Canyon Recovery Plan 2020

3.2.8 Visual Resources

3.2.8.1 Regulatory Environment

There is no specific policy or guidance administered by the Navajo Nation for how to evaluate a project's visual impact on land. Due to the transferability of methods to evaluate project contrast in relation to the existing landscape character, this visual resource analysis uses concepts and methods developed by the Bureau of Land Management (BLM 1986). The BLM contrast rating process is a widely used tool for visual resource analysis, regardless of jurisdiction, and provides a consistent approach to evaluating project components within the landscape and how those components may be perceived by viewers. This analysis uses the contrast rating process and general information on landscape character and potential impacts on scenery resources in the Project vicinity.

3.2.8.2 Baseline Conditions

Characteristic Landscape

The Project Site is located within the Painted Desert section of the Colorado Plateau physiographic province in northern Arizona. Geomorphic processes in this area include sedimentary deposition followed by tilting and erosion into majestic plateaus. Major landforms are plains, hills, canyonlands, and valley plains. With elevations ranging from 4,000 to 7,000 ft above mean sea level (amsl), the Painted Desert has a cold desert climate with hot, dry summers and cold, nearly snow-free winters. Vegetation includes grama and galleta grasses at lower elevations and pinyon-juniper woodlands at higher elevations; saltbrush-greasewood type shrubs occur in dry, salt-affected, and calcareous soils. The annual average precipitation is 6.35 inches.

The major watershed in the area, the Little Colorado River, is located approximately 1 mile west-southwest of the Project Site. Its tributaries originate in the White Mountains of Arizona and New Mexico and flow north through the Little Colorado River floodplain. The river becomes a deeply incised canyon at Cameron, Arizona, forming the Little Colorado River Gorge before it empties into the Colorado River.

US 89 runs north to south through the Navajo Nation from Flagstaff to Page, Arizona, and is in the viewshed of the Project. US 89 provides primary access to major recreation destinations, including Grand Canyon National Park and Glen Canyon National Recreation Area, and is part of the Grand Circle, a popular national park touring route that extends through Utah, Arizona, and Nevada. Other roads in the Project's viewshed include BIA RT 6730 and unpaved roads.

The Project area consists of low-density range grazing lands partially disturbed by grazing and historic mining activities. Scattered rural residential and ranching properties are located in the vicinity of the Project Site and the community of Cameron and the Cameron Trading Post are located approximately 1 to 2 miles west-southwest of the Project area.

Existing transmission infrastructure located in the area landscape includes two major sets of existing HV transmission lines: the APS Four Corners transmission corridor and the APS NGS transmission corridor. The APS-operated Moenkopi Substation is located approximately 6 miles to the west-southwest of the proposed solar array.

The overall character of the immediate landscape is rangelands interspersed with rolling hills and mesas. The most notable natural features in the landscape are the eroded mesas interspersed with dry valleys with distant backdrop views of mountains—including the San Francisco Peaks and the North and South Rims of Grand Canyon—and textured dirt and soft, light tan, scenic sand dunes leading to mountain ranges in the background.

Sensitive Viewing Platforms and Key Observation Points

Sensitive viewing platforms represent specific places, areas, and features of visual importance relative to one's home, social, business, or recreation environment. Sensitive viewing platforms include both public views of the Project that are stationary (e.g., a residential area) and views that are linear (e.g., a major roadway). Potential changes in the viewshed are evaluated from these locations, which include:

- highway travel routes used by local, regional, and recreational travelers and tourists.
- rural travel routes used by local residents and for access to ranching properties.
- area residences.

PDP worked with representatives from the Navajo Nation to identify four key observation points (KOPs) for impact analysis in the Visual Assessment Report, included in **Appendix G** (SWCA 2021). These sensitive viewing platform locations were chosen to represent the visual impact of the solar array, gen tie line, and substation expansion. Descriptions of the views from these KOPs are included in **Section 3.3.9**.

KOP A: Area 2 from US 89 Looking East

KOP A represents views of travelers looking east from US 89 toward the Project Site and potential views from residences in the vicinity of the KOP. There are several residential properties in the vicinity of this KOP west of the solar array, including properties on the east and west sides of US 89. The closest structure on the northeast side of the array appears to be a hogan, which is approximately 0.25 miles from the Project boundary.

KOP B: Panoramic View of Area 2 from Bluff along BIA Route 6730

KOP B represents views from people traveling along and in the vicinity of BIA RT 6730 and residents of several residential properties along BIA RT 6730. The closest residential property is southwest of Area 2, approximately 0.3 miles from the Project boundary.

KOP C East: Proposed Gen Tie Crossing US 89 Looking East

KOP C East represents views of travelers from US 89 looking east toward the proposed gen tie.

KOP C West: Proposed Gen Tie Crossing US 89 Looking West

KOP C West represents views of travelers from US 89 looking west toward the proposed gen tie and substation expansion.

3.2.9 Public Health and Safety

3.2.9.1 Regulatory Environment

The Navajo Nation Department of Health and the Navajo Nation Division of Public Safety are the primary agencies responsible for public health and safety on the Navajo Nation. The Division of Public Safety would oversee police, fire, medical, and other emergency response services at the Project Site.

PDP would prepare and implement safety, emergency preparedness, fire, and site security plans prior to construction. These plans would address fire and fuels management and fire protection, provide a safety program for construction and operation at the Project Site, address health and safety protocols related to the neighboring AUMs, and provide for site security and monitoring.

3.2.9.2 Baseline Conditions

Potential public health and safety issues related to the proposed action include:

- potential for health effects on sensitive populations from dust or air emissions, including uranium exposure.
- potential for public exposure to hazardous materials, including battery storage.
- risks of fire or other emergencies during construction and operation.

Section 3.2.2 provides a detailed description of the regulatory environment for air quality and the existing (or baseline) conditions for air quality in the vicinity of the Project Site. A similar discussion of regulations and existing conditions regarding hazards and hazardous waste is included in **Section 3.2.5**.

3.2.10 Traffic and Transportation

3.2.10.1 Regulatory Environment

The NDOT plans, operates, and maintains roadways within the Navajo Nation. Coordination with NDOT would be required for improvements to local routes and planned access to the Project Site.

ADOT requires encroachment permits "for any work within the state right of way such as highways, driveways, grading, fence removal or replacement, surveying and geotechnical investigations" (ADOT 2021a). Proposed engineering improvements, documentation indicating compliance with relevant environmental laws, and a proposed traffic control plan would be required to support the encroachment permit. The Northcentral ADOT District includes the Project area. ADOT operates and maintains US 89; however, the Navajo Nation holds the underlying ownership of US 89 ROW, portions of which may be improved as part of the Project.

Federal Aviation Administration (FAA) Policy (78 FR 63276) requires certain criteria be met for solar energy systems on airport property. This policy is to ensure safety by eliminating the potential for ocular impact to pilots and/or air traffic control facilities due to glare from such projects. There is no airport located close to the Project area.

3.2.10.2 Baseline Conditions

US 89 is the main highway used to access the Project Site and is located approximately 1 mile west of the Project Site. US 89 is a two-lane roadway stretching from Interstate 40 in the city of Flagstaff, Arizona, to the Arizona-Utah border. US 89 provides a regional transportation corridor for access to the nearby community of Cameron, BIA RT 6730, and turnouts to SR 64 and SR 260. In addition, US 89 serves tourist traffic loads to the Grand Canyon area. Traffic using US 89 is generally limited.

BIA RT 6730 is an unpaved roadway with existing turnout access from US 89. BIA RT 6730 provides local access to the Navajo Nation and travels for several miles to the east.

PDP anticipates completion of a traffic study and transportation plan to assess in detail the existing traffic characteristics, appropriate enhancements, and potential for environmental effects from the Project.

3.2.11 Water Resources

3.2.11.1 Regulatory Environment

Surface Water

As amended, Section 404 of the CWA (33 USC §§ 1251 et seq.) regulates the discharge of dredged or fill material into waters of the US (WUS). The USACE has authorization responsibility. Section 401 of the CWA regulates surface water quality certification and requires a review for compliance with appropriate federal, state, and tribal water quality standards any proposed activity requiring a federal license or permit that may result in a discharge into WUS. In March 2006, the USEPA approved the Navajo Nation Surface Water Quality Standards (NNSWQS), which allows the Navajo Nation to issue federal permit certifications. NNEPA has primacy over Section 401 water quality certification for Section 404 permits, administered by the Surface and Groundwater Protection Department (SGWPD) in accordance with the NNSWQS. Dredge or fill of waters of the Navajo Nation (WNN) that may not be defined as WUS also requires certification under this authority. WNN may include all surface waters including, but not limited to, rivers, streams, lakes, washes, marshes, and other natural or human-made waterways within the borders of the Navajo Nation, and include perennial, intermittent, and ephemeral waters. Section 402 of the CWA regulates stormwater discharges into WUS through National Pollutant Discharge Elimination System (NPDES) permitting. The SGWPD administers NPDES permitting for stormwater discharges into WUS and WNN.

WUS were most recently addressed by the Navigable Waters Protection Rule, or NWPR (33 CFR § 328.3; 40 CFR § 120.2). Pursuant to Presidential EO 13778, the 2020 rule redefined the federal government's CWA permitting jurisdiction by reducing what waters were considered WUS. The NWPR eliminated the application of the 2015 rule's significant nexus test by defining WUS to include four categories of waters:

1. territorial seas and traditional navigable waters
2. tributaries of such waters
3. certain lakes, ponds, and impoundments of jurisdictional waters
4. wetlands adjacent to other jurisdictional waters

On August 30, 2021, the NWPR was vacated by a federal court, thereby effectively reinstating the 2015 significant nexus test for WUS, also called the Clean Water Rule.

Before the NWPR was vacated, PDP submitted a request to the USACE for an approved JD (November 13, 2020, File No. SPL-2018-00831) under Section 404 of the CWA. On March 29, 2021, the USACE completed the requested review and made a JD that no CWA 404 permit was required since the Project would not discharge into any WUS (**Appendix Q**). The basis for this JD is that the Project Site contains ephemeral features, swales, and areas where sheet flow occurs. The approved JD is valid for 5 years unless new information warrants revision of the determination before the expiration date. According to USEPA's website specific to the changing WUS rule, "AJDs completed prior to the court's decision and not associated with a permit action (also known as 'stand-alone' AJDs under [Regulatory Guidance Letter] 16-01) will not be reopened until their expiration date" (USEPA 2023).

Following communication with the USACE regarding their project review, the NNEPA issued a letter, dated March 18, 2021, stating that no Section 401 WQC was required for the Project as no CWA 404 permit was required (**Appendix R**).

Groundwater

Any new private well must be authorized by the Navajo Nation Technical Construction and Operations Bureau (NNTCOB) Water Code Section through submittal of drilling and water use permit applications.

The NNEPA, through the Public Water Systems Supervision Program, has primary responsibility for wellhead protection to ensure proper drilling, casing, and land surface use near any drinking water source wells. The program is enforced under the Navajo Nation Safe Drinking Water Act (Title 22 NNC § 11).

Floodplains

EO 11988 Floodplain Management (42 FR 26951) directs federal agencies to evaluate the potential effects of actions in a floodplain, consider alternatives, and develop plans to reduce flood hazards.

Imported Water

The NNTCOB Water Code Section is responsible for implementing water regulations to protect public health if construction water must be imported from outside the Navajo Nation. A water use permit must be issued to ensure imported water is from an approved source.

3.2.11.2 Baseline Conditions

Surface Water

An inventory of surface water resources, including wetlands, in the Project area was completed in 2020. This AQR identified existing surface waters and their conditions and, where present, delineated the ordinary high water mark (OHWM), which defines an area of regulatory jurisdiction for permitting purposes. The potential need for permits was also evaluated. On November 13, 2020, the AQR was submitted to the USACE with a request for a JD on what if any features were subject to CWA permitting.

Forty-three water features were evaluated in the AQR. Except for the Little Colorado River corridor and associated wetlands, all aquatic resources were either swales with no defined channel bed or banks, or ephemeral and flowing only in response to precipitation events. Most of the waterways (mapped as National Hydrography Dataset bluelines) were swales or discontinuous drainage channels across the Project area. These drainages are constantly changing as they alternate in a repetitive sequence of aggradation or degradation of sediments along their course. Because of this, most drainages within the Project area do not support OHWM indicators or well-defined banks. Additionally, most of these features originate within or immediately adjacent to the

Project area, indicating very limited drainage areas (i.e., micro watersheds less than an estimated 250 acres in size). This also limits the formation of defined channels with established stream banks.

Three stock ponds identified as wetland features by the National Wetlands Inventory (NWI) occur in areas not slated for development within the Project area. Three other NWI classifications are mapped along the Little Colorado River floodplain (**Figure 3.2-7**).

The Little Colorado River (Hydrologic Unit Code 15020016) at Cameron has a contributing drainage area of 26,091 square miles and is the principal drainage from the Painted Desert region. The Little Colorado River is one of two major tributaries of the Colorado River in Arizona. It discharges into the Colorado River approximately 57 river miles downstream from the Project Site. Details regarding surface waters, delineations, runoff, and stream gauge data are available in the AQR.

Surface Water Quality

Surface waters generated during precipitation events are subject to sediment transport, including that of any uranium-contaminated soils encountered in the flow path. The Little Colorado River is the receiving water for the area and thus its floodplain, wetlands, and stream sediments are vulnerable to the accumulation of any such contaminants. Water, soil, and sediment investigations for nearby areas along the Little Colorado River reflect the land use history. Weston Solutions identified uranium, radium, arsenic, and molybdenum above background levels in Little Colorado River wetland sediments at Section 9 AUM sampling sites approximately 8 miles upstream from the Project area (Weston 2014). Other previously reported surface water sample locations in the general area containing uranium concentrations greater than the maximum allowed levels include a spring box at the Clay Well Spring and an open pit at the Jeepster No. 1 Mine (USGS 1994).

Floodplains

Arrowhead Engineering delineated the Project area floodplains (Arrowhead 2019). The 100-year flows were generated using a modified rational method via Autodesk's Storm and Sanitary Analysis 2019. Times of concentration for the peak flows were calculated using the Papadakis-Kazan method and methodologies presented in ADOT's 2014 *Highway Drainage Design Manual, Volume 2: Hydrology*. The watershed boundaries for the Project Site were delineated using USGS topographic maps with 20-ft contour intervals. The watershed flows discharged were used in generating the floodplain limits. The hydraulic analysis was conducted with the USACE Hydrologic Engineering Center River Analysis System (HEC-RAS) 4.1. Standard hydraulic methodology was utilized in accordance with the USACE modeling guidelines. The Project Site drainage area encompasses 45.5 square miles and has 100-year peak discharge of approximately 8,186 cubic ft per second (cfs). The calculated 100-year flood depths range from a minimum of 1 ft to a maximum of 6 ft. The 1-ft flood depths occur in the alluvial fan areas toward the bottom of the basin, and the 6-ft flood depths occur in the well-defined waterway areas near the top of the watershed.

Groundwater

Desktop sources were consulted to characterize groundwater beneath the Project area surface. The Project area overlies the broad Colorado Plateaus aquifer system, a complex of several aquifers associated principally with the geographic area of the Colorado Plateaus. Specifically, the Project area overlies the regionally important Coconino (C) aquifer (Brown and Macy 2012; Jones and Robinson 2021).

The distribution of aquifers in the Colorado Plateaus region is determined largely by component sediments' structural deformation and erosion, which is highly variable based on the geological history and stratigraphy of specific locations. In uplifted areas, such as the Coconino Plateau, younger rocks have been eroded away and aquifers are present in underlying older rocks.

The C aquifer underlies much of the geographical area of the Colorado Plateaus system. It is an important aquifer within the Little Colorado River Basin, though it is dry north of Cameron and west of Flagstaff (BOR 2006). The C aquifer is separated from geographically co-occurring aquifers by stratigraphy. It is generally more than 2,500 ft below ground surface, or bgs (Hart, et al 2002; Bills, et al 2007) but can be much deeper in areas with intact overlying strata such as the Black Mesa Basin, where it is up to 4,900 ft bgs (BOR 2018).

Another principal aquifer underlying the Coconino Plateau in the Little Colorado River Basin is the Navajo (N) aquifer associated with Navajo Sandstone, a stratum that, when present, overlies the C aquifer associated with Coconino Sandstone and De Chelly Sandstone. When present, the C aquifer overlies the Redwall-Muav (R-M) aquifer associated with Redwall Limestone and other deposits (Jones and Robinson 2021). Within the vicinity of Cameron, there is a small perched alluvial aquifer associated with the Little Colorado River (Bills, et al 2007).

Groundwater Quality

The C aquifer in the vicinity of the Project area is associated with high salinity with total dissolved solids exceeding 1,500 milligrams per liter (BOR 2018). Additionally, the Cameron area is the site of several AUMs associated with radiation levels as high as ten times above background levels (USEPA 2014). Previous well sampling from the Cameron area identified uranium contaminant levels above maximum allowed levels at the Arizona Inspection Station well and a shallow well at the Jack Daniels No. 1 Mine near the Project area (USGS 1994).

Regulated groundwater in the Cameron area is monitored and treated to meet USEPA and NNEPA drinking water standards for uranium and other contaminants, but unregulated sources are not considered safe with respect to uranium or other contaminants. A regulated drinking water source is present in the nearby Cameron Chapter, but this may not be a feasible source for construction or revegetation. Unregulated and contaminated groundwater sources may be present in association with area AUMs that are unreclaimed or in the process of being evaluated.

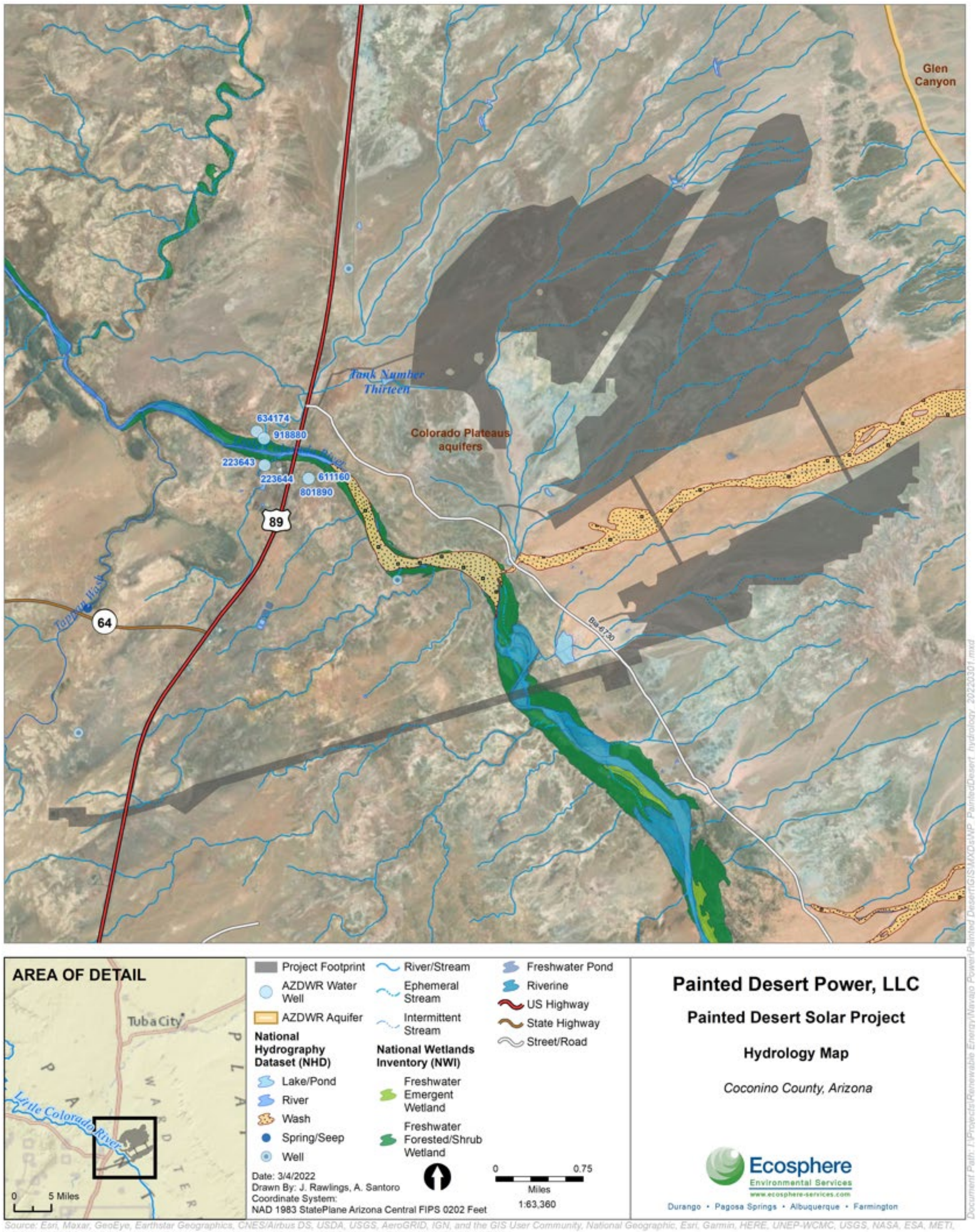


Figure 3.2-8 Map of Hydrological Resources[37]

3.3 COMPLIANCE EVALUATION

3.3.1 Impact Analysis Methodology and Terminology

The affected environment for the Project includes the physical area that encompasses the environmental, cultural, or economic resources that could be impacted by the Project or alternatives. The baseline conditions in the affected environment are described using publicly

[37] This map shows the original project scoping area.

available data augmented by field studies and information provided by local chapter officials and residents on some resource topics.

Environmental impacts are evaluated by comparing possible changes to resources from the Project as compared to baseline conditions using the following impact terminology:

- Impacts are categorized as beneficial, adverse, direct, indirect, or cumulative.
- A *beneficial* impact indicates a positive change and an *adverse* impact refers to a negative change.
- *Direct* indicates an effect that is caused by the Project or alternatives at a particular time and place and *indirect* is an effect that is attributable but further removed in time or proximity.
- A *cumulative* impact is one that is a result of an incremental impact from the Project or alternatives when added to other past, present, and/or reasonably foreseeable actions.
- The duration of impacts are referred to as *short-term, temporary* (e.g., a few months or during construction only), or *long-term, permanent* (e.g., effects are expected to last beyond construction and the resource may require mitigation to return to preconstruction conditions).
- The intensity of impacts are described as *negligible* (barely measurable), *minor* (little loss of resource integrity and small, localized, or little consequence), *moderate* (would alter the resource but the impact could be successfully mitigated), or *major* (substantial, highly noticeable, and long-term change to the resource).

Design features are provided by PDP to minimize or avoid potential impacts from the Project.

3.3.1.1 Significant Impact Definition

The definition of Significant Impact used in the preparation of the threshold determination is from the Navajo Nation General Leasing Regulations approved by the BIA in 2014. The definition is excerpted here:

> Significant Impact means a determination that an action will have a significant effect on the quality of the human environment after considering the following:
>
> i) effects on public health and safety;
> ii) effects on the unique characteristics of the geographic areas, including its historic or cultural resources, park lands or ecologically critical areas;
> iii) highly controversial effects on the human environment;
> iv) highly uncertain or unknown effects on the human environment;
> v) effects in terms of precedent for future actions with significant effects;
> vi) effects that may be individually insignificant, but when considered with other projects, have a significant impact on the environment;
> vii) effects that cause loss or destruction of scientific, cultural, or historical resources; and
> viii) effects on endangered or threatened species or habitat protected under Navajo Nation or federal law. (Navajo Nation General Leasing Regulations § 2304 T)

3.3.1.2 No Action Alternative

Under the no action alternative, the Project would not be developed and there would be no Project-related impacts on the environmental, cultural, or economic resources of the Project area.

3.3.2 Geology, Mineral Resources, Soils, and Paleontology

3.3.2.1 Compliance Evaluation

Geology, Mineral Resources, and Soils

The Project would not restrict access to valuable mineral deposits and is designed to avoid the locations of AUMs where potential future reclamation efforts may occur (**GEO-1**; **HAZMAT-3**). Low levels of radioactive material may be found in rocks and soils in the Project area, but these do not preclude safe development of the Project Site. The soils within the Project area do not constitute important natural resources.

Impact Determination

Project construction would generate localized impacts on the geology, mineral resources, and soils in the Project area. These would include disturbances from grading, access road improvement, gen tie lines, substation construction, and directional drilling for electrical cable installations. The POD proposes a light-on-land approach to minimize impacts (Terabase Energy 2022). Some minor earthwork—including grading, fill, compaction, and erosion control—will be required to accommodate the placement of trackers, foundations or footings, access roads, and drainage features. Excavation work on the Project Site is expected to balance with no import or export of material. The dirt roadways within and around the Project Site would be graded and compacted. Some roads, including BIA RT 6730 and access roads serving the O&M facilities and the Project substation, would be covered with imported aggregate base course. Minimal grading work is expected along these routes.

O&M activities would result in minor impacts on the geology, mineral resources, and soils in the Project area. The Project is expected to have a useful life of at least 35 years, subject to extension with component upgrades and system replacements. PDP would decommission and remove the system and its components at the end of the Project's useful life. The Project Site could then be converted to other uses or be restored to sheep grazing property. Decommissioning would result in minor impacts on the geology, mineral resources, and soils on the Project Site.

Paleontology

Impact Determination

Minimal ground disturbance is expected with the grading, trenching, and/or boring for the access roads, gen tie corridor, substation, and DC and AV MV cable and communications line trenches and with the leveling for arrays or other facilities. Direct localized impacts on surface or subsurface paleontological resources may occur from ground disturbance within the Chinle Formation if the resources are crushed, broken, and/or moved. Exposed fossils not initially damaged or destroyed may be subject to long-term damage or destruction from erosion once exposed. Increased human activity in remote areas during construction may also indirectly permanently affect known and unknown paleontological resources, intentionally or unintentionally, if they are moved, removed, broken, or otherwise disturbed. Impacts on paleontological resources would be permanent as they are non-renewable resources. Ground disturbance and/or increased human activity can also reveal scientifically significant fossils that would otherwise remain buried and unavailable for scientific study. Such fossils can be collected properly and curated into the museum collection of a qualified repository, making them available for scientific study and education (**CULTURAL-2**; **PALEO-1**).

There is potential for an unknown number of previously undiscovered or undescribed paleontological localities within Chinle Formation exposures in the Project area and these exposures may be less accessible for the long term due to infrastructure and limited access to the Project Site during the operational phase of the Project. During Project operation, new and improved access roads would allow increased human activity, including non-Project activity, in some previously remote areas outside the fenced and gated areas.

Limited new ground disturbance would occur during decommissioning activities. Any disturbance within previously undisturbed Chinle Formation would have minimal potential to permanently impact unknown paleontological resources through extraction, crushing, and breaking. New and improved access roads that remain after Project Site security is removed may increase human activity in previously remote areas and permanently affect known and unknown paleontological resources positively through legal collection and preservation or negatively through illegal collection (poaching) and intentional or accidental vandalism.

3.3.2.2 Design Features and Mitigation Measures

Design Features

AIR-1: Dust Control Plan

PDP would submit a dust control plan (**Appendix I**) for construction and operation to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan addresses watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

CULTURAL-2: Tribal Cultural and Paleontological Worker Training

Prior to construction and in collaboration with the NNHHPD, PDP would provide training by a qualified archaeologist for all construction personnel on the recognition of buried tribal cultural resources and paleontological resources and the protection of these resources during construction.

GEO-1: Access to Neighboring Abandoned Uranium Mines for Potential Future Reclamation

While the Project footprint does not include any mining areas (**HAZMAT-3**; **HAZMAT-4**), the Project is located adjacent to 14 historic uranium mines in various stages of reclamation by the USEPA and NNEPA. PDP's Project design would not impede access to these mines for potential future reclamation efforts.

GEO-2: Geotechnical Evaluation

Prior to construction, PDP would complete a full geotechnical characterization of the Project Site to inform the design of the foundations for Project facilities.

PALEO-1: Paleontological Pre-Construction Survey and Unanticipated Discovery Plan

A paleontological pedestrian survey is recommended prior to ground disturbance in areas with exposed Chinle Formation; monitoring of ground disturbance by an experienced vertebrate paleontologist is recommended in areas with exposed or shallowly buried Chinle Formation. An unanticipated discovery plan will be developed and include, at a minimum, guidance for: paleontological resource monitoring during construction within areas of disturbance; discovery notification; resource documentation; and potential collection and curation of important finds.

WATER-2: Stormwater Pollution Prevention Plan

The EPC contractor would control Project Site drainage, erosion, and sedimentation related to stormwater runoff. The Project developer would identify site surface water runoff patterns and develop measures to prevent adverse impacts associated with Project-related soil deposition and erosion throughout and downslope of the Project Site and Project-related construction areas. These measures would be implemented within the Stormwater Pollution Prevention Plan (SWPPP) and incorporated into the POD, as appropriate.

Additional Design Feature for the Alternative Solar Generating Facility

AIR-1A: Dust Control Plan

PDP would commit to quantifying the revised dust emissions resulting from the construction and operation of the Alternative Solar Generating Facility if it is selected and when more data is available. PDP would update the dust control plan (**Appendix I**) for Project construction and operation accordingly to account for the features of the Alternative Solar Generating Facility, including additional earthmoving activities, and submit it to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan would address watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

3.3.3 Air Quality and Noise

3.3.3.1 Compliance Evaluation

Air Quality

Impacts on air quality are discussed in terms of Project emissions of criteria air pollutants, HAPs, and GHGs. Regulated pollutant emissions from Project construction and operation have been estimated to characterize potential emissions increases. These emissions estimates are compared with Coconino County's emissions inventory as a percentage of the county's annual emissions. The potential emissions decreases from emissions avoided because of Project operation and from the offsetting of traditional fossil fuel-fired generation have also been characterized.

The emissions calculations use emission factors for construction and operational maintenance equipment developed by California's South Coast Air Quality Management District to estimate construction worker commute and on-road construction equipment emissions (South Coast Air Quality Management District 2007, 2017). For off-road equipment, the appropriate emission factor, equipment type, quantity of equipment, and duration of use during Project construction were used in determining emissions. The assumption was that the estimated average number of construction workers each day (as many as 500, as discussed in the POD) would commute to the Project Site. It was estimated that approximately 15,000 total trips[38] would be required to deliver materials and off-road equipment.

The emissions of PM_{10} and $PM_{2.5}$ estimated include emissions from on-road vehicle and off-road equipment exhaust in addition to dust. PM_{10} and $PM_{2.5}$ emissions from dust generated by earthmoving activities were estimated using the Western Regional Air Partnership Fugitive Dust Handbook (Western Regional Air Partnership 2006). The estimated emissions calculations account for the Project's dust control methods, including using water during construction to control dust. To be conservative, it is assumed that water for dust control would be trucked to the Project Site from the next closest city, Tuba City, Arizona. (**Appendix H** includes a summary of available water sources.) Applicant proposed design features would be employed to further reduce emissions, as practicable. These mitigation measures also appear in the dust control plan (**Appendix I**) as described in **AIR-1**.

Impact Determination

Sources would not emit pollutants in excess of the emissions standards set by the director of the NNEPA and if the standards were to be exceeded a permit would be required from the NNEPA.

Based on the most conservative estimate of a 12-month construction period, the Project would create short-term air pollutant emissions from off-road vehicle and equipment exhaust, on-road vehicle exhaust from travel to and from the Project Site and from material deliveries, and dust from soil disturbance and travel on paved and unpaved roads. **Appendix C** details specific types, quantities, commutes, and hours of use for construction equipment.

Although Project construction would generate emissions of criteria pollutants, given the temporary nature of those emissions, the scope of construction activities, and the remote location of the Project, it is unlikely that emissions would exceed NAAQS or expose sensitive receptors to substantial pollutants. **Table 3.3-1** lists annual estimated Project construction emissions, annual emissions at the county level, and emissions from Project construction as a percentage of the county's total emissions. The highest pollutant emissions produced by construction are CO_2e, PM_{10}, and NO_x. The projected emissions estimate for each pollutant from Project construction is minor in comparison to the county's annual emissions (with an increase of 1.27% or less for each pollutant). Project construction emissions would be temporary. To reduce dust emissions, PDP would implement a dust control plan (**Appendix I**) that includes measures such as watering the Project Site (**AIR-1**). As a result, construction impacts on air quality would be less than significant.

[38] This analysis was based on an earlier version of the POD.

Table 3.3-1 Estimated Project Construction Emissions in Tons per Year

SOURCE	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPS	CO_2e *(in metric tons)*
Construction Equipment (off-road)	53.10	75.27	0.15	3.50	3.11	10.94	1.09	12,764
Worker and On-Road Construction Equipment Commuting	4.96	1.55	0.01	39.25	4.28	0.61	0.06	1,183
Equipment/ Material Delivery	6.92	7.35	0.02	56.30	6.36	1.05	0.11	1,938
Dust from Construction Operations	–	–	–	24.21	2.42	–	–	–
Total	64.98	84.18	0.18	123.25	16.17	12.60	1.26	15,885
Coconino County Emissions Inventory Total	217,671	16,341	1,194	27,990	16,310	135,336	21,612	3,533,109
Project Construction Emissions as a Percent of Coconino County Emissions	0.03	0.52	0.02	0.44	0.1	0.01	0.01	0.45

Source: USEPA 2017a

Project construction may generate odors from construction equipment exhaust. Any odors from construction would be periodic and temporary. Because the Project is in a remote location, odors would not affect a substantial number of people. Therefore, impacts related to odors during construction would be less than significant.

Project construction would also result in the emissions of GHGs. Internal combustion engines associated with construction vehicles and equipment would emit GHGs. These GHG emissions would result in a maximum of 15,890 metric tons of CO_2e emitted during Project construction. In Coconino County, Project construction emissions could equal up to 0.45% of the county's total emission inventory for CO_2e. Construction activities and corresponding GHG emissions would be temporary, localized, and typical of other construction projects.

Project O&M emissions are summarized in **Table 3.3-2** and would include vehicle exhaust and dust from weekly inspection activities—such as exhaust from on-road inspection vehicles and dust from travel on paved and unpaved roads—and emissions from maintenance activities, such as panel washing, routine maintenance, and any equipment or road repairs. Project emissions would increase Coconino County's annual emissions inventory by less than 0.01% for each pollutant. Impact on air quality from Project operation would be negligible and would not cause an exceedance of the NAAQS.

Table 3.3-2 Estimated Project Operational Emissions in Tons per Year

SOURCE	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CO_2E *(in metric tons)*
Maintenance/ Inspection Activities	0.48	0.28	0.00	1.29	0.15	0.06	0.01	85
Total	0.48	0.28	0.00	1.29	0.15	0.06	0.01	85
Coconino County Emissions Inventory Total	217,671	16,341	1,194	27,990	16,310	135,336	21,612	3,533,109
Project Operations Emissions as a Percent of Coconino County Emissions	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Source: USEPA 2017a

Decommissioning would not involve any more time or equipment than construction; therefore, the impacts on air quality from decommissioning would be less than or equal to the construction impacts.

The use of solar power to generate electricity could also reduce the need for electricity generation from new traditional fossil fuel power plants. The Project would annually displace CO_2, NO_x, $PM_{2.5}$, and sulfur oxides (SO_x) produced by the Arizona electric grid and decrease the creation of air pollutant emissions in the atmosphere from traditional fossil fuel power plants (**Table 3.3-3**). Avoided emissions were obtained from the USEPA's 2021 AVoided Emissions and geneRation Tool (AVERT) for the Arizona region. The estimated potential annual emissions avoided are based on the 750MW design capacity of the Project. This is a general upper-boundary estimate of the potential avoided emissions and the AVERT model cannot with certainty estimate long-term avoided emissions associated with the Project.

Table 3.3-3 Estimated Annual Avoided Emissions for Project Operations

POLLUTANT	CO_2 *(in tons)*	NO_X *(in tons)*	SO_X *(in tons)*	$PM_{2.5}$ *(in tons)*
Annual Avoided Emissions	491	592	196	58

Source: USEPA AVERT 2021

The web edition of the USEPA's CO-Benefits Risk Assessment (COBRA) was used to estimate the potential health benefit impacts of these avoided emissions in the state of Arizona based on the following inputs:

- "Arizona" was selected as the state where the emissions changes would occur.

- “Fuel Combustion: Electric Utility” was selected as the sector where the emissions changes would occur.
- The change of emissions used the annual avoided emissions for CO_2, NO_X, SO_X, and $PM_{2.5}$ (**Table 3.3-3**).

The COBRA model provides estimated ranges of reduced occurrences of health events due to air pollution, such as mortality, nonfatal heart attacks, and hospitalizations. It also estimates the total health benefit, which encompasses all saved costs of the avoided health events. For Arizona, COBRA estimates the 2023 total health benefit ranges to be $3,642,823 to $8,219,593 at a 3% discount rate and $3,251,985 to $7,330,369 at a 7% discount rate. COBRA estimates statistical lives saved within the state of Arizona for calendar year 2023 to range from 0.326 to 0.741 (USEPA COBRA 2021).

Decommissioning would require activities similar to those associated with construction; therefore, impacts on air quality from Project decommissioning are anticipated to be similar to those reported for Project construction (**Table 3.3-1**).

Noise

The general human response to changes in sound levels that are similar in frequency content (such as increases in continuous traffic noise levels) are summarized as follows:

- a 3-dBA change in sound level is considered a barely noticeable difference.
- a 5-dBA change in sound level is noticeable.
- a 10-dBA increase is considered a doubling in loudness.

The A-weighting network measures sound similarly to the way a person perceives sound. **Table 3.2-5** presents A-weighted sound levels and the general subjective responses associated with common sources of noise in the physical environment.

Table 3.2-4 Typical Sound Levels Measured in the Environment and Industry

NOISE SOURCE AT A GIVEN DISTANCE	SOUND LEVEL *(in A-weighted dBA)*	QUALITATIVE DESCRIPTION
Carrier deck jet operation	140	
Civil defense siren (100 ft)	130	Pain threshold
Jet takeoff (200 ft)	120	Deafening
• Auto horn (3 ft) • Pile driver (50 ft) • Rock music concert environment	110	Maximum vocal effort
• Jet takeoff (100 ft) • Shout (0.5 ft) • Ambulance siren (100 ft) • Newspaper press (5 ft) • Power lawnmower (3 ft)	100	

NOISE SOURCE AT A GIVEN DISTANCE	SOUND LEVEL *(in A-weighted dBA)*	QUALITATIVE DESCRIPTION
• Heavy truck (50 ft) • Power mower (100 ft) • Motorcycle (25 ft) • Propeller plane flyover (1,000 ft)	90	Very loud/Annoying; hearing damage with 8 hours of continuous exposure
• Pneumatic drill (50 ft) • Garbage disposal (3 ft) • High urban environment	80	Very loud
• Passenger car, 65 miles per hour (25 ft) • Living room stereo (15 ft) • Vacuum cleaner (3 ft)	70	Loud/Intrusive (telephone use difficult)
• Air conditioning unit (20 ft) • Human voice (3 ft) • Department store environment	60	
• Light auto traffic (50 ft) • Residential air conditioner (50 ft) • Private business office environment	50	Moderate/Quiet
Estimated existing daytime sound level for land use Category 6: very quiet, sparse suburban or rural areas	43	
• Living room/bedroom • Bird calls (distant)	40	
Estimated existing nighttime sound level for land use Category 6: very quiet, sparse suburban or rural areas	37	
• Library soft whisper (5 ft) • Quiet bedroom environment	30	Very quiet
Broadcasting/recording studio	20	Faint
	10	Just audible
	0	Threshold of human audibility

Sources: New York State Department of Environmental Conservation 2001; Cowan 1993

In outdoor settings, the rate at which noise attenuates (decreases) is influenced by the distance separating noise sources and noise receptors, as well as local conditions such as traffic, topography, and weather. Generally, when noise is emitted from a point source, the noise is attenuated an average of 6 dBA each time the separating distance is doubled.

The construction noise level was estimated using the FHWA Roadway Construction Noise Model (RCNM) Default Noise Emission Reference Levels and Usage Factors (FHWA 2006), a national model for the prediction of construction noise. Although the Project is not a road construction project, the RCNM includes the same types of equipment that would be used in Project construction. The RCNM has noise levels for various types of equipment pre-programmed into the software; therefore, the noise level associated with the equipment is typical for the equipment type and not based on any specific make or model. The RCNM assumes the maximum sound level

(L_{MAX}) for the Project is the maximum sound level for the loudest piece of equipment operating at the Project property boundary closest to the NSA.

Worker commutes and material delivery vehicles would generate short-term noise with little effect on the hourly average noise level. In comparison to other construction equipment noise, the increased frequency of vehicles passing would not be noticed. Therefore, this traffic was not included in the Project construction noise analysis. Additionally, decreases in noise levels due to atmospheric interference (i.e., weather) or intervening structures were not accounted for in the analysis.

The use of equipment such as inverters, MV transformers, solar tracker motors, hand power tools, and basic utility and pickup trucks during O&M would also elevate ambient noise levels. The types of equipment proposed typically operate in the range of 58 to 80 dBA at the source. In outdoor settings, noise decreases as the distance between noise sources and receptors increases and at rates influenced by local conditions, such as traffic, topography, and weather. Generally, when noise is emitted from a point source, the noise is decreased an average of 6 dBA each time the separating distance is doubled (Nuclear Regulatory Commission 2021).

The estimated construction noise levels are compared to the existing conditions at the Project Site, classified as ANSI Category 6 with an estimated existing daytime L_{EQ} of 43 dBA and an estimated existing nighttime L_{EQ} of 37 dBA.

Impact Determination

During the construction period, the total noise level at NSA 1 would consist of the estimated noise generated by Project construction activities combined with the estimated ambient baseline noise level. NSA 1 is a residence approximately 0.42 miles (2,200 ft) southwest of the closest Area 1 Project boundary, 2.29 miles northwest from the center of the construction area. The maximum noise levels are based on the simultaneous operation of the maximum amount of construction equipment in use (**Appendix C**). Calculations assume all equipment is located at the center point of the solar array construction area.

Table 3.3-5 Calculated Noise Levels of Area 1 Construction at the Nearest Sensitive Receptor

NOISE LEVELS	CALCULATED L_{MAX} *(in dBA)*	CALCULATED L_{EQ} TOTAL *(in dBA)*	NOISE LEVEL, AMBIENT AND CONSTRUCTION L_{EQ} *(in dBA)*
Ambient Baseline Noise Level[39]	–	–	43.0
Noise Level at Nearest Residence (11,200 ft from the center of Area 1)	50.3	52.3	51.4

As shown in **Table 3.3-4**, the total noise level at the nearest sensitive receptor during daytime construction is conservatively estimated to be approximately 51.4 dBA. The outdoor noise level

[39] Baseline noise level based on estimated local land use.

at the nearest sensitive receptor would increase by approximately 9.3 dBA and it would be interpreted by the human ear as being almost twice as loud as the outdoor ambient baseline noise level. This cumulative noise level is approximately equivalent to the sound level of hearing a residential air conditioning unit located 50 ft away. Impacts due to the noise generated by Project construction would be audible but temporary and would remain below the USEPA's recommended outdoor noise level of 55 dBA.

The Project's O&M-related noise would be generated by weekly site visits and routine maintenance actions by workers in pick-up trucks or small utility vehicles, water trucks, and operation of transformers, inverters, solar tracker motors, and hand power tools. Solar tracker motors, inverters, and hand power tools would only be operated during daytime hours. The Project's operation-related noise from solar tracker motors, transformers, and inverters would have minor long-term impacts on NSA 1. Noise impacts from the operation of pick-up trucks, other vehicles, and hand power tools are expected to be minor and of short duration.

Based on the equipment noise levels listed in the POD and RCNM-estimated equipment noise levels (FHWA 2006), noise generation from equipment would be in the range of 58 to 80 dBA:

- 58 dBA: solar tracker motor
- 66 dBA: MV transformer
- 75 dBA: inverter, pick-up truck
- 80 dBA: hand power tools

Table 3.3-5 captures predicted noise levels based on noise attenuation at increasing distances for three different scenarios. In one scenario, neighboring inverters and transformers run in combination; the second scenario features solar tracker motors; and the third scenario analyzes the use of hand power tools and pick-up trucks, two mobile sources. The sound power levels for the equipment grouped together in these scenarios were added together logarithmically to account for the loudest noise generated in each area. Noise levels from the solar tracker motors, inverters, and transformers were analyzed from the edge of Area 1 to NSA 1 (approximately 0.42 miles). Noise levels from the hand power tools and pick-up trucks were analyzed from the center of the Areas1 and 2 to the nearest property boundary (approximately 1.42 miles) since they would be mobile within the Project Site.

Table 3.3-6 Summary of Predicted Noise Generation from the Proposed Operation Equipment by Distance

SOLAR TRACKER MOTOR AT 58 DBA		INVERTER AND TRANSFORMER AT 75 DBA		HAND POWER TOOLS AND PICK-UP TRUCKS AT 80 DBA	
APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*	APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*	APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*
0'	58	0'	75	0'	80
50' (0.01 miles)	52	50' (0.01 miles)	69	50' (0.01 miles)	74
100' (0.02 miles)	46	100' (0.02 miles)	63	100' (0.02 miles)	68
200' (0.04 miles)	40	200' (0.04 miles)	57	200' (0.04 miles)	62

SOLAR TRACKER MOTOR AT 58 DBA		INVERTER AND TRANSFORMER AT 75 DBA		HAND POWER TOOLS AND PICK-UP TRUCKS AT 80 DBA	
APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*	APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*	APPROX. DISTANCE FROM SOURCE	NOISE LEVEL *(in dBA)*
400' (0.08 miles)	34	400' (0.08 miles)	51	400' (0.08 miles)	56
800' (0.15 miles)	28	800' (0.15 miles)	45	800' (0.15 miles)	50
1,000' (0.18 miles)	26	1,000' (0.18 miles)	43	1,000' (0.18 miles)	48
1,200' (0.23 miles)	24	1,200' (0.23 miles)	41	2,000' (0.38 miles)	42
1,400' (0.27 miles)	23	1,400' (0.27 miles)	40	3,000' (0.57 miles)	38
1,600' (0.30 miles)	22	1,600' (0.30 miles)	39	4,000' (0.76 miles)	36
1,800' (0.34 miles)	21	1,800' (0.34 miles)	38	5,000' (0.95 miles)	34
2,000' (0.38 miles)	20	2,000' (0.38 miles)	37	6,000' (1.14 miles)	32
2,200' (0.42 miles)[40]	19	2,200' (0.42 miles) [1]	36	7,000' (1.33 miles)	31
				7,500' (1.42 miles)[41]	30

The loudest estimated noise level generated by stationary equipment (solar tracker motors, inverters, and transformers) at NSA 1 is 36 dBA. The loudest estimated noise level generated by mobile equipment (hand power tools and pickup trucks) at the property boundary is 30 dBA. The estimated noise levels at NSA 1 and the property boundary are below the USEPA's recommended outdoor noise level of 55 dBA and the existing ambient daytime (43 dBA) and nighttime (37 dBA) noise levels at the Project Site, which means there would be no increase in noise at either location. The estimated O&M-generated noise levels would be negligible and Project design features (**NOISE-1**) would also be implemented to further reduce any potential noise impacts.

Decommissioning would involve no more time or equipment than construction; therefore, the impact on noise levels due to Project decommissioning would be no greater than the impacts due to Project construction (**Table 3.3-4**).

3.3.3.2 Design Features and Mitigation Measures

Design Features

AIR-1: Dust Control Plan

PDP would submit a dust control plan (**Appendix I**) for construction and operation to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan addresses watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on

[40] The distance from the source to NSA 1 is approximately 2,200 ft, or 0.42 miles.
[41] The distance from the source to the property boundary is approximately 7,500 ft, or 1.42 miles.

the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

NOISE-1: Noise-Reducing Practices and Work Hour Restrictions

PDP would follow noise-reducing practices during construction, including maintaining equipment to proper manufacturer's specifications and limiting excessive use of horns or other loud signals on the Project Site except when needed as safety alerts. All construction, clearing, and grading activities within the Project footprint would be limited to the hours of 7:00 AM to 7:00 PM Monday through Friday and 8:00 AM to 6:00 PM Saturday and Sunday.

Additional Design Feature for the Alternative Solar Generating Facility

AIR-1A: Dust Control Plan

PDP would commit to quantifying the revised dust emissions resulting from the construction and operation of the Alternative Solar Generating Facility if it is selected and when more data is available. PDP would update the dust control plan (**Appendix I**) for Project construction and operation accordingly to account for the features of the Alternative Solar Generating Facility, including additional earthmoving activities, and submit it to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan would address watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

3.3.4 Biological Resources

3.3.4.1 Compliance Evaluation

Of all the listed species with the potential to occur in the Project area, the NNDFW review determined that golden eagle, ferruginous hawk, peregrine falcon, Peebles' blue-star, and Beath's milkvetch have the potential to occur in the Project area. Except for the Peebles' blue-star, which was down listed to a sensitive species, these are all G3 and G4 species. Species-specific surveys and revegetation of temporary access and use areas are identified as conditions of approval.

Vegetation Communities

The Project area supports a low-cover vegetation community. Approximately 0-25% of area soils are vegetated (Natural Resources Conservation Service 2012, 2020). Much of the vegetation present would be directly or indirectly impacted by the Project. Approximately 423 acres of the Project Site would be permanently impacted and 4,950 acres temporarily impacted. Another 17 to 24 acres or more could be impacted by alternative components such as the substation and gen tie alignment. Temporary impacts are those associated with site preparation and construction and permanent impacts are those associated with constructed facilities and operation. Permanent infrastructure would include access and maintenance roads (most existing), powerline structures, the substation and expansion of the existing Moenkopi Substation, and the solar array areas.

The Project is expected to have a useful life of at least 35 years, after which decommissioning and reclamation would occur. The Project Site would be reclaimed to NNDFW standards and to suit future land uses (Terabase Energy 2022). “Permanent” Project impacts would persist for the proposed life of the development rather than into perpetuity. The Navajo Nation and chapter officials would determine the future land use of the Project Site prior to decommissioning.

Removal of vegetation would directly impact plant mortality and injury, soil compaction, infiltration rates, and erosion (Lovich and Bainbridge 1999; Newman and Redente 2001; Belnap and Herrick 2006). The Project would also result in some habitat fragmentation, which converts large continuous patches of a vegetation community into numerous smaller, less functional areas (Roig-Silva 2013; USDOE 2014). Indirect impacts from disturbance and vegetation removal could also alter soil temperatures and moisture regimes, particularly underneath solar PV panels.

Ground disturbance from construction would make vegetation communities more susceptible to the introduction or spread of noxious weeds or invasive plants, resulting in indirect adverse long-term moderate impacts. Seeds of noxious species could unknowingly be carried on vehicles or heavy equipment and on the clothing and shoes of personnel. Roads can be a significant conduit for the spread of noxious weeds or undesirable plants (Gelbard and Belnap 2002).

Indirect impacts would include changes in plant density, abundance, and species diversity since disturbed areas would not necessarily regenerate with the same species in the same abundance (Hickman, et al 2013) and colonization by species from nearby native communities may be slow (Paschke, et al 2005; Newman and Redente 2001). Restoration of plant communities in arid climates, such as the Project area, can be particularly difficult (Monsen, et al 2004).

Other impacts could include damage to vegetation from accidental spills and leaks of petroleum products or other containments (BLM/DOE 2010). A leak from a construction vehicle is unlikely to be of sufficient duration or size to warrant large-scale treatment or reporting and would affect small areas, if any. Moreover, through the implementation of best management practices, construction vehicles and equipment would be properly maintained to minimize the frequency of accidental spills and leaks. The deposition of dust generated during clearing and grading activities and operational use of access roads could reduce plant photosynthesis and productivity (Farmer 1993), but this would be largely avoided by implementing surface spraying when needed to control dust. With the implementation of avoidance and mitigation measures (**Section 3.3.4.2**), impacts from accidental spills/leaks or dust would be short-term and of negligible to minor intensity.

Impact Determination

Project impacts on vegetation have been reduced and mitigated by selecting a Project area that is previously disturbed and scarcely vegetated. However, vegetation present would be removed or disturbed and further fragmented beyond the time frame of construction. Mitigation in the form of revegetation of temporary use areas would occur after construction (**BIO-1**). In addition, the use of herbicides would be employed in accordance with **BIO-5**. Other reclamation activities would occur during decommissioning. Therefore, impacts on vegetation would be direct and indirect, long-term, and moderate in intensity compared to the baseline.

Wildlife

During construction, marginal quality wildlife habitat would be directly and indirectly impacted by ground disturbance, vegetation removal, human activity, and fragmentation. Approximately 423 acres of the Project Site would be impacted permanently and 4,950 acres temporarily. Another

17 to 24 acres could be impacted by alternative components such as the substation and gen tie alignments.

Temporary impacts are those associated with site preparation and construction activities, and permanent impacts are those associated with constructed facilities. Permanent infrastructure would include access and maintenance roads (most existing), powerline structures, the substation and expansion of an existing substation, and the solar array areas. The Project is expected to have a useful life of at least 35 years, after which decommissioning and reclamation would occur. The Project Site would be reclaimed to NNDFW standards and to suit future land uses (Terabase Energy 2022). "Permanent" Project impacts would persist for the proposed life of the development rather than into perpetuity. The Navajo Nation and chapter officials would determine the future land use of the Project Site prior to decommissioning.

During the expected 35-year operational life of the development, most of the Project Site, except areas with constructed facilities, would be largely available to some wildlife. Some species would be attracted to the cover and shelter the panel arrays offer. However, other species would avoid the area due to loss or alteration of vegetation and human activity. Some would use the Project Site at night or while workers are not present. Predatory animals may be deterred from hunting due to the presence of panel arrays and other facilities.

Within the Project area, wildlife habitat would be modified by a change in vegetation composition and density, resulting in a change in wildlife use. In addition to the direct loss of habitat, human activity and noise in the Project area would result in effective habitat loss. Disturbance, and barriers such as fences, can alter the ways wildlife uses or moves through an area and could push individual animals from preferred habitat into less suitable habitat. Such displacement would likely be localized around the Project Site (Roig-Siva, et al 2013). Earthmoving and heavy equipment and vehicle traffic could result in the direct injury or death of less mobile wildlife or those that use burrows, but very few of these species are using the Project area (Ecosphere 2020a).

No construction would occur within the Little Colorado River or its floodplain, which provide the area's highest quality wildlife habitat. Access to resources provided by the Little Colorado River would be restricted during construction in the immediate vicinity due to human activity and noise, but wildlife would be expected to access the Little Colorado River during the operational life of the development. The potential for impacts from increased sedimentation or the potential for spills during Project construction and operation would be avoided or mitigated with the implementation of best management practices. Direct and indirect impacts on wildlife habitat in the Little Colorado River corridor would be short-term and negligible.

Impact Determination

Project impacts on wildlife are reduced because the Project Site is in a previously disturbed and scarcely vegetated area that provides a generally low-quality habitat largely unoccupied or sparsely populated by potential resident species. Nonetheless, soils and vegetation present that provide structure, cover, and food sources to wildlife would be removed or disturbed beyond the construction time frame. Therefore, impacts on wildlife would be direct and indirect, long-term, and minor to moderate in intensity compared to the baseline. Mitigation may occur during decommissioning.

Migratory Birds

Impacts on migratory birds include the loss of marginal quality potential shrub- and ground-nesting, foraging, migration, and dispersal habitat in permanent impact areas and the reduction of food resources associated with vegetation loss. Additional impacts on migratory birds may result from collisions with PV panels and associated transmission infrastructure. Kosciuch, et al analyzed avian fatality data from 13 studies at ten PV solar sites in the Southwestern US and calculated an average fatality estimate of 2.49 birds per MW per year. Kosciuch, et al found that the species with the highest adjusted composition of fatalities among projects were widely distributed ground-dwelling birds with large populations in the area where the studies occurred (Kosciuch, et al 2020). Temporary impacts on migratory birds include avoidance of the Project area due to noise and increased human activity during construction.

Impacts on migratory birds are expected to be greater should construction occur within the migratory bird breeding season (early May to early August). A pre-construction nest survey may be necessary before vegetation clearing is scheduled.

Impact Determination

Project impacts on migratory birds are reduced because the Project Site is in a previously disturbed and scarcely vegetated area that provides a generally low-quality habitat largely unoccupied by potential resident species. If vegetation clearing were scheduled within the migratory bird nesting season, a pre-construction survey for nesting migratory birds would be conducted (**BIO-3**). There is also potential for birds to collide with PV panels and associated transmission infrastructure. Therefore, impacts on migratory birds would be direct and indirect, long-term, and minor to moderate in intensity compared to the baseline. Mitigation may occur during decommissioning.

Special Status Species

Of all the listed species with the potential to occur in the Project area, the NNDFW review of the BE determined that only golden eagle, ferruginous hawk, peregrine falcon, Peebles' blue-star, and Beath's milkvetch have the potential to occur in the Project area. Except for the Peebles' blue-star, which was down listed to a sensitive species, these are all G3 and G4 species.

Ferruginous Hawk, NESL Group 3 Species; Golden Eagle, NESL Group 3 Species; Peregrine Falcon, NESL Sensitive Species

There is suitable foraging habitat throughout the entire Project area for the ferruginous hawk, golden eagle, and peregrine falcon. Though it seemed that there might be potential for suitable nesting habitat less than 1 mile east of the Project Site on Ward Terrace, intensive raptor surveys completed in 2021 (**BIO-2**) resulted in documentation that the terrace provides few nesting opportunities for larger raptors and overall is considered poor nesting substrate due to the rapid erosion of the terrace and the instability of, or lack of, platforms or shelves for nest building. The 2021 raptor surveys detected no nesting use of the Project area by any of these species. No historic records indicate nesting in the area. Ferruginous hawks and golden eagles were observed flying over the Project area on several occasions over the 2 years of field surveys, but no other use was observed. Peregrine falcons were not observed.

Direct adverse impacts on potential foraging habitat would result from vegetation loss and increased fragmentation, particularly from roads and transmission lines. Adjacent habitat may be indirectly impacted in the long term by increased traffic and human disturbance, modifications to vegetation from dust, invasive species, and increased use by displaced herbivores. Glare from the facility may also affect ferruginous hawks that incidentally occur in or near the Project area. Impacts on potential ferruginous hawk foraging habitat would be considered moderate and temporary as the Project area is already subject to disturbance and fragmentation from previous land uses.

The presence of powerlines and the facility would increase the risk of collision with human-made structures and, therefore, injury or mortality for ferruginous hawks. Ferruginous hawks roosting or perching on powerlines may be electrocuted, causing injury or mortality.

Impact Determination

Impacts of Project construction and operation on ferruginous hawks and golden eagles are expected to be direct, indirect, and long-term and of minor to moderate intensity. The most serious impact would be the potential for electrocution, which would be largely avoided and mitigated by implementing **BIO-4** and **BIO-6**. Peregrine falcons are not present and impacts on that species would be indirect and long-term, but negligible in intensity.

Peebles' Blue-Star and Beath's Milkvetch, NESL G4 Species

Assessment of the potential for these species to occur within the Project area is based on suitable habitat identified during desktop and field studies completed in 2019. Peeble's blue-star pre-construction surveys were initiated during the 2021 flowering period (**BIO-2**) and this species was found within the proposed gen tie footprint at the extreme western extent. It is likely that most plants present would be spanned by the proposed gen tie and impacts avoided. Beath's milkvetch was not found. Impacts on this species would be indirect and associated with loss of potentially suitable but currently unoccupied habitat.

Earthmoving activities and construction traffic may destroy the present individuals or small populations if they cannot be avoided. Any spill of industrial fluids could impact individuals or habitat. Indirect impacts from construction and operation would include soil compaction, changes in temperature and moisture regimes, the potential for introducing and spreading competitive invasive species, and habitat fragmentation. Areas adjacent to the Project Site would be indirectly impacted by dust during construction, the potential for sedimentation or changes in surface water flows, and a decrease in the local abundance of pollinators.

Impact Determination

Project impacts on Peeble's blue-star would be largely avoided because the proposed gen tie would span most occupied habitat. However, a relatively few individuals may be lost, resulting in direct, adverse, and short-term impacts on the population. Indirect long-term impacts would occur in association with vegetation and soil changes to the Project area. These impacts would be minor in intensity compared to the baseline. Impacts on Beath's milkvetch, which is not currently present in the Project area, would be indirect and long-term, but negligible in intensity compared to the baseline.

3.3.4.2 Design Features and Mitigation Measures

Design Features

BIO-1: Noxious Weed Control and Vegetation Management, Revegetation, and Monitoring

To minimize site disturbance, erosion, and weed establishment and to maintain wildlife and pollinator habitat in the Project area, revegetation would use an NNHP botanist-approved native seed mix (or mixes) in the temporary use areas identified by the NNDFW conditional approval letter where vegetation was present prior to disturbance. Noxious weed and vegetation management plans would be prepared as needed to mitigate short-term impacts during construction.

BIO-2: Pre-Construction Clearance Surveys and Monitoring

The NNDFW conditional approval for the Project required pre-construction surveys for select raptors and two sensitive plant species. These surveys were conducted in 2021 with no new raptor nests detected within a 1-mile radius of the Project area. Beath's milkvetch was found near the Moenkopi Substation.

BIO-3: Migratory Bird Treaty Act Compliance

Impacts on migratory birds are expected to be greater should construction occur within the migratory bird breeding season, generally between the beginning of mid-April and the end of July. A pre-construction survey for nesting migratory birds may be necessary before vegetation clearing if scheduled to occur during migratory bird nesting season.

BIO-4: Golden Eagle Protection

PDP would adhere to the Bald and Golden Eagle Protection Act and Navajo Nation Raptor Electrocution Prevention Regulations. Any analysis of potential impacts on, and mitigation for, the golden eagle would be done during ongoing coordination with the USFWS and NNDFW.

BIO-5: Limitation of Herbicide Use to Non-Persistent, Immobile Substances

As determined in consultation with the USFWS and/or NNDFW, only herbicides with low toxicity to wildlife and non-target native plant species would be used.

BIO-6: Raptor Electrocution Prevention

The Project would implement current guidelines and methodologies in designing and analyzing proposed transmission facilities to minimize the potential for raptors and other birds to collide or be electrocuted by them. Measures would be coordinated with the NNDFW and would comply with Navajo Nation Raptor Electrocution Prevention Regulations.

3.3.5 Cultural and Historic Resources

3.3.5.1 Compliance Evaluation

All 33 sites evaluated as either NRHP eligible or NRHP undetermined and those sites with AIRFA concerns would be avoided. This includes human burial sites identified during surveying or interviews. With full implementation of the management recommendations provided by the

NNHPD in the Cultural Resources Compliance Form for the Project (**Appendix E**), no significant or potentially significant cultural properties would be adversely affected.

3.3.5.2 Design Features and Mitigation Measures

Design Features

CULTURAL-1: Site Avoidance, Monitoring, Discovery, and Treatment Plan

PDP would avoid all cultural, historic, and other tribal resources identified by the NNHHPD that require avoidance (**Appendix E**). Specifically, the NNHHPD requires that the Project archaeologist clearly demarcates with lathe and flagging 50-foot offsets around each protected resource prior to construction. These lathe and flagging barriers will remain in place throughout Project construction and be removed after the completion of Project construction. No surface-disturbing activities or vehicle traffic are allowed within the barriers. In addition, a qualified archaeologist must monitor all earth-disturbing construction activities within 100 ft of the flagged avoidance zones. The monitoring archaeologist must obtain a Class C Permit from the NNHHPD prior to any monitoring or construction activities. A report summarizing monitoring activities must be submitted to the NNHHPD within 30 days of the completion of Project construction.

In the event of a subsurface discovery during the Project's lifetime, all construction within 200 ft of the discovery would be immediately halted and a qualified archaeologist would examine and evaluate the remains. Should the remains be identified as cultural deposits/features of antiquity, or if human bone is found, the Project archaeologist would immediately contact the NNHHPD and inform them of the nature and condition of the discovery. All maps, photographs, notes, and Geographic Information Systems (GIS) data would be sent to the NNHHPD to assist in their evaluation and consultation process. The NNHHPD would then determine appropriate mitigation measures for the discovery before construction in the area could resume. These measures may include, but are not limited to, directing the archaeologist to document and map the stratigraphic profile, extraction of dating or other sample types, excavation of isolated features, complete avoidance of the area, or full data recovery (excavation) if the area cannot be avoided. Due to the variable situations associated with construction, discoveries would be evaluated by the NNHHPD on a case-by-case basis and any number of other measures could be employed depending on the nature, sensitivity, and/or information potential of the discovery.

CULTURAL-2: Tribal Cultural and Paleontological Worker Training

Prior to construction and in collaboration with the NNHHPD, PDP would provide training by a qualified archaeologist for all construction personnel on the recognition of buried tribal cultural resources and paleontological resources and the protection of these resources during construction.

CULTURAL-3: Native American Graves Protection and Repatriation Act Compliance

PDP would consult with the NNHHPD under the terms of NAGRA. Any planning for treatment of historic properties or mitigation would take such consultations into account.

3.3.6 Hazards, Hazardous Materials, and Waste

3.3.6.1 Compliance Evaluation

Hazards

PDP procured a Phase I ESA to identify potential hazards at the Project Site. No abandoned landfills were identified within the Project Site, but inactive AUMs were identified in the vicinity of the Project Site (SWCA 2022). PDP used data generated from the Phase I ESA to develop AUM exclusion areas to prevent both permanent and temporary impacts. These AUM exclusion areas would minimize worker exposure to soil and dust potentially contaminated with uranium (**Figure 3.2-1)**. Additionally, PDP would use the proposed design features and mitigation measures described below to ensure that Project Site development activities minimize worker exposure to potential hazards and do not preclude access to AUMs for further studies, characterizations, or potential future reclamation activities conducted by other parties (**HAZMAT-3; HAZMAT-4**).

Hazardous Materials

Hazardous materials on the Project Site are expected to be limited to fuels and transformer fluids and would require monitoring. Step-up transformers at the Project substation would be installed within concrete basins to contain any leaks or spills. Design features, including implementation of a hazardous material handling plan and a spill prevention, control, and countermeasure (SPCC) plan, would minimize the potential impacts on public health and safety from spills of hazardous materials. Therefore, the risk of worker or public exposure to hazardous material would be negligible.

Worker exposure to hazardous material would be avoided by clearly communicating the AUM exclusion areas and following Project Site-specific protocols listed in the Health and Safety Plan, or HASP (**HAZMAT-5**).

Solid and/or hazardous material waste from the Project is expected to be generated by isolated fuel spills or PV modules damaged during shipping or construction. Contaminated soils from isolated spills are unlikely to exceed 150 lbs and would be disposed of in steel drums, with any damaged modules removed from the Project Site by the EPC contractor and recycled or disposed of according to Navajo Nation, state, and federal regulations (**HAZMAT-1**).

Construction Waste

Construction waste would be generated from the installation of the solar arrays and related facilities. Construction waste is expected to be minimal and consist mostly of recyclable materials, such as cardboard, steel, and electrical wiring. The EPC contractor responsible for daily on-site management of construction would carefully disassemble and recycle shipping containers and solar panel packaging to minimize solid waste impacts and would contract with a waste and recycling service provider to ensure all waste generated from Project construction is disposed of in accordance with applicable regulations (**Section 2.2.10**). The EPC contractor would store, collect, and dispose of solid waste in such a manner as to prevent fire and health hazards, rodent harborage, insect breeding, accidents, and odor and ensure that no littering on the Project Site or neighboring properties would occur during construction (**HAZMAT-2**).

To minimize the risk of fire and exposure to hazardous materials associated with the BESS, the battery modules would be installed inside enclosed containers that allow access for maintenance but not for human entry. The containers would be constructed in accordance with all applicable building and fire codes. Fire suppression systems would be installed in the BESS.

The solar arrays and Project Site would be regularly inspected during operation. Any damaged or defective PV modules, inverters, or other equipment would be taken out of service and recycled or disposed of in accordance with all applicable regulations. Therefore, there is a very low risk of exposure to hazardous substances associated with these components.

Decommissioning would have impacts similar to those associated with construction since it would involve similar equipment and activities and would occur over roughly the same number of months. During decommissioning, the potential sources of public health and safety risks—such as hazardous fuels, transformer fluids, and electrical equipment—would be removed from the Project Site.

In summary, impacts concerning hazards, hazardous materials, and waste would be minimized through the implementation of design features and site-specific health and hazardous material plans. Once decommissioning is complete, the conditions at the Project Site would return to pre-Project conditions.

3.3.6.2 Design Features and Mitigation Measures

Design Features

HAZMAT-1: Hazardous Material Handling and Spill Prevention and Response Plans

Prior to the start of construction, PDP would prepare hazardous material handling and SPCC plans to reduce the potential for contamination and exposure of workers and the public to hazardous material in the event of a spill and to require that any surface spills are cleaned expediently and any contaminated soil disposed of properly.

HAZMAT-2: Waste Disposal

PDP would require that the EPC contractor responsible for daily on-site management of construction carefully disassemble and recycle shipping containers and solar panel packaging to minimize solid waste impacts and store, collect, and dispose of solid waste in such a manner as to prevent fire and health hazards, rodent harborage, insect breeding, accidents, and odor. The EPC contractor would ensure that no littering on the Project Site or neighboring properties occurs during construction. Prior to construction, an agreement would be made with Blanding Landfill, Flagstaff Landfill, or another qualified facility and a waste and recycling service provider so waste generated from Project construction is disposed of in accordance with applicable regulations.

HAZMAT-3: Avoidance of Abandoned Uranium Mines

All mapped AUMs should be avoided during Project construction and operation with a 100-ft land-use buffer around mine boundaries to allow access for any potential future assessment and mitigation of AUMs (**GEO-1**) and to ensure Project construction activities would not impact known AUMs and possibly create CERCLA liability.

HAZMAT-4: Refining Abandoned Uranium Mine Exclusion Areas as Needed

AUM-related exclusion areas should be refined based on Project-specific exposure scenarios within the context of the total radiation doses workers may receive while constructing the Project. Additional field data verification, limited soil sampling and analysis, and site-specific toxicology and exposure assessments may be needed.

HAZMAT-5: Health and Safety Plan

A site-specific HASP for Project construction and operation should be prepared and implemented. The plan should include discussions of proper personal protective equipment (PPE) and inform workers of potential hazards.

HAZMAT-6: Dust Suppression Measures

Dust control best management practices should be implemented during Project construction and operation (**AIR-1**; **Appendix I**). On-site and local water should be tested for safety before use in dust suppression because the prevalence of uranium and other constituents in local groundwater could pose concerns for human contact and ingestion and/or inhalation of water mist.

3.3.7 Land Use, Tribal Trust Lands, Grazing, and Agriculture

3.3.7.1 Compliance Evaluation

Land Use

Transportation

Access to the Project Site would be via US 89 and BIA RT 6730. The turnout from US 89 onto BIA RT 6730 would be enlarged, improved, or paved and BIA RT 6730 would be widened and resurfaced to handle the Project construction, operation and maintenance, and emergency traffic during all weather conditions. Four new roads would be constructed for access to and within Areas 1 and 2 and two temporary construction access routes would be used for installation of the West and East Connectors. If the full 750MW Project is built in a single phase, there would be short-term traffic impacts on US 89 and BIA RT 6730 from construction, expected at its peak to require an average of approximately 70 daily round trips by workforce personnel vehicles and 48 vehicles per day associated with the delivery of equipment and supplies. Any public street surfaces damaged by construction traffic would be restored to pre-existing conditions within 6 months of completion of the full-scale Project build-out. During operation, maintenance and security personnel would generate approximately 15 to 20 trips per day, plus additional trips during panel cleaning events. Each panel cleaning period could require an average of up to 10 water truck deliveries per day. Improvements and ongoing maintenance and repair would result in long-term, moderate beneficial direct and indirect impacts on approximately 14.2 acres of existing public transportation facilities used for access to the Project Site.

During construction, proposed Access Road 2 North would provide access to the northwest corner of the Project Site via the runway of the abandoned airstrip (formerly Cameron Airport). This road would be graded and improved due to the increased traffic volume and heavy loads transported on these roads during construction. During operation, Access Road 2 North may only be used for emergencies. Improvements and ongoing maintenance and repair would result in long-term, moderate beneficial direct impacts on approximately 6.9 acres of dirt runway. Because the airstrip is inactive, traditional airport activity would not be impacted during Project construction or operation.

Utilities

The proposed Project would provide a new source of up to 750MW of renewable energy. This would result in long-term beneficial direct impacts on electrical utility service supplied by the existing APS transmission facilities; long-term beneficial indirect impacts on the Navajo Nation, the facility's leaseholder; and long-term beneficial direct impacts on entities with renewable energy development goals, including the Navajo Nation, the state of Arizona, and local customers. The existing infrastructure at the Moenkopi Substation would be expanded to the south with additional equipment required to connect the proposed gen tie. Short-term, adverse direct impacts are possible should temporary power outages occur upon final interconnection between the Project and the existing utility infrastructure at the Moenkopi Substation or during maintenance scheduled outside of peak load periods. These impacts would range from negligible to minor, depending on the duration of any power outages. Existing buried pipelines would be flagged and staked for avoidance during Project construction; thus, impacts would be avoided during construction and impacts are not anticipated during Project operation.

Recreation

Fencing the Project's perimeter would eliminate approximately 1,784.52 acres from the southeasternmost extent of the Little Colorado River Navajo Tribal Park from recreational use and the generation of revenue from permits issued by the park for such use. There are insufficient data to indicate the extent permitted individuals and regional tourists use the area. The removal of recreational acreage and resulting revenue loss would result in permanent minor adverse direct and indirect impacts on the Little Colorado River Navajo Tribal Park.

Mining Reclamation

Project area development activities would avoid historic AUMs. Additionally, access to AUMs for long-term studies, characterization, and potential future reclamation activities would be maintained during Project construction and operation. Direct and indirect impacts would be avoided during Project construction and operation.

Tribal Trust Lands

Resolutions supporting the land withdrawal from the Cameron and Coalmine Canyon chapters and approval of the withdrawal by the Navajo Nation are required for a solar lease. The withdrawal of the Project Site results in a reduction of 4,563 acres of tribal trust lands, including the abandoned airstrip (formerly Cameron Airport) and a portion of the Little Colorado River Navajo Tribal Park. Use of the proposed access roads and gen tie would be implemented through BIA ROW permits. The Cameron and Coalmine Canyon chapters have entered into agreements with PDP whereby the chapters would receive revenues from the Project to provide essential community services. These agreements give PDP the exclusive right to develop a utility-scale solar project within the chapters. The withdrawal of these lands would result in permanent moderate direct impacts on tribal trust lands that would be mitigated by the agreements between PDP and the Navajo Nation. Impacts would be adverse as they relate to area tribal land use opportunities and beneficial as they relate to Project area infrastructure improvements and new socioeconomic opportunities.

Grazing

The Project would include new fencing that would limit livestock access to the solar array areas. As many as 4,563 acres would be removed from grazing. There would be additional losses, albeit minor, from gen tie impacts (such as the footprints of the 28 proposed transmission towers) in LMD 3-1-12, 3-4-8, and 3-4-5 and the Moenkopi Substation expansion in LMD 3-4-5. These reductions in available grazing areas would result in a concomitant loss of carrying capacity for each grazing area, with the greatest losses occurring in LMD 3-1-10. **Table 3.3-6** specifies the upper range limits of the impacts.

Because the land surrounding the Project area has traditionally been used to graze sheep, these data are highlighted.

Table 3.3-7 Permanent Range Unit Carrying Capacity Reductions Due to the Proposed Project

GRAZING AREA	PERMANENTLY IMPACTED ACREAGE[42]	CATTLE		SHEEP		GOATS	
		(in year long[43])	*(in unit month[44])*	*(in year long)*	*(in unit month)*	*(in year long)*	*(in unit month)*
3-1-10	-7,190	-13	-161	-49	-583	-53	-635
3-1-12	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
3-4-8	-0.05	0.00	0.00	0.00	-0.01	0.00	-0.01
3-4-5	-1.34	-0.01	-0.11	-0.04	-0.46	-0.07	-0.79
Total	-7,191	-13	-161	-49	-583	-53	-635

Source: Parametrix 2014

Impact Determination

In LMD 3-1-10, where most of the Project is situated, implementation would result in a temporary reduction of 52 sheep units yearly and a permanent reduction of 49 sheep units yearly, 20.4% and 19.2% decreases in carrying capacity, respectively, from baseline conditions.

Currently, the Project area does not provide suitable grazing habitat due to low vegetative cover and quality. Whether the Project is constructed in the area or not, the quality of the grazing habitat is unlikely to improve under future climate conditions and continuing drought.

Temporary use areas would be revegetated in accordance with NNDFW requirements. At the end of the Project lifetime, the Project area would be reclaimed per NNDFW requirements and future land use objectives identified by Navajo Nation and chapter officials. With the implementation of **LAND USE-1**, **LAND USE-2**, and **LAND USE-3**, the Project would result in short-term to long-term direct and indirect impacts of minor to moderate intensity compared to the current and predicted future baseline conditions. Mitigation, such as reclamation per NNDFW requirements, may occur during decommissioning.

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[42] Number of acres whose slopes are less than or equal to 30% and are considered accessible to all livestock
[43] Year long represents the maximum number of animal units that can be grazed for one year.
[44] Unit month represents the maximum number of animal units that can be grazed for one month.

Agriculture

The proposed gen tie would span the 413.1-acre BIA-designated cropland, which is not expected to be impacted by the Project.

3.3.7.2 Design Features and Mitigation Measures

Design Features

LAND USE-1: Fencing Improvements

PDP would work with local grazing permit holders and farmers to design fencing.

LAND USE-2: Road Design to Minimize Impacts on Grazing

Roads would be constructed, improved, and maintained to minimize their impact on grazing operations. Road design would include fencing, cattle guards, and speed control and information signs where appropriate.

LAND USE-3: Coordination with Grazing Permit Holders

PDP would coordinate discussion with affected grazing permit holders on how proposed Project construction and operation activity may affect grazing operations and possible alternatives to avoid or minimize impacts.

3.3.8 Socioeconomics

3.3.8.1 Compliance Evaluation

The IMPLAN Model

The following examination of Project impacts on the socioeconomics of the region is based on analyses from both Triple Point Strategic Consulting LLC (Triple Point) and Mangum Economic Consulting, or Mangum Economics (**Appendix F**)[45] using the IMPLAN input-output economic model. The IMPLAN model uses annual, regional economic data to map buy-sell relationships that can predict how specific economic changes would impact a given regional economy or estimate the effect on past or existing economic activity.

For a given producing industry—in this case construction and operation of an electric power generation facility—the IMPLAN model uses multipliers to estimate the economic impact resulting from an investment or change in an industry. There are three components of total change within the local area and impacted region.

1. *Direct effects* represent the initial change in the industry in question. For example, building a new facility to generate electricity from solar energy will directly expand the size of that industry within the region. Examples of direct employment include the hiring of electricians and equipment operators.

[45] Mangum Economics Consulting LLC's Painted Desert Power Economic and Fiscal Contribution to Coconino County, Arizona and the Navajo Nation is dated April 7, 2022. Triple Point Strategic Consulting LLC's Review of Mangum Economics 2022 Report is dated May 2022.

2. *Indirect effects* are changes in inter-industry transactions as supplying industries respond to increased demand from the directly affected industries. Examples of indirect employment include concrete suppliers and commercial vehicle mechanics.
3. *Induced effects* reflect changes in local spending resulting from income changes in the directly and indirectly affected industry sectors. Examples of induced employment include day care workers, hospital staff, and restaurant employees.

The IMPLAN modeling conducted for the economic impact study estimates impacts occurring within both Coconino County, including the entirety of the Coalmine and Cameron chapters, and the State of Arizona.

Construction Phase Investment

The total amount of investment required to develop the Project is estimated to be $775 million. Equipment purchased outside of Coconino County would have fiscal impacts but would not have other economic impacts within the region and thus are not included in the economic impact modeling. The total cost of capital equipment to be purchased from vendors outside of Coconino County is estimated to be $584 million.

The remaining $191 million is budgeted for architecture, site preparation, and other construction costs not including equipment. It is assumed 45% of the $191 million, or $86 million, would be spent with vendors in Coconino County. Thus, $86 million is the estimated amount of direct economic impact on Coconino County resulting from Project construction and is the basis for modeling the indirect and induced impacts.

The entire $191 million budgeted for Project construction costs (not including equipment) is projected to be spent in Arizona. Thus, $191 million is the estimated amount of direct economic impact on Arizona resulting from Project construction and is the basis for modeling the indirect and induced impacts.

Construction Phase Impacts

The economic impact modeling assumes the Project would be constructed in 12 months; thus, the construction phase impacts occur for the year of construction. However, it is possible construction would occur in phases over multiple years. If that were to be the case, the impacts described would be distributed over the actual duration of Project construction. The actual timing of construction cannot be forecast at this time.

Employment

The total number of direct jobs in Coconino County supported by Project construction would be 570 and the total combined number of indirect and induced jobs would be 200. The average labor income per job falls between $47,600 and $53,000 (**Table 3.3-7**), as compared to the Cameron Chapter per capita and household incomes of $13,453 and $34,853, respectively, and those of the Coalmine Canyon Chapter at $11,653 and $26,875, respectively (**Table 3.2-9**). The IMPLAN estimates are based on the capital expenditure estimate, as well as the underlying model data.

Table 3.3-8 Coconino County Construction Phase Employment Impacts

IMPACT TYPE	JOBS	LABOR INCOME *(in dollars)*	INCOME/JOB *(in dollars)*
Direct	570	30,194,000	52,972
Indirect and Induced	200	9,524,000	47,620
Total	770	39,718,000	51,582

Source: Mangum Economics 2022

The total number of direct jobs in Arizona supported by Project construction would be 1,170 and the total combined number of indirect and induced jobs would be 700. The average labor income per job falls between $53,900 and $58,700 (**Table 3.3-8**). The IMPLAN estimates are based on the capital expenditure estimate, as well as the underlying model data.

Table 3.3-9 Arizona Construction Phase Employment Impacts

IMPACT TYPE	JOBS	LABOR INCOME *(in dollars)*	INCOME/JOB *(in dollars)*
Direct	1,170	68,644,000	58,670
Indirect and Induced	700	37,708,000	53,869
Total	1,870	106,352,000	56,873

Source: Mangum Economics 2022

To fill these jobs, the Project would need to draw workers from elsewhere within the FBFA and across the Navajo Nation. Workforce housing would consist of hotels, motels, RV parks, and short-term rentals in nearby towns and cities, including Cameron, Tuba City, and Flagstaff. To prepare for Project construction, PDP would work with the Navajo Nation to develop a workforce housing plan that incorporates hotel, motel, RV park, and temporary rental resources near the Project Site. No on-site housing facilities are expected to be built. PDP would also work with the Navajo Nation to prepare and implement a transportation plan to reduce the Project's impacts on local traffic patterns (**TRANSPORTATION-1**).

PDP would require a number of permanent and temporary hired workers; therefore, depending on the specific timing, duration, and workforce needs of Project construction activities, there may be some increased competition for labor and perhaps increased demand for short-term housing.

In compliance with the Navajo Preference in Employment Act (15 NNC 7) and the Navajo Nation Business Opportunity Act (5 NNC 2), PDP will make efforts to hire qualified Navajo professional employees and/or contractors. To maximize the number of Western Navajo residents able to take advantage of this opportunity, PDP will make efforts to work with Navajo colleges, universities, and others to create a workforce development and training program to build capacity for Navajos to work on the Project. In addition, the Project will aim to hire relevant Navajo-owned businesses.

Table 3.3-9 shows the percentage of total jobs in each of the top 15 occupations. The highest percentages of jobs supported are for construction laborers, carpenters, and electricians.

Table 3.3-10 Specific Occupations for Project Construction

OCCUPATION	PERCENT OF TOTAL JOBS
Construction Laborers	5
Carpenters	4
Electricians	3
First-Line Supervisors of Construction Trades and Extraction Workers	3
Office Clerks, General	3
Retail Salespersons	2
Plumbers, Pipefitters, and Steamfitters	2
General and Operations Managers	2
Laborers and Freight, Stock, and Material Movers, Hand	2
Heavy and Tractor-Trailer Truck Drivers	2
Operating Engineers and Other Construction Equipment Operators	2
Fast Food and Counter Workers	2
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	2
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	2
Cashiers	1

Source: IMPLAN, Triple Point 2021

The 570 people directly employed in Coconino County to construct the Project would spend a portion of their paychecks at nearby convenience stores and the Trading Post. The 200 people with jobs supported by the Project would in turn spend a portion of their earnings at stores within the region. Given that total labor income is estimated to be $39.7 million, if only 10% were spent at stores in the Cameron and Coalmine Canyon chapters, that would provide a $3.97 million infusion into the local economy during construction.

Additional demands may be placed on certain public facilities or services if Project construction overlaps with one or more other activities.

Intermediate Expenditures

In addition to the economic activity driven by the spending of members of the construction workforce, Project construction itself would require significant purchases of goods and services throughout the county. Total direct economic output within Coconino County resulting from Project construction is estimated to be $86 million, with approximately 35-50% of this total comprised of intermediate expenses. IMPLAN defines intermediate expenses as routine supply and material purchases. For this Project, that translates to $30 million to $43 million in spending on items and services such as concrete, gasoline, solder, drilling, and even copy paper. In the case of indirect and induced expenditures, Project spending would range from $9.8 million to $13.7 million. That would be the spending of suppliers and service providers, such as bookkeepers, carpenters, health care providers, and retailers.

Assuming only 5% of total intermediate expenditures during Project construction occur within the Cameron and Coalmine Canyon chapters, that would represent a total of $2 million to $3 million in additional economic activity.

Sales Tax and Other Revenues

The economic activity described above would generate revenues in categories including, but not limited to, registration fees and consumption and excise taxes, subject to the provisions of federal, state, and local statutes.

The fiscal analysis prepared by Mangum Economics (**Appendix F**) estimates the Project would generate $1.6 million for Coconino County from payment of the county's share of the state transaction privilege tax (TPT), currently set at 1.3 percent. Additional fiscal analysis conducted by Triple Point estimates the Project would generate as much as $6.6 million in TPT revenue for the state of Arizona.

The Triple Point analysis estimates another $3 million to $5.7 million in tax revenues would accrue to local jurisdictions and other taxing entities within Coconino County in the forms of fee revenue and consumption and excise taxes. Given that the current chapter operating budgets are approximately $250,000 each, additional tax revenue could support many unfunded chapter and regional initiatives.

Property Tax Revenue Resulting from the Purchase of Capital Equipment

Coconino County personal property taxes would be levied on the acquisition of capital equipment during the construction phase and throughout the operating lifetime of the Project. Capital equipment is liable for taxation subject to several factors including depreciation and investment tax credits. The Project would be subject to personal property tax at a rate of $2.0393 per $100 of assessed value. The Project would be exempt from Coconino County real property tax because it would be located on a 4,563-acre solar lease area and 600-acre ROW on the Navajo Nation.

PDP would be liable for personal property tax on all equipment purchases. The estimated cost of the initial purchases of PV, BESS, and other equipment from vendors outside of Coconino County is $584 million. This expenditure would result in an estimated $380,000 tax payment during the Project's first year of operation, stepping down to an estimated $39,000 tax payment in its 27th year of operation and each year after (**Appendix F**). Total personal property tax payments to Coconino County resulting from initial capital equipment purchases are estimated to be $6 million.

Operation Phase Investment

Over the course of its anticipated 35 years of operation, the Project would create new jobs requiring technical skills. Maintaining the facility would involve repairing and replacing faulty equipment, pest control, and weed and dust mitigation, among other tasks.

During the Project's operation phase, annual expenses would range from $5 million to $10 million depending on how the facility is operated.

Operation Phase Impacts

For every year of its 35-year operational life, the Project would drive the regional economy. Navajo people not yet born would have the opportunity to work at this facility if they want a career in solar energy.

Employment

The total number of jobs in Coconino County created directly by Project operation would be at least 15 per year for the lifetime of the Project, with an additional six or more jobs created indirectly. The average labor income per job would fall between $49,000 and $50,200 (**Table 3.3-10**), as compared to the Cameron Chapter per capita and household incomes of $13,453 and $34,853, respectively, and those of the Coalmine Canyon Chapter at $11,653 and $26,875, respectively (**Table 3.2-9**).

Table 3.3-11 Coconino County Operation Phase Annual Employment Impacts

IMPACT TYPE	JOBS	LABOR INCOME *(in dollars)*	INCOME/JOB *(in dollars)*
Direct	15	736,000	49,067
Indirect and Induced	6	301,000	50,167
Total	21	1,037,000	49,381

Source: Mangum Economics 2022

The total number of jobs in Arizona created directly by Project operation would be at least 33 per year for the lifetime of the Project, with an additional 27 jobs created indirectly. The average labor income per job would fall between $54,100 and $61,500 (**Table 3.3-11**). The IMPLAN estimates are based on the capital expenditure estimate, as well as the underlying model data.

Table 3.3-12 Arizona Operation Phase Annual Employment Impacts

IMPACT TYPE	JOBS	LABOR INCOME *(in dollars)*	INCOME/JOB *(in dollars)*
Direct	33	2,030,000	61,515
Indirect and Induced	27	1,462,000	54,148
Total	60	3,492,000	58,200

Source: Mangum Economics 2022

As in the construction phase or phases, PDP will make efforts to hire qualified Navajo professional employees and/or contractors. To maximize the number of Western Navajo residents able to take advantage of this opportunity, PDP will make efforts to work with Navajo colleges, universities, and others to create a workforce development and training program to build capacity for Navajos to work on the Project. In addition, the Project will aim to hire relevant Navajo-owned businesses.

Table 3.3-12 shows the percentage of total jobs in each of the top 15 occupations. The highest percentages of jobs supported are for PV installers and operations managers.

Table 3.3-13 Specific Occupations for Project Operation

OCCUPATION	PERCENT OF TOTAL JOBS
Solar Photovoltaic Installers	4
General and Operations Managers	3
Customer Service Representatives	3
Laborers and Freight, Stock, and Material Movers, Hand	3
Fast Food and Counter Workers	2
Cashiers	2
Retail Salespersons	2
Waiters and Waitresses	2

OCCUPATION	PERCENT OF TOTAL JOBS
Office Clerks, General	2
Electrical Engineers	2
Home Health and Personal Care Aides	2
Maintenance and Repair Workers, General	2
Project Management Specialists and Business Operations Specialists, All Other	2
Accountants and Auditors	2
Heavy and Tractor-Trailer Truck Drivers	1

Source: IMPLAN, Triple Point 2021

As in the construction phase, local chapter businesses would benefit from increased sales due to Project operation. The 21 people employed in Coconino County as a result of Project operations would spend a portion of their paychecks at nearby convenience stores and the Trading Post. Given that total labor income is estimated to be $1.04 million, if only 10% were spent at stores in the Cameron and Coalmine Canyon chapters, that would be an annual infusion of $104,000 into the local economy for 35 years.

Intermediate Expenditures

In addition to economic activity driven by the spending of members of the Project operation workforce, Project operation itself would require purchases of goods and services throughout the county over the Project's lifetime. Total direct output within Coconino County during Project operation is estimated to be $5 million to $10 million, with approximately 35-50% of this total comprised of intermediate expenses. IMPLAN defines intermediate expenses as routine supply and material purchases. For this Project, that translates to $1.75 million to $5 million in spending on items and services such as gasoline, computer repair, solder, and lawn mowing equipment.

Indirect and induced expenditures resulting from Project operation would produce an estimated $500,000 to $1.5 million per year in additional economic activity within Coconino County. That would be the spending of suppliers and service providers, such as commercial vehicle mechanics, bookkeepers, carpenters, health care providers, and retailers.

Sales Tax and Other Revenues

TPT revenue associated with Project operation is collected for the state and county, with other tax and fee revenues accruing to local and sub-county jurisdictions. Economic activity resulting from Project operation would generate tax revenues in categories including, but not limited to, registration fees and consumption and excise taxes, all subject to the provisions of federal, state, and local statutes.

The fiscal analysis conducted by Triple Point estimates the Project would generate $43,000 to $70,000 annually for Coconino County from payment of the county's share of the state TPT, currently set at 1.3 percent. Project operation would generate as much as an estimated $200,000 annually in TPT revenue for the state of Arizona. Over the lifetime of the Project, this would result in an estimated $1.5 million to $2.5 million for the county and $7 million for the state.

Additional tax revenues would accrue to local jurisdictions and other taxing entities within Coconino County in the form of fee revenues and consumption and excise taxes. The revenue from these taxes is estimated to be $60,000 to $90,000 annually, or $2.1 million to $3.2 million over the lifetime of the Project. County tax revenue does not flow to Navajo chapters, but a portion of this additional tax revenue might support initiatives that could directly or indirectly benefit the area, such as county road construction and joint use of heavy equipment for road maintenance.

Property Tax Revenue Resulting from the Purchase of Capital Equipment

Coconino County personal property taxes would be levied on the capital equipment acquired during the construction phase and throughout the operating lifetime of the Project. Capital equipment is liable for taxation subject to several factors including depreciation and investment tax credits. The Project would be subject to personal property tax at a rate of $2.0393 per $100 of assessed value. The Project would be exempt from Coconino County real property tax because it would be located on a 4,563-acre tract of land on the Navajo Nation.

During Project operation, capital equipment will need to be purchased to replace and maintain faulty and broken equipment. These capital purchases would presumably be subject to the same tax liability and statutes as the initial capital investment. At 3-5% of the initial investment, the tax revenue from purchasing replacement equipment is estimated to be $179,000 to $299,000 over the lifetime of the Project.

Population and Demographic Impacts

For a population of fewer than 2,000 people in the Cameron and Coalmine Canyon chapters, half of whom are living near or below the poverty line, this Project would deliver hope for the future in the form of well-paying jobs that would raise median household incomes (**Table 3.3-7**; **Table 3.3-10**).

Housing Impacts

By increasing the tax base across the region, this Project would give local agencies the means to invest in planned local infrastructure projects (**Table 3.2-17**; **Table 3.2-18**). Homes that have been denied electrification and running water throughout the Bennett Freeze era would now have an opportunity to be modernized.

As household incomes rise, homeowners would be better able to maintain and improve their homes, many of which are currently in very poor or poor condition (**Table 3.2-11**; **Figure 3.2-5**; **Figure 3.2-6**). Homeowners and local contractors would have the opportunity to make repairs to roofing, windows, insulation, flooring, and furnishings.

Social and Cultural Impacts

The Project would create demand for skilled workers and technological innovation. Staffing 18 ongoing jobs in Project operations would give potential students incentive to seek job training. PDP will make efforts to work with Navajo colleges, universities, and others to create a workforce development and training program to build capacity for Navajos to work on the Project. In addition, the Project will aim to hire relevant Navajo-owned businesses.

Decommissioning Impacts

The Project is expected to have a useful life of 35 years, subject to extension with component upgrades and system replacements. PDP would decommission and remove the system and its components at the end of the Project lifetime. The Project Site could then be converted to other uses or be restored to sheep grazing property. All decommissioning, system removal, and Project Site restoration activities would adhere to the requirements of appropriate governing authorities, including requirements set forth in the lease and real estate agreements with the Navajo Nation.

Decommissioning would also require expenditures with economic impacts. Given that utility-scale solar power generation facilities are based on new technology, there is little precedent for their decommissioning, and the technology that would be used to dispose of solar panels three decades or more into the future may not yet have been developed.

AES estimated the cost of decommissioning a 200MW solar PV and 100MW BESS project in Arizona to be $16 million. Based on this limited information, the estimated cost of decommissioning the 750MW Project could be $33 million to $40 million. For comparison, a 2019 study by Swift Current estimated the cost of decommissioning a 100MW solar facility in Maine in 50 years to be $2.2 million (Swift Current 2019). Scaling this estimate to the Project's 750MW would bring the cost to just under $19 million. A 2020 study by the Commercial Solar Guy estimated the cost of decommissioning a 5MW solar facility in Massachusetts in 20 years to be $287,798 (Weaver 2020).

3.3.8.2 Summary of Beneficial Impacts

The Project would have a positive impact on the economy of the Navajo Nation and help the Navajo Nation build a more balanced energy portfolio by developing clean renewable energy for the long-term benefit of the Navajo people.

The Project would repurpose reclaimed lands impacted by historic uranium mining and reduce dependence on energy generated from fossil fuels, partially replacing the coal-fired NGS, decommissioned in 2019. This Project would offset GHG and other air pollutant emissions produced by fossil fuel plants, using virtually no water to produce electricity relative to coal- or gas-fired generation. The Project would help the Navajo Nation become a significant producer of renewable energy and provide clean energy jobs and workforce training within the community. In addition, as part of an applicant-proposed benefits package, PDP plans to include opportunities for rural electrification through off-grid solar power and energy storage solutions for remotely located Navajo households lacking access to power and running water.

The Project would create revenue streams for the Navajo Nation through taxation[46] and lease payments while also generating jobs in a new sector for the Navajo community. PDP would generate an estimated $58 million in community stakeholder payments and $12 million in Navajo Nation lease payments over the Project's lifetime (Mangum Economics 2022)[47].

Project construction would support an estimated 770 jobs in Coconino County with $39.7 million in associated labor income, and $116.9 million in total economic output. Of the jobs supported by Project construction, 570 would be directly associated with construction, contributing $30.2 million in labor income to Coconino County's fifth largest industry sector. The average weekly

[46] Navajo Nation taxes are under confidential negotiation; therefore, an estimate is not available for this document.
[47] Mangum Economics Consulting LLC's Painted Desert Power Economic and Fiscal Contribution to Coconino County, Arizona and the Navajo Nation is dated April 7, 2022. Triple Point Strategic Consulting LLC's Review of Mangum Economics 2022 Report is dated May 2022.

wages for construction jobs are $918, as compared to the county-wide average of $866. Total intermediate expenditures within the county resulting from Project construction are estimated to range from $41 million to $58 million. Sales and other consumption tax revenues resulting from this economic activity are estimated to range from $1.6 million to $7.4 million.

Project operation would create at least 21 new jobs in Coconino County with $1 million in associated labor income and $3.3 million in total economic output, annually. Total intermediate expenditures within the county resulting from Project operation are estimated to range from $500,000 to $1.5 million, annually. Sales and other consumption tax revenues resulting from this economic activity are estimated to range from $103,000 to $160,000, annually.

Personal property tax revenue would be generated from the purchase and ownership of PV, BESS, and other capital equipment purchased outside of Coconino County for Project construction and operation. The total lifetime revenue generated by personal property tax is estimated to range from $6.3 million to $6.4 million.

3.3.9 Visual Resources

3.3.9.1 Compliance Evaluation

Visual impacts are defined as the change to an existing visual environment resulting from the introduction of modifications to the landscape. An analysis of visual contrast was used in determining to what degree the Project would attract attention and in assessing the relative change in the character landscape. This analysis uses concepts and methods based on the visual resource contrast rating process presented in BLM Handbook H-8431-1 (BLM 1986). The methodology consists of landscape review, KOP identification, field reconnaissance and photography, visual simulations, and contrast rating analysis and is described in detail in the Visual Resource Assessment (**Appendix G**).

The impact analysis was performed using contrast ratings and visual simulations from each KOP. The amount of visual contrast that would be created is directly related to the amount of attention that would be drawn to a feature in the landscape. Using the BLM visual resource contrast rating process, the level of contrast between the Project and the existing landscape was evaluated from each KOP.

The following distance zones were used for evaluating impacts on scenery from each KOP:

- Foreground: up to 0.5 miles
- Middle ground: 0.5 to 3 miles
- Background: 3 to 5 miles

The level of perceived contrast between the Project elements and the existing landscape from each KOP were classified using the following BLM Contrast Rating terms, listed here with the corresponding impact assessment for intensity in italics:

- None: The element contrast is not visible or perceived.
- Weak (*negligible/minor impact*): The element contrast can be seen but does not attract attention.

- Moderate (*moderate impact*): The element contrast begins to attract attention and to dominate the characteristic landscape.
- Strong (*major impact*): The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

The Visual Resource Assessment includes a viewshed analysis that illustrates where in the surrounding landscape the solar array structures would theoretically be visible. The viewshed model represents the area in the surrounding landscape where potential visual effects from the Project may be discerned by the casual observer. Created using GIS software, the viewshed analysis models the approximate heights and locations of the solar panel components and incorporates those features into the existing landform to illustrate the areas from which the Project may be potentially visible. This theoretical view is based on elevation and landform and does not account for vegetation, existing structures, and other landscape elements that could obstruct views. The viewshed model also includes approximate locations of rural residential properties in the vicinity of the Project Site.

Impact Determination

During the construction period, the predominant visual impacts would be from dust, created by soil disturbance from grading and construction activities and by vehicular traffic on unpaved roads. The short-term visual impact from dust would be visible to travelers and residents in the Project's vicinity. To reduce dust emissions, PDP would implement a dust control plan (**Appendix I**) that includes measures such as watering the Project Site. It is expected that dust emissions would be adequately controlled by watering soils, thereby mitigating dust concerns (**Section 3.3.3**; **Section 3.3.6**). As a result, construction impacts on visual resources would be short-term, temporary, and minor.

Long-term impacts on visually sensitive receptors from operation of the solar array, gen tie, and substation expansion were determined by examining the visual simulations and evaluating the visual change and contrast with the existing landscape (**VISUAL-1**; **VISUAL-3**). The visual impact analysis for the four KOPs associated with the Project components is provided below. The KOP locations, contrast rating forms, and visual simulations appear in the Visual Resource Assessment (**Appendix G**).

KOP A: Area 2 from US 89 Looking East

KOP A represents the view of travelers looking east from US 89 toward the Project area and the potential view from residences in the vicinity of the KOP. It is a prominent, superior (overlooking) view of the Project and surrounding valley from where the road runs closest to the Project area. This KOP is characterized by broad, panoramic views of flat, horizontal terrain with clustered, low, rounded, yellow shrubs and grasses. The foreground includes a dark gray, rocky slope and reddish brown to dark gray exposed soils. The foreground and middle ground include white, rectangular building structures. Other structures include prominent, tall, vertical transmission structures consistently located through the foreground and middle ground landscape.

This KOP is located approximately 0.8 miles west of the nearest western edge of Area 2. The solar panels, although low-profile with a maximum height of 13 ft, are visible because the KOP is a superior vantage point. This provides a full view of the valley below, where the solar panel arrays would be visible in the middle ground to casual observers traveling on US 89 (**Appendix G**). The

Project would result in strong contrast between the existing landscape and the Project structures, primarily from changing lines and colors in the landscape. Due to the dark color of the solar panels, the contrast is greater where the background landscape is lighter in color. Contrast is reduced in areas with the dark rocky slope background color.

Although the long-term visual change in contrast at this KOP would be strong when looking directly at the Project, the general view for persons traveling along the highway in vehicles at highway speeds would be temporally short. The visual impact from this short-duration view would be moderate.

Residences in the vicinity of KOP A, located at similar elevations with similar unobstructed views, would have moderate to major, long-term visual impacts because the landscape is so open and without vegetative screening. The intensity of impact would be greater for higher-elevation locations with unscreened views. Residential properties located at lower elevations without superior viewing opportunities would experience minor visual impacts.

KOP B: Panoramic View of Area 2 from Bluff Along BIA Route 6730

KOP B represents the view of travelers on and in the vicinity of BIA RT 6730 and residents in the area. BIA RT 6730 is the primary rural road in the vicinity of the Project and used by residents and ranchers. The superior view of the proposed Project in the valley below from an overlooking bluff represents a prominent view of likely visibility. The panoramic view contains a low valley in the foreground and middle ground that is framed by higher mesa landforms in the foreground and distant plateaus in the background. The valley contains curvilinear line washes in the foreground and middle ground that are light tan in color and contain low, globular form yellow shrubs, among a flat, medium brown, smooth valley bottom. The mesas in the foreground present vertical and horizontal lines that frame the valley view with rock substrate and outcrops ranging in color from white to dark brown.

This KOP is located approximately 0.75 miles from the nearest visible edge of Area 2. As with KOP A, this superior view provides an overlooking prominent view with high visibility of the solar arrays for casual observers traveling on BIA RT 6730 and others in the vicinity (**Appendix G**). The proposed Project would result in strong contrast between the existing landscape and the Project structures, primarily from changing lines and colors in the landscape. The strong contrast of the dark grey panel structures against the background of the light tan and light brown landscape features would be visible to travelers, residents, and persons viewing the area from prominent, superior viewpoints.

Visual impacts on travelers along the high bluff area of BIA RT 6730 would be major as a result of the superior view of the solar arrays. Further east along the road, travelers descend to a lower elevation where the solar arrays would be less visible. Residences in the vicinity of KOP B, located at similar elevations with similar unobstructed views, would have moderate to major, long-term visual impacts because the landscape is so open and without vegetative screening. The intensity of impact would be greater for higher-elevation locations with unscreened views. Residential properties located at lower elevations without superior viewing opportunities would experience minor visual impacts. The closest residential property 0.3 miles southwest of the Project is located at a lower elevation point in the landscape and would not have a prominent, superior view of the Project area. Visual impacts at this location would be minor to moderate.

KOP C East: Proposed Gen Tie Crossing US 89 Looking East

This KOP represents the view of travelers on US 89 looking east toward the Project's gen tie. Views from this KOP are characterized by broad, panoramic views of flat, consistent, horizontal terrain with very low, small hills in the middle ground. Exposed soils provide smooth texture and medium brown color, with small areas of white rock outcrops presenting coarse terrain. Areas of medium-density vegetation include light green, rounded shrubs and yellow grasses. The foreground and middle ground contain prominent, tall, vertical transmission structures of various types, including monopole structures and large HV lattice structures that are grey and dark brown in color. Transmission structures also include horizontal wire lines that cross the entire KOP view. A tall, dark grey radio tower structure with white, round radio components is located in the middle ground amongst the transmission lines. The view also includes a small, local dirt road that is light tan to grey in color with horizontal and curvilinear lines.

The proposed gen tie, located adjacent to and south of the existing APS Four Corners HV (500kV) lines and lattice towers, is visible from this KOP in the foreground and middle ground (**Appendix G**). However, with the extensive quantity and concentration of existing structures in the view, the visibility and contrast resulting from the additional gen tie is weak in form, line, texture, and color. From this KOP, the additional structures and change would not be noticeable to casual observers traveling along US 89. The visual impact of the gen tie line to views looking eastward from US 89 would be minor.

KOP C West: Proposed Gen Tie Crossing US 89 Looking West

This KOP represents the view of travelers on US 89 looking west toward the proposed Project's gen tie corridor and the Moenkopi Substation expansion area. The panoramic view is of flat, horizontal terrain with exposed rocky, dark brown soils, small areas of flat, white rock outcrops that are interspersed with vegetation of light green, globular shrubs and a few yellow grasses. The foreground and middle ground views contain prominent, tall, vertical transmission structures of various types, including monopole structures and large HV lattice structures that are grey and dark brown in color. Transmission structures also include horizontal wire lines. The foreground contains the Moenkopi Substation, a concentration of dark grey, tall vertical and horizontal lines that obscure the hills in the background.

The proposed gen tie line, located adjacent to and south of the existing APS Four Corners HV lines and lattice towers, is visible in the foreground (**Appendix G**). It is closer and more prominently visible than the proposed transmission towers in the view of KOP C East. With the concentration of existing structures in the view, the visibility and contrast resulting from the additional gen tie is moderate in form, line, and color. Because of the proposed gen tie's proximity to the highway, it would likely be noticeable to casual observers traveling along US 89. The structural expansion of the Moenkopi Substation, although visible from this KOP, would create minimal changes in contrast relative to the existing substation and would not be noticeable to casual observers traveling on US 89. Visual impact on views looking westward from US 89 would be moderate for the gen tie line and minor for the Moenkopi Substation expansion. Impacts on views from rural residential properties in the vicinity of the proposed gen tie would be minor because its location adjacent to the existing HV transmission structures would allow it to blend in and be absorbed into existing landscape features.

3.3.9.2 Design Features and Mitigation Measures

Design Features

HAZMAT-2: Waste Disposal

PDP would require that the EPC contractor responsible for daily on-site management of construction carefully disassemble and recycle shipping containers and solar panel packaging to minimize solid waste impacts and store, collect, and dispose of solid waste in such a manner as to prevent fire and health hazards, rodent harborage, insect breeding, accidents, and odor. The EPC contractor would ensure that no littering on the Project Site or neighboring properties occurs during construction. Prior to construction, an agreement would be made with Blanding Landfill, Flagstaff Landfill, or another qualified facility and a waste and recycling service provider so waste generated from Project construction is disposed of in accordance with applicable regulations.

VISUAL-1: Height Restrictions and Site Maintenance

To minimize impacts on the viewshed for sensitive receptors, PDP would keep the Project Site free from debris, trash, and waste during construction and solar generating structures (e.g., inverters, solar panels) would not exceed 15 ft at their highest point, as measured from their installed foundation.

VISUAL-2: Minimization of Lighting Impacts

During Project operation, facility lighting would be located, screened, or shielded so that any sensitive receptors or access roads are not directly illuminated.

VISUAL-3: Material Reflectivity and Color Treatment

Materials, coatings, or paints with little or no reflectivity should be used on structures to the extent possible. The surfaces of structures should be painted with neutral colors to minimize the contrast of the structures with their landscape backdrops. Security fencing should have a dulled, darkened finish to reduce contrast. Electric transmission towers should be color treated and should have a low-reflectivity treatment to reduce contrast with the existing landscape. Where the transmission facilities using towers are located within the same ROW or corridor as existing facilities, the color treatment of the proposed facilities should match that of the existing facilities, unless the existing facilities' color treatment contrasts with the visual backdrop.

3.3.10 Public Health and Safety

3.3.10.1 Compliance Evaluation

As described in **Section 3.3.3**, with the implementation of dust control measures, the proposed Project would have a negligible effect on air quality in the region. To minimize the potential for workers or the public to be exposed to soil or dust contaminated with uranium, PDP procured a Phase I ESA to identify AUMs in the vicinity of the Project Site (**Section 3.2.6.2**) and develop exclusion areas to prevent both permanent and temporary impacts in these areas (SWCA 2022; Terabase Energy 2022). Furthermore, PDP would ensure that Project construction and operation do not preclude access to AUMs for further studies, characterizations, or potential future reclamation activities conducted by other parties (**GEO-1**).

Although studies procured to date indicate the risk of worker exposure to radiation in exceedance of applicable health and safety thresholds is considered low, the HASP prepared for the Project would include any measures necessary to protect workers and the public from exposure to radioactive materials (**HAZMAT-5**). Prior to construction, PDP would ensure the AUM exclusion areas are clearly communicated to construction personnel (**HAZMAT-3**); site-specific protocols would also be outlined in the HASP. No ground disturbance would occur within the AUMs and it is anticipated that typical dust control measures would be sufficient to ensure that no workers or other on-site personnel are exposed to health risks associated with AUMs (**HAZMAT-6**).

As described in **Section 3.3.6**, the only hazardous materials involved in construction and operation of the Project are fuels and transformer fluids. A hazardous material handling plan would be prepared to minimize the potential for leaks and spills. Step-up transformers at the Project substation would be installed within concrete basins to contain any leaks or spills. Design features—including implementation of hazardous material handling and SPCC plans—would be implemented to minimize the potential impacts on public health and safety from hazardous materials associated with the Project (**HAZMAT-1**). Therefore, the risk of worker or public exposure to hazardous material would be negligible.

To minimize the risk of fire and exposure to hazardous materials associated with the BESS, the battery modules would be installed inside enclosed containers that allow access for maintenance but not for human entry. The containers would be constructed in accordance with all applicable building and fire codes. Fire suppression systems would be installed in the BESS.

The solar arrays and Project Site would be regularly inspected during Project operation. Any damaged or defective PV modules, inverters, or other equipment would be taken out of service and recycled or disposed of in accordance with all applicable regulations. Therefore, there is a very low risk of exposure to hazardous substances associated with these components.

Fire response at the Project Site would be provided by the NNFD and PDP would prepare an FPP to NFPA standards. It is expected to be reviewed by the NNFD and approved by the appropriate county or state representative designated by the Navajo Nation. The Project would also be designed to meet NNFD requirements for access and would not hinder access to neighboring properties. Due to the generally passive nature of PV solar facilities, the risk of fire during Project operation would be very small. The risk of fire would be somewhat higher during the construction period due to the operation of vehicles and heavy equipment but would be controlled through implementation of the FPP. Therefore, there would be minor, short-term impacts on public health and safety during Project construction from the small increase in fire risk, and negligible long-term impacts during Project operation.

During construction and operation, the Project may be monitored by on-site security staff and/or security cameras monitored remotely. An appropriate security fence, approximately 8 ft tall with signage, would be placed around the perimeter of the Project and all electrical equipment would be locked and could be topped with barbed wire per applicable electrical and safety code requirements. PDP would coordinate with the NNFD Fire Chief, or the appropriate county or state representative designated by the Navajo Nation, to ensure that access to the Project Site is maintained in a manner consistent with emergency services requirements. The Project would use inward-facing, low-level security lighting at ingress and egress points.

The impacts of decommissioning would be similar to those associated with construction, since decommissioning would involve similar equipment and activities and would occur over roughly the same number of months. During decommissioning, the potential sources of public health and safety risks, such as hazardous fuels and transformer fluids and electrical equipment, would be removed from the Project Site.

In summary, the risks to workers and public health and safety associated with the Project are well understood and would be minimized through the implementation of design features and site-specific health, safety, fire, security, and hazardous material plans (**PUBLIC HEALTH-1**). There would be a minor, localized, direct, short-term impact on public health and safety from the small increase in the risk of fire during Project construction and decommissioning, and negligible long-term impacts during Project operation. Once decommissioning is complete, the public health and safety conditions at the Project Site would return to pre-Project conditions.

3.3.10.2 Design Features and Mitigation Measures

Design Features

AIR-1: Dust Control Plan

PDP would submit a dust control plan (**Appendix I**) for construction and operation to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan addresses watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

GEO-1: Access to Neighboring Abandoned Uranium Mines for Potential Future Reclamation

While the Project footprint does not include any mining areas (**HAZMAT-3**; **HAZMAT-4**), the Project is located adjacent to 14 historic uranium mines in various stages of reclamation by the USEPA and NNEPA. PDP's Project design would not impede access to these mines for potential future reclamation efforts.

HAZMAT-1: Hazardous Material Handling and Spill Prevention and Response Plans

Prior to the start of construction, PDP would prepare hazardous material handling and SPCC plans to reduce the potential for contamination and exposure of workers and the public to hazardous material in the event of a spill and to require that any surface spills are cleaned expediently and any contaminated soil disposed of properly.

HAZMAT-3: Avoidance of Abandoned Uranium Mines

All mapped AUMs should be avoided during Project construction and operation with a 100-ft land-use buffer around mine boundaries to allow access for any potential future assessment and mitigation of AUMs (**GEO-1**) and to ensure Project construction activities would not impact known AUMs and possibly create CERCLA liability.

HAZMAT-5: Health and Safety Plan

A site-specific HASP for Project construction and operation should be prepared and implemented. The plan should include discussions of proper personal protective equipment (PPE) and inform workers of potential hazards.

HAZMAT-6: Dust Suppression Measures

Dust control best management practices should be implemented during Project construction and operation (**AIR-1**; **Appendix I**). On-site and local water should be tested for safety before use in dust suppression because the prevalence of uranium and other constituents in local groundwater could pose concerns for human contact and ingestion and/or inhalation of water mist.

PUBLIC HEALTH-1: Safety, Emergency Preparedness, Fire, and Site Security Plans

PDP would prepare and implement safety, emergency preparedness, fire, and site security plans to address fire and fuels management and fire protection, provide a safety program for construction and operation at the facility, address health and safety protocols related to the neighboring AUMs, and provide for site security and monitoring.

Additional Design Feature for the Alternative Solar Generating Facility

AIR-1A: Dust Control Plan

PDP would commit to quantifying the revised dust emissions resulting from the construction and operation of the Alternative Solar Generating Facility if it is selected and when more data is available. PDP would update the dust control plan (**Appendix I**) for Project construction and operation accordingly to account for the features of the Alternative Solar Generating Facility, including additional earthmoving activities, and submit it to the NNEPA for approval prior to construction. The approved plan would remain in effect throughout the lifetime of the Project. The plan would address watering active construction sites or sites where earthmoving is planned (in accordance with **HAZMAT-6**), vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium.

3.3.11 Traffic and Transportation

3.3.11.1 Compliance Evaluation

Impact Determination

The proposed action includes the improvement and expansion of the existing turnout at US 89, improvement and widening of BIA RT 6730, and construction of four new roads for access within the solar array areas and from BIA RT 6730 and two temporary construction access routes for installation of the West and East Connectors. Road corridors would be surveyed, cleared, graded, and improved (widened, compacted, covered with aggregate or paved, etc.) in anticipation of the increased traffic volume and heavy loads on these roads transporting equipment, materials, and workers during Project construction. Improvements would be used to support Project operation, including the movement of workers and equipment to the solar array areas. Permanent and temporary acreage impacts anticipated for the proposed access and roadway improvements are shown in **Table 2.2-2**.

Construction access to the Project Site would be via US 89 and BIA RT 6730. The existing turnout from US 89 onto BIA RT 6730 would be expanded to accommodate construction traffic. In addition, BIA RT 6730, a public road, would likely be widened and resurfaced with aggregate to accommodate Project construction traffic during all weather conditions.

Access Road 1 would be constructed to provide primary access from BIA RT 6730 to Area 1, located at the southwest corner of the Project Site. In addition, three secondary access roads are proposed for access to Area 2: Access Road 2 South would provide access from BIA RT 6730 to the southwest corner of Area 2; Access Road 2 North would provide access from BIA RT 6730 to the northwest corner of the Project Site; and the Area 2 Connector would connect the two portions of Area 2, crossing the cultural corridor and slurry pipeline. PDP proposes repurposing one former landing strip of the abandoned airstrip (formerly Cameron Airport) as a portion of Access Road 2 North. All access roads would be used during construction. During Project operation, Access Road 2 North may only be used for emergencies.

The improvement and expansion of the existing US 89 access to BIA RT 6730, which is anticipated to require coordination with ADOT for an encroachment permit, may also need to be reviewed to ensure compatibility with the existing ROW grant to ADOT. This could include a BIA review of the improvements within the ROW to ensure NEPA compliance. If necessary, it is anticipated that the BIA can issue a CATEX associated with the ROW and improvements to US 89. Detailed specifications for improvements to the US 89 turnout and BIA RT 6730 would be defined through coordination through applicable agreements with NDOT and consultation with ADOT and the BIA.

The number of workers expected on the Project Site would vary over the construction period. If the full 750MW Project is built in a single phase, peak daily workforce is expected to average approximately 500 workers, generating about 70 daily round trips (**Table 2.2-3**). The number of deliveries of equipment and supplies per day would also vary over the construction period (**Table 2.2-4**), with an estimated daily average of 48 trips per day and a total of approximately 7,000 trips over a material delivery period of 12 months. Depending on the phasing of construction, more or fewer daily deliveries could be required.

All Project-related parking during construction would be on-site, moving within the solar array areas as they are developed. Off-site parking and worker shuttling could also be considered.

The increase in Project-related traffic and the proposed roadway widening and improvements would result in minor, direct impacts on US 89 and BIA RT 6730 during Project construction. Through traffic on US 89 and BIA RT 6730 would be maintained during Project construction; however, temporary traffic controls, including lane closures, may be implemented and minor traffic delays could occur. The transportation plan to be developed would reduce local impacts on traffic patterns from the Project when implemented (**TRANSPORTATION-1**). These impacts would be short-term and temporary in nature since impacts would cease following Project construction.

Project operation would generate approximately 15 to 20 trips per day by maintenance and security personnel. Each panel cleaning period could require an average of up to 100 water truck deliveries per day. Other deliveries of supplies or equipment could be necessary to support O&M.

It is anticipated that roadway maintenance would be necessary in response to large-scale storm events or natural disasters, such as wildfire, earthquake, or flooding. Maintenance up to and including full reconstruction or adjusting the elevation/location of access roads may occur to provide adequate access for workers, deliveries, vehicles, and emergency vehicles, as needed.

The Project would cause a negligible increase in traffic on US 89 and BIA RT 6730. Any potential maintenance activity needed to improve access roads would have a minor, direct impact on traffic, but would be short-term and temporary in nature and would cease following completion of maintenance.

The September 2020 glare analysis conducted for the Project Site concluded that ocular impact to pilots and/or air traffic control facilities would not occur (Terabase Energy 2022). The FAA Notice Criteria Tool (FAA 2021) determined that the Project would not exceed notification criteria (**Appendix M**) and FAA notice is not required for the proposed communications towers associated with the Project's proposed gen tie line (14 CFR 77.9).

Project Site restoration activities are likely to include the removal of permanent access roads, including Access Road 1, Access Road 2 South, Access Road 2 North, and the Area 2 Connector, according to the requirements of the appropriate governing authorities, including requirements set forth in the lease and real estate agreements with the Navajo Nation (**TRANSPORTATION-3**). Vehicle trips associated with routine O&M would no longer be needed after decommissioning. Decommissioning would have traffic impacts similar to those associated with Project construction, described above.

3.3.11.2 Design Features and Mitigation Measures

Design Features

TRANSPORTATION-1: Transportation Plan

PDP would prepare and implement a transportation plan to reduce the Project's impacts on local traffic patterns. This plan would include working with the Navajo Nation and ADOT to design appropriate turnout enhancements on US 89 to minimize traffic disruption during workforce and equipment deliveries to the Project Site during Project construction and minimizing truck deliveries during heavy tourist traffic loads to the Grand Canyon area north of the Project Site.

TRANSPORTATION-2: Road Repair and Restoration

Prior to construction, PDP would document the conditions of all access roads and turnoffs to the Project Site by video, showing the full width of the roadway plus a 5-ft buffer. Any public street surfaces damaged by Project construction traffic would be restored to their pre-existing condition within 6 months of completion of the full-scale Project build-out.

TRANSPORTATION-3: Temporary Access Road Reclamation

Upon completion of the full-scale Project build-out, the temporary access roads used during construction would be reclaimed back to as close as possible to pre-construction function and conditions, rendering impacts temporary and minimal.

3.3.12 Water Resources

3.3.12.1 Compliance Evaluation

Surface Water

One currently regulated WUS, the Little Colorado River, crosses the Project area. This jurisdictional feature would be spanned by the proposed gen tie from the proposed new collector substation to the existing Moenkopi Substation. No Project components are currently proposed within the Little Colorado River floodplain.

Before the NWPR was vacated, PDP submitted a request to the USACE for an approved JD (November 13, 2020, File No. SPL-2018-00831) under Section 404 of the CWA. On March 29, 2021, the USACE completed the requested review and made a JD that no CWA 404 permit was required since the Project would not discharge into any WUS (**Appendix Q**). The basis for this JD is that the Project Site contains ephemeral features, swales, and areas where sheet flow occurs. The approved JD is valid for 5 years unless new information warrants revision of the determination before the expiration date. Following communication with the USACE regarding their project review, the NNEPA issued PDP a letter, dated March 18, 2021, stating that no Section 401 WQC was required as no CWA 404 permit was required for the Project (**Appendix R**).

According to the current POD (Terabase Energy 2022), no impacts on regulated surface waters would occur. If this changes, PDP would obtain permitting per the following as applicable:

- all sections of the CWA and Navajo Nation Clean Water Act (NNCWA) addressing licensing and permitting issues—including CWA Sections 401, 402, and 404
- EO 11988 Floodplain Management (42 FR 26951) and EO 11990 Protection of Wetlands (42FR26961)

The Project would impact a fraction of ephemeral surface drainages/swales present in the Project area. It would not impact the Little Colorado River or associated wetlands; the dominant and highest functioning water resources present in the Project area and its vicinity. Impacts on ephemeral washes/swales would reduce the capacity of micro-drainage areas in the short term. However, drainages in the Project area are continually changing. In the event of a significant event, a new flow pathway could be created and would be managed in accordance with **WATER-4**. During construction, soils would be disturbed and potential would exist for fluids to leak from machinery. Water quality in surface flows exposed to loosened sediments or industrial fluids would be reduced. A storm event could convey these substances to the river and adjacent wetlands. Typical best management practices would be identified in the Project NPDES permit and SWPPP to protect surface water quality and prevent stormwater sediments from entering the Little Colorado River (**WATER-2**).

Impact Determination

Project impacts on surface waters are reduced because the Project components would avoid sensitive surface water resources such as the Little Colorado River and associated wetlands. No impacts on intermittent or perennial surface water features would occur during Project construction or operation. Impacts on surface waters would be limited primarily to grading and site preparation at minor ephemeral waterways and swales in the Project area. Small surface drainages would be removed or disturbed but would re-establish a new flow path during or shortly after the construction time frame in response to any precipitation. Therefore, with the implementation of **WATER-1, WATER-2**, **WATER-4**, and **WATER-5**, impacts on surface waters would be direct and indirect, short-term, and minor in intensity. Mitigation would occur during decommissioning (**WATER-5**).

Groundwater

The C aquifer, over which the Project area lies, is expected to be more than 2,500 ft bgs and dry. The perched alluvial aquifer associated with the Little Colorado River is not expected to be impacted by excavations associated with gen tie construction. The Project is not expected to require any excavations deeper than 18 ft (Terabase Energy 2022).

PDP is still determining the source for the water required for Project construction and operation (**Section 2.2.7**). Project water needs and access are being assessed and issues with groundwater rights, permitting requirements, and safety addressed. Construction would use water from the Navajo Nation per the Navajo Nation Water Code or find water from outside the Navajo Nation and truck it in. Options for the Project water supply are outlined in a technical memorandum from C2 Environmental (**Appendix H**). C2 Environmental evaluated the potential effects on local water resources of the Project's anticipated direct non-potable water uses during construction and operation, including compaction, cleaning, repairs, and dust abatement. The entire buildout of the Project Site would be expected to require approximately 750 acre-feet (ac ft) of water. Depending upon climatic conditions during construction, actual use could be much lower. During the operational phase, solar PV plants use minimal water. The annual water consumption for operation of the facility would be expected to be approximately 30 ac ft. Prior to construction, PDP will conduct a water source review (**WATER-3**).

PDP would coordinate with the NNTCOB regarding appropriate approval if the Project requires imported water or groundwater. Historic uranium mining activities have impacted groundwater in and surrounding the Project area and unidentified contaminated sources may be present. No potentially contaminated groundwater may be used for Project construction or operation until sufficiently tested and approved.

Impact Determination

Project construction impacts on groundwater are negligible in terms of surface excavation for solar facilities. If area water is needed and obtained for construction, a short-term use of 750 ac ft may be needed. Approximately 30 ac ft or less would be needed annually from sources yet unidentified. Therefore, impacts on groundwater quantity may be direct and short-term, or direct and long-term but minor in intensity; impacts on groundwater quality are expected to be non-existent to negligible.

3.3.12.2 Design Features and Mitigation Measures

Design Features

WATER-1: Minimization of Project Impacts on Surface Waters

Any unavoidable impacts of Project development on existing surface water features—including streams, lakes, ponds, wetlands, floodplains, and intermittent/ephemeral streams—both within the Project area and in nearby regions would be minimized or mitigated.

WATER-2: Stormwater Pollution Prevention Plan

The EPC contractor would control Project Site drainage, erosion, and sedimentation related to stormwater runoff. The Project developer would identify site surface water runoff patterns and develop measures to prevent adverse impacts associated with Project-related soil deposition and erosion throughout and downslope of the Project Site and Project-related construction areas. These measures would be implemented within the SWPPP and incorporated into the POD, as appropriate.

WATER-3: Water Source Review

PDP would work with Navajo Nation water resources officials to identify a water source for the Project (**Appendix H**) and complete testing to check for contaminants that would make it unsuitable to use for panel washing or dust suppression. Assessing water use would include, but is not limited to, the following:

- quantifying water use requirements for Project construction, operation, and decommissioning
- meeting the potable water supply standards of federal and Navajo Nation water quality authorities (e.g., CWA Sections 303 and 304 and applicable sections of the NNCWA)
- identifying wastewater treatment measures and new or expanded facilities, if any, to be included as part of the Project's NPDES permit

WATER-4: Minimization of Impacts on Area Drainage Patterns and Floodplains

PDP would maintain natural drainages and pre-Project hydrographs across the Project Site to the extent practicable and maintain a pre-development flood hydrograph for all storms up to and including the 100-year rainfall event.

WATER-5: Reclamation and Decommissioning

Reclamation of the Project area would begin immediately after decommissioning to reduce the likelihood of surface water sedimentation.

4.0 CUMULATIVE IMPACTS

This section analyzes the cumulative impacts of the proposed lease. Under NEPA regulations, a cumulative impact is defined in 40 CFR. Section 1508.7 as, "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

The BIA and Navajo Nation prepared a comprehensive listing of past, present, and reasonably foreseeable developments as part of the 2022 Final Programmatic Environmental Impact Statement for the Navajo Nation Integrated Weed Management Plan (BIA 2022). The list included community development proposals, mining and mineral extraction projects, reclamation projects, road and utility infrastructure projects, energy projects, housing and land use plans, and a variety of other projects specific to the Western Navajo Agency, which serves the region in which the proposed land lease is located. All of the projects listed in Section 4.11 of the Navajo Nation Integrated Weed Management Plan Final Programmatic Environmental Impact Statement are incorporated here by reference.

4.2 CUMULATIVE IMPACT ASSESSMENT

4.2.1 Geology, Mineral Resources, and Soils

Cumulative impacts on rock, soil, and minerals can, over a long period of time, result in gradual changes in soil and rock erosion potential, ecological function, and mineral access. Disturbance in the cumulative impacts analysis area includes past, present, and reasonably foreseeable future roads, potential future AUM reclamation, rural ranching, and residential developments. The impacts on the Project Site soils, rocks, and bedrock would be greatest from actions that involve ground disturbing activities, such as construction or installation of access roads, the solar array and associated equipment, gen tie structures, and the substation.

Since the Project avoids known mineral deposits in the area, cumulative impacts on mineral resources would be minimal; potential future AUM reclamation efforts would help restore soils in AUM areas and minimize cumulative impacts. Construction activities have the potential to permanently alter the geology and soils in the cumulative impacts analysis area. The potential for erosion and dust associated with ground disturbance are the major soils concerns, although the potential for erosion would diminish over time. Other planned projects or developments in the cumulative impacts analysis area could also result in soil loss from ground disturbing activities, particularly during construction.

In combination with the Project, additional projects could result in a long-term loss of soils in the area given the increased disturbance and developed features. In addition to the Project, the proposed widening of US 89 and other future projects could add to the depletion of the resources located in the Chinle Formation; however, the contribution to cumulative impacts from the Project would be minimal because the Project would impact a very small percentage of the total Chinle Formation exposures.

4.2.1.1 Paleontology

The cumulative impacts analysis area for paleontological resources is limited to exposures of the lower Chinle Formation, the primary geologic unit underlying the Project Site. Within the cumulative impacts analysis area, there are numerous previously recorded and potentially undiscovered paleontological localities. Disturbance in the cumulative analysis impacts area includes past, present, and reasonably foreseeable activities such as US 89 and future road improvements, construction and/or maintenance of Project access roads, potential future mining reclamation, rural ranching, and residential developments. These activities would be anticipated to continue at baseline levels. Construction of Project access roads may result in the loss of important paleontological resources due to ground disturbance and associated crushing or moving of fossils. In addition, these roads could allow access to previously inaccessible areas, providing for the illegal collection or legal collection and preservation of paleontological resources not immediately destroyed by road construction. Since ranching and residential developments are typically concentrated on flatter, vegetated areas immediately underlain by younger Quaternary geological units, they are less likely to impact paleontological resources. The Project's contribution to cumulative impacts would be minor because the Project would impact a very small percentage of the total Chinle Formation exposures.

4.2.2 Air Quality and Noise

The Project would result in temporary moderate and long-term minor beneficial incremental impacts on air quality from the generation of emissions associated with Project construction and installation, O&M, and decommissioning. Project construction would temporarily increase emissions of regulated pollutants, but Project operation would annually displace an estimated 491 tons of CO_2, 592 tons of NO_x, 196 tons of SO_x, and 58 tons of $PM_{2.5}$ by generating energy that would otherwise have been provided by traditional fossil fuel power plants (**Table 3.3-3**). The Project, when combined with past, present, and reasonably foreseeable projects, would result in minor cumulative impacts on air quality due to air emissions and long-term minor beneficial impact on climate change due to reduced reliance on fossil fuel-generated energy sources.

Noise impacts from the Project would typically be localized, with noise levels associated with construction and system maintenance returning to ambient conditions within a relatively short distance. Localized cumulative minor noise impacts would be temporary. Based on the relatively minimal nature of operational noise, ongoing cumulative effects would only occur for a short time during Project construction and routine maintenance. There would be no long-term cumulative noise impacts. During the county permit review for the potential US 89 widening project, nuisance noise impacts associated with that project would be reviewed and restrictions or mitigation could be applied, if appropriate.

4.2.3 Biological Resources

The geographic area for the cumulative impacts analysis is the Coalmine Canyon Chapter since most Project-related disturbance occurs within it. The Coalmine Canyon Chapter includes approximately 463,888 acres. Past, ongoing, and foreseeable activities that impact biological resources are primarily sheep and cattle grazing and uranium mining and subsequent reclamation. The chapter's other land uses include scattered residential homesite construction, minor commercial development, road and utility construction/maintenance, and recreation.

Direct impacts on biological resources resulting from these activities include: loss or modification of habitat through vegetation removal and disturbance and the potential for spread or introduction of noxious weeds; fragmentation of habitat; disturbance from human activities; and the potential increase in human-wildlife encounters, including vehicle collisions. Navajo free-ranging horses have negatively impacted livestock forage resources and degraded wildlife habitat through overgrazing (Wallace, et al 2017; NNDFW 2018).

Changing climatic and hydrologic conditions have modified and would continue to modify the ecosystems in the cumulative impacts analysis area. These changes may include:

- increased sand dune mobility and wildfire risk.
- changes in vegetation community composition, habitat loss, and conversion.
- increased spread of invasive or non-native species.
- shifts in species' geographic ranges.
- increases or decreases in wildlife and plant populations.
- alterations in the timing of life cycle events, such as animal migration, emergence from hibernation, etc. (Nania and Cossetto 2014).

The potential impacts of climate change on wildlife are species-dependent, as some species are more adaptable while others are specialists or limited in distribution and highly vulnerable to change. Driving factors for species vulnerability are predicted changes in terrestrial, riparian, and aquatic ecosystems resulting from pollution, habitat loss and fragmentation, energy and other development, increased human water demands, overgrazing, and encroachment of non-native plants (Nania and Cossetto 2014). When considered along with other past, ongoing, and foreseeable activities in the analysis area, the Project would incrementally impact approximately 1.6% of vegetation and wildlife habitat in the cumulative impacts analysis area.

There would be no cumulative impacts expected for the Project or future area projects to federally listed threatened or endangered species or experimental non-essential species. Any foreseeable future project in the area have the potential to impact NESL species. The Project impacts and future projects' impacts would include some loss or modification of potentially suitable habitat. These impacts would be reduced through the implementation of mitigation measures and monitoring specified by the NNDFW.

Raptor species, including the ferruginous hawk, golden eagle, and peregrine falcon, could be cumulatively impacted through foraging habitat loss or modification and fragmentation. However, this impact is expected to be negligible to low based on the poor raptor habitat for nesting and limited prey base for foraging. Cumulative impacts on Peeble's bluestar and Beath's milkvetch would include a loss or modification of suitable habitat. While these impacts could affect individuals, no population-level impacts would be expected to occur.

4.2.4 Cultural and Historic Resources

As all sites evaluated as either NRHP eligible or NRHP undetermined and those with AIRFA concerns would be avoided, no cumulative impacts are anticipated for cultural resources.

4.2.5 Hazards, Hazardous Materials, and Waste

The US 89 widening and any potential future AUM reclamation projects near the Project area would likely utilize or produce many of the same hazardous materials and waste discussed in **Section 3.3.6**. The risk of accidental hazardous material and waste spills would increase, but with proper training and observation of federal, state, and local regulations, only minor impacts on surrounding properties would be anticipated.

4.2.6 Land Use, Tribal Trust Lands, Grazing, and Agriculture

At a cumulative level, the Project and future projects may gradually and incrementally shift the area toward a more developed land use pattern. This could change community character, impact community services associated with education and health provision, and increase demand for drinking water and other utilities.

Potential future reclamation of area AUMs is expected and will improve soils, surface water, and groundwater conditions. No cumulative impacts are expected to agricultural resources or practices, as agriculture is not a current land use. There may be a slight increase in transportation land use associated with foreseeable future projects and the increase associated with Project access roads. Grazing is not expected to be a viable future land use. This is due more to historic use and existing/future climate and drought conditions than to this Project or other foreseeable projects. The withdrawal of trust lands from grazing is expected to be permanent because of these conditions. The lease of trust lands is not expected to have cumulative impacts on Navajo Nation trust lands overall.

4.2.7 Socioeconomics

The 750MW Project is expected to support a total of 770 jobs, generating $40 million in labor income and $117 million in economic output.[48] The long-term cumulative impacts would include ongoing employment for 21 employees, generating $1 million a year in labor income and $3 million a year in economic output. The Project would draw $69.5 million in lease payments and community stakeholder payments over its expected 35-year operational life and would generate another $8 million in cumulative tax payments to Coconino County.

Many family-run businesses in the area wish to expand and/or were hit hard by COVID-19. From the outset of Project construction, these businesses would benefit greatly from the presence of construction workers in the area who would need places to stay, food to eat, and consumer goods to purchase. Money spent building the Project would flow through the local economy as workers spend their paychecks and as the Project itself purchases goods and services. Local businesses, in turn, would need to increase their employees' hours and/or hire additional employees. The profits of local businesses would increase, allowing them to remodel, expand into additional sales space, or purchase new equipment.

The longer-term ripple effects of Project construction and operation spending would be an economic boost to the FBFA, generating the economic growth necessary to support other projects, as well. The 2020 Navajo Thaw Recovery Plan identifies several immediate recovery projects in various stages of planning and funding (**Table 4.2-1**).

[48] Mangum Economics Consulting LLC's Painted Desert Power Economic and Fiscal Contribution to Coconino County, Arizona and the Navajo Nation is dated April 7, 2022. Triple Point Strategic Consulting LLC's Review of Mangum Economics 2022 Report is dated May 2022.

Table 4.2-1 Navajo Thaw Immediate Recovery Projects

NAVAJO THAW IMMEDIATE RECOVERY PROJECTS	CAPITAL EXPENSE BUDGET *(in dollars)*
Echo Cliffs Health Center	151,200,000
Little Colorado River Valley Farms Project (4,000 acres)	79,480,000
Livestock Projects	3,178,408
Bodaway Gap Echo Cliffs Veterans Facility	2,240,000
Tuba City RBDO Business Information Center	2,500,000
Tonalea Commercial Site	1,700,000
Kerley Valley Commercial - Light Industrial Site	1,320,050
Bodaway Gap Economic Development Site (100 acres)	5,000,000
Tuba City Airport	13,100,000
Total	259,718,458

Source: Navajo Thaw Recovery Plan 2020

In combination with other anticipated activity, Project construction would result in a short-term beneficial cumulative economic stimulus to the local chapters and serve as a foundation for long-term economic development by providing reliable and clean electric energy, workforce development, ongoing employment, and annual tax revenues. The construction of powerlines, waterlines, wastewater treatment facilities, road improvements, public safety buildings, and other community infrastructure projects would improve the socioeconomic conditions of current residents and fuel future economic growth.

4.2.8 Visual Resources

Cumulative impacts on visual resources are related to existing conditions, the proposed Project, and any future renewable energy, transmission, or other infrastructure projects developed in the Project Site viewshed. The proposed widening of US 89 and any potential future AUM reclamation projects, when combined with visual impacts from the proposed Project, would create a minor cumulative impact on the viewshed of the Project Site.

4.2.9 Public Health and Safety

The cumulative impacts analysis area for public health and safety is the Project Site boundary. Preliminary planning is underway for the widening of US 89 and there is potential for future AUM reclamation projects, both within the cumulative impacts analysis area. These projects would likely require the presence of heavy equipment and use of the local roads for transport of materials, increasing the risk of roadway accidents, particularly in combination with an increase in commuters and in large trucks carrying the oversized loads that would be associated with the US 89 widening project. The risks would be greater if the construction of multiple projects coincided, which is not expected at this time.

The widening of US 89 and any potential future AUM reclamation projects could precede, coincide with, or follow Project construction, operation, or decommissioning. Simultaneous construction could increase the production of dust, resulting in temporarily reduced visibility and potential for adverse health impacts.

It is likely that the proposed widening of US 89 and any potential future AUM reclamation activities would involve the use and/or disposal of hazardous material and waste. While compliance with federal, state, local, and tribal requirements for handling and disposal of these materials would be required, it is possible that an accidental spill could occur, resulting in minor cumulative impacts in the long term when combined with the proposed Project.

4.2.10 Traffic and Transportation

The cumulative impacts analysis area for traffic and transportation is the Project Site boundary, US 89, BIA RT 6730, the intersection of US 89 and BIA RT 6730, and the proposed Project access roads. US 89 would be used to transport construction materials and personnel to the Project Site and the proposed improvement and widening of the existing US 89 access to BIA RT 6730 would provide a primary entry point to the solar array areas.

Preliminary planning is underway for ADOT's widening of US 89 near Cameron, Arizona, which is within the cumulative impacts analysis area. At this time, the widening of US 89 is not expected to overlap with Project construction, which limits the potential for temporary cumulative effects on traffic and transportation in the cumulative impacts analysis area. Cumulative impacts on existing traffic conditions along US 89 could occur if Project construction coincided with ADOT's proposed roadway widening. Should both projects occur simultaneously, it is anticipated that coordination with ADOT would address the Project's contribution to traffic and transportation impacts and the result would be minor, direct impacts on US 89 that would cease after Project construction. Following Project construction, including the improvement and widening of the existing US 89 access to BIA RT 6730 to be coordinated with ADOT, the Project would have a minor cumulative impact on traffic and transportation.

4.2.11 Water Resources

Surface and groundwater cumulative impacts are interrelated and similar. Changing climatic and hydrologic conditions have modified and continue to modify the ecosystems in the cumulative impacts analysis area. The potential cumulative impacts from climate change to surface and groundwater resources are interrelated with the reduced volume, quality, and availability to humans, wildlife, and vegetation due to lower precipitation and increased demand resulting from warming and drought. To the extent the Project requires local water resources, it would contribute to the ongoing trend of reduced water availability in the region. Ongoing grazing, transportation projects, and potential future AUM reclamation projects could also contribute to these impacts. Development of the Project and foreseeable future projects would result in increased impervious surface area and stormwater runoff in local watersheds. Without proper stormwater controls, these projects could include the discharge of pollutants to surface and groundwaters. Grazing reduction of stabilizing vegetation would result in higher sediment loads in surface waters. Most of these impacts would be eliminated or reduced because of mitigation measures adopted by PDP.

5.0 CONSULTATION RECORD

5.1 COGNIZANT AND OTHER AGENCY COORDINATION

For the purposes of environmental review, the Navajo Nation General Leasing Regulations of 2013 defines as cognizant agencies the NNEPA, the NNHHPD, the NNDFW, and any successor or equivalent Navajo Nation agencies with authority for environmental compliance review.

Table 5.1-1 Cognizant Agency Engagement

AGENCY	RESOURCE	INITIAL OUTREACH DATE	RESPONSE DATE
NNDFW	NESL and USFWS Listed Species	5/22/2019	2/5/2021
NNEPA	CWA Section 401, WNN	11/13/2020	3/18/2021
NNHHPD	Cultural Resources	12/2019	4/2/2021

To ensure Project compliance with CWA Section 404, a request for a JD was submitted to the USACE Phoenix Regulatory Office on November 13, 2020, and on March 29, 2021, the USACE issued to PDP a “no permit required” letter regarding compliance with CWA Section 404 (**Appendix Q**).

5.2 PUBLIC INVOLVEMENT

5.2.1 Public Outreach

Beginning March 23, 2018, Navajo Power and PDP engaged individual community members, including grazing permit holders, community members and representatives from the Cameron and Coalmine Canyon chapters, members of the Navajo Nation Tribal Council and Navajo-Hopi Land Commission, and staff from US and Navajo Nation agencies, businesses, and non-governmental organizations based on the Nation. Navajo Power and PDP conducted informal and formal meetings, site visits, community events, virtual meetings, and planning meetings. The results of and feedback from these meetings led to the selection of the current Project Site, which maximizes economic benefits for economically distressed communities, minimizes impacts on biological and cultural resources, avoids high-density residential areas, and repurposes previously impacted areas with few other suitable land uses.

A full list of meetings conducted between March 2018 and March 2023[49] has been included as **Appendix J**.

5.3 LIST OF PREPARERS

Table 5.3-1 List of Preparers

RESOURCE TOPIC/ROLE	PREPARER/MANAGER
Geology, Mineral Resources, Soils, and Paleontology	Paul Rawson, SWCA Environmental Consultants Inc. Georgia Knauss, SWCA Environmental Consultants Inc.

[49] Meetings are ongoing and the end date of this range is current as of the date of this document.

RESOURCE TOPIC/ROLE	PREPARER/MANAGER
Air Quality and Noise	Breanna Bernal, SWCA Environmental Consultants Inc. Brad Sohm, PE, SWCA Environmental Consultants Inc.
Biological Resources	Mike Fitzgerald, Ecosphere Environmental Services Inc.
Cultural and Historic Resources	Doug Loebig, MA, Stratified Environmental & Archaeological Services LLC Randy Davis, Stratified Environmental & Archaeological Services LLC Virginia Davis, Stratified Environmental & Archaeological Services LLC Ian Geoffrey Thompson, Stratified Environmental & Archaeological Services LLC Julius Tulley, Stratified Environmental & Archaeological Services LLC
Hazards, Hazardous Materials, and Waste	Steve O'Brien, SWCA Environmental Consultants Inc. Erin A. Drake, MA, SWCA Environmental Consultants Inc.
Land Use, Tribal Trust Lands, Agriculture, and Grazing	Heather Parmeter, Ecosphere Environmental Services Inc.
Socioeconomics	Jeff Moffett, PhD, Triple Point Strategic Consulting LLC Martina Arel, MBA, Mangum Economic Consulting LLC A. Fletcher Mangum, PhD, Mangum Economic Consulting LLC Adelita Barrett, Navajo Power PBC Brett Isaac, Navajo Power PBC Tony Skrelunas, Navajo Power PBC
Visual Resources	Chris Baker, Terabase Energy Inc. Carol Aber, Terabase Energy Inc. Jill Grams, SWCA Environmental Consultants Inc.
Public Health and Safety	Nicholas Brasier, SWCA Environmental Consultants Inc. Erin A. Drake, MA, SWCA Environmental Consultants Inc.
Traffic and Transportation	Jeremy Casteel, SWCA Environmental Consultants Inc. Erin A. Drake, MA, SWCA Environmental Consultants Inc.
Water Resources	Mike Fitzgerald, Ecosphere Environmental Services Inc. Chuck Howe, C2 Environmental LLC Geoffrey Dewhurst, Terabase Energy Inc.
Project Description and Alternatives	Matt Gordon, AES Clean Energy Tanya Martinez, AES Clean Energy Terrance Unrein, AES Clean Energy Chris Baker, Terabase Energy Inc. Carol Aber, Terabase Energy Inc. Julien Blarel, Terabase Energy Inc. Pierre Gousseland, Terabase Energy Inc. Hanz Henson, Terabase Energy Inc. Dillon Morra, Terabase Energy Inc. Leslie Mejia, Terabase Energy, Inc. Romeo Roque-Nido, Terabase Energy Inc.

RESOURCE TOPIC/ROLE	PREPARER/MANAGER
Stakeholder Engagement	John Lauer, Navajo Power PBC Adelita Barrett, Navajo Power PBC Brett Isaac, Navajo Power PBC Clara Pratte, Navajo Power PBC Tony Skrelunas, Navajo Power PBC
Editor	Kristin Weinberger, Terabase Energy Inc.
SWCA Environmental Consultants Project Manager	Erin A. Drake, MA, SWCA Environmental Consultants Inc.
Reviewers	Mike Fitzgerald, Ecosphere Environmental Services Inc. Adelita Barrett, Navajo Power PBC Josh Finn, Navajo Power PBC Tony Skrelunas, Navajo Power PBC Margaret Tallmadge, Navajo Power PBC
Project Manager	John Lauer, Navajo Power PBC
Environmental Planner	Jennifer Rouda, Navajo Power PBC
General Counsel	A. Joseph Sarcinella, Drummond Woodsum

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Appendix A ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AC	alternating current
ACC	Arizona Corporation Commission
ac ft	acre-feet
ACHP	Advisory Council on Historic Preservation
ADOT	Arizona Department of Transportation
AES	AES Clean Energy
AIRFA	American Indian Religious Freedom Act
ALARA	as low as reasonably achievable
amsl	above mean sea level
ANSI	American National Standards Institute
APE	area of potential effect
APS	Arizona Public Service
AQI	Air Quality Index
AQR	Aquatic Resources Report
Area 1	Proposed Solar Array Area 1
Area 2	Proposed Solar Array Area 2
Area 1A	Alternative Solar Array Area 1A
Area 2A	Alternative Solar Array Area 2A
ARPA	Archaeological Resources Protection Act
ASPECT	Airborne Spectral Photometric Environmental Collection Technology
AUM	abandoned uranium mine
AVERT	AVoided Emissions and geneRation Tool
BE	biological evaluation
BESS	battery energy storage system
bgs	below ground surface
BIA	Bureau of Indian Affairs
BIA RT 6730	Bureau of Indian Affairs Route 6730
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
C	Coconino
C2 Environmental	C2 Environmental LLC
CATEX	categorical exclusion
CDP	census designated place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CIDH	cast-in-drilled-hole

CIP	Capital Improvement Plan
CLUP	Chapter Community-Based Land Use Plans
CO	carbon monoxide
CO_2e	carbon dioxide equivalents
COBRA	CO-Benefits Risk Assessment
COVID-19	Coronavirus Disease 2019
CSPs	Chapter-Specific Plans
CWA	Clean Water Act
dBA	A-weighted decibels
DC	direct current
DWR	Navajo Nation Department of Water Resources
EA	environmental assessment
Ecosphere	Ecosphere Environmental Services Inc.
EO	executive order
EPC	engineering, procurement, and construction
eU	equivalent uranium
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FBFA	Former Bennett Freeze Area
FHWA	Federal Highway Administration
FM	Factory Mutual
FOIA	Freedom of Information Act
FONSI	Finding of No Significant Impact
FPP	fire protection plan
FR	Federal Register
ft	foot, or feet
gen tie	generation intertie
GHG	greenhouse gas
GIS	Geographic Information Systems
GLDD	Navajo Nation General Land Development Department
GW	gigawatt
H&A	Haley and Aldrich Inc.
HAP	hazardous air pollutant
HASP	Health and Safety Plan
HEC-RAS	Hydrologic Engineering Center River Analysis System
HV	high voltage
IPCC	Intergovernmental Panel on Climate Change
IRMP	Integrated Resource Management Plan
ISO	International Organization for Standardization
JD	jurisdictional determination
KOP	key observation point
kV	kilovolt
lbs	pounds

LDN	day-night average sound levels
LEQ	energy-averaged sound levels
LGA	Local Governance Act
LLC	Limited Liability Company
LMAX	maximum sound level
LMD	Land Management District
Mangum Economics	Mangum Economic Consulting LLC
MV	medium voltage
MW	megawatt
MWdc	megawatts of direct current
N	Navajo
NAAQS	National Ambient Air Quality Standards
NAGRA	Native American Graves Protection and Repatriation Act
NAML	Navajo Abandoned Mine Lands
Navajo Power	Navajo Power PBC
NCDC	National Climatic Data Center
NDOT	Navajo Division of Transportation
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NESL	Navajo Endangered Species List
NFPA	National Fire Protection Association
NGS	Navajo Generating Station
NHA	Navajo Housing Authority
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NLD	Navajo Land Department
NNC	Navajo Nation Code
NNCRPA	Navajo Nation Cultural Resources Protection Act
NNCWA	Navajo Nation Clean Water Act
NNDFW	Navajo Nation Department of Fish and Wildlife
NNDNR	Navajo Nation Division of Natural Resources
NNEPA	Navajo Nation Environmental Protection Agency
NNFD	Navajo Nation Department of Fire & Rescue Services
NNHHPD	Navajo Nation Heritage & Historic Preservation Department
NNHP	Navajo Natural Heritage Program
NNOAG	Navajo Nation Office of the Auditor General
NNRDC	Navajo Nation Resources and Development Committee
NNSP	Navajo Nation Superfund Program
NNSWQS	Navajo Nation Surface Water Quality Standards

NNTCOB	Navajo Nation Technical Construction and Operations Bureau
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NORM	naturally occurring radioactive material
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSTS	Navajo Southern Transmission System
NTUA	Navajo Tribal Utility Authority
NWI	National Wetlands Inventory
NWPR	Navigable Waters Protection Rule
O_3	ozone
OEH	Office of Environmental Health
OHWM	ordinary high water mark
O&M	operations and maintenance
Pb	lead
PBC	public benefit corporation
PCS	plant control system
PDP	Painted Desert Power LLC
Phase I ESA	Phase I Environmental Site Assessment
PM	particulate matter
POD	plan of development
PPE	personal protective equipment
Project	Painted Desert Power Solar Project
PV	photovoltaic(s)
RCNM	Roadway Construction Noise Model
RCP	Biological Resource Land Use Clearance Policies and Procedures
REC	renewable energy credit
R-M	Redwall-Muav
ROW	right-of-way
RPS	renewable portfolio standard
RT	Route
RV	recreational vehicle
SCADA	Supervisory Control and Data Acquisition
SEAS	Stratified Environmental & Archaeological Services LLC
SEIA	Solar Energy Infrastructure Association
SEMS	Superfund Enterprise Management System
SF_6	sulfur hexafluoride

SGWPD	Surface and Groundwater Protection Department
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SOX	sulphur oxides
SPCC	spill prevention, control, and countermeasure
sq ft	square feet
SR	State Route
SUYL	sheep units year long
SWCA	SWCA Environmental Consultants Inc.
SWPPP	stormwater pollution prevention plan
TCOB	Technical, Construction and Operations Branch, Navajo Nation Department of Water Resources
TDD	threshold determination document
Terabase Energy	Terabase Energy Inc.
THPO	Tribal Historic Preservation Office
TPT	transaction privilege tax
Triple Point	Triple Point Strategic Consulting LLC
UL	Underwriters Laboratories
US	United States
US 89	US Route 89
USACE	US Army Corps of Engineers
USBR	US Bureau of Reclamation
USC	United States Code
USEPA	US Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compound
WNN	waters of the Navajo Nation
WQC	Water Quality Certification
WUS	waters of the United States

Navajo Háyoołkááł Proclamation

Navajo Nation
Office of the President and Vice President

WHEREAS, the Navajo Háyoołkááł Proclamation, also known as the Navajo Sunrise Proclamation, hereby creates a new economic vision for the Navajo people through healing the land, fostering clean energy development, and providing leadership for the energy market for the Navajo people; and

WHEREAS, the Navajo Sunrise Proclamation shall be based on four principles:

1. A diverse energy portfolio, creating workforce development and job creation for the Navajo People from focused carbon-based energy to renewable energy development, including workforce,
2. Restoration of land and water after decades of uranium and coal mining,
3. Rural electrification of homes that lack access to electricity,
4. Utility-scale renewable energy development, to supply electricity to the Navajo Nation and Western United States; and

WHEREAS, the U.S. economic trend has led to the scheduled closures or retrofitting of coal-fired generating stations and coal mines in and around the Navajo Nation in the coming years. The Nez-Lizer Administration will strive to protect our people's livelihood with jobs and incomes as we work to restore the land, and to build a more diverse economy and energy portfolio, including clean energy development; and

WHEREAS, the Nez-Lizer Administration will prioritize providing off-grid solar generated electricity to Navajo households that do not have electricity and building new community and utility-scale clean energy projects. Renewable energy projects require designers, installers, electricians, and maintenance crews, which will build capacity among Navajo workers and sustain this workforce in the long-term. Once this economic engine is established, the Navajo Nation will continue to secure new investment and new jobs through ancillary industries like the assembly of solar panels and racking systems, further solidifying its role as a leader in the clean energy market; and

WHEREAS, the Navajo Nation will build economic opportunities for our people by reinvesting a portion of our renewable energy revenues into infrastructure and the enterprises created by our entrepreneurs and small business owners; and

WHEREAS, to ensure the transition to a balanced energy portfolio, and to bring benefits to the Navajo people, the Nez-Lizer Administration will support groups that provide off-grid solar power and energy storage for Navajo households that do not have electricity. We recognize that the Navajo Nation has been providing electricity for the Western United States for many years using our natural resources while many of our own people lack basic access to power and running water; and

WHEREAS, the Nez-Lizer Administration supports amending the Navajo Energy Policy of 2013 to prioritize renewable energy as a key focus of the Navajo Nation, while creating an energy office to oversee energy projects and development; as information is enhanced and technology is improved and achieving economies of scale enable cost conducive structure, the Navajo Energy Office can position itself for optimal gains; and

WHEREAS, through the practice of Nitsáhákees, Nahatá, Iiná and Sihasin, this Proclamation is issued with the belief that our greatest problems can be solved by creating a diversified energy portfolio that will contribute to combating climate change, powering the Navajo Nation and Western United States, and uplifting the Navajo people. The Navajo Nation will become a leader in clean energy, and ensure that clean energy is advanced through Navajo labor, entrepreneurship, innovation and adaptation; and

WHEREAS, the greatest resource of the Navajo Nation is its people, who, through war and attrition, overcame adversity and prospered partly through its vast sources of energy, which today is held for future generations.

THEREFORE, through the Diné teaching of "T'áá hwó' ajít'éego" and for the many who have called upon our Nation's leaders to transition away from our overdependence on fossil fuels, the Navajo Nation will strive for a balanced energy portfolio and will pursue and prioritize clean renewable energy development for the long-term benefit of the Navajo People and our communities. I, Navajo Nation President Jonathan Nez and I, Vice President Myron Lizer, do hereby issue the Navajo Háyoołkááł Proclamation, also known as the Navajo Sunrise Proclamation, to create a new, diverse economy for the Navajo people to heal the land, foster clean energy development, and to become a leader the energy market for the Navajo People. Proclaimed this 2nd Day of April 2019.

Jonathan Nez, President
THE NAVAJO NATION

Myron Lizer, Vice President
THE NAVAJO NATION

Appendix C AIR QUALITY CALCULATIONS

Painted Desert Project
Air Quality
Emission Calculations
Construction Emissions Summary

Annual Construction Emissions Summary

Construction Emission Source	Emissions, tpy							Emissions, mtpy
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CO_2e
Construction Equipment (Off-Road)	53.10	75.27	0.15	3.50	3.11	10.94	1.09	12,764
Worker and On-Road Construction Equipment Commuting	4.96	1.55	0.01	39.25	4.28	0.61	0.06	1,183
Equipment/Material Delivery	6.92	7.35	0.02	56.30	6.36	1.05	0.11	1,938
Fugitive Dust From Construction Operations	-	-	-	24.21	2.42	-	-	-
Total:	**64.98**	**84.18**	**0.18**	**123.25**	**16.17**	**12.60**	**1.26**	**15,885**

Annual Operational Emissions Summary

Operational Emission Source	Emissions, tpy							Emissions, mtpy
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CO_2e
Maintenance/Inspection Activities	0.48	0.28	0.00	1.29	0.15	0.06	0.01	85
Total:	**0.48**	**0.28**	**0.00**	**1.29**	**0.15**	**0.06**	**0.01**	**85**

Painted Desert Project
Air Quality
Emission Calculations
County Emission Inventory Comparison to Proposed Action Emissions

Construction Emissions - Percent of County Inventory

Emissions Source	Emissions, tpy						
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs
Construction Emissions	64.98	84.18	0.18	123.25	16.17	12.60	1.26
Coconino County Emissions Inventory Total	217,671	16,341	1,194	27,990	16,310	135,336	21,612
Percent of County EI Total	**0.03%**	**0.52%**	**0.02%**	**0.44%**	**0.10%**	**0.01%**	**0.01%**

Note: Emission inventory data from the National Emissions Inventory, 2017.

Operational Emissions - Percent of County Inventory

Emissions Source	Emissions, tpy						
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs
Operational Emissions	0.48	0.28	0.00	1.29	0.15	0.06	0.01
Coconino County Emissions Inventory Total	217,671	16,341	1,194	27,990	16,310	135,336	21,612
Percent of County EI Total	**< 0.01%**	**< 0.01%**	**< 0.01%**	**< 0.01%**	**< 0.01%**	**< 0.01%**	**< 0.01%**

Note: Emission inventory data from the National Emissions Inventory, 2017.

Painted Desert Project
Air Quality
Emission Calculations
Construction Emissions: Equipment Emissions

South Coast Air Quality Management District - Off-Road Model Mobile Source Emission Factors - 2018 Fleet Average (pounds/hour)

Equipment	CO	NO_X	SO_X	PM / PM_{10}	ROG / VOC	CH_4	CO_2
Aerial Lifts Composite	0.1740	0.2152	0.0004	0.0119	0.0322	0.0029	34.72
Air Compressors Composite	0.3130	0.3935	0.0007	0.0246	0.0582	0.0052	63.61
Bore/Drill Rigs Composite	0.5011	0.4175	0.0017	0.0099	0.0539	0.0049	164.88
Cement and Mortar Mixers Composite	0.0416	0.0538	0.0001	0.0022	0.0087	0.0008	7.25
Cranes Composite	0.4060	0.7908	0.0014	0.0318	0.1012	0.0091	128.63
Dumpers/Tenders Composite	0.0314	0.0584	0.0001	0.0023	0.0092	0.0008	7.62
Excavators Composite	0.5160	0.5181	0.0013	0.0249	0.0848	0.0077	119.58
Forklifts Composite	0.2173	0.2186	0.0006	0.0101	0.0372	0.0034	54.40
Generator Sets Composite	0.2786	0.3759	0.0007	0.0192	0.0477	0.0043	60.99
Graders Composite	0.5812	0.7217	0.0015	0.0355	0.1049	0.0095	132.74
Off-Highway Trucks Composite	0.5634	1.0525	0.0027	0.0360	0.1613	0.0146	260.07
Other General Industrial Equipment Composite	0.4591	0.8242	0.0016	0.0336	0.1113	0.0100	152.24
Pavers Composite	0.5017	0.6241	0.0009	0.0419	0.1121	0.0101	77.93
Rollers Composite	0.3885	0.4485	0.0008	0.0291	0.0683	0.0062	67.04
Rubber Tired Dozers Composite	0.8819	1.8194	0.0025	0.0737	0.2343	0.0211	239.09
Scrapers Composite	0.8418	1.6042	0.0027	0.0653	0.2135	0.0193	262.49
Skid Steer Loaders Composite	0.2146	0.1799	0.0004	0.0074	0.0253	0.0023	30.28
Tractors/Loaders/Backhoes Composite	0.3647	0.3331	0.0008	0.0189	0.0513	0.0046	66.80
Trenchers Composite	0.4368	0.5117	0.0007	0.0393	0.1061	0.0096	58.71

Note: Available at http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/off-road-mobile-source-emission-factors. All PM is assumed to be equal to PM_{10}. All ROG is assumed to be equal to all VOC.

Off-Road Mobile Source Emissions

Construction Timeframe	Equipment						Emissions, tpy									Emissions, mtpy
	Equipment Type	Mapped SCAQMD Equipment Category	Quantity [1]	Hours per Day [2]	Days of Use [2]	Total Cumulative Hours of Use	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CH_4	CO_2	CO_2e
Painted Desert Project	Crane	Cranes Composite	16	6	72	6,912	1.40	2.73	0.00	0.11	0.10	0.35	0.03	0.03	444.54	403.99
	Water Truck	Off-Highway Trucks Composite	2	10	120	2,400	0.68	1.26	0.00	0.04	0.04	0.19	0.02	0.02	312.09	283.52
	Helicopter	Aerial Lifts Composite	1	8	60	480	0.04	0.05	0.00	0.00	0.00	0.01	0.00	0.00	8.33	7.58
	Rubber Tired Dozer	Rubber Tired Dozers Composite	12	8	72	6,912	3.05	6.29	0.01	0.25	0.23	0.81	0.08	0.07	826.29	751.25
	Excavator	Excavators Composite	30	8	72	17,280	4.46	4.48	0.01	0.22	0.19	0.73	0.07	0.07	1033.17	938.77
	Graders	Graders Composite	12	8	72	6,912	2.01	2.49	0.01	0.12	0.11	0.36	0.04	0.03	458.76	416.92
	Skid Steer Loader	Skid Steer Loaders Composite	30	8	72	17,280	1.85	1.55	0.00	0.06	0.06	0.22	0.02	0.02	261.60	237.76
	Roller	Rollers Composite	8	8	72	4,608	0.90	1.03	0.00	0.07	0.06	0.16	0.02	0.01	154.47	140.45
	Forklift	Forklifts Composite	40	8	72	23,040	2.50	2.52	0.01	0.12	0.10	0.43	0.04	0.04	626.64	569.35
	Reach Stacker	Reach Stackers Composite	16	8	72	9,216	1.25	1.52	0.00	0.09	0.08	0.21	0.02	0.02	228.59	207.80
	Generator Set	Generator Sets Composite	16	10	72	11,520	1.60	2.17	0.00	0.11	0.10	0.27	0.03	0.02	351.32	319.27
	Pile Driver	Pile Drivers Composite	48	8	72	27,648	5.72	7.68	0.01	0.52	0.46	1.18	0.12	0.11	953.03	867.00
	Dump Truck	Dumpers/Tenders Composite	30	8	72	17,280	0.27	0.50	0.00	0.02	0.02	0.08	0.01	0.01	65.87	59.92
	Trencher	Trenchers Composite	30	8	72	17,280	3.77	4.42	0.01	0.34	0.30	0.92	0.09	0.08	507.29	462.08
	D6, D8, 320	Other General Industrial Equipment Composite	100	8	72	57,600	13.22	23.74	0.05	0.97	0.86	3.21	0.32	0.29	4384.51	3984.12
	Trailer	Other General Industrial Equipment Composite	16	8	72	9,216	2.12	3.80	0.01	0.16	0.14	0.51	0.05	0.05	701.52	637.46
	Drill Rig	Bore/Drill Rigs Composite	32	8	72	18,432	4.62	3.85	0.02	0.09	0.08	0.50	0.05	0.04	1519.57	1379.54
	Backhoe	Tractors/Loaders/Backhoes Composite	16	8	72	9,216	1.68	1.53	0.00	0.09	0.08	0.24	0.02	0.02	307.80	279.72
	Concrete Truck	Cement and Mortar Mixers Composite	1	3	100	300	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.99
	Off-Highway Trucks	Off-Highway Trucks Composite	12	8	72	6,912	1.95	3.64	0.01	0.12	0.11	0.56	0.06	0.05	898.81	816.53
						Total:	**53.10**	**75.27**	**0.15**	**3.50**	**3.11**	**10.94**	**1.09**	**0.99**	**14,045.27**	**12,764.04**

[2] Quantities taken from Plan of Development (August 2021) Table 10.6-1. Assumed 2 water trucks & 1 concrete truck.

[2] Schedule taken from Plan of Development (August 2021) Table 10.6-2. Assumptions made for water and concrete trucks.

Note: The Equipment Type is 'mapped' to the appropriate SCAQMD equipment category in order to determine the emission factor for estimating emissions. $PM_{2.5}$ is assumed to be equal to 89% of PM_{10} emissions (SCAQMD derived default ratio for estimating
Example Calculation: [Emission Factor, lb/hour] * [Total vehicle hours used per day, hours/day] * [Total days of construction, days/project] * [1 ton / 2000 lb] = Tons of pollutant for duration of project

Painted Desert Project
Air Quality
Emission Calculations
On-Road Vehicle Emissions: Construction Worker Commuting and Equipment/Material Delivery

Total Project On-Road Vehicle Emissions

Construction Timeframe	Vehicle Type	Class	Quantity	Days Used	Commuting/Material Delivery Miles Paved			Commuting/Material Delivery Miles Unpaved		
					Commuting Miles (Round Trip)	Total miles per day	Total miles for project	Commuting Miles (Round Trip)	Total miles per day	Total miles for project
Painted Desert Project	Worker Pickup	HHDT	5	288	90	450	129,600	10	50	14,400
	Worker Pickup	Passenger	20	288	90	1,800	518,400	10	200	57,600
	Worker Pickup	Passenger	40	288	90	3,600	1,036,800	10	400	115,200
	Construction Pickup	Passenger	5	288	27	135	38,880	3	15	4,320
	Water Truck	Passenger	2	288	36	72	20,736	4	8	2,304
	Concrete Truck	Concrete	1	100	36	36	3,600	4	4	400

Notes: Workers were assumed to commute from the Flagstaff, AZ area, via bus, vanpool, and cars. 5 of those worker pickups are assumed to be used as construction pickups onsite. An estimated 10 percent of the drive would be on unpaved road. Construction vehicles were assumed to commute from Flagstaff. Construction pickups and water trucks were also assumed to drive an additional 5 miles per day traveling around the project site (unpaved roads). Concreteand water trucks were assumed to commute from Tuba City and travel 10% on unpaved roads getting to the required location on the project site and back.

SCAQMD EMFAC 2007 On-Road Emission Factors (lb./mile)

2018	CO	NO_X	ROG	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Passenger	0.00503	0.00047	0.00057	0.00001	0.00009	0.00006	1.10563	0.00005
HHDT	0.00605	0.01526	0.00132	0.00004	0.00140	0.00120	4.20757	0.00006

Note: SCAQMD EMFAC 2007 (v2.3) Emission Factors can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/emfac-2007-(v2-3)-emission-factors-(on-road). SCAQMD EMFAC 2007 (v2.3) Emission Factors for scenario year 2018 (all vehicle model years in the range from 1974 to 2018) were used. Emissions rom the concrete truck used the HHDT emission factors.

Emission Factors for Fugitive Dust from Roads, lb/VMT

Source	PM_{10}	$PM_{2.5}$
Unpaved Roads Emission Factors for Passenger Vehicles	0.34	0.03
Unpaved Roads Emission Factors for HHDT Vehicles	0.96	0.10
Unpaved Roads Emission Factors for Concrete Trucks	1.15	0.11
Paved Roads Emission Factors for Passenger Vehicles	0.00	0.00
Paved Roads Emission Factors for HHDT Vehicles	0.01	0.00
Paved Roads Emission Factors for Concrete Trucks	0.02	0.00

On-Road Vehicle Emissions - Annual

Type	Vehicle Type	Total miles	CO	NO_X	ROG	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	CO_2e, mtpy
Construction Worker Commute	Passenger	1,728,000	4.34	0.41	0.49	0.01	0.08	0.05	955.26	0.04	867.58
Fugitive Dust From Paved Roads	Passenger	1,555,200	-	-	-	-	0.79	0.19	-	-	-
Fugitive Dust From Unpaved Roads	Passenger	172,800	-	-	-	-	29.29	2.93	-	-	-
Construction Vehicles	Passenger	66,240	0.17	0.02	0.02	0.00	0.00	0.00	36.62	0.00	33.26
Fugitive Dust From Paved Roads	Passenger	59,616	-	-	-	-	0.03	0.01	-	-	-
Fugitive Dust From Unpaved Roads	Passenger	6,624	-	-	-	-	1.12	0.11	-	-	-
Heavy-Heavy Duty Vehicles	HHDT	144,000	0.44	1.10	0.09	0.00	0.10	0.09	302.94	0.00	274.93
Fugitive Dust From Paved Roads	HHDT	129,600	-	-	-	-	0.69	0.17	-	-	-
Fugitive Dust From Unpaved Roads	HHDT	14,400	-	-	-	-	6.88	0.69	-	-	-
Concrete Truck*	Concrete	4,000	0.01	0.03	0.00	0.00	0.00	0.00	8.42	0.00	7.64
Fugitive Dust From Paved Roads	Concrete	3,600	-	-	-	-	0.03	0.01	-	-	-
Fugitive Dust From Unpaved Roads	Concrete	400	-	-	-	-	0.23	0.02	-	-	-
		Total:	**4.96**	**1.55**	**0.61**	**0.01**	**39.25**	**4.28**	**1,303.24**	**0.05**	**1,183.40**

Painted Desert Project
Air Quality
Emission Calculations
Construction Emissions: Equipment Delivery

Emission Factors for Heavy-Heavy Duty Trucks in Pounds per Mile

Vehicle Type	Units	Emission Factor								Fugitive Dust from Unpaved Roads [2]	
		CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	CH_4	CO_2	PM_{10}	$PM_{2.5}$
Delivery Trucks[1]	lb/mile	0.00923	0.00979	0.00003	0.00040	0.00032	0.00140	0.00006	2.84647	0.69936	0.06994

[1] SCAQMD EMFAC 2007 (v2.3) Heavy-Heavy-Duty Vehicles Emission Factors can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/emfac-2007-(v2-3)-emission-factors-(on-road). SCAQMD EMFAC 2 Factors for scenario year 2018 (all vehicle model years in the range from 1974 to 2018) was used. Weight of delivery truck approximated to be 10 tons for fugitive dust emission factors.

[2] Based on fugitive dust emission factors calculated for delivery trucks.

Heavy Duty Truck Material Delivery Assumptions

Parameter	Value	Source / Notes
Delivery Trips per Day	50	*From POD (August 2021), section before Table 10.4-1*
Project Duration in Days	300	*Assumption*
Total Truck Trips	15,000	*Delivery Trips per Day x Project Duration in Days*
On-Road Material Delivery Miles, Round-Trip, per Load	90	*Assumed all material would be sourced in Flagstaff, 50 miles away from the project site*
Total On-Road Material Delivery Miles Traveled per Day	4500	*Delivery Trips per Day x On-Road Material Delivery Miles, Round-Trip, per Load*
Total On-Road Material Delivery Miles Traveled	1,350,000	*Total Truck Trips x On-Road Material Delivery Miles, Round-Trip, per Load*
Off-Road Material Delivery Miles, Round-Trip, per Load	10.0	*Estimated 10% unpaved roads per POD (August 2021) Table 10.4-1*
Total Off-Road Material Delivery Miles Traveled per Day	500.0	*Delivery Trips per Day x Off-Road Material Delivery Miles, Round-Trip, per Load*
Total Off-Road Material Delivery Miles Traveled	150,000	*Total Truck Trips x Off-Road Material Delivery Miles, Round-Trip, per Load*
Total On- and Off-Road Material Delivery Miles Traveled per Day	5,000	*Total On-Road Material Delivery Miles Traveled per Day + Total Off-Road Material Delivery Miles Traveled per Day*
Total On- and Off-Road Material Delivery Miles Traveled	1,500,000	*Total On-Road Material Delivery Miles Traveled + Total Off-Road Material Delivery Miles Traveled*

Annual Emissions From Material Delivery Using Heavy-Heavy Duty Trucks

Vehicle Type	Emissions, tpy									Emissions, mtpy
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CH_4	CO_2	CO_2e
On-Road Heavy-Heavy Duty Trucks	6.92	7.35	0.02	0.30	0.24	1.05	0.11	0.05	2,134.85	1,937.84
Fugitive Dust From Paved Roads	-	-	-	3.55	0.87	-	-	-	-	-
Fugitive Dust From Unpaved Roads	-	-	-	52.45	5.25	-	-	-	-	-
Total Emissions from Material Delivery	**6.92**	**7.35**	**0.02**	**56.30**	**6.36**	**1.05**	**0.11**	**0.05**	**2,134.85**	**1,937.84**

Note: GHG are based on the GWP of CO_2 (1) and CH_4 (25), and are reported in metric tons per year (mtpy). HAPs are assumed to be equal to 10% of VOC emissions.

Example Calculation (for HHDT): [Emission Factor, lb/mile] * [Total vehicle miles traveled for all loads, miles/project] * [1 ton / 2000 lb] = Tons of pollutant for duration of project

Painted Desert Project
Air Quality
Emission Calculations
Construction Emissions: Earthmoving Activities

Fugitive Dust From Construction Operations: General Construction and Cut/Fill

Parameter	Value	Source / Notes
Total Acres Affected During Construction	470	*Painted Desert Draft TDD (February 2022) Table 2.1-4*
Total Months of Construction	12	*Painted Desert POD (August 2021)*
General Construction PM_{10} Emission Factor, ton/acre-month	0.011	*WRAP Fugitive Dust Handbook, Table 3-2, "Level 2"*
Assumed Control Efficiency, %	61%	*WRAP Fugitive Dust Handbook, Table 3-6, for applying water at various intervals (3.2hr watering interval).*

Note: No off-site haulage indicated or assumed.

Source: Based on WRAP Fugitive Dust Handbook, Table 3-2, "Recommended PM_{10} Emission Factors for Construction Operations," Level 2. http://www.wrapair.org/forums/dejf/fdh/content/final-handbook.pdf

Annual Fugitive Dust Emissions From Construction Operations, in Tons

Source	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CH_4	CO_2	CO_2e
General Construction	-	-	-	24.21	2.42	-	-	-	-	-
Total Fugitive Emissions, tons	-	-	-	**24.21**	**2.42**	-	-	-	-	-

Note: $PM_{2.5}/PM_{10}$ ratio of 0.10 used from the WRAP Fugitive Dust Handbook, Section 3.3.1. On-site cut-fill emissions do not assume controls.

Example Calculation, General Construction: [Emission Factor, ton/acre-month] * [# of acres affected] * [# of months of construction/project] * [1 - Control Efficiency] = Tons of pollutant for duration of project

Example Calculation, On-Site Cut/Fill: [Emission Factor, ton/1,000 cu yds] * [total cu yds of material/1,000] = Tons of pollutant for duration of project

Painted Desert Project
Air Quality
Emission Calculations
Operational Emissions: Off-Road Vehicles Line Maintenance Emissions

South Coast Air Quality Management District - Off-Road Model Mobile Source Emission Factors - 2018 Fleet Average (pounds/hour)

Equipment	CO	NO_X	SO_X	PM / PM_{10}	ROG / VOC	CH_4	CO_2
Generator Sets Composite	0.2786	0.3759	0.0007	0.0192	0.0477	0.0043	60.99
Tractors/Loaders/Backhoes Composite	0.3647	0.3331	0.0008	0.0189	0.0513	0.0046	66.80

Note: Available at http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/off-road-mobile-source-emission-factors. All PM is assumed to be equal to PM_{10}. All ROG is assumed to be equal to all VOC.

Off-Road Mobile Source Emissions

Operations Task	Equipment						Emissions, tpy									Emissions, mtpy
	Equipment Type	Mapped SCAQMD Equipment Category	Quantity	Hours per Day	Days of Use	Total Cumulative Hours of Use	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CH_4	CO_2	CO_2e
Maintenance Activities	Backup Generator	Generator Sets Composit	1	1	12	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.30
Maintenance Activities	Tractor	Tractors/Loaders/Backhoes	10	8	20	1,600	0.29	0.27	0.00	0.02	0.01	0.04	0.00	0.00	53.44	48.56
						Total:	**0.29**	**0.27**	**0.00**	**0.02**	**0.01**	**0.04**	**0.00**	**0.00**	**53.76**	**48.86**

Note: The Equipment Type is 'mapped' to the appropriate SCAQMD equipment category in order to determine the emission factor for estimating emissions. $PM_{2.5}$ is assumed to be equal to 89% of PM_{10} emissions (SCAQMD derived default ratio for estimating $PM_{2.5}$). HAPs are assumed to be equal to 10% of VOC emissions. GHG are based on the GWP of CO_2 (1) and CH_4 (25), and are reported in metric tons per year (mtpy). Emissions of GHG include CH_4 and CO_2 emissions; they are not in addition to those emissions.

Note: Assumed a 6-day work week. Equipment discussed in Plan of Development (August 2021) in section before Table 11.3-1.

Example Calculation: [Emission Factor, lb/mile] * [Total vehicle miles traveled per day, miles/day] * [Total days of construction, days/project] * [1 ton / 2000 lb] = Tons of pollutant for duration of project

Painted Desert Project
Air Quality
Emission Calculations
On-Road Vehicle Emissions: Operational Maintenance On-Road Construction Vehicles

On-Road Vehicle Emissions

Vehicle Type	Class	Quantity	Days Used	Commuting/Material Delivery Miles Paved			Commuting/Material Delivery Miles Unpaved		
				Commuting Miles (Round Trip)	Total miles per day	Total miles for project	Commuting Miles (Round Trip)	Total miles per day	Total miles for project
Water Truck	Passenger	2	56	36	72	4,032	4	8	448
Worker Pickup	Passenger	2	288	90	180	51,840	10	20	5,760
Water Truck	Passenger	1	4	90	90	360	10	10	40

Notes: Worker Pickup values from Plan of Development (August 2021) Table 11.2-1. Assumed 2 water trucks commuting from Tuba City, 20 miles away. Assumed 1 water truck commuting from Flagstaff, 50 miles away. 10% unpaved road.

SCAQMD EMFAC 2007 On-Road Emission Factors (lb./mile)

2018	CO	NO_X	ROG	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4
Passenger	0.00503	0.00047	0.00057	0.00001	0.00009	0.00006	1.10563	0.00005
HHDT	0.00605	0.01526	0.00132	0.00004	0.00140	0.00120	4.20757	0.00006

Note: SCAQMD EMFAC 2007 (v2.3) Emission Factors can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/emfac-2007-(v2-3)-emission-factors-(on-road). SCAQMD EMFAC 2007 (v2.3) Emission Factors for scenario year 2018 (all vehicle model years in the range from 1974 to 2018) were used.

Emission Factors for Fugitive Dust from Roads, lb/VMT

Source	PM_{10}	$PM_{2.5}$
Unpaved Roads Emission Factors for Pickup Trucks	0.34	0.03
Unpaved Roads Emission Factors for Delivery Truck	0.70	0.07
Paved Roads Emission Factors for Passenger Vehicles	0.00	0.00
Paved Roads Emission Factors for Delivery Truck	0.01	0.00

Annual On-Road Vehicle Emissions (tons/year)

Type	Vehicle Type	Total miles	CO	NO_X	ROG	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	GHG, mtpy
Construction Worker Commute	Passenger	4,480	0.01	0.00	0.00	0.00	0.00	0.00	2.48	0.00	2.25
Fugitive Dust From Paved Roads	Passenger	4,032	-	-	-	-	0.00	0.00	-	-	-
Fugitive Dust From Unpaved Roads	Passenger	448	-	-	-	-	0.08	0.01	-	-	-
Construction Vehicle	Passenger	58,000	0.15	0.01	0.02	0.00	0.00	0.00	32.06	0.00	29.12
Fugitive Dust From Paved Roads	Passenger	52,200	-	-	-	-	0.03	0.01	-	-	-
Fugitive Dust From Unpaved Roads	Passenger	5,800	-	-	-	-	0.98	0.10	-	-	-
Heavy-Heavy Duty Vehicles	Delivery Truck	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust From Paved Roads	Delivery Truck	0	-	-	-	-	0.00	0.00	-	-	-
Fugitive Dust From Unpaved Roads	Delivery Truck	0	-	-	-	-	0.00	0.00	-	-	-
		Total:	**0.16**	**0.01**	**0.02**	**0.00**	**1.09**	**0.11**	**34.54**	**0.00**	**31.37**

Example Calculations:

{ ([Unpaved Emission Factor, lb/mile] * [Total unpaved vehicle miles traveled for duration of project, miles/project]) + ([Paved Emission Factor, lb/mile] * [Paved vehicle miles traveled for duration of project, miles/project])} * [1 ton/2,000 lb] = Tons of pollutant for duration of project

[Emission Factor, lb/mile] * [Total vehicle miles traveled for duration of project, miles/project] * [1 ton/2,000 lb] = Tons of pollutant for duration of project

Painted Desert Project
Air Quality
Emission Calculations
Operational Emissions: Inspection and Maintenance Emissions

Emission Factors for On-Road Passenger Vehicles, in Pounds per Mile

Vehicle Type	On-Road SCAQMD Emission Factors								Fugitive Dust from Unpaved Roads	
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	CH_4	CO_2	PM_{10} [1]	$PM_{2.5}$ [1]
Passenger Vehicles	0.00503	0.00047	0.00001	0.00009	0.00006	0.00057	0.00005	1.10563	0.33897	0.03390

Note: SCAQMD EMFAC 2007 (v2.3) Emission Factors can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/emfac-2007-(v2-3)-emission-factors-(on-road). SCAQMD EMFAC 2007 (v2.3) scenario year 2018 (all vehicle model years in the range from 1974 to 2018) was used).

[1] Fugitive dust from paved and unpaved road emission factors estimated using AP-42 Section 13.2.1 & Section 13.2.2. Mean vehicle weight was conservatively estimated at 2 tons for passenger vehicles.

Inspection and Maintenance Activity Assumptions

Parameter	Value	Source / Notes
Number of Site Visits per Year	104	*1 visit per week to Painted Desert by 2 vehicles*
Total On-Road Miles, Round-Trip	90	*Assumed truck travels from Flagstaff, AZ which is 50 miles from project area*
Total On-Road Miles, Round-Trip, Per Year	9,360	*Number of Site Visits per Year x Total On-Road Miles, Round-Trip*
Off-Road Distance Traveled Round-Trip	10	*The vehicles drive around the project area during the inspection*
Total Off-Road Miles Traveled per Year	1,040	*Off-Road Distance Traveled Round-Trip x Number of Site Visits per Year = Total Off-Road Miles Traveled per Year*
Total On- and Off-Road Vehicle Miles Traveled per Round-Trip	100	*Total On-Road Miles, Round-Trip + Off-Road Distance Traveled Round-Trip*
Total On- and Off-Road Vehicle Miles Traveled per Year	10,400	*Total On-Road Miles, Round-Trip, Per Year + Total Off-Road Miles Traveled per Year*

Annual Emissions From Inspection and Maintenance Activities using On-Road Passenger Vehicles, in Tons per Year

Vehicle Type	Emissions, tpy									Emissions, mtpy
	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	VOC	HAPs	CH_4	CO_2	CO_2e
On-Road Passenger Vehicles	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.75	5.22
Fugitive Dust from Paved Roads	-	-	-	0.00	0.00	-	-	-	-	-
Fugitive Dust from Unpaved Roads	-	-	-	0.18	0.02	-	-	-	-	-
Total Inspection and Maintenance Activity Emissions	**0.03**	**0.00**	**0.00**	**0.18**	**0.02**	**0.00**	**0.00**	**0.00**	**5.75**	**5.22**

Example Calculation: [Emission Factor, lb/mile] * [Total vehicle miles traveled per year, miles/year] * [1 ton / 2,000 lb] = Tons of pollutant per year

Note: GHG are based on the GWP of CO_2 (1) and CH_4 (25). HAPs are assumed to be equal to 10% of VOC emissions.

Appendix C NOISE CALCULATIONS

Painted Desert Project
NSA #1 - Residence
Construction
Noise Impact Assessment

NSA #:	1
Distance from Construction (ft)	11200

Baseline Noise

Baselines (Representative Existing Conditions)[1]			
LAeq	Ldn	Day	Night
(dBA)	(dBA)	(dBA)	(dBA)
41.6	45.0	43	37

[1] Source:

Sources

Description	Distance to Receptor	Modeled As	Quantity [2]	Acoustical Usage Factor[1]	Noise Level Reference Distance [1]	Sound Pressure Level @ reference distance [1]
	feet			%/hr.	(feet)	(dBA)
Crane	11200	Crane	16	16	50	81
Water Truck	11200	Pickup Truck	2	40	50	75
Rubber Tired Dozer	11200	Dozer	12	40	50	82
Excavator	11200	Excavator	17	40	50	81
Graders	11200	Grader	12	40	50	85
Skid Steer Loader	11200	Front End Loader	17	40	50	79
Roller	11200	Roller	8	20	50	80
Forklift	11200	All Other Equipment > 5 HP	17	50	50	85
Reach Stacker	11200	All Other Equipment > 5 HP	16	50	50	85
Generator Set	11200	Generator	16	50	50	81
Pile Driver	11200	Impact Pile Driver	17	20	50	101
Dump Truck	11200	Flat Bed Truck	17	40	50	74
Trencher	11200	Trencher	17	50	50	80
D6, D8, 320	11200	All Other Equipment > 5 HP	17	50	50	85
Drill Rig	11200	Drill Rig Truck	17	20	50	79
Backhoe	11200	Backhoe	16	40	50	78
Concrete Truck	11200	Concrete Mixer Truck	1	40	50	79
Off-Highway Trucks	11200	Pickup Truck	12	40	50	75

[1] FHWA -Construction Noise Handbook - Table 9.1 RCNM Default Noise Emission Reference Levels and Usage Factors

[2] Quantities taken from Plan of Development (August 2021) Table 10.6-1. Assumed no more than 17 pieces of same equipment would be operating at once. Assumed 2 water trucks & 1 concrete truck.

Sound Levels at NSA 1

Equipment	Construction Levels	
	Leq (dBA)	L_{Max} (dBA)
Crane	38.1	46.0
Pickup Truck	27.0	31.0
Dozer	41.8	45.8
Excavator	42.3	46.3
Grader	44.8	48.8
Front End Loader	40.3	44.3
Roller	35.0	42.0
Trencher	42.3	45.3
All Other Equipment > 5 HP	47.3	50.3
Drill Rig Truck	37.3	44.3
Backhoe	39.1	43.0
Concrete Mixer Truck	28.0	32.0
Pickup Truck	34.8	38.8
Total [1]	**52.3**	**50.3**

[1] Noise Level assumes all equipment is operating simultaneously.

NSA #	Construction, Leq	Construction, Lmax [1]	Combined Ambient + Calculated Noise Level, LAeq	Daytime Noise Level, Lday	Nighttime Noise Level, Lnight [2]	Combined Ambient + Calculated Noise Level, Ldn	Potential Noise Increase, Ldn	Potential Noise Increase, Leq
	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)
1	52.3	50.3	50.8	52.8	37.0	51.4	6.5	9.3

[1] Calculated Lmax is the loudest individual value.

[2] Assumes daytime construction only

Painted Desert Project
NSA #1 & Property Boundary
Operation
Noise Impact Assessment

Inverter, MV Transformer from edge of Solar Array Area 1 to NSA #1	
Distance in feet from source	Noise level (dBa)
0	75
50	69
100	63
200	57
400	51
800	45
1000	43
1200	41
1400	40
1600	39
1800	38
2000	37
2200	36

Solar Tracker Motor from edge of Solar Array Area 1 to NSA #1	
Distance in feet from source	Noise level (dBa)
0	58
50	52
100	46
200	40
400	34
800	28
1000	26
1200	24
1400	23
1600	22
1800	21
2000	20
2200	19

Hand Powered Tools, Pick-up Trucks from center of Solar Array Areas to Property Boundary	
Distance in feet from source	Noise level (dBa)
0	80
50	74
100	68
200	62
400	56
800	50
1000	48
2000	42
3000	38
4000	36
5000	34
6000	32
7000	31
7500	30

Notes: Predicted Noise Generation Equation: $Lp(R2) = Lp(R1) - 20 \cdot Log_{10}(R2/R1)$

Where:

Lp(R1) = Known sound pressure level at the first location (typically measured data or equipment vendor data)

Lp(R2) = Unknown sound pressure level at the second location Location

R1 = Distance from the noise source to location of known sound pressure level

R2 = Distance from noise source to the second location

Appendix D BIOLOGICAL RESOURCES COMPLIANCE FORM

BIOLOGICAL RESOURCES COMPLIANCE FORM
NAVAJO NATION DEPARTMENT OF FISH AND WILDLIFE
P.O. BOX 1480, WINDOW ROCK, ARIZONA 86515-1480

It is the Department's opinion the project described below, with applicable conditions, is in compliance with Tribal and Federal laws protecting biological resources including the Navajo Endangered Species and Environmental Policy Codes, U.S. Endangered Species, Migratory Bird Treaty, Eagle Protection and National Environmental Policy Acts. This form does not preclude or replace consultation with the U.S. Fish and Wildlife Service if a Federally-listed species is affected.

PROJECT NAME & NO.: Navajo Power, Painted Desert Solar Array

DESCRIPTION: Painted Desert Power (PDP), LLC proposes to develop and operate the Painted Desert Project (Project) a proposed photovoltaic solar generating facility. The solar development areas encompass just under 5,000-acres. The Project also includes the proposed substation/BESS area and a gen tie corridor to the Moenkopi substation as well as expansion of the existing Moenkopi Substation (south) and the Arizona State Route 89 (SR 89) turnout, improvement and widening of Bureau of Indian Affairs (BIA) Route 6730 (BIA RT 6730), construction of three new access roads from BIA RT 6730 to the solar array areas, and East and West Connectors linking Areas 1 and 2.

LOCATION: The proposed Project is located on Navajo Nation lands in Coconino County, Arizona within the Cameron and Coalmine Canyon chapters, approximately 4 miles east of Cameron, Arizona.

REPRESENTATIVE: Jennifer Rouda

ACTION AGENCY: Painted Desert Power, LLC

B.R. REPORT TITLE / DATE / PREPARER: Biological Evaluation, Painted Desert Solar Project/ OCT 2020/Ecosphere Environmental Services, Inc.

SIGNIFICANT BIOLOGICAL RESOURCES FOUND: 1,826 acres (26 percent) of this project is located in RCP Area 1, highly sensitive wildlife area and 4,088 acres (58 percent) of this project is located in RCP Area 2, moderately sensitive wildlife area.

POTENTIAL IMPACTS

NESL SPECIES POTENTIALLY IMPACTED: [1] Aquila chrysaetos (golden eagle), G3, [2] Buteo regalis (ferruginous hawk), G3, [3] Falco peregrinus (peregrine falcon), G4, [4] Amsonia peeblesii (Peeble's bluestar), sensitive [5] Astragalus beathii (Beath's milkvetch), sensitive.

FEDERALLY-LISTED SPECIES AFFECTED: NA

OTHER SIGNIFICANT IMPACTS TO BIOLOGICAL RESOURCES: Grading and removal of existing vegetation for temporary access and staging of equiptment and facilities during construction may result in increased erosion, weed encroachment, and loss of wildlife habitat. Temporary-use roads and areas will need to be recontoured where necessary and reseeded using a NNHP botanist-approved native seed mix or mixes.

AVOIDANCE / MITIGATION MEASURES: Mitigation measures outlined in the Biological Evaluation will be required on a case-by-case basis in the event that NESL species are identified within the Project Area during species-specific surveys in close consultation with the NNHP zoologist and/or botanist.

CONDITIONS OF COMPLIANCE*: Habitat is present for golden eagle (Aquila chrysaetos), ferruginous hawk (Buteo regalis), peregrine falcon (Falco peregrinus), Peeble's bluestar (Amsonia peeblesii), and Beath's milkvetch (Astragalus beathii). Specifies-specific surveys shall be conducted prior to construction between March and mid June for raptor species and between mid May through mid July for Peeble's bluestar and mid March through early May for Beath's milkvetch, when plants are flowering. All powerlines within the Project Area shall be constructed utilizing a raptor-safe, power-pole design standard (per Raptor Electrocution Prevention Regulations).

FORM PREPARED BY / DATE: Nora E. Talkington/04 February, 2021

COPIES TO: (add categories as necessary)

☒ ______________________ ☐ ______________________

2 NTC § 164 Recommendation:	Signature	Date
☐Approval		
☒Conditional Approval (with memo)	Gloria M. Tom	02/05/21
☐Disapproval (with memo)	Gloria M. Tom, Director, Navajo Nation Department of Fish and Wildlife	
☐Categorical Exclusion (with request letter)		
☐None (with memo)		

*I understand and accept the conditions of compliance, and acknowledge that lack of signature may be grounds for the Department not recommending the above described project for approval to the Tribal Decision-maker.

Representative's signature Joshua S. Finn Date 02/08/2021

Joshua S. Finn
Managing Director, Development

Appendix E CULTURAL RESOURCES COMPLIANCE FORM

THE NAVAJO NATION
HERITAGE & HISTORIC PRESERVATION DEPARTMENT
PO Box 4950, Window Rock, Arizona 86515
TEL: (928) 871-7198 FAX: (928) 871-7886

CULTURAL RESOURCES COMPLIANCE FORM

ROUTE COPIES TO:	**NNHPD NO.: HPD-20-914 - REVISED**
☑ SEAS	**OTHER PROJECT NO.: SEAS 20-012**

PROJECT TITLE:

Cultural Resource Inventory for the Proposed Painted Desert Solar Project in Cameron and Coalmine Canyon Chapters of the Navajo Nation, Coconino County, Arizona

LEAD AGENCY:	BIA/NR
SPONSOR:	Jennifer Rouda, Project Planner, Painted Desert Power, LLC

PROJECT DESCRIPTION:

The project proposes a 750-megawatt photovoltaic solar-generating and battery energy storage system facility with numerous exclusion areas within and adjacent to the project where uranium mines and wildcat pits. Some of these former mines have been capped/stabilized. The project consists of two areas (Areas 1 and 2) and is connected via the East and West Connectors. Area 1 consists of a large area of solar arrays and related facilities (such as inverters and access roads), one or more operations and maintenance (O&M) buildings, and a new high-voltage substation and BESS area. Area 1 would be accessed via Bureau of Indian Affairs (BIA) Route (RT) 6730. The larger Area 2 is located north of Area 1 by approximately 0.3 to 0.7 miles and features additional solar arrays. Area 2 would be accessed via two existing roads running east from BIA RT 6730. The gap between Areas 1 and 2 will be connected via the East and West Connectors. These corridors would contain medium-voltage (MV) circuits, all-weather access roads, and overhead or underground communications (fiber-optic) cable. Generation intertie (Gentie) will connect the project to the Moenkopi substation. Including all project components, the area of potential effect (APE) is 5,283.68 acres, and the total area surveyed is 5,653.26 acres.

LAND STATUS:	Navajo Tribal Trust Land
CHAPTER:	Cameron & Coalmine Canyon
LOCATION:	The project occurs on the Cameron North, Cameron NE, Cameron South, Cameron SE Quadrangles in Coconino County, Arizona G&SRPM

T.28N, R.9E – Sec. 1, 2, 3, 4

T.29N, R.9E – Sec. 13, 14, 22, 23, 24, 26, 34, 35, 36

T.29N, R.10E – Sec. 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32

UTM COORDINATES: ***NAD 83, Zone 12***	See Report
PROJECT ARCHAEOLOGIST:	Doug Loebig, Katelyn Hillmeyer, Julius Tulley, Ian Geoffrey Thompson
NAVAJO ANTIQUITIES PERMIT NO.:	B20075

-DOCUMENT IS VOID IF ALTERED-

DATE INSPECTED:	03/04/20 – 07/07/20
DATE OF REPORT:	10/20
TOTAL ACREAGE INSPECTED:	5,653.26 – ac total
METHOD OF INVESTIGATION:	Class III pedestrian inventory with transects spaced 10-12 m apart.
LIST OF CULTURAL RESOURCES FOUND:	**(60) SITES** AZ-N-5-48, AZ-N-5-49, AZ-N-5-50, AZ-N-5-51, AZ-N-5-52, AZ-N-5-53, AZ-N-6-5, AZ-N-6-6, AZ-N-6-7, AZ-N-6-8, AZ-N-6-9, AZ-N-6-10, AZ-N-6-11, AZ-N-6-12, AZ-N-6-13, AZ-N-6-14, AZ-N-6-15, AZ-N-6-16, AZ-N-6-17, AZ-N-6-18, AZ-N-11-22, AZ-N-11-23, AZ-N-11-24, AZ-N-11-25, AZ-N-11-26, AZ-N-11-27, AZ-N-11-28, AZ-N-11-29, AZ-N-11-30, AZ-N-11-31, AZ-N-11-32, AZ-N-11-33, AZ-N-11-34, AZ-N-11-35, AZ-N-11-36, AZ-N-11-37, AZ-N-11-38, AZ-N-11-39, AZ-N-12-82, AZ-N-12-83, AZ-N-12-84, AZ-N-12-85 (CONTAINS TCP), AZ-N-12-86, AZ-N-12-87, AZ-N-12-88, AZ-N-12-89, AZ-N-12-90, AZ-N-12-91, AZ-N-12-92, AZ-N-12-93, AZ-N-12-94, AZ-N-12-95, AZ-N-12-96, AZ-N-12-97, AZ-N-12-98, AZ-N-12-99, AZ-N-12-100, AZ-N-12-101, AZ-N-12-102, AZ-N-12-103 **(108) ISOLATED OCCURRENCES (IO)** **(4) IN-USE AREAS (IUA)/CURRENT CULTURAL PROPERTIES (CCP)** **(4) JISCHAA/UNMARKED BURIALS**

-DOCUMENT IS VOID IF ALTERED-

LIST OF ELIGIBLE PROPERTIES:	**(23) SITES** AZ-N-5-48, AZ-N-6-7, AZ-N-6-8, AZ-N-6-9, AZ-N-6-10, AZ-N-6-11, AZ-N-6-13, AZ-N-6-14, AZ-N-6-16, AZ-N-6-18, AZ-N-11-24, AZ-N-11-27, AZ-N-11-28, AZ-N-11-30, AZ-N-11-37, AZ-N-11-39, AZ-N-12-85 (CONTAINS TCP), AZ-N-12-86, AZ-N-12-87, AZ-N-12-88, AZ-N-12-93, AZ-N-12-98, AZ-N-12-99
UNEVALUATED/UNDETERMINED PROPERTIES:	**(10) SITES** AZ-N-5-50, AZ-N-5-52, AZ-N-6-6, AZ-N-11-22, AZ-N-11-29, AZ-N-11-36, AZ-N-12-94, AZ-N-12-91, AZ-N-12-92, AZ-N-12-102
LIST OF NON-ELIGIBLE PROPERTIES:	**(27) SITES** AZ-N-5-49, AZ-N-5-51, AZ-N-5-53, AZ-N-6-5, AZ-N-6-12, AZ-N-6-15, AZ-N-6-17, AZ-N-11-23, AZ-N-11-25, AZ-N-11-26, AZ-N-11-31, AZ-N-11-32, AZ-N-11-33, AZ-N-11-34, AZ-N-11-35, AZ-N-11-38, AZ-N-12-82, AZ-N-12-83, AZ-N-12-84, AZ-N-12-89, AZ-N-12-90, AZ-N-12-95, AZ-N-12-96, AZ-N-12-97, AZ-N-12-100, AZ-N-12-101, AZ-N-12-103 **(4) IN-USE AREAS (IUA)** **(108) ISOLATED OCCURRENCES (IO)**

-DOCUMENT IS VOID IF ALTERED-.

LIST OF ARCHAEOLOGICAL RESOURCES:	**(22) SITES** AZ-N-5-48, AZ-N-6-7, AZ-N-6-8, AZ-N-6-9, AZ-N-6-10, AZ-N-6-11, AZ-N-6-13, AZ-N-6-14, AZ-N-6-16, AZ-N-6-18, AZ-N-11-27, AZ-N-11-28, AZ-N-11-30, AZ-N-11-37, AZ-N-11-39, AZ-N-12-85, AZ-N-12-86, AZ-N-12-87, AZ-N-12-88, AZ-N-12-93, AZ-N-12-98, AZ-N-12-99

EFFECT/CONDITIONS OF COMPLIANCE: The proposed undertaking will have No Adverse Effect on Historic Properties identified provided that the following conditions are met. Painted Desert Power will ensure:

SITE PROTECTIONS & EMPLOYEE EDUCATION: All employees of the project, including the project sponsor and its contractors/subcontractors, will be educated on archaeological site locations, sensitive areas, and stipulations those places before any construction activities begin. All cultural sites will be avoided by all personnel, vehicles, and company equipment. They will also be notified that it is illegal to collect, damage, or disturb cultural resources and that such activities are punishable by criminal and/or administrative penalties under the provision of the Archaeological Resources Protection Act (ARPA) the Navajo Nation Cultural Resources Protection Act (CRPA)

Sites: AZ-N-6-7, AZ-N-6-8, AZ-N-6-9, AZ-N-6-10, AZ-N-6-11, AZ-N-6-13, AZ-N-6-14, AZ-N-6-16, AZ-N-6-18

1. The project sponsor will avoid these nine sites, including the projected zones in between sites.
2. The southeast side of the abandoned coal slurry pipeline corridor parallel to and offset from the alignment of nine sites will serve as the southeast boundary of the avoidance zone.
3. A 100-foot offset zone from the site boundaries will serve as the northwestern boundary of the avoidance zone.
4. The entirety of the avoidance zone will be clearly demarcated with lathe and flagging placed by a qualified archaeologist before construction begins
5. Barriers will remain in place throughout construction & removed after project completion
6. There will be not ground-disturbing activities within the marked site boundaries.
7. A qualified archaeologist will monitor all earth-disturbing project-related activities within 100 feet of the flagged avoidance zones.
8. The monitoring archaeologist will obtain a Class C Permit from NNHHPD before monitoring activities begin.
9. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Sites: AZ-N-6-6, AZ-N-11-22, AZ-N-11-27, AZ-N-11-29, AZ-N-36, AZ-N-11-37, AZ-N-11-39, AZ-N-12-88, AZ-N-12-93, AZ-N-12-94

1. The project design avoids the sites by at least 50-ft from the site boundaries.
2. The avoidance zones are delineated with lathe and flagging placed by a qualified archaeologist before construction begins.
3. Barriers will remain in place throughout construction & removed after project completion.
4. There will be no surface-disturbing activities or vehicle traffic within the barriers.
5. A qualified archaeologist will monitor all ground-disturbing activities within 100-ft of the avoidance zone.
6. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
7. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

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Site: AZ-N-5-48

1. The Sponsor will avoid site AZ-N-5-48 by limiting all road improvement activities on NR 6730 to the existing road cut on the road's northeast side.
2. The northeastern road cut will be clearly marked with lathe and flagging for avoidance. A qualified archaeologist will place flagging before construction begins.
3. Barriers will remain in place throughout construction & removed after project completion.
4. There will be no surface-disturbing activities or vehicle traffic within the barriers.
5. A qualified archaeologist should monitor all earth-disturbing construction activities within 100 feet of the avoidance zone.
6. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
7. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-11-24

1. The Sponsor will avoid site AZ-N-11-24 by a minimum 100-foot buffer zone around the project area's site boundary.
2. A minimum 100-foot offset buffer zone should be clearly demarcated with lathe and flagging. A qualified archaeologist will place flagging before construction begins.
3. Barriers will remain in place throughout construction & removed after project completion.
4. There will be no surface-disturbing activities or vehicle traffic within the barriers.
5. A qualified archaeologist should monitor Earth-disturbing construction activities within 100 feet of the flagged avoidance zone.
6. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
7. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-11-28

1. Site disturbance and avoidance will be achieved by placing flags and wooden lathes along both sides of the existing NR 6730 road cut for proposed road improvements.
2. The site's portion extending southwest from NR 6730 into the proposed solar field, site AZ-N-11-28, be avoided by a minimum 50-foot avoidance zone around the site boundary.
3. This 50-foot offset avoidance zone will be clearly demarcated with lathe and flagging. A qualified archaeologist will place flagging before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist should monitor Earth-disturbing project-related activities within 100 feet of the flagged avoidance zone.
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-11-30

1. AZ-N-11-30 extends 3 meters into the 50-foot buffer zone for the solar field project area.
2. The Sponsor will ensure that a 50-foot offset avoidance zone off the northeast side of the site be clearly demarcated with lathe and flagging to ensure no damage occurs.
3. A qualified archaeologist will place flagging before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist should monitor Earth-disturbing construction activities within 100 feet of the flagged avoidance zone.
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-11-31

1. Site AZ-N-11-31 is located in the buffer zone of a proposed Connector utility corridor.
2. The site be avoided with the northeast side of the site boundary clearly demarcated by lathe and flagging.
3. A qualified archaeologist will place flagging before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist should monitor Earth-disturbing construction activities within 100 feet of the flagged avoidance zone
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-85. Contains TCP1

1. Site AZ-N-12-85 is located in the survey buffer zone of NR 6730 and will not be impacted by the project.
2. However, to ensure maximum protection for the site and other concerns in the area, road improvements at NR 6730 are restricted entirely to the northeast side of the existing southwestern road cut of NR 6730 within the existing disturbance.
3. The road cut will be clearly marked with lathe and flagging and serve as the avoidance zone.
4. Lathe and flagging avoidance zone will continue along the road cut southeast of this site all the way to, and connecting with, the proposed AZ-N-12-86 avoidance zone concerning a TCP southwest of NR 6730 within and between AZ-N-12-85 and AZ-N-12-86.
5. A qualified archaeologist will place flagging before construction begins.
6. Barriers will remain in place throughout construction & removed after project completion.
7. There will be no surface-disturbing activities or vehicle traffic within the barriers.
8. A qualified archaeologist should monitor all earth-disturbing construction activities within 100 feet of the flagged avoidance zone.
9. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
10. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-86

1. Site AZ-N-12-86 will be avoided by restricting road improvements along NR 6730 northeast of the southwestern roadcut within the existing disturbance.
2. The road cut should be clearly demarcated with lathe and flagging and extending to the northwest to form a continuous avoidance zone with site AZ-N-12-85 due to traditional cultural concerns in the area southwest of the road.
3. A qualified archaeologist will place flagging before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist should monitor all earth-disturbing construction activities within 100 feet of the flagged avoidance zone.
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-87

1. The southern end of site AZ-N-12-87 is within the Gentie survey corridor.
2. A minimum of 50 feet will avoid the site.
3. It is recommended that a 50-foot offset buffer zone around the site boundary portion within the project should be clearly demarcated with lathe and flagging to ensure no incidental damage occurs.
4. A qualified archaeologist will place flagging before construction begins.

5. Barriers will remain in place throughout construction & removed after project completion.
6. There will be no surface-disturbing activities or vehicle traffic within the barriers.
7. A qualified archaeologist should monitor Earth-disturbing construction activities within 100 feet of the flagged avoidance zone.
8. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
9. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-98

1. The northern tip of this site extends into the Gentie corridor.
2. A minimum of 50 feet avoid the site portion within the project.
3. This 50-foot offset avoidance zone should be clearly demarcated with lathe and flagging.
4. A qualified archaeologist will place flagging before construction begins.
5. Barriers will remain in place throughout construction & removed after project completion.
6. There will be no surface-disturbing activities or vehicle traffic within the barriers.
7. A qualified archaeologist should monitor all earth-disturbing construction related activities within 100 feet of the flagged avoidance zone.
8. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
9. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-99

1. AZ-N-12-99 straddles most of the Gentie survey corridor.
2. A minimum of 50 feet will avoid the site. This 50-foot offset avoidance zone should be clearly demarcated with lathe and flagging.
3. A qualified archaeologist will place flagging before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist should monitor all earth-disturbing construction-related activities within 100 feet of the flagged avoidance zone.
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Site: AZ-N-12-101

1. No further cultural resource work is considered necessary at AZ-N-12-101.
2. The site is naturally protected, is on the edge of the Gentie project area, and will not be impacted.

Site: AZ-N-12-102. NNHHPD disagrees with SEAS's site eligibility. Site needs more data to decide eligibility.

1. The site needs more data to make site eligibility.
2. The site will be avoided in the absence of more needed data.
3. A 50-foot avoidance zone around the east side of the site be clearly marked with lathe, and blue flagging, and the road alignment shifted slightly east.
4. A qualified archaeologist will place flagging before construction begins.
5. Barriers will remain in place throughout construction & removed after project completion.
6. There will be no surface-disturbing activities or vehicle traffic within the barriers.
7. A qualified archaeologist should monitor all earth-disturbing construction activities within 100 feet of the avoidance zone.
8. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
9. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Sites: AZ-N-12-91, AZ-N-12-92. NNHPD determines that these sites may be eligible to the NRHP changing SEAS's determination.

1. NNHHPD disagrees with SEAS on the site's eligibility determination to the NRHP. NNHHPD maintains that the site may be eligible to the NRHP and;
2. The project design will avoid the site by at least 50-ft from the site boundary.
3. The site boundary will be marked with lathe and flagging placed by a qualified archaeologist before construction begins.
4. Barriers will remain in place throughout construction & removed after project completion.
5. There will be no surface-disturbing activities or vehicle traffic within the barriers.
6. A qualified archaeologist will monitor all ground-disturbing activities within 100-ft of the avoidance zone.
7. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
8. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

Sites: AZ-N-5-50, AZ-N-5-51, AZ-N-5-52, AZ-N-11-38

These site locations are outside of the Areas of Potential Effect (APE), avoiding the cultural resources.

Sites: AZ-N-5-49, AZ-N-5-53, AZ-N-6-5, AZ-N-6-12, AZ-N-6-15, AZ-N-6-17, AZ-N-11-23, AZ-N-11-25, AZ-N-11-26, AZ-N-11-32, AZ-N-11-33, AZ-N-11-34, AZ-N-11-35, AZ-N-12-82, AZ-N-12-83, AZ-N-12-84, AZ-N-12-89, AZ-N-12-90, AZ-N-12-95, AZ-N-12-96, AZ-N-12-97, AZ-N-12-100, AZ-N-12-103**

****Site AZ-N-12-82. NNHHPD determines that this site is not eligible to the NRHP, changing SEAS's determination.**

1. No further cultural resources work is not warranted.
2. Site documentation exhausts the sites' potential.

Jischaa

B20075 B.1 & B20075 B.2:

1. The project design will avoid the Jischaa 100-ft from the boundaries.
2. The avoidance zones will be delineated with lathe and flagging placed by a qualified archaeologist before construction begins.
3. Barriers will remain in place throughout construction & removed after project completion.
4. There will be no surface-disturbing activities or vehicle traffic within the barriers.
5. A qualified archaeologist will monitor all ground-disturbing activities within 100-ft of the avoidance zone.
6. The monitoring archaeologist obtains a Class C Permit from NNHHPD before monitoring activities begin.
7. A report of monitoring activities is to be submitted to NNHHPD within 30-days of the completed action.

B20075 B.3 & B20075 B.4:

1. Jischaa are located outside of the APE and will be avoided.
2. All future maintenance activities will avoid the Jischaa.

In-Use Areas/Current Cultural Properties:

IUA 3/CCP 3:

1. A community cemetery is excluded from the project area.

In the event of a discovery ["discovery" means any previously unidentified or incorrectly identified cultural resources including but not limited to archaeological deposits, human remains, or locations reportedly associated with Native American religious/traditional beliefs or practices], all operations near the discovery must cease, and the Navajo Nation Historic Preservation Department must be notified at (928) 871-7198.

FORM PREPARED BY: **Tamara Billie**
FINALIZED: March 11, 2021 – *Revised*

Notification to Proceed Recommended ☑ Yes □ No

Conditions: ☑ Yes □ No

03/12/2021
Richard M. Begay, Dept. Mgr./THPO — Date
The Navajo Nation
Heritage & Historic Preservation Department

Navajo Region Approval □ Yes □ No
8/30/2021

31 MAR 21
BIA – Navajo Regional Office — Date

-DOCUMENT IS VOID IF ALTERED-

Appendix F ECONOMIC AND FISCAL CONTRIBUTION TO COCONINO COUNTY, ARIZONA AND THE NAVAJO NATION

PAINTED DESERT POWER, LLC
ECONOMIC & FISCAL CONTRIBUTION TO COCONINO COUNTY, ARIZONA & THE NAVAJO NATION

Prepared for

aes

MANGUM economics

4201 DOMINION BOULEVARD, SUITE 114
GLEN ALLEN, VIRGINIA 23060
804-346-8446

MANGUMECONOMICS.COM

APRIL 2022

About Mangum Economics, LLC

Mangum Economics is a Glen Allen, Virginia based firm that was founded in 2003. Since then, we have become known as a leader in industry analysis, economic impact assessment, policy and program evaluation, and economic and workforce strategy development. The Mangum Team specializes in producing objective and actionable quantitative economic research that our clients use for strategic decision making in a variety of industries and environments. We know that our clients are unique, and that one size does not fit all. As a result, we have a well-earned reputation for tailoring our analyses to meet the specific needs of specific clients, with a specific audience.

Most of our research falls into four general categories:

- **Information Technology:** Working with some of the largest names in the industry, to date the Mangum Team has produced analyses of the economic and fiscal impact of the data center industry in Virginia, home to the largest concentration of data centers in the world, and in five other states.
- **Energy:** The Mangum Team has produced analyses of the economic and fiscal impact of over 13 GW of proposed solar, wind, battery storage, and hydro projects spanning Virginia and eleven other states. Among those projects was Dominion Energy's 2.6 GW Coastal Virginia Offshore Wind project off of Virginia Beach. In addition, the Mangum Team has also performed economic and fiscal impact analyses for the natural gas, nuclear, oil, and pipeline industries.
- **Economic Development and Special Projects:** The Mangum Team has performed hundreds of analyses of proposed economic development projects. Most recently, we were called upon by Henrico County to provide an analysis of the proposed $2.3 billion Green City "net-zero eco district." The Mangum Team has also authored multiple economic development plans, including identifying industries that were likely recruitment targets because of the high-speed MAREA and BRUSA sub-sea cable landings in Virginia Beach.
- **Education and Workforce:** The Mangum Team has worked with multiple post-secondary and secondary education institutions to quantify their economic contribution to their host communities as well as their impact on regional and statewide workforce needs.

The Project Team

Martina Arel, M.B.A.
Director – Economic Development &
Renewable Energy Research

A. Fletcher Mangum, Ph.D.
Founder and CEO

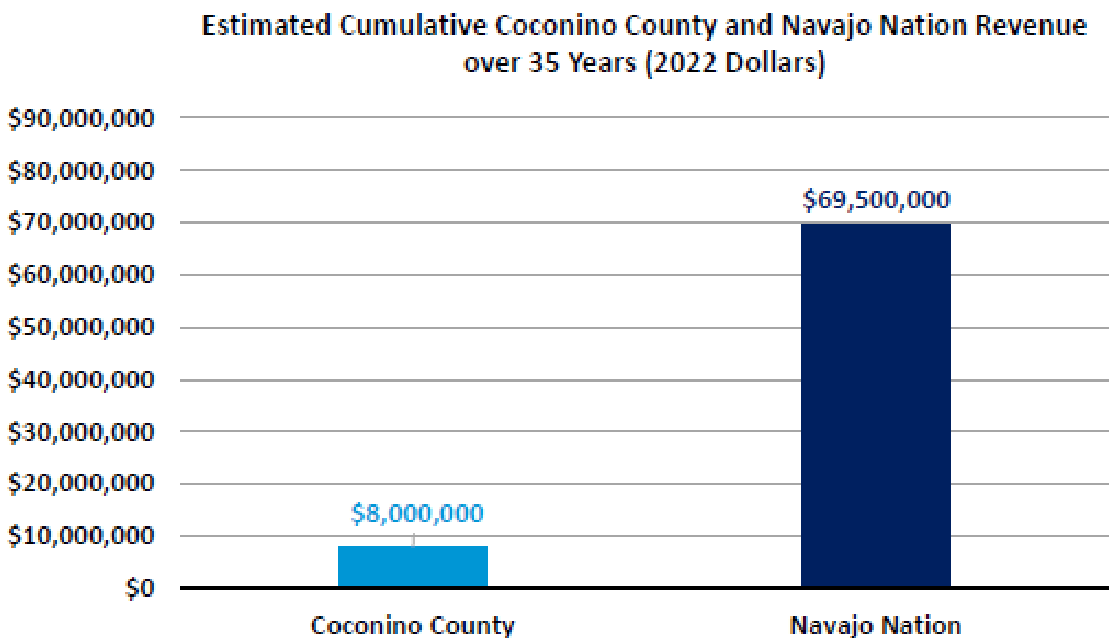
Table of Contents

Executive Summary

This report assesses the economic and fiscal contribution that the proposed Painted Desert Power, LLC (PDP) project would make to Coconino County, Arizona and the Navajo Nation. The primary findings from that assessment are as follows:

- **The proposed Painted Desert Power project (Proposed Project) being developed by AES Corporation is a 750-Megawatt (MW) AC utility-scale solar photovoltaic power generating facility with single-axis trackers. The Project would be located on Navajo Nation land in Coconino County, Arizona. The lease would encompass approximately 5,500 acres.**
- **Given the recent closing of Arizona's Navajo Generating Station and the consequent closure of the Kayenta Mine, the Navajo Nation and Coconino County can benefit from the addition of AES' solar facility.**
- **The Proposed Project would make a significant economic contribution to Coconino County and to the state of Arizona during construction of the project:**
    - The Proposed Project would provide an estimated one-time total pulse of economic activity to Arizona supporting approximately:
        - 1,870 direct, indirect, and induced jobs.
        - $106.4 million in associated labor income.
        - $310.7 million in economic output.
    - **The Proposed Project would provide an estimated one-time pulse of economic activity to Coconino County supporting approximately:**
        - 770 direct, indirect, and induced jobs.
        - $39.7 million in associated labor income.
        - $116.9 million in economic output.
- **The Proposed Project would make a significant economic contribution to Coconino County and to the state of Arizona during its ongoing operational phase:**
    - The Proposed Project would provide an estimated total annual economic impact to Arizona supporting approximately:
        - 60 direct, indirect, and induced jobs.
        - $3.5 million in associated labor income.
        - $9.9 million in economic output.
    - The Proposed Project would provide an estimated annual economic impact to Coconino County supporting approximately:
        - 21 direct, indirect, and induced jobs.
        - $1.0 million in associated labor income.
        - $3.3 million in economic output.

- **The Proposed Project would have a significant fiscal impact on Coconino County and the Navajo Nation:**
  - The Proposed Project would generate approximately $8 million in cumulative Coconino County tax revenue over the facility's anticipated 35-year operational life.
  - The Proposed Project would generate approximately up to $69.5 million in lease payments and community stakeholder payments for the Navajo Nation over the facility's anticipated 35-year operational life.



- **The Proposed Project would provide a boost to Coconino County's construction sector:**
  - At approximately 2,600 jobs, construction is Coconino County's fifth largest industry sector. It also pays average weekly wages ($918/week) that are above the county-wide average wage ($866/week).1
  - The Proposed Project could directly support approximately 570 jobs and $30 million in labor income in Coconino County's construction sector.

The estimates provided in this report are based on the best information available and all reasonable care has been taken in assessing that information. However, because these estimates attempt to foresee circumstances that have not yet occurred, it is not possible to provide any assurance that they will be representative of actual events. These estimates are intended to provide a general indication of likely future outcomes and should not be construed to represent a precise measure of those outcomes.

[1] Data Source: Bureau of Labor Statistics.

Introduction

This report assesses the economic and fiscal contribution that the proposed Painted Desert Power, LLC (PDP) would make to Coconino County, Arizona and the Navajo Nation. This report was commissioned by AES Corporation and produced by Mangum Economics.

Please note that the analysis assumes best case scenario where the entire project would be constructed. The economic and fiscal impacts ultimately depend on what proportion of the project gets contracted and constructed. The purpose of this analysis is to provide readers with a preliminary view of the potential economic and fiscal impacts to the region and are not to be considered final.

The Project

The proposed Painted Desert Power project (Proposed Project) being developed by AES Corporation is a 750-Megawatt (MW) AC utility-scale solar photovoltaic power generating facility with single-axis trackers. The Project would be located on Navajo Nation land in Coconino County, Arizona. The lease would encompass approximately 5,500 acres.

Please note that battery storage may be added to the project. However, the calculations presented in this study do not include any potential economic nor fiscal impact that battery storage would add to the project.

Electricity Production in Arizona

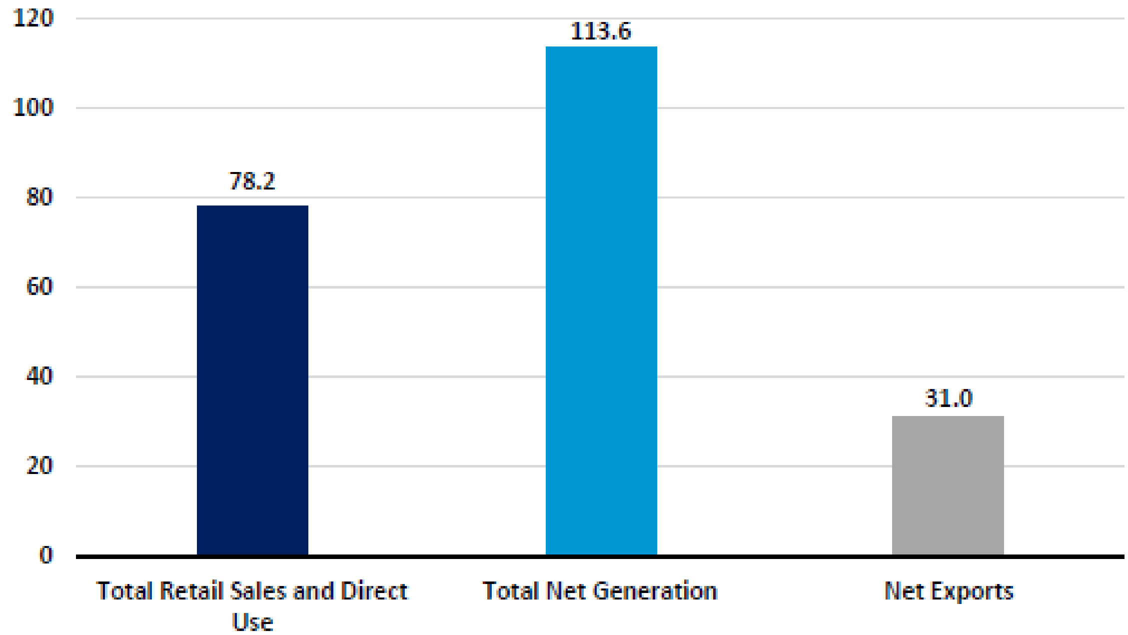
This section provides a backdrop for the Proposed Project by profiling Arizona's electricity production sector and the role that solar energy could play in that sector.

Overall Market

As shown in Figure 1, in 2019 electricity sales and direct use in Arizona totaled 78.2 million megawatt hours while total net generation of electricity from in-state sources was 113.6 million megawatt hours. As a result, the state was able to export more than a quarter of the electricity it produced to other states.[2] As with all exports, this means that the jobs, wages, and economic output created by that production remained in Arizona.

[2] Data Source: U.S. Energy Information Administration.

Figure 1: Demand and Supply of Electricity in Arizona in 2019 (in millions of megawatt-hours)3



Sources of Production

Between 2009 and 2019, the total amount of electricity produced in Arizona fluctuated somewhat, but overall, only slightly increased from 112.0 to 113.6 million megawatt hours, while retail and direct consumption of electricity increased from 73.8 to 78.2 million megawatt hours. Consequently, exports of electricity declined by 1.6 million megawatt hours (or 5 percent) during this time.

Figure 2 provides a comparison of the energy sources that were used to produce electricity in the state in each of those years. As these data show, the most significant change between 2009 and 2019 was a decrease in the use of coal and an increase in the use of natural gas and solar energy. Where coal was the state's largest source of electricity in 2009, accounting for 39.7 million megawatt hours (or 35 percent) of production, by 2019 production had fallen by 16.5 million megawatt hours, making coal the third largest source of electricity with only 20 percent of total production. Although the 2020 data from the U.S. Energy Information Administration has not yet been released, these trends are likely to continue due to the closure of Arizona's Navajo Generating Station, the state's second-largest coal power plant in late 2019.

In contrast, the share of electricity produced using cleaner-burning low-emissions energy sources increased over the period. Where natural gas accounted for 34.8 million megawatt hours (or 31 percent)

[3] Data Source: U.S. Energy Information Administration. In this chart, "Net Exports" also takes into account losses during transmission. As a result, it does not directly equal the residual of "Total Net Generation" minus "Total Retail Sales and Direct Use."

of Arizona's electricity production in 2009, by 2019 that proportion had increased by one third to 46.1 million megawatt hours (or 41 percent of production), making natural gas the state's largest source of electricity. During this time, the use of solar energy increased to 5.3 million megawatt hours (or 5 percent) of production, ranking Arizona second in the nation in total electricity generation from solar energy in 2019.

Figure 2: Electricity Generation in Arizona by Energy Source in 2009 and 2019
(in millions of megawatt-hours) [4]

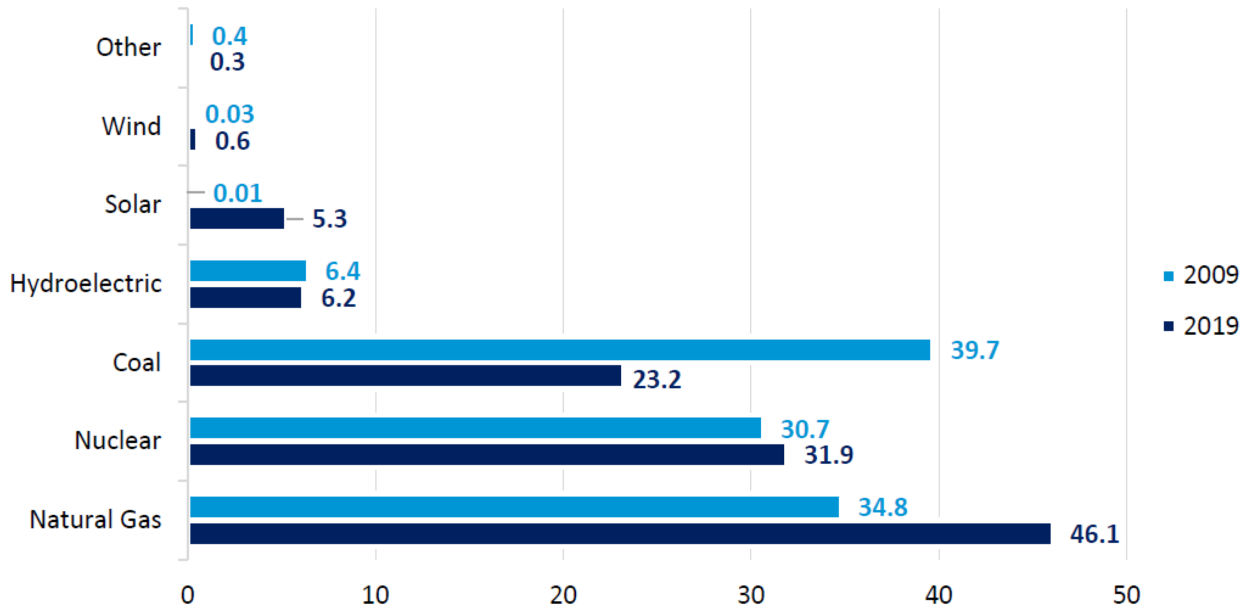
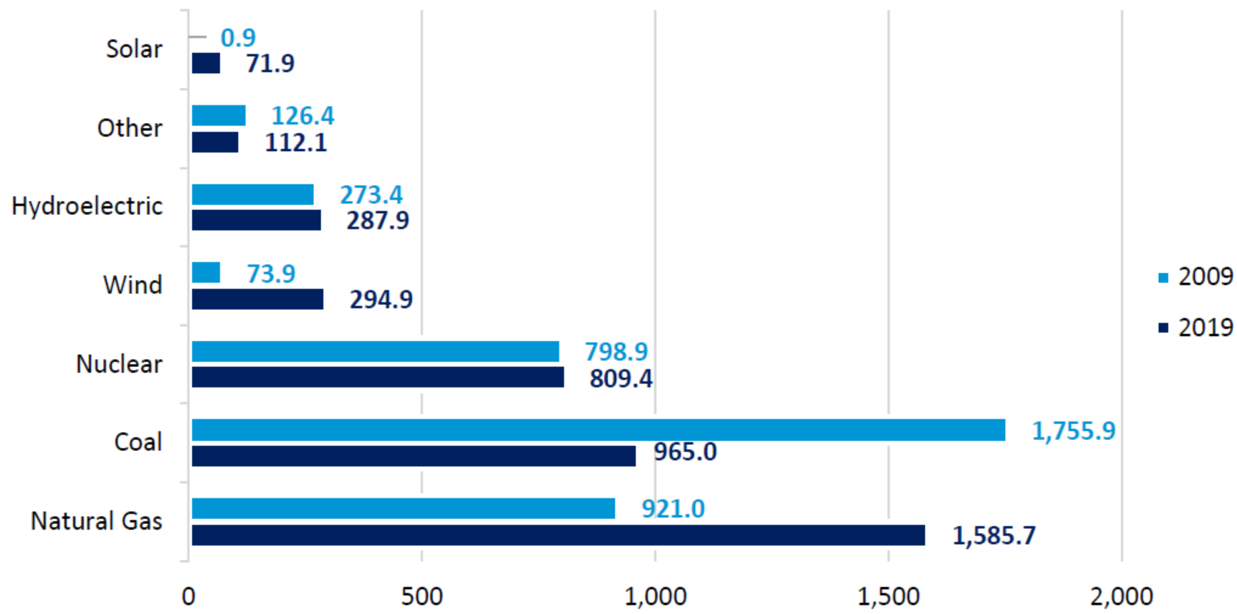


Figure 3 provides similar data for the U.S. as a whole. A quick comparison of Figures 2 and 3 shows that although the degree of reliance on specific energy sources for electricity production is slightly different between the U.S. and Arizona, the trend toward lower-emissions energy sources is the same. Nationally, between 2009 and 2019 the amount of electricity produced using coal declined by 790.9 million megawatt hours from 44 to 23 percent of production, while in contrast the amount of electricity produced using natural gas increased by 664.6 million megawatt hours from 23 to 38 percent of production. Nationwide, as in Arizona, the reliance on solar increased during this time but with an overall lower magnitude. Between 2009 and 2019, nationwide the amount of electricity produced using solar increased by 71.0 million megawatt hours to 2 percent of total electricity production compared to 5 percent of total electricity production in Arizona.

[4] Data Source: U.S. Energy Information Administration. "Other" includes battery, other biomass, other, petroleum, pumped storage, and wood.

Figure 3: Electricity Generation in the United States by Energy Source in 2009 and 2019 (in millions of megawatt-hours) [5]

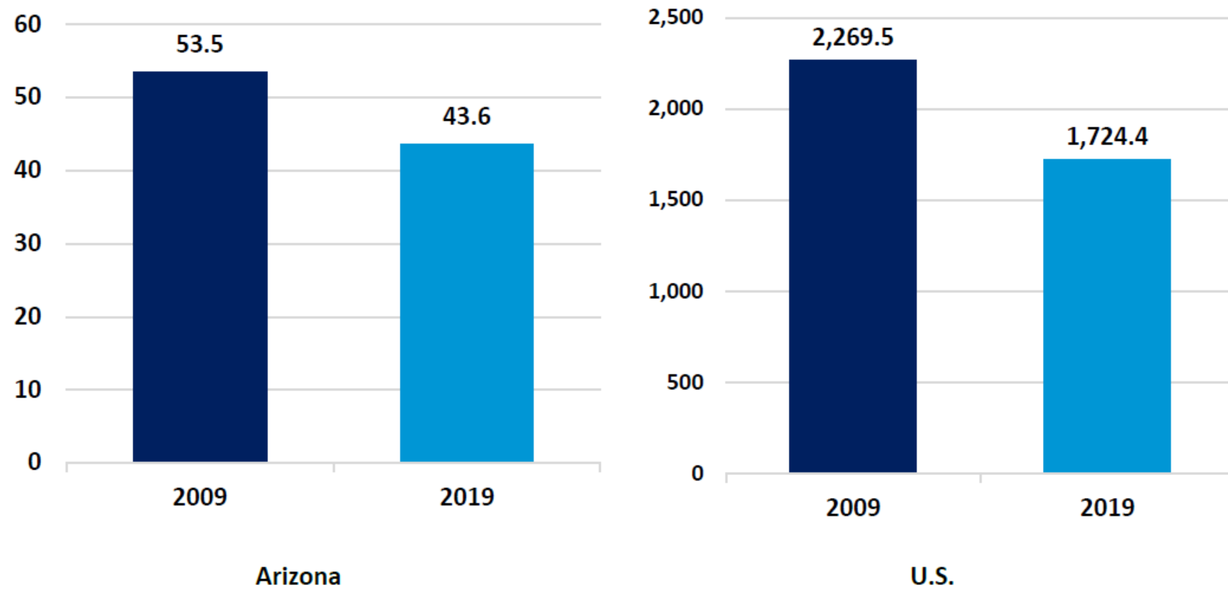


Impact on the Environment

In discussing the impact of these trends on the environment, it is important to realize that electricity production is one of the U.S.'s largest sources of greenhouse gas emissions. Figure 4 depicts carbon dioxide emissions from electricity production in 2009 and 2019 for both Arizona and the U.S. As these data indicate, between 2009 and 2019, as the share of electricity produced in Arizona by coal fell from 35 to 20 percent, carbon dioxide emissions from electricity production fell from 53.5 to 43.6 million metric tons. Where at the national level, as the share of electricity produced by coal fell from 44 to 23 percent, carbon dioxide emissions from electricity production fell from 2,269.5 to 1,724.4 million metric tons.

[5] Data Source: U.S. Energy Information Administration. "Other" includes battery, geothermal, other, other biomass, other gas, petroleum, pumped storage, and wood.

Figure 4: Carbon Dioxide Emissions from Electricity Production (millions of metric tons)[6]



Local Economic Profile

This section provides context for the economic and fiscal impact assessments to follow by profiling the local economy of Coconino County.

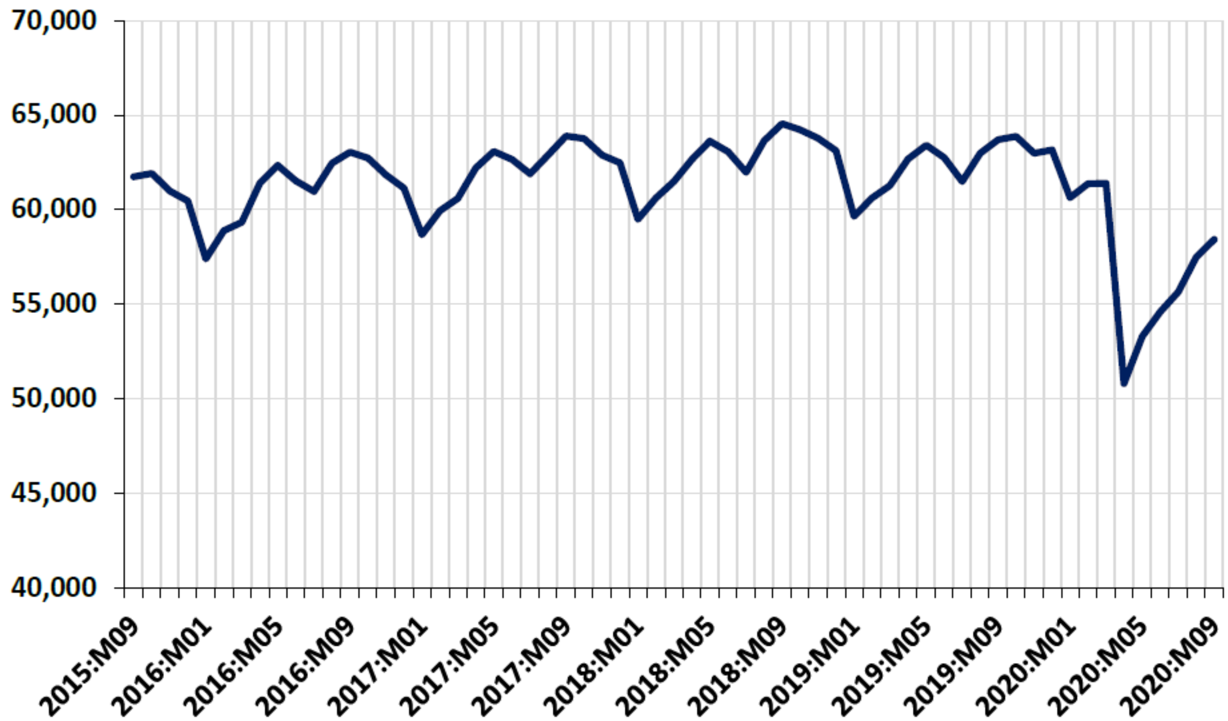
Total Employment

Figure 5 depicts the trend in total employment in Coconino County from September 2015 to September 2020. As these data show, employment in the county followed a cyclical trend but steadily grew over the period until the economic dislocations caused by the COVID-19 virus led to a steep decrease in employment in Coconino County in April 2020. By September 2020, total employment in the county had somewhat recovered and stood at 58,416 jobs, which represents an overall decrease in employment of 5.4 percent (or 3,315 jobs) over the five-year period. To put this number in perspective, over this same period, total statewide employment in Arizona increased by 7.0 percent.[7]

[6] Data Source: U.S. Energy Information Administration.

[7] Data Source: Bureau of Labor Statistics.

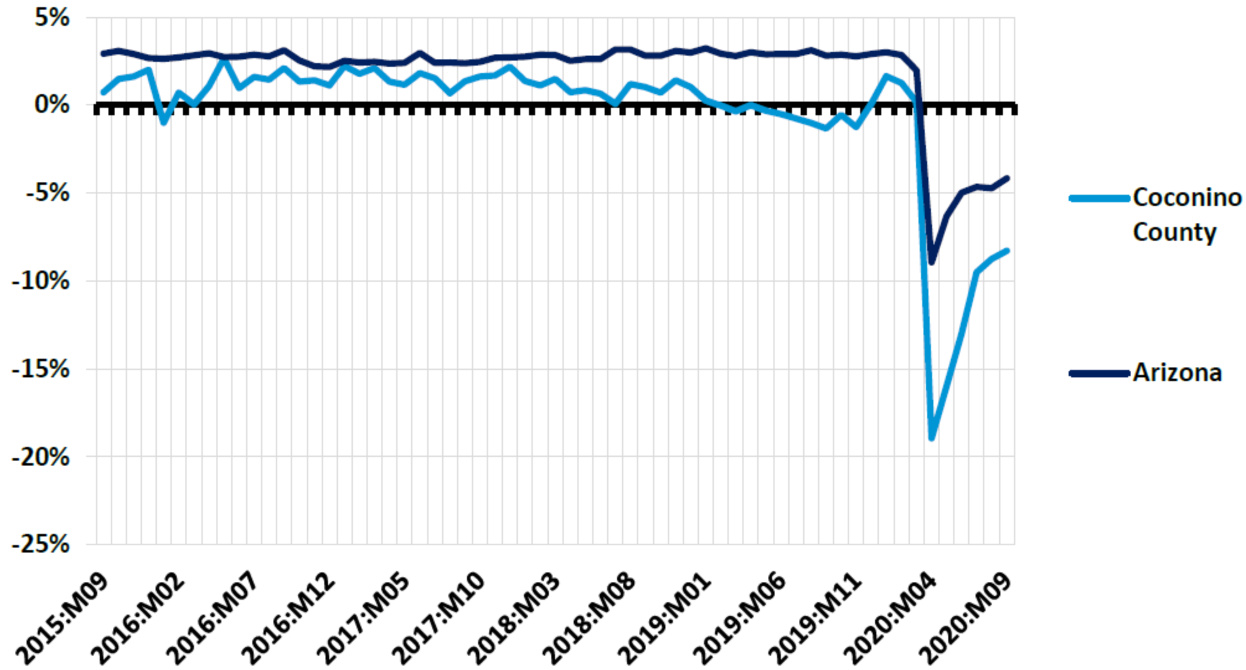
Figure 5: Total Employment in Coconino County – September 2015 to September 2020[8]



To control for seasonality and provide a point of reference, Figure 6 compares the year-over-year change in total employment in Coconino County to that of the state of Arizona as a whole over the same five-year period. Any point above the zero line in this graph indicates an increase in employment, while any point below the zero line indicates a decline in employment. As these data show, year-over-year employment growth in Coconino County consistently underperformed the statewide average, even falling into negative territory in 2019. In April 2020, the economic dislocations caused by the COVID-19 virus resulted in a steep decline in year-over-year employment of minus 18.9 percent in Coconino County compared to minus 8.9 percent statewide. As of September 2020, the year-over-year change in total employment in Coconino County was minus 8.3 percent as compared to minus 4.2 percent statewide in Arizona.

[8] Data Source: Bureau of Labor Statistics.

Figure 6: Year-Over-Year Change in Total Employment – September 2015 to September 2020[9]



Employment and Wages by Major Industry Sector

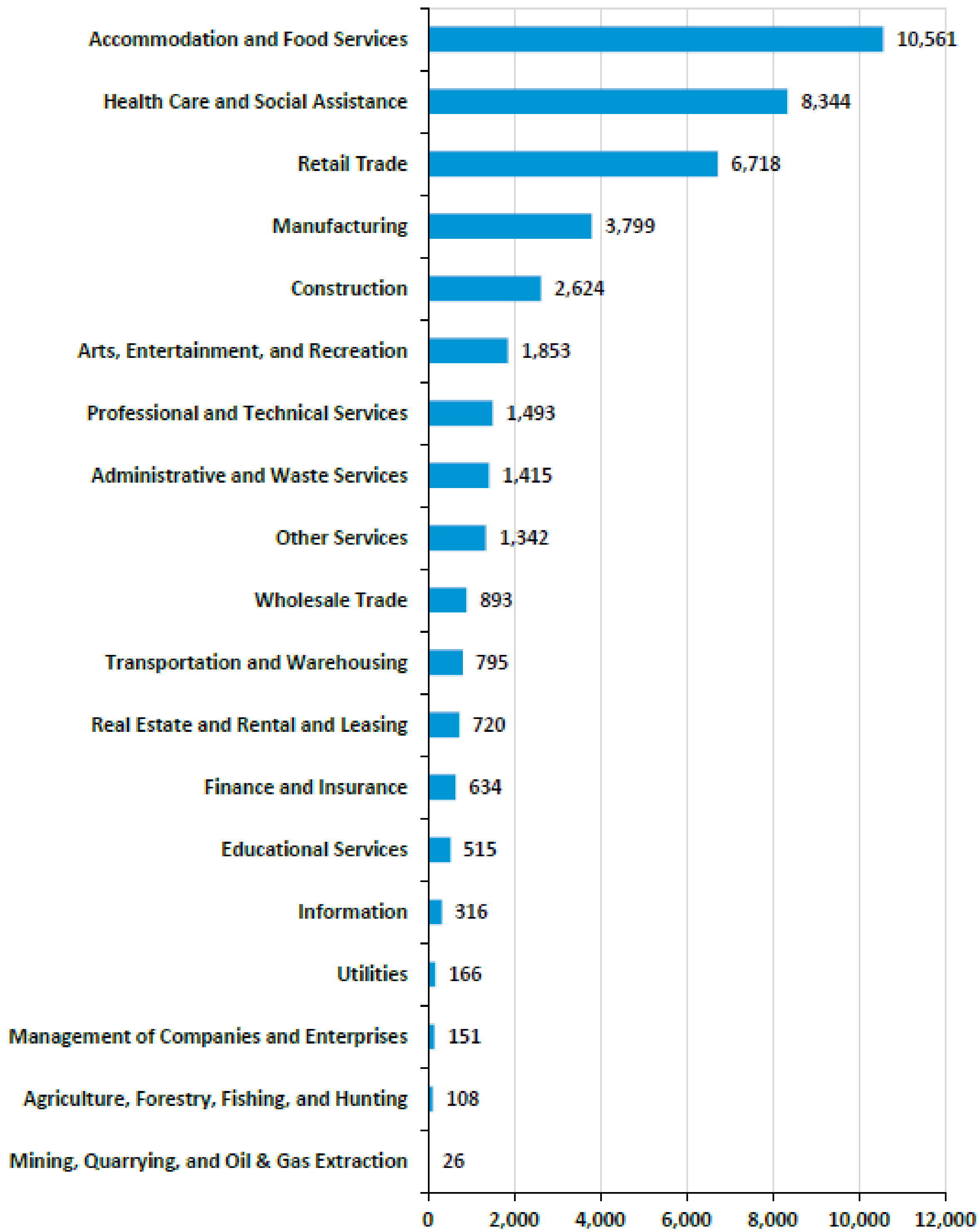
To provide a better understanding of the underlying factors motivating the total employment trends depicted in Figures 5 and 6, Figures 7 through 9 provide data on private employment and wages in Coconino County by major industry sector.

Figure 7 provides an indication of the distribution of private sector employment across major industry sectors in Coconino County for the third quarter of 2020. As these data indicate, the county's largest industry sector that quarter was Accommodation and Food Services (10,561 jobs), followed by Health Care and Social Assistance (8,344 jobs) and Retail Trade (6,718 jobs).

Figure 8 provides a similar ranking for average private sector weekly wages by major industry sector in Coconino County for the third quarter of 2020. As these data show, the highest paying industry sectors that quarter were Finance and Insurance ($1,806 per week), Manufacturing ($1,428 per week), and Health Care and Social Assistance ($1,235 per week). To provide a point of reference, the average private sector weekly wage across all industry sectors in Coconino County that quarter was $866 per week.

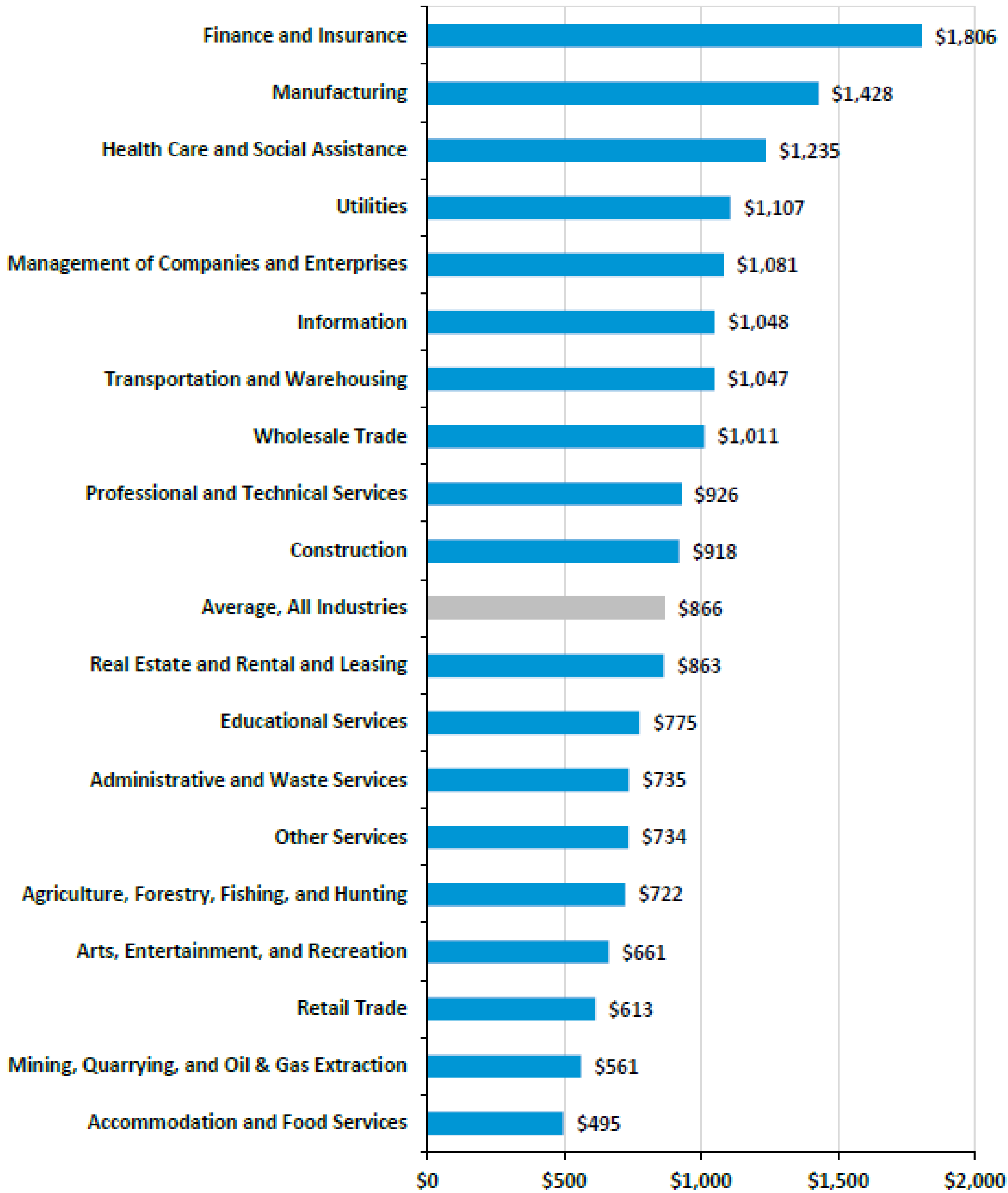
[9] Data Source: Bureau of Labor Statistics.

Figure 7: Private Employment by Major Industry Sector in Coconino County – 3rd Qu. 2020[10]



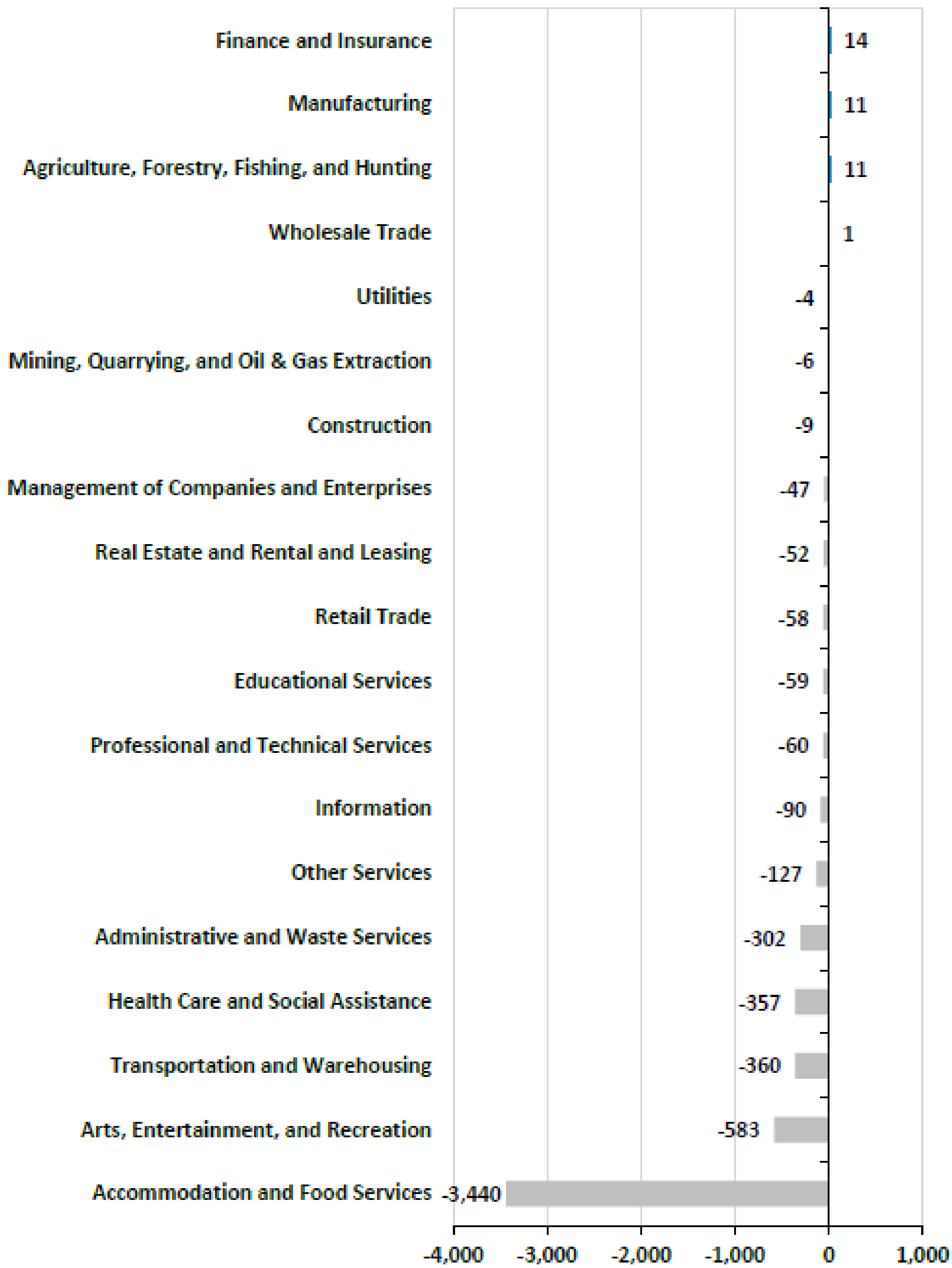
[10] Data Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Figure 8: Average Private Weekly Wages by Major Industry in Coconino County – 3rd Qu. 2020[11]



[11] Data Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Figure 9: Change in Private Employment by Major Industry in Coconino County from the 3rd Qu. 2019 – 3rd Qu. 2020[12]



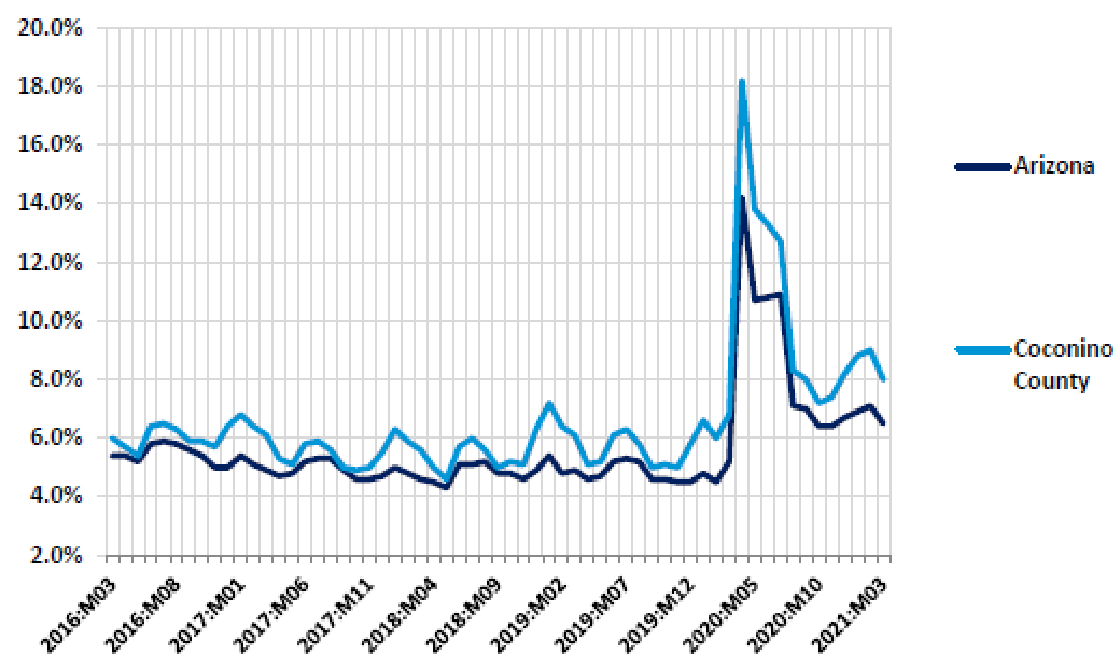
[12] Data Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages.

Lastly, Figure 9 details the year-over-year change in private sector employment from the third quarter of 2019 to the third quarter of 2020 in Coconino County by major industry sector. Over this period, the only employment gains occurred in the Finance and Insurance (up 14 jobs), Manufacturing (up 11 jobs), and Agriculture, Forestry, Fishing and Hunting (up 11 jobs) sectors. All other sectors experienced employment losses, with the highest losses occurring in the Accommodation and Food Services (down 3,440 jobs), Arts, Entertainment and Recreation (down 583 jobs), and in the Transportation and Warehousing (down 360 jobs) sectors.

Unemployment

Figure 10 illustrates the trend in Coconino County's unemployment rate over the five-year period from March 2016 through March 2021 and benchmarks those data against the statewide trend for Arizona. As these data show, unemployment rates in Coconino County generally tracked closely with statewide trends, but peaks in the unemployment rate were often more prominent in Coconino County. On average, the unemployment rate in Coconino County tracked 1.0 percentage point higher than the statewide rate. However, as a result of the economic dislocations caused by the COVID-19 virus, in April 2020, unemployment in Coconino County, as it did throughout Arizona and the rest of the United States, rose to levels not seen since the Great Depression of the 1930s. By March 2021, unemployment had dropped to 8.0 percent in Coconino County compared to 6.5 percent statewide.

Figure 10: Unemployment Rate – March 2016 to March 2021[13]



[13] Data Source: Bureau of Labor Statistics, Local Area Unemployment Statistics.

Economic and Fiscal Impact

The following sections quantify the economic and fiscal contribution that the Proposed Project would make to Coconino County and the Navajo Nation. The analysis separately evaluates the one-time pulse of economic activity that would occur during the construction phase of the Project, as well as the annual economic activity that the Project would generate during its ongoing operations phase.

METHOD

To empirically evaluate the likely local economic impact attributable to the Proposed Project, the analysis employs a regional economic impact model called IMPLAN.[14] The IMPLAN model is one of the most commonly used economic impact simulation models in the U.S. and is commonly employed by universities, state agencies and research institutes. Like all economic impact models, the IMPLAN model uses economic multipliers to quantify economic impact.

Economic multipliers measure the ripple effects that an expenditure generates as it makes its way through the economy. For example, as when the Project purchases goods and services – or when contractors or employees hired by the facility use their salaries and wages to make household purchases – thereby generating income for someone else, which is in turn spent, thereby becoming income for yet someone else, and so on, and so on. Through this process, one dollar in expenditures generates multiple dollars of income. The mathematical relationship between the initial expenditure and the total income generated is the economic multiplier.

One of the primary advantages of the IMPLAN model is that it uses regional and national production and trade flow data to construct region-specific and industry-specific economic multipliers, which are then further adjusted to reflect anticipated actual spending patterns within the specific geographic study area that is being evaluated. As a result, the economic impact estimates produced by IMPLAN are not generic. They reflect as precisely as possible the economic realities of the specific industry, and the specific study area, being evaluated.

In the analysis that follows, these impact estimates are divided into three categories. First round direct impact measures the direct economic contribution of the entity being evaluated (e.g. goods and services purchased by the Project). Second round indirect and induced impact measures the economic ripple effects of this direct impact in terms of business to business, and household (employee) to business, transactions. Total impact is simply the sum of the preceding two. These categories of impact are then further defined in terms of employment (the jobs that are created), labor income (the wages and benefits associated with those jobs), and economic output (the total amount of economic activity that is created in the economy).

[14] IMPLAN is produced by IMPLAN Group, LLC.

CONSTRUCTION PHASE

This portion of the section assesses the economic and fiscal impact that the one-time pulse of activity associated with construction of the Proposed Project would have on Coconino County and the state of Arizona.

Assumptions

The analysis is based on the following assumptions:

- **For ease of analysis, all construction expenditures are assumed to take place in a single year.**
- **Total investment in the Project is estimated to be approximately $775 million.[15]**
- **Of that total:**
    - Architecture, engineering, site preparation, and other construction costs are estimated to be $191 million.[16]
    - Capital equipment and other development costs are estimated to be $584 million.[17] It is anticipated that no capital equipment would be purchased from vendors in Coconino County.[18]
- **Coconino County:**
    - The total local portion of the transaction privilege tax (TPT) rate for contractors in Coconino County is 1.3 percent.[19]
    - A construction contractor's tax base is 65 percent of gross income.[20]
    - Equipment purchases would be exempt from the TPT or use tax because purchases would be made from a registered solar energy retailer or would be considered machinery or equipment used directly in producing or transmitting electrical power.[21]

Economic Impact on Coconino County

Applying these assumptions in the IMPLAN model results in the following estimates of one-time economic impact. As shown in Table 1, construction of the Proposed Project would directly provide a one-time pulse supporting approximately: 1) 570 jobs, 2) $30.2 million in labor income, and 3) $86.3 million in economic output to Coconino County (in 2022 dollars).[22]

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[15] Data Source: AES Corporation.

[16] Data Source: AES Corporation.

[17] Data Source: AES Corporation.

[18] Data Source: IMPLAN Group, LLC.

[19] 19 Data Source: Arizona Department of Revenue. TPT and Other Tax Rate Tables.

[20] Data Source: Arizona Department of Revenue and AES Corporation.

[21] Data Source: Arizona Department of Revenue. According to A.R.S. § 42-5061(M), A.R.S. § 42-5061(B)(4), and A.R.S. § 42-5159 (B and E).

[22] Please note that estimates are rounded. It is important to note that construction sector jobs are not necessarily new jobs, but the investments made can also support a job during the construction of the project.

Taking into account the economic ripple effects that direct investment would generate, the estimated total one-time impact on Coconino County would support approximately: 1) 770 jobs, 2) $39.7 million in labor income, and 3) $116.9 million in economic output (in 2022 dollars).

Table 1: Estimated One-Time Economic Impact on Coconino County from Construction of the Project (2022 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	570	$30,194,000	$86,250,000
2nd Round Indirect and Induced Economic Activity	200	$9,524,000	$30,650,000
Total Economic Activity	**770**	**$39,718,000**	**$116,900,000**

Total Economic Impact on Arizona

(Including impact on Coconino County)

Applying these assumptions in the IMPLAN model results in the following estimates of one-time total economic impact. As shown in Table 2, construction of the Proposed Project would directly provide a one-time pulse supporting approximately: 1) 1,170 jobs, 2) $68.6 million in labor income, and 3) $191.3 million in economic output to the state of Arizona (in 2022 dollars).[23]

Taking into account the economic ripple effects that direct investment would generate, the estimated total one-time impact on the state of Arizona would support approximately: 1) 1,870 jobs, 2) $106.4 million in labor income, and 3) $310.7 million in economic output (in 2022 dollars).

Table 2: Estimated One-Time Economic Impact on Arizona from Construction of the Project (2022 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	1,170	$68,644,000	$191,250,000
2nd Round Indirect and Induced Economic Activity	700	$37,708,000	$119,417,000
Total Economic Activity	**1,870**	**$106,352,000**	**$310,667,000**

Fiscal Impact

This portion of the section quantifies the direct fiscal contribution that the Proposed Project would make to Coconino County during the construction phase of the project. Table 3 details the revenue that the Proposed Project would generate for Coconino County during construction of the Project. As the data in Table 3 indicate, the estimated county transaction privilege tax revenue from construction of the Project would be approximately up to $1.6 million (in 2022 dollars).

[23] Please note that estimates are rounded. It is important to note that construction sector jobs are not necessarily new jobs, but the investments made can also support a job during the construction of the project.

Table 3: Estimated Coconino County Revenue Generated by the Project during Construction (2022 Dollars)

	Value / Tax Rate[24]	Coconino County Revenue
Total Construction Investment[25]	$191,250,000	
Construction Contractor's Tax Base – 65%[26]	$124,312,500	
Coconino County TPT Tax Rate	1.3%	
Total Coconino County TPT Tax Revenue[27]		**$1,616,000**

ONGOING OPERATIONS PHASE

This portion of the section assesses the annual economic and fiscal impact that the Proposed Project would have on Coconino County and the Navajo Nation during its anticipated 35-year operational phase.

Assumptions

The analysis is based on the following assumptions:

- **Total investment in the Project is estimated to be $775 million.[28]**
- **The Project would spend approximately $5 million each year for maintenance and repair, pest control, and other operational expenditures.[29]**
- **The Project qualifies to apply the value of its entire Investment Tax Credit, estimated at $240 million, to the assessment value of its property in year 1 of the project.[30]**
- **The Proposed Project would be situated on an approximately 5,500-acre tract of land.**
    - The land is owned by the Navajo Nation and it is therefore not subject to Coconino County's real property taxes.[31]
    - The parcels are located in "Tax Area Code 1500 - SD#15 Navajo Reservation" in Coconino County. The total applicable tax rate on the investment in personal property is $2.0393 per $100 of assessed value.[32]

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[24] Data Source: Arizona Department of Revenue. A.R.S. §42-5075(B) and TPT and Other Tax Rate Tables.

[25] Data Source: AES Corporation.

[26] Does not include any potential additional exemptions or deductions to the tax base.

[27] Calculations include the county TPT tax rate but not potential additional distributions from the state TPT tax collections. Figures rounded.

[28] Data Source: AES Corporation.

[29] Data Source: AES Corporation.

[30] Data Source: AES Corporation. Assumes Project will be connected in 2024. Also assumes that the company's income tax liability in year 1 is equal to or greater than the value of its Income Tax Credit (ITC), resulting in the reduction of the Project's original cost by the value of the entire ITC beginning in year 1.

[31] Data Source: AES Corporation and Coconino County Assessor's Office.

Economic Impact on Coconino County

Applying these assumptions in the IMPLAN model results in the following estimates of annual economic impact. As shown in Table 4, annual operation of the Proposed Project would directly support approximately: 1) 15 jobs, 2) $736,000 in labor income, and 3) $2.3 million in economic output in Coconino County (in 2022 dollars).

Taking into account the economic ripple effects that direct impact would generate, the estimated total annually supported impact on Coconino County would be approximately: 1) 21 jobs, 2) $1.0 million in labor income, and 3) $3.3 million in economic output (in 2022 dollars).

Table 4: Estimated Annual Economic Impact on Coconino County from the Ongoing Operation of the Project (2022 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	15	$736,000	$2,314,000
2nd Round Indirect and Induced Economic Activity	6	$301,000	$960,000
Total Economic Activity	**21**	**$1,037,000**	**$3,274,000**

Total Economic Impact on Arizona

(Including impact on Coconino County)

Applying these assumptions in the IMPLAN model results in the following estimates of total annual economic impact. As shown in Table 5, annual operation of the Proposed Project would directly support approximately: 1) 33 jobs, 2) $2.0 million in labor income, and 3) $5.3 million in economic output in the state of Arizona (in 2022 dollars).

Taking into account the economic ripple effects that direct impact would generate, the estimated total annually supported impact on the state of Arizona would be approximately: 1) 60 jobs, 2) $3.5 million in labor income, and 3) $9.9 million in economic output (in 2022 dollars).

Table 5: Estimated Total Annual Economic Impact on Arizona from the Ongoing Operation of the Project (2022 Dollars)

Economic Impact	Employment	Labor Income	Output
1st Round Direct Economic Activity	33	$2,030,000	$5,275,000
2nd Round Indirect and Induced Economic Activity	27	$1,462,000	$4,636,000
Total Economic Activity	**60**	**$3,492,000**	**$9,911,000**

[32] Data Source: Coconino County Assessor's Office and Taxes by District 2021. 2020 total tax rate = Primary tax rate + Personal Property tax rate for Tax Area Code 1500.

Fiscal Impact

This portion of the section quantifies the direct fiscal contribution that the Proposed Project would make to Coconino County and the Navajo Nation during the operational phase of the Project. It should be noted at the outset, however, that the analysis that follows likely understates the actual fiscal impact that Painted Desert Power would have on Coconino County and the Navajo Nation as it only accounts for the direct fiscal impact that Painted Desert Power would have on Coconino County and the Navajo Nation. It does not take into account any additional tax revenue that would be generated as a result of the indirect economic activity attributable to the ongoing operation of Painted Desert Power.

Fiscal Contribution to Coconino County

Table 6 details the revenue that the Proposed Project would generate for Coconino County over a 35-year period from taxes levied on capital investment. This calculation is based on: 1) the taxable portion of capital investment less 1) the value of Painted Desert Power's Investment Tax Credit, subject to 2) the Arizona Department of Revenue's depreciation guidelines for solar facilities, times 3) the Arizona Department of Revenue's 20 percent central valuation of solar facilities, times 4) Coconino County's 18 percent property assessment value, times 5) Coconino County's applicable property tax rate of $2.0393 per $100.[33]

As the data In Table 6 indicate, based on these calculations, the estimated additional county revenue from taxation of capital investments associated with the Proposed Project would be approximately $380,263 in the Project's first year of operation, with that figure projected to gradually decline to approximately $39,338 in the Project's 27th year of operation and thereafter, as the value of the proposed capital investments is depreciated, for a cumulative total of approximately $6.0 million (2022 dollars).

[33] Data Source: Arizona Department of Revenue, Centrally Valued Property Unit, Coconino County Assessor's Office and AES Corporation.

Table 6 Estimated Revenue Generated by the Proposed Project over 35 Years from Taxes on Capital Investment in Coconino County (2022 Dollars)

Year	Taxable Original Cost (after ITC Deduction)[34]	Depreciation[35]	Depreciated Cost of Taxable Capital Investment	AZ Department of Revenue Value of Investment[36]	County Assessed Value[37]	Additional Annual County Tax Revenue from Solar Investment[38]
Baseline – Total Capital Investment: $775,329,000						
1	$535,829,000	3.33%	$517,964,461	$103,592,892	$18,646,721	$380,263
2	$535,829,000	6.67%	$500,099,922	$100,019,984	$18,003,597	$367,147
3	$535,829,000	10.00%	$482,235,383	$96,447,077	$17,360,474	$354,032
4	$535,829,000	13.34%	$464,370,845	$92,874,169	$16,717,350	$340,917
5	$535,829,000	16.67%	$446,506,306	$89,301,261	$16,074,227	$327,802
6	$535,829,000	20.00%	$428,641,767	$85,728,353	$15,431,104	$314,686
7	$535,829,000	23.34%	$410,777,228	$82,155,446	$14,787,980	$301,571
8	$535,829,000	26.67%	$392,912,689	$78,582,538	$14,144,857	$288,456
9	$535,829,000	30.01%	$375,048,150	$75,009,630	$13,501,733	$275,341
10	$535,829,000	33.34%	$357,183,611	$71,436,722	$12,858,610	$262,226
11	$535,829,000	36.67%	$339,319,073	$67,863,815	$12,215,487	$249,110
12	$535,829,000	40.01%	$321,454,534	$64,290,907	$11,572,363	$235,995
13	$535,829,000	43.34%	$303,589,995	$60,717,999	$10,929,240	$222,880
14	$535,829,000	46.68%	$285,725,456	$57,145,091	$10,286,116	$209,765
15	$535,829,000	50.01%	$267,860,917	$53,572,183	$9,642,993	$196,650
16	$535,829,000	53.34%	$249,996,378	$49,999,276	$8,999,870	$183,534
17	$535,829,000	56.68%	$232,131,839	$46,426,368	$8,356,746	$170,419

[34] Data Source: AES Corporation. Assumes Project is connected in 2024 and qualifies for the ITC (Investment Tax Credit). Also assumes that the company's income tax liability in year 1 is equal to or greater than the value of its ITC, resulting in the reduction of the Project's original cost by the value of the entire ITC beginning in year 1.

[35] Data Source: Arizona Department of Revenue, Centrally Valued Property Unit.

[36] Data Source: Arizona Department of Revenue, Centrally Valued Property Unit. Depreciated cost of investments is valued at 20 percent.

[37] Data Source: Arizona Department of Revenue, Centrally Valued Property Unit. Assessed Value of property in Coconino County is 18 percent.

[38] Data Source: Coconino County Assessor's Office. Calculated based on Coconino County's 2021 tax rate for property located in the tax area code 1500, which is $2.0393 per $100 of assessed value. Tax rate is assumed to remain constant throughout analysis.

Year	Taxable Original Cost (after ITC Deduction)[34]	Depreciation[35]	Depreciated Cost of Taxable Capital Investment	AZ Department of Revenue Value of Investment[36]	County Assessed Value[37]	Additional Annual County Tax Revenue from Solar Investment[38]
18	$535,829,000	60.01%	$214,267,301	$42,853,460	$7,713,623	$157,304
19	$535,829,000	63.35%	$196,402,762	$39,280,552	$7,070,499	$144,189
20	$535,829,000	66.68%	$178,538,223	$35,707,645	$6,427,376	$131,073
21	$535,829,000	70.01%	$160,673,684	$32,134,737	$5,784,253	$117,958
22	$535,829,000	73.35%	$142,809,145	$28,561,829	$5,141,129	$104,843
23	$535,829,000	76.68%	$124,944,606	$24,988,921	$4,498,006	$91,728
24	$535,829,000	80.02%	$107,080,067	$21,416,013	$3,854,882	$78,613
25	$535,829,000	83.35%	$89,215,529	$17,843,106	$3,211,759	$65,497
26	$535,829,000	86.68%	$71,350,990	$14,270,198	$2,568,636	$52,382
27	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
28	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
29	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
30	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
31	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
32	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
33	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
34	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
35	$535,829,000	90.00%	$53,582,900	$10,716,580	$1,928,984	$39,338
CUMULATIVE TOTAL						**$5,978,422**

Fiscal Contribution to the Navajo Nation

The Proposed Project would generate revenues associated with community stakeholder payments and lease payments for the Navajo Nation over a 35-year period. As the data in Table 7 indicate, Community Stakeholder payments are estimated at approximately $57.7 million and Navajo Nation lease payments at approximately $11.8 million over a 35-year period, for a cumulative total of approximately $69.5 million over 35 years (in 2022 dollars).[39]

Table 7: Estimated Navajo Nation Revenue Generated by the Proposed Project over 35 Years (2022 Dollars)

	Cumulative Navajo Nation Revenue[40]
Community Stakeholder Payments[41]	$57,700,000
Navajo Nation Lease Payments[42]	$11,800,000
TOTAL Cumulative Revenue over 35 Years	**$69,500,000**

The estimates provided in this report are based on the best information available and all reasonable care has been taken in assessing that information. However, because these estimates attempt to foresee circumstances that have not yet occurred, it is not possible to provide any assurance that they will be representative of actual events. These estimates are intended to provide a general indication of likely future outcomes and should not be construed to represent a precise measure of those outcomes.

[39] Data Source: AES Corporation.

[40] Data Source: Navajo Nation Taxes are under confidential negotiation with the Nation; therefore, an estimate is not currently available for this report.

[41] Data Source: AES Corporation. Negotiations with permittees are ongoing; figure reflects current offer that is under negotiation but is not final.

[42] Data Source: AES Corporation.

Appendix G VISUAL RESOURCE ASSESSMENT

Visual Resource Assessment for the Painted Desert Solar Project

FEBRUARY 2022

PREPARED FOR

Navajo Power, PBC

PREPARED BY

SWCA Environmental Consultants

VISUAL RESOURCE ASSESSMENT FOR THE PAINTED DESERT SOLAR PROJECT

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SWCA Project No. 61380

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CONTENTS

Appendices

Figures

1 INTRODUCTION

SWCA Environmental Consultants (SWCA) has been contracted by Navajo Power, PBD (the applicant), to evaluate the existing conditions of the landscape within and surrounding the proposed Painted Desert Solar Project (project) and to describe potential changes to the landscape resulting from the project. The Project is a proposed 750-megawatt (MW) photovoltaic (PV) solar generating and battery energy storage system (BESS) facility in the Cameron and Coalmine Canyon chapters of the Navajo Nation Reservation, approximately 4 miles east of Cameron, Arizona (**Figure 1)**.

Navajo Power is jointly developing the Project with the AES Corporation (AES), a leading independent power producer that owns and operates more than 150 renewable generation systems across the United States (US). AES is expected to be the eventual owner and operator of the Project.

The Project is planned in two distinct areas, Areas 1 and 2, separated by a floodplain and presumed United States Army Corps of Engineers (USACE) jurisdictional wash. To the south of the wash lies Area 1, consisting of a large area of solar arrays and related facilities, one or more operations and maintenance (O&M) buildings, and a new high-voltage (HV) Project substation and BESS area. Area 1 would be accessed via Access Road 1 running east from Bureau of Indian Affairs (BIA) Route (RT) 6730. The larger Area 2 is located north of Area 1 by almost a mile and would feature additional solar arrays. Area 2 would be accessed via Access Roads 2 South and 2 North running east from BIA RT 6730. The two portions of Area 2 would be connected by a single access road crossing the cultural corridor and slurry pipeline with alternating current (AC) medium-voltage (MV) cables running overhead. The gap between Areas 1 and 2 would be connected via the East and West Connectors. These corridors would contain MV circuits, temporary access roads (except for areas within the seasonal wash, where there would be no construction of any kind), and overhead or underground communications cable. Generation intertie (gen tie) options for connecting the Project to the Moenkopi substation (35°49'57"N 111°26'47"W) and for expansion of public access roads to construct the Project will also be evaluated. Several alternative project components are also described, including an alternative solar generating facility and three substation and gen tie alternatives.

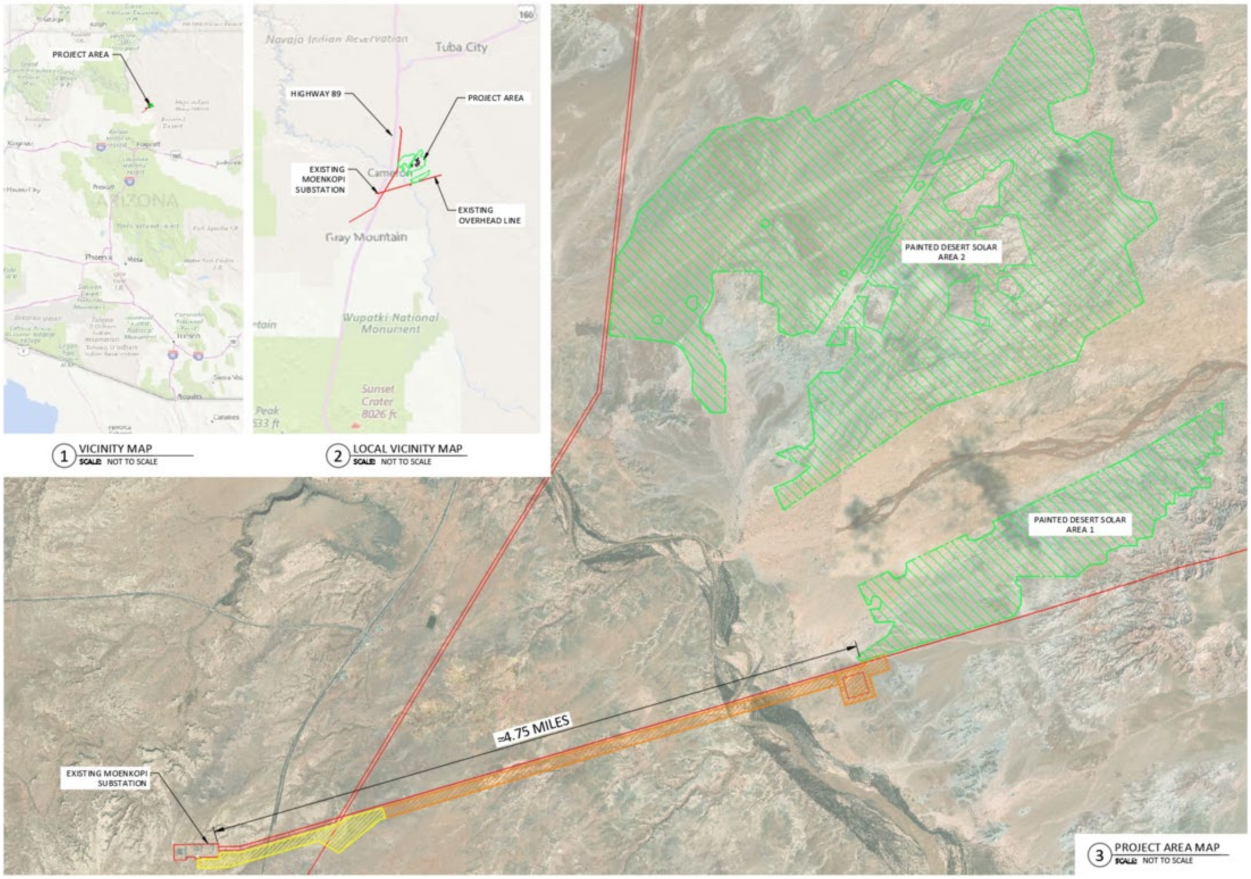


Figure 1. Project Overview.

An approximately 4.5-mile, 500-kilovolt (kV) generation tie line would run west from the project substation near Area 1 to interconnect directly with the APS-operated Moenkopi Substation on the west side of US Route 89 (US 89). When fully built out, the generation tie would support up to three circuits of suspended 500-kV electrical conductors and one or two communications lines. The communications lines would be either suspended overhead and/or buried in a trench within the generation tie corridor.

This visual resource assessment presents the anticipated visual impact of the project's construction and operation on the scenery and views in the surrounding area based on views from key observation points (KOPs).

2 CHARACTERISTIC LANDSCAPE

The major watershed in the area, the Little Colorado River, is located approximately 1 mile west-southwest of the proposed project. Its tributaries originate in the White Mountains of Arizona and New Mexico and flow north through the Little Colorado River floodplain. The river becomes a deeply incised canyon at Cameron, Arizona, forming the Little Colorado River Gorge before it empties into the Colorado River.

US 89 runs north to south through the Navajo Nation from Flagstaff to Page, Arizona, and is in the viewshed of the proposed solar project. The highway provides primary access to major recreation destinations, including Grand Canyon National Park and Glen Canyon National Recreation Area, and is also part of a popular national park touring route that extends through Utah, Arizona, and Nevada called the “grand circle.” Other roads in the project viewshed include BIA Route 6730 and other unpaved roads.

The project area consists of low-density range grazing lands that are partially disturbed by grazing and historic mining activities. Scattered rural residential and ranching properties are located in the vicinity of the proposed project, and the community of Cameron, Arizona, and the Cameron Trading Post are located approximately 1 to 2 miles west-southwest of the proposed project area.

Existing transmission infrastructure located in the area landscape includes two major sets of existing high-voltage transmission lines: the Arizona Public Service (APS) Four Corners transmission corridor and the APS Navajo Generating Station transmission corridor. The APS-operated Moenkopi Substation is located approximately 6 miles to the west-southwest of the proposed solar array.

The overall character of the immediate landscape is rangelands interspersed with rolling hills and mesas. The most notable natural features in the landscape are the eroded mesa features interspersed with dry valleys with distant backdrop views of mountains, including the San Francisco Peaks and the North and South Rims of Grand Canyon, and textured dirt and soft, light tan, scenic sand dunes leading to mountain ranges in the background.

3 METHODS

To provide a systematic basis for evaluating impacts to visual resources resulting from the construction and operation of the proposed project, the assessment was based on the Bureau of Land Management’s (BLM) Visual Resource Management System. BLM Form 8400-1 (BLM 1986) was adapted for project purposes and used to document the potential visual contrast of the proposed project components to the surrounding landscape (Appendix A). The BLM’s process is an industry standard and is often applied to non-BLM visual assessments to provide project proponents and authorizing agencies with a consistent and translatable methodology for understanding visual impacts from proposed projects.

3.1 KOP Identification

The KOPs selected for analysis represent visually sensitive areas that would have potential views of the project and consist of either high-use travel routes or local roads with nearby residential development.

Existing visual conditions were assessed for sensitive receptors and sensitive viewing areas in the project vicinity. The applicant and their consultant, Terabase, worked with representatives from the Navajo Nation to identify the following four KOPs to represent visual impact of the proposed project (the KOPs are shown on the map on page 1 of Appendix B).

- KOP A – Area 2 from US 89 Looking East, which represents the highway travelers’ best vantage of the solar arrays east of the project area.

- KOP B – Panoramic View of Area 2 from Bluff Along BIA Route 6730, which represents a superior (overlooking) view of the solar arrays that would be seen by local road travelers and isolated residences southwest of the project area.
- KOP C East – Preferred Gen-Tie Crossing US 89 Looking East, which represents travelers' views of the generation tie line looking east.
- KOP C West – Preferred Gen-Tie Crossing US 89 Looking West, which represents travelers' views of the generation tie line and substation area looking west.

3.2 Field Reconnaissance

A field visit to the project area was conducted on September 25, 2020, by Terabase, to collect the necessary photo documentation from each KOP for analysis and computer simulations.

An image series of two to three horizontal photographs was taken with a digital single-lens reflex camera at each KOP for use in producing the visual simulations. These images were combined ("stitched") using Adobe Photoshop to create a cylindrical panoramic image that represents a person's average peripheral vision of approximately 125 degrees (horizontally) by 55 degrees (vertically). The stitched photographs represent the view a person would see looking towards the project from each KOP. The photo points were recorded using a global positioning system (GPS) unit and photographs were collected under typical, sunny, and generally clear viewing conditions.

3.3 Viewshed Analysis

A viewshed analysis for the project was developed to illustrate where, in the surrounding landscape, the project would theoretically be visible (see Appendix A). The viewshed model represents the area in the surrounding landscape where potential visual effects from the proposed project may be discerned by the casual observer. Created using a geographic information system (GIS) software, the viewshed analysis models the approximate heights and locations of the project solar panel components and incorporates those features into the existing landform to illustrate the areas from which the proposed project may be potentially visible. This theoretical view is based on elevation and landform and does not account for vegetation, existing structures, and other landscape elements that could obstruct views.

3.4 Visual Simulations

Photo-realistic simulations of the project components were created by Terabase using a variety of visualization software for each KOP (see Appendix B). The proposed layout of the solar array, battery storage, substation, and generation tie line were modeled based on the most recent design files available, dated December 2020, and the images (or "models") of the layout were superimposed onto the panoramic photographs taken during the field reconnaissance.

The photo-realistic simulations were developed by superimposing a three-dimensional computer model of the proposed project components on a digital elevation model and then placing that onto the base photographs at the correct scale and distance. Date and time-of-day inputs determine shadows and reflected light, and the software accounts for distance and haze to increase accuracy of viewing conditions.

3.5 Contrast Analysis

The visual contrast analysis is a qualitative discussion of anticipated contrast between the existing landscape character and the proposed activities and/or facilities. Factors taken into consideration for such an analysis include distance of the proposed project elements from the viewer and the level of perceived contrast between the proposed project elements and the existing landscape. These factors are further defined below.

The following distance zones were used for evaluating impacts on scenery from each KOP:

- Foreground: up to 0.5 mile
- Middle ground: 0.5 to 3 miles
- Background: 3 to 5 miles

The level of perceived contrast between the proposed project elements and the existing landscape from each KOP were classified using the following terms:

- None: The element contrast is not visible or perceived.
- Weak: The element contrast can be seen but does not attract attention.
- Moderate: The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- Strong: The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

4 RESULTS

4.1 Visual Simulations and Contrast Analysis by KOP

Impacts to scenic resources were determined by examining the simulations and evaluating the visual change and contrast with the existing landscape that would result from the construction and operation of the project. The visual impact analysis for each of the four KOPs is provided below. Contrast Rating Worksheets for each of the KOPs are provided in Appendix A and individual KOP locations and Visual Simulations are provided in Appendix B.

4.1.1 *KOP A: Area 2 from US 89 Looking East*

KOP A represents views of travelers looking east from US 89 toward the project area and potential views from residences in the vicinity of the KOP. This view represents a prominent, superior (overlooking) view of the proposed project and surrounding valley and is the located where the road is nearest the project area. The view from this KOP is characterized by broad, panoramic views of flat, horizontal terrain, with clustered, low, rounded, yellow shrubs and grasses. The foreground includes a dark gray, rocky slope, and reddish brown to dark gray exposed soils. The foreground and middle ground areas include white, rectangular building structures. Other structures include prominent, tall, vertical transmission structures consistently located through the foreground and middle ground landscape.

This KOP is located approximately 0.8 mile west from the nearest western edge of Area 2 of the solar array. The solar panels, although low profile with a maximum height of 13 feet, are visible because the

KOP is looking from a superior vantage point. This vantage point provides a full view of the valley below where the solar panel arrays will be visible by casual observers in the middle ground view traveling on US 89, as illustrated in the visual simulation (see Appendix B). The proposed project would result in strong contrast between the existing landscape and the project structures primarily from changing lines and color in the landscape. The contrast is greater where the background landscape is lighter in color and contrasts with the dark solar panel color. Contrast is reduced in areas with the dark rocky slope background color.

4.1.2 *KOP B: Panoramic View of Area 2 From Bluff Along BIA Route 6730*

KOP B represents views of persons traveling along and in the vicinity of BIA Route 6730 and residents in the project vicinity. Route 6730, the primary rural road in the vicinity of the proposed project, is used by local residents and ranchers to access lands in the local vicinity. The superior view of the proposed project into the valley below from an overlooking bluff represents a prominent view of likely visibility.
The panoramic view contains a low valley in the foreground and middle ground that is framed by higher mesa landforms in the foreground and distant plateaus in the background. The valley contains curvilinear line washes in the foreground and middle ground that are light tan in color and contain low, globular form, yellow shrubs, among a flat, medium brown, smooth valley bottom. The mesas in the foreground present vertical and horizontal lines that frame the valley view with rock substrate and outcrops ranging in color from white to dark brown.

This KOP is located approximately 0.75 mile from the nearest visible edge of Area 2 of the solar array. As with KOP A, this superior view provides an overlooking prominent view with high visibility of the solar arrays. This provides a full view of the valley below where the solar panel arrays will be visible in the middle ground by casual observers traveling on Route 6730 and others in the vicinity, as illustrated in the visual simulation (see Appendix B). The proposed project would result in strong contrast between the existing landscape and the project structures primarily from changing lines and color in the landscape. The strong contrast of the dark grey panel structures against the background of the light tan and light brown landscape features would be visible to travelers, residents, and persons using the landscape who view the area from prominent, superior viewpoints.

4.1.3 *KOP C East: Preferred Gen-Tie Crossing US 89 Looking East*

This KOP represents the view of travelers on US 89 looking east toward the proposed project's generation tie line area. Views from this KOP are characterized by broad, panoramic views of flat, consistent, and horizontal terrain with very low, small hills in the middle ground area. Exposed soils provide smooth texture and medium brown color, with small areas of white rock outcrops presenting coarse terrain. Areas of medium-density vegetation present light green rounded shrubs and yellow grasses. The foreground and middle ground views contain prominent, tall, vertical transmission structures of various types, including monopole local structures and large high-voltage lattice structures that are grey and dark brown in color. Transmission structures also include horizontal wire lines that cross the entire KOP view. A tall, dark grey, radio tower structure with white, round, radio components is located in the middle ground amongst the transmission lines. The view also includes a small, local dirt road that is light tan to grey in color and presents horizontal and curvilinear lines.

The proposed generation tie line, located adjacent to and south of the existing APS Four Corners high-voltage (500-kV) lines and lattice towers, is visible from this KOP in the foreground and middle ground (see Appendix B). However, with the extensive quantity and concentration of existing structures in the view, the visibility and contrast resulting from the additional generation tie transmission is weak in form, line, texture, and color. From this KOP, the additional structures and change would not be noticeable by casual observers traveling along US 89.

4.1.4 *KOP C West – Preferred Gen-Tie Crossing US 89 Looking West*

This KOP represents the view of travelers on US 89 looking west toward the proposed project's generation tie line and the Moenkopi Substation expansion area. Views from this KOP are characterized by panoramic views of flat, horizontal terrain with exposed rocky, dark brown soils, small areas of flat, white, rock outcrops that are interspersed with vegetation of light green, globular, shrubs and a few yellow grasses. The foreground and middle ground views contain prominent, tall, vertical transmission structures of various types, including monopole local structures and large high-voltage lattice structures that are grey and dark brown in color. Transmission structures also include horizontal wire lines.
The foreground view contains the Moenkopi Substation, which presents a concentration of tall, dark grey, vertical and horizontal lines that obscure the hills in the background.

The proposed generation tie line, located adjacent to and south of the existing APS Four Corners high-voltage (500-kV) lines and lattice towers, is visible in the foreground from this KOP (see Appendix B). It is closer and more prominently visible than the proposed transmission towers in the view of KOP C East. With the concentration of existing structures in the view, the visibility and contrast resulting from the additional generation tie transmission structure from this KOP is moderate in form, line, and color. From this KOP, because of the proximity to the highway of this proposed transmission structure, it would likely be noticeable by casual observers traveling along US 89. The structural expansion of the Moenkopi Substation, although visible from this KOP, would create minimal changes in contrast relative the existing substation and would not be noticeable by casual observers traveling on US 89.

4.2 Design Features

Project design features are activities or plans included in the proposed project design and implementation for the purpose of reducing anticipated environmental impacts which might otherwise stem from project implementation.

Design features related to visual resources currently included in the proposed project's plan of development include the following:

- **VISUAL-1**: Height Restrictions and Site Maintenance: To minimize impacts to the viewshed for sensitive receptors, PDP will keep the Project Site free from debris, trash, and waste during construction and structures (e.g., inverters, solar panels) will not exceed 15 feet at their highest point, as measured from their installed foundation.
- **VISUAL-2**: Lighting: During operations, facility lighting will be located, screened, or shielded so that any sensitive receptors or access roads are not directly illuminated.

The following additional design features are recommended to include in the project design to reduce visual impacts:

- **Material Reflectivity:** Materials, coatings, or paints that have little or no reflectivity should be used on structures. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations should be non-reflective. The surfaces of substation structures should be given low reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Security fence surrounding the substations should have a dulled, darkened finish to reduce contrast.

- **Structure Color Treatment:** Electric transmission towers should be color treated to reduce contrasts with the existing landscape. Monopole towers should have a low-reflectivity treatment. Where transmission facilities using monopole towers are located within the same right-of-way or corridor, the color treatment should match the existing facilities within the right-of-way, unless they contrast with the visual backdrop. Building structures should be painted non-reflective colors that blend with background landscape colors to reduce contrast.

Disclaimer: *The project design map used in the appendices herein was applied from the original Plan of Development and may undergo updates throughout the planning process. The KOPs used remain unchanged and the outcome of this report remains unchanged.*

5 LITERATURE CITED

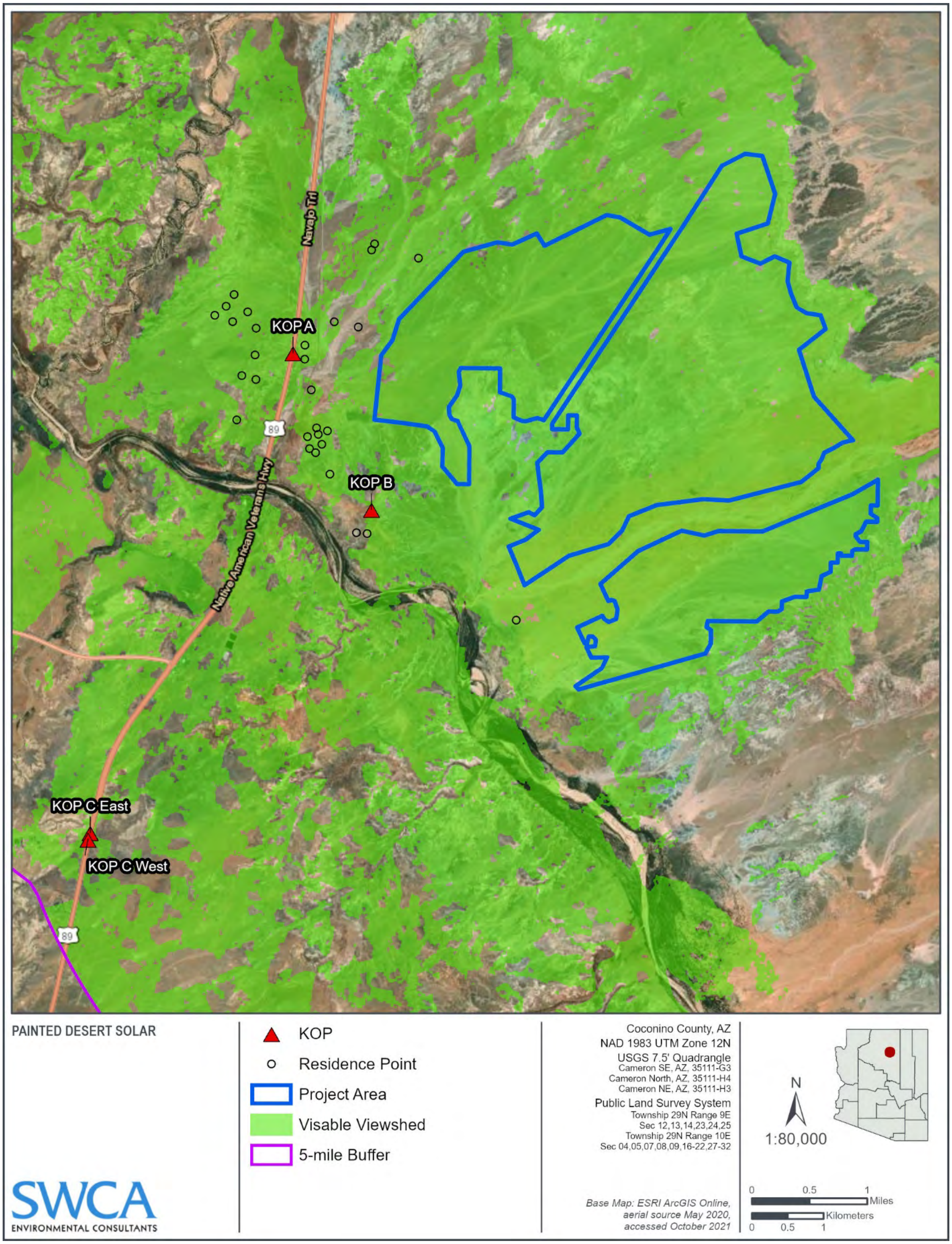
Bureau of Land Management (BLM). 1986. Manual H-8431. Visual Resource Contrast Rating. BLM. Available at: https://www.blm.gov/sites/blm.gov/files/program_recreation_visual%20resource%20management_quick%20link_BLM%20Handbook%20H-8431-1,%20Visual%20Resource%20Contrast%20Rating.pdf. Accessed September 2021.

Terabase Energy. 2021. Draft Plan of Development. Painted Desert Solar Project: Cameron and Coalmine Canyon Chapters, Navajo Nation, Arizona.

APPENDIX A

Contrast Rating Worksheets and Viewshed Analysis

Painted Desert Solar Project: Viewshed Analysis



Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 9/24/2021

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Painted Desert Solar Project	4. Location Township ______ Range ______ Section ______	5. Location Sketch See Figure Latitude: 35°53'39.09"N Longitude: 111°24'23.16"W
2. Key Observation Point KOP A – Area 2 from US 89 Looking East		
3. VRM Class NA		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Panoramic, flat, lands in the background and rolling slope in foreground.	Low, rounded, simple form of grasses and shrubs in foreground. Indistinct forms of vegetation in background.	Prominent, tall, rectangular buildings. Linear, parallel, tall, vertical transmission lines. Foreground linear fence.
LINE	Straight, horizontal, parallel lines	Irregular, undulating, curving, shrubs and grasses in foreground. Indistinct vegetation lines in background.	Bold, regular straight, parallel transmission structures. and building structures.
COLOR	Reddish brown to dark grey exposed soils	Light yellow grasses and shrubs.	White buildings, dark grey transmission lines.
TEX-TURE	Medium to fine and smooth in background, medium and rough texture in foreground.	Clumped shrubs and fine grasses in foreground. Indistinct texture in background.	Continuous and repetitive transmission line infrastructure. Isolated geometric building structures.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	NA	NA	Bold, flat, solid, horizontal solar array infrastructure.
LINE	NA	NA	Bold, regular, straight, horizontal edge line for solar array.
COLOR	NA	NA	Dark subdued grey to blue black of solar array. Monotone.
TEX-TURE	NA	NA	Smooth, uniform, ordered, dense solar array infrastructure.

SECTION D. CONTRAST RATING ☐ SHORT TERM X LONG TERM

1. DEGREE OF CONSTRAST

		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form				x				x			x	
	Line				x				x	x			
	Color				x				x	x			
	Texture				x				x		x		

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) NA

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names

Jill Grams., SWCA Environmental Consultants

Date: 09/24/2021

Comments from item 2.

Additional Mitigating Measures (See item 3)
Recommended Mitigation Measures
Materials, coatings, or paints that have little or no reflectivity should be used on structures. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations should be non-reflective. The surfaces of substation structures should be given low reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Security fence surrounding the substations should have a dulled, darkened finish to reduce contrast.

Electric transmission towers should be color treated to reduce contrasts with the existing landscape. Monopole towers should have a low-reflectivity treatment. Where transmission facilities using monopole towers are located within the same ROW or corridor, the color treatment should match the existing facilities within the ROW, unless they contrast with the visual backdrop.

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 9/24/2021

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Painted Desert Solar Project

2. Key Observation Point
KOP B– Panoramic View of Area 2 From Bluff Along BIA Route 6730

3. VRM Class
NA

4. Location

Township ____________

Range ____________

Section ____________

5. Location Sketch
See Figure

Latitude: 35°52'28.33"N
Longitude: 111°23'39.10"W

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Panoramic landform with central valley framed by rolling hills and mesas. Flat hills frame background.	Low, rounded, simple form shrubs in foreground and middle ground valley wash bottom. Indistinct grasses and shrubs background.	Flat road in middle ground.
LINE	Curvilinear wash lines in valley foreground, middle ground. Distinct, straight, horizontal, and angular lines from mesas and valley in foreground and middle ground. Straight, horizontal lines background hillslopes	Irregular, undulating, curving, shrubs and grasses in foreground. Indistinct vegetation lines in background.	Curvilinear dirt road in middle ground.
COLOR	White rock outcrops, light tan wash valley bottom, medium brown soil.	Light yellow grasses and shrubs.	Light tan dirt road in middle ground.
TEXTURE	Coarse rock outcrops in foreground, fine textures valley bottom and background.	Clumped shrubs and fine grasses in foreground. Indistinct texture in background.	Fine texture dirt road in middle ground.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	NA	NA	Bold, flat, solid, horizontal solar array infrastructure.
LINE	NA	NA	Bold, regular, straight, horizontal edge line for solar array infrastructure.
COLOR	NA	NA	Dark subdued grey to blue black of solar array. Monotone.
TEXTURE	NA	NA	Smooth, uniform, ordered, dense solar array infrastructure.

SECTION D. CONTRAST RATING ☐ SHORT TERM X LONG TERM

1. DEGREE OF CONSTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
ELEMENTS	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form				x				x			x	
Line				x				x	x			
Color				x				x	x			
Texture				x				x		x		

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) NA

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names

Jill Grams., SWCA Environmental Consultants

Date: 09/24/2021

Comments from item 2.

Additional Mitigating Measures (See item 3)
Recommended Mitigation Measures
Materials, coatings, or paints that have little or no reflectivity should be used on structures. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations should be non-reflective. The surfaces of substation structures should be given low reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Security fence surrounding the substations should have a dulled, darkened finish to reduce contrast.

Electric transmission towers should be color treated to reduce contrasts with the existing landscape. Monopole towers should have a low-reflectivity treatment. Where transmission facilities using monopole towers are located within the same ROW or corridor, the color treatment should match the existing facilities within the ROW, unless they contrast with the visual backdrop.

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 9/24/2021

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name	4. Location	5. Location Sketch
Painted Desert Solar Project	Township ____________	See Figure
2. Key Observation Point KOP C East–Preferred Gen-Tie Crossing US 89	Range ____________	Latitude: 35°50'1.41"N
3. VRM Class NA	Section ____________	Longitude: 111°26'14.79"W

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Panoramic flat landform in foreground middle ground.	Low, rounded, simple form of grasses and shrubs in foreground and middle ground.	Prominent, tall, linear, parallel, vertical transmission structures and a radio tower structure. Horizontal transmission lines.
LINE	Straight horizontal lines, angular line rock outcrops in foreground.	Irregular, undulating, curving, shrubs and grasses in foreground and middle ground.	Bold, regular straight, parallel transmission and radio tower structures. Curvilinear and straight roads.
COLOR	Medium brown soil. Light tan to white rock outcrops.	Light green shrubs and yellow grasses	Dark grey and medium grey metallic transmission structures. Light grey transmission lines.
TEXTURE	Smooth soils, medium rough rock outcrops.	Clumped shrubs and fine grasses in foreground and middle ground.	Continuous and repetitive transmission line structures and lines infrastructure.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	NA	NA	Tall linear monopole transmission line structures adjacent to existing large lattice transmission line structures.
LINE	NA	NA	Vertical monopole transmission pole lines. Horizontal transmission wire lines.
COLOR	NA	NA	Light grey poles and wires.
TEXTURE	NA	NA	Uniform and continues texture for transmission structures and wires.

SECTION D. CONTRAST RATING ☐ SHORT TERM x LONG TERM

1. DEGREE OF CONSTRAST

		FEATURES											
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form				x			x				x	
	Line				x			x				x	
	Color				x			x				x	
	Texture				x			x				x	

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) NA

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names

Jill Grams., SWCA Environmental Consultants

Date: 09/24/2021

Comments from item 2.

Additional Mitigating Measures (See item 3)

Recommended Mitigation Measures
Materials, coatings, or paints that have little or no reflectivity should be used on structures. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations should be non-reflective. The surfaces of substation structures should be given low reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Security fence surrounding the substations should have a dulled, darkened finish to reduce contrast.

Electric transmission towers should be color treated to reduce contrasts with the existing landscape. Monopole towers should have a low-reflectivity treatment. Where transmission facilities using monopole towers are located within the same ROW or corridor, the color treatment should match the existing facilities within the ROW, unless they contrast with the visual backdrop.

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date 9/24/2021

District

Resource Area

Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name
Painted Desert Solar Project

2. Key Observation Point
KOP C West – Preferred Gen-Tie Crossing US 89

3. VRM Class
NA

4. Location
Township ____________
Range ____________
Section ____________

5. Location Sketch
See Figure

Latitude: 35°49'58.36"N
Longitude: 111°26'15.98"

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Panoramic flat landform in foreground and middle ground. Horizontal rolling hills in background.	Low, rounded, simple form of grasses and shrubs in foreground and middle ground.	Prominent, tall, linear, parallel, vertical and horizontal transmission and substation structures. Horizontal transmission lines.
LINE	Straight horizontal lines, angular line rock outcrops in foreground.	Irregular, undulating, curving, shrubs and grasses in foreground and middle ground.	Bold, regular straight, parallel transmission and substation structures. Strong horizontal and vertical structure lines. Horizontal wires.
COLOR	Medium to dark brown soil. Light tan to white rock outcrops.	Light green to yellow shrubs and yellow grasses	Dark grey and medium grey metallic transmission and substation structures. Light grey transmission lines.
TEXTURE	Medium rough, rocky soils.	Clumped shrubs and fine grasses in foreground and middle ground.	Continuous and repetitive transmission line and substation structures and lines infrastructure.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	NA	NA	Tall linear monopole transmission line structure adjacent to existing large lattice transmission line structures. Additional substation structures withing existing footprint.
LINE	NA	NA	Vertical and horizontal monopole transmission pole lines Horizontal transmission wire lines. Vertical and horizontal substation infrastructure.
COLOR	NA	NA	Light grey pole and wires.
TEXTURE	NA	NA	Uniform and continues texture for transmission and substation structures and wires.

SECTION D. CONTRAST RATING ☐ SHORT TERM x LONG TERM

1. DEGREE OF CONSTRAST

ELEMENTS	LAND/WATER BODY (1) Strong	LAND/WATER BODY (1) Moderate	LAND/WATER BODY (1) Weak	LAND/WATER BODY (1) None	VEGETATION (2) Strong	VEGETATION (2) Moderate	VEGETATION (2) Weak	VEGETATION (2) None	STRUCTURES (3) Strong	STRUCTURES (3) Moderate	STRUCTURES (3) Weak	STRUCTURES (3) None
Form				x				x		x		
Line				x				x		x		
Color				x				x		x		
Texture				x				x			x	

2. Does project design meet visual resource management objectives? ☐ Yes ☐ No (Explain on reverse side) NA

3. Additional mitigating measures recommended? ☐ Yes ☐ No (Explain on reverse side)

Evaluator's Names

Jill Grams., SWCA Environmental Consultants

Date: 09/24/2021

Comments from item 2.

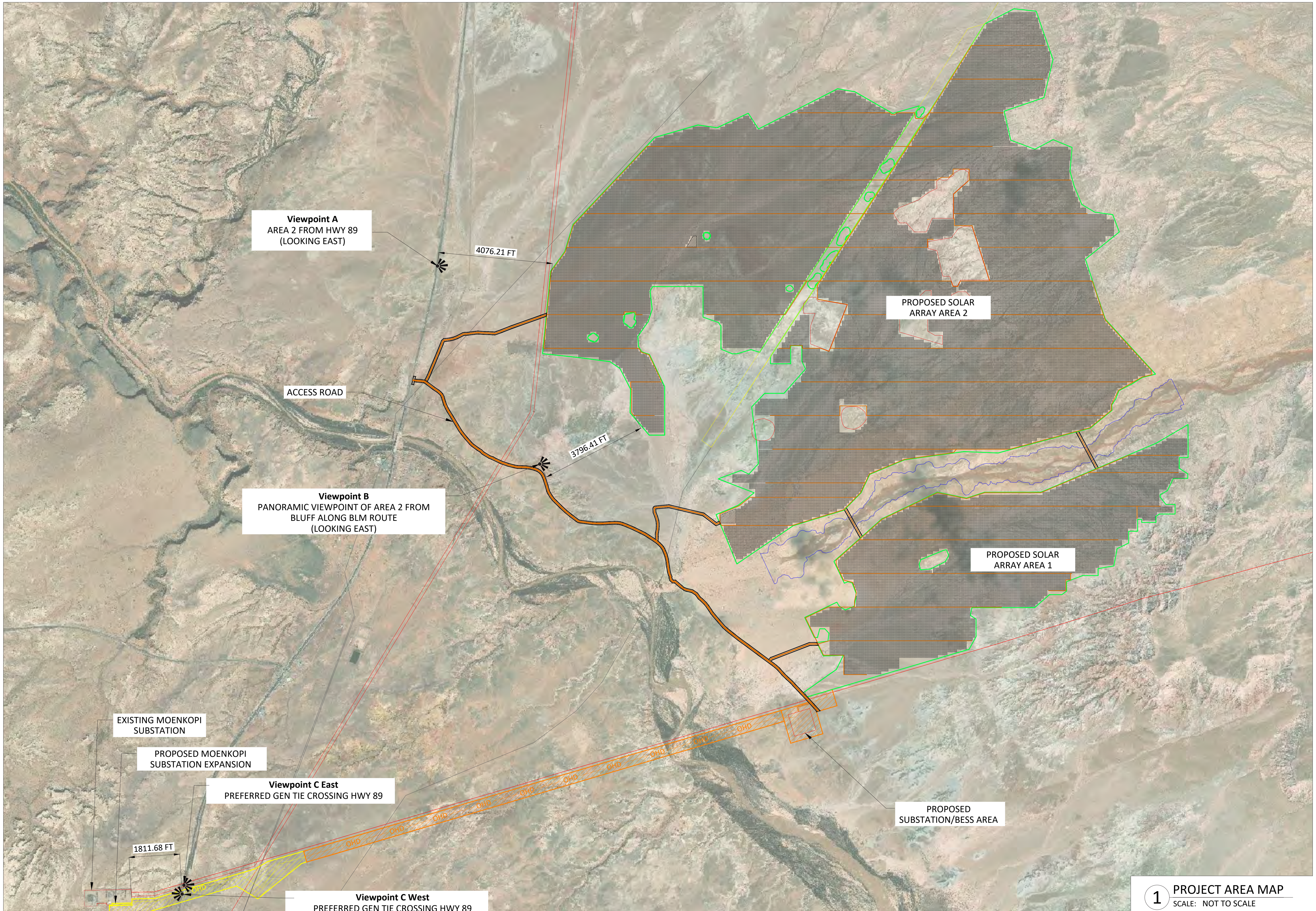
Additional Mitigating Measures (See item 3)

Recommended Mitigation Measures
Materials, coatings, or paints that have little or no reflectivity should be used on structures. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations should be non-reflective. The surfaces of substation structures should be given low reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Security fence surrounding the substations should have a dulled, darkened finish to reduce contrast.

Electric transmission towers should be color treated to reduce contrasts with the existing landscape. Monopole towers should have a low-reflectivity treatment. Where transmission facilities using monopole towers are located within the same ROW or corridor, the color treatment should match the existing facilities within the ROW, unless they contrast with the visual backdrop.

APPENDIX B

Visual Simulations



1 PROJECT AREA MAP
SCALE: NOT TO SCALE

PRELIMINARY
NOT FOR
CONSTRUCTION

ENGINEER'S STAMP

terabase
Terabase Energy, Inc.
Berkeley, CA 94704 USA
+1 (415) 763-7181

REVISIONS

REV	DESIGN #	DESCRIPTION	DATE	DB	CB
H.1	2020-00130	VIEWPOINTS EXHIBIT	01-OCT-2020	CA	CB

PAINTED DESERT
NAVAJO POWER

CAMERON, AZ
USA

PLAN OF DEVELOPMENT
PROPOSED PROJECT COMPONENTS MAP

DESIGNED BY	JB
PROJECT	2020-0054
DATE	12FEB2020
FORMAT	ARCH-D

0 ½" 1"
IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET
POD-01


Viewpoint A – Area 2 from US 89 Looking East, Existing View


Viewpoint A – Area 2 from US 89 Looking East, Visual Simulation

Viewpoint B – Panoramic View of Area 2 From Bluff Along BLM Route, Existing View

Viewpoint B – Panoramic View of Area 2 From Bluff Along BLM Route, Visual Simulation

Viewpoint C East – Preferred Gen-Tie Crossing US 89, Existing View

Viewpoint C East – Preferred Gen-Tie Crossing US 89, Visual Simulation

Viewpoint C West – Preferred Gen-Tie Crossing US 89, Existing View

Viewpoint C West – Preferred Gen-Tie Crossing US 89, Visual Simulation

Appendix H CONSTRUCTION WATER SUPPLY MEMORANDUM

Technical Project Memo – Construction Water Supply

Painted Desert Project (Navajo Power)

RE: Water Development/Supply for Construction and Continued Operations

This memo is a summary of available water resources to be considered in the evaluation of effects on local resources associated with the planned development and long-term operations of this facility. Further evaluations of cost:benefit, feasibility and resource impacts will be conducted in other associated assessments.

Project Understanding:

Proposed development of a 750-megawatt (MW) photovoltaic (PV) solar generating and battery energy storage system (BESS) facility, and a generation intertie (gen tie) into the Moenkopi substation. The proposed development encompasses 1,236 acres of land, with 2,935 acres of temporary ground disturbance, in addition to 9.13 miles of road to be constructed and/or improved for use during construction. Roads constructed will be maintained associated with routine daily operations. The project area includes Area 1 and Area 2 for solar panel placement, separated by a natural wash. The gen tie corridor connecting the system to the Moenkopi substation is approximately 6 miles to the southwest. *(Draft Threshold Determination Document; Painted Desert Solar Project. Oct. 2021)*

Water uses during construction will include the use of non-potable water for compaction and dust abatement, in addition to other incidental uses. Long-term non-potable water uses will include cleaning, repairs and dust abatement. Materials needed during construction include manufactured gravel, concrete, fill material, as well as other industrially-produced products to be shipped to the site. This memo addresses the anticipated direct water uses during construction and operations. Water uses through the manufacturing of: industrial products, processing gravel, asphalt and concrete are considered indirect and incidental to the procurement of these materials by suppliers, and are therefore not evaluated under this memo.

Project Scope:

An assessment of the water demands assumed during construction has been provided below. Two primary evaluations have been provided for the purposes of comparison in different levels of construction water usage. It is assumed that there will be 2,935 acres of temporary ground disturbance and 1,236 acres of permanent ground disturbance. The evaluations differ based on the use of a soil polymer to stabilize and bond soils for road and structural elements of the project, thus reducing the demand for construction water. Further evaluation of the cost:benefit of using this material as a part of the construction and long term operation of this project will be conducted independently of this memo at a later time.

(Navajo Power, Revised Draft Plan of Development. July 2021); (Navajo Power, Draft Threshold Determination Document. October 2021).

Traditional Road Construction

Water use Category w/out Polymer Road Treatment	Total Gal	Total AF	Duration (mos)	Approx use by task	
				Month	Day
Entrance Road	1,440,000	4.4	1.5	960,000	80,000
Trailer Village	480,000	1.5	0.5	960,000	80,000
Fence Installation	48,480,000	148.8	10.0	4,848,000	404,000
Temporary Roads	138,240,000	565.7	24.0	5,760,000	480,000
Permanent Roads	184,320,000	565.7	24.0	7,680,000	640,000
SWPPP/Erosion Control	11,520,000	35.4	16.0	720,000	60,000
Personnel Dust Control	23,040,000	70.7	16.0	1,440,000	120,000
Switching Station	1,920,000	5.9	2.0	960,000	80,000
Substation	3,840,000	11.8	3.0	1,280,000	106,667
Task Specific Dust Control	7,680,000	23.6	6.0	1,280,000	106,667
	420,960,000	**1,433.3**	**24.00**		

Average 254,000 gpd,
peak 278,400 gpd

Polymer Road Option

Water Use Category	Total Gal	Total AF	Duration (mos)	Approx use by task	
				Month	Day
Entrance Road	1,440,000	4.4	1.5	960,000	80,000
Trailer Village	480,000	1.5	0.5	960,000	80,000
Fence Installation	3,360,000	10.3	10.0	336,000	28,000
Temporary Roads	7,800,000	23.9	24.0	325,000	27,083
Permanent Roads	12,408,000	32.6	24.0	517,000	43,083
SWPPP/Erosion Control	11,520,000	23.6	16.0	720,000	60,000
Personnel Dust Control	23,040,000	70.7	16.0	1,440,000	120,000
Switching Station	1,920,000	5.9	2.0	960,000	80,000
Substation	3,840,000	11.8	3.0	1,280,000	106,667
Task Specific Dust Control	7,680,000	23.6	6.0	1,280,000	106,667
	73,488,000	**208.23**	**24.00**		

Average 60,000 gal,
peak 175,000 gpd

Source Data*: Dewhurst, G. December 3, 2021. Draft Painted Desert Water Estimate for Construction 12-03-2021*.

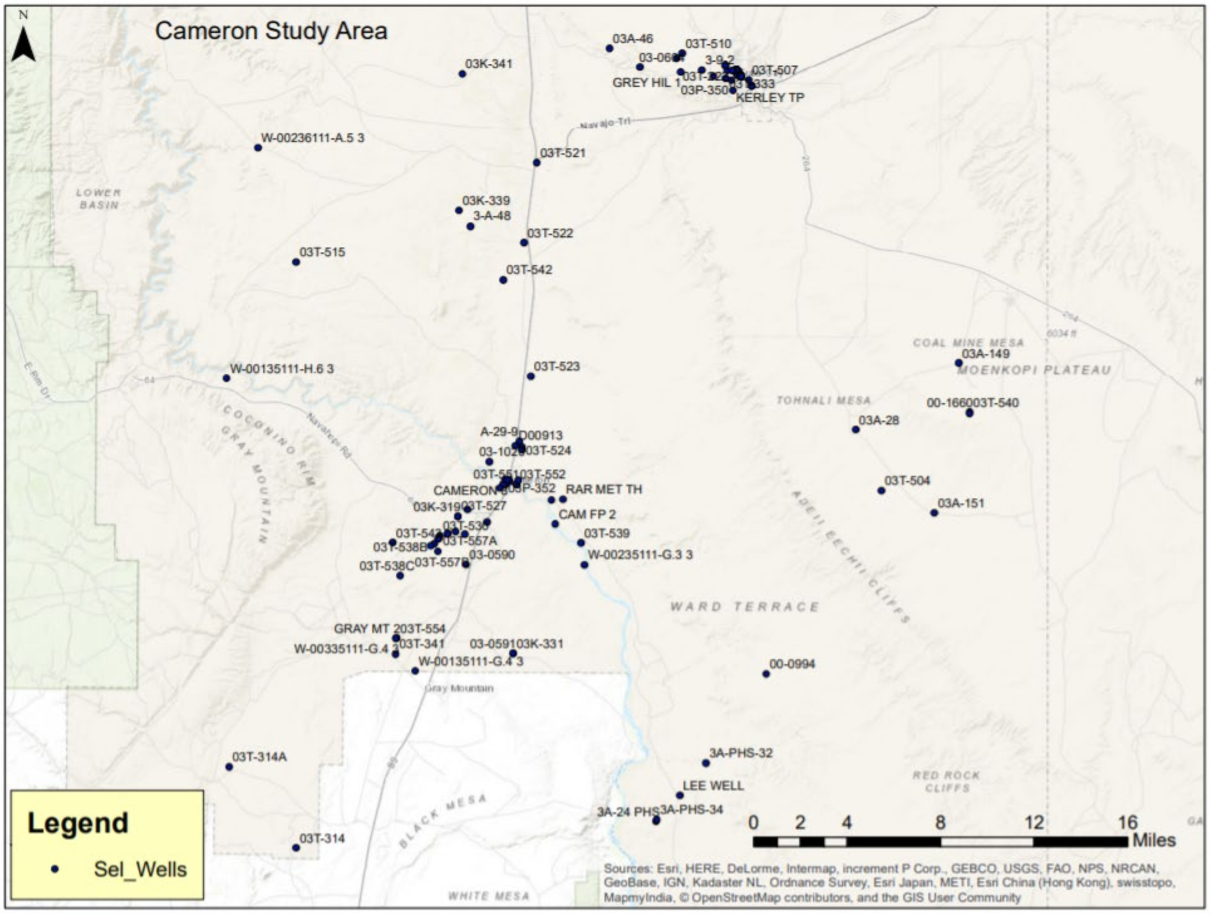
Assumptions:

- Well Production at 50 gal/minute generating 72,000 gal/24 hrs
- Trucking at 4,000 gal/truck at 1.2 hours/trip = 40,000 gal/truck/12-hour day
- Road construction (9.13 miles) to be constructed in months 1 & 2
- Nominal weather conditions

(Threshold Determination Document, Oct 2021)

Water Supply Options:

- <u>Babbitt Ranches, LLC</u> has identified two large production wells (50 gallons/minute) that would be available to lease for construction water. These wells have been identified to be used for non-potable purposes and use rates would be negotiated with the landowner. The primary well is located approximately 15 miles from the project site. A straight alignment (for purposes of considering a pipeline) is 13.5 miles. *(pers. comm. Babbitt Ranches, LLC).*
- <u>Navajo Nation</u> – Water Management Branch has identified 140 existing wells within a 10-mile radius of Cameron. (*pers. comm. Navajo Nation Water Resources Dept.*) However, the majority of these wells have been capped, dormant and/or have not been tested and would likely not be considered high-production wells needed to support construction activities.
    - <u>70 wells less than 100’ deep</u>
    - <u>9 wells 100’-200’</u>
    - <u>10 wells 200’-300’</u>
    - <u>10 wells 300’-500’</u>
    - <u>12 wells 500’-1,500’</u>
    - <u>26 wells with no depth identified</u>
- <u>Cameron Chapter</u> - <u>Well 3T-551</u> – Located within the Cameron community, this well was transferred to Cameron Chapter for its use as a restricted non-potable water only well. This well could be utilized for the purposes of construction water, if it is determined that the capacity would support all anticipated uses of construction and community demands. Use of this well would be contingent upon negotiations with the Cameron Chapter administration. (*pers. comm. Navajo Nation Water Resources Dept.*)
- <u>Development of a new well</u> – regulated by Navajo Nation Water Management Branch. Drilling of a new high production well in or around the proposed project area could provide a non-potable source of water for construction, long term operations, in addition to supporting other future community needs for non-potable water. (*Navajo Nation Water Management Branch Development Code)*



<u>Alternatives to be evaluated:</u>

The two highest water-use functions within the water use estimate include dust abatement for the site access road. *(Dewhurst, G. Dec 3, 2021).* The following are two alternatives to be considered for comparison purposes from the traditional soil & gravel road construction method originally estimated.

- <u>Polymer application – road base and surface treatment</u> – An option to reduce water demand during construction and long-term dust control is to apply a soil polymer to condition road base and surface to reduce/eliminate the need for daily dust abatement treatment. Preliminary estimates show a reduction of water consumption by six times the amount needed for traditional construction/operations approach. A treatment cost per mile is estimated to be roughly $400,000/mile, over 9.3 miles of dirt and gravel roads. This matched with the estimated cost of hauling an estimated 420 million gallons of non-potable water over a two-year period, and then followed by long term water consumption to maintain the existing and new roads The assumed draw down of the local wells through pumping of a large quantity of water over a 24-month timeline could affect other wells within the community. Through the reduced water demand under this approach, these effects would be lessened and/or avoided, along with a possible reduction of overall construction costs over the life of the project. (Pers. Comm. Bitco Construction, Inc.).

- Hard surfacing roadway – A more traditional paving with asphalt-based products could also be undertaken for permanent access roads, in addition to gravel or polymer treatment of hard scaping beneath the solar panels. This combination of applications would also greatly reduce the demand for water during the construction period and lessen the effect of a high construction water demand on local wells. A more detailed cost:benefit analysis would also be warranted for this approach prior to selecting a final option. (Pers. Comm. Bitco Construction, Inc.).

Recommendations:

- Refine cost comparison for supplying, transporting and storing construction water during the construction period as well as for long term dust abatement.
- Further evaluate the cost:benefit of polymer treatment and asphalt paving options in comparison to the high-demand water option of untreated roadway system.
- Evaluate water quality and test recharge capacity of preferred well options.
- Evaluate potential cone of depression to nearby groundwater wells associated with draw-down of preferred wells.
- Evaluate feasibility and viability of drilling a new well to supply the project with construction and long-term operations water on-site.

References

Navajo Nation Water Management Branch Development Code). Robert Kirk and Maurice Upshaw

Navajo Power. 2021. Revised Draft of Plan of Development for the Proposed Painted Desert Solar project (July 2021 version). Prepared by Terabase Energy.

Pers. comm. November 23, 2021. Navajo Nation Water Resources Dept. Discussion w/Robert Kirk & Maurice Upshaw re: available wells within 10-mile radius of proposed project area. Window Rock, AZ.

Pers. comm. January 4, 2022. Bitco Corporation. Discussion w/Jeremiah Bitsui re: soil polymer construction estimates and durability of materials available.

Navajo Power. October 2021. Draft Threshold Determination Document, Painted Desert Solar Project. Prepared by Terabase Energy.

Pers. Comm. November 23, 2021. Babbitt Ranches, LLC. Discussion w/Billy Cordasco re: available wells, capacity and willingness to lease. Flagstaff, AZ.

Dewhurst, G. December 3, 2021. Draft Painted Desert Water Estimate for Construction 12-03-2021. Terabase Energy, Inc., Berkeley, CA.

Submitted/Revised: January 11, 2022

Chuck Howe, C2 Environmental, LLC.

Painted Desert Solar Project
Cameron & Coalmine Canyon Chapters
Navajo Nation, Arizona

Dust Control Plan

Appendix I

October 2021

Revised February 2022

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Table of Contents

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1. Introduction

The dust control plan was prepared to identify sources of dust emissions during construction and operation of the Painted Desert Solar Project (Project), and describes the measures that Painted Desert Power, LLC (PDP) will implement to minimize dust emissions. As specified in Applicant Proposed Design Feature AIR-1, this dust control plan is being submitted to the Navajo Nation Environmental Protection Agency (NNEPA) for approval prior to construction. The plan approval will remain in effect throughout the life of the Project. The plan will address watering active construction sites or sites where earthmoving is planned, vehicle speeds and idling protocols on the Project Site, covering of equipment and materials, minimizing grading and excavation to prevent excessive dust, vehicle cleaning, and protective measures related to uranium. The plan will also identify the personnel responsible for implementing the dust control plan and protocols for identifying, reporting, and remedying dust emissions.

1.1. Project Description

Navajo Power, PBC has established PDP to develop the Project as a model for renewable energy development that promotes community engagement and benefits to the Navajo Nation and the local community.

The Project is a proposed 750-megawatt (MW) photovoltaic (PV) solar-generating and battery energy storage system facility in the Cameron and Coalmine Canyon chapters of the Navajo Nation Reservation, approximately 4 miles east of Cameron, Arizona.

Construction of the Project is expected to take place over a period of 12 to 36 months in which the Project would create particulate matter emissions from off-road vehicle and equipment exhaust, construction worker and material delivery on-road vehicle exhaust from travel to and from the Project Site, and dust from soil disturbance and travel on paved and unpaved roads. Typical PV construction activities expected to generate dust include land clearing, excavating, trenching, and grading. Upon completion of construction, temporary impacts will be remediated by restoration and reseeding of Project areas that had been graded or cleared.

Dust will be generated during the operational phase as a result of routine maintenance and inspections. Personnel in trucks will conduct routine inspections of equipment and facilities, respond to alarms and outages, clean, maintain spare part inventories, and clear obstructive ground cover.

2. Dust Sources

Dust emissions are generated as a result of various construction and operational activities, such as ground disturbance, equipment and vehicle travel on unpaved roads, and equipment exhaust. Sources of dust emissions, and activities/conditions that generate dust, include:

- Grading activities that include soil disturbance:
    - Clearing and grubbing for ground clearing
    - Excavation and cut-fill activities
    - Soil storage and stockpiling
    - Final grade construction and soil compaction
    - Vegetation management
- Vehicle travel on unpaved roads and off-road within the site
- Typical construction traffic on temporary and permanent roads
- Completed road maintenance including application of environmentally appropriate, non-hazardous soil binder and water
- High winds
- Module cleaning

Construction activities are expected to take place up to six days a week, with workdays being expected to last up to 10 hours each. Dust-generating activities are expected to occur throughout the duration of the workday. Operational activities are expected to occur intermittently throughout the life of the Project.

As provided in the air quality and noise section of the PDSP threshold determination document, it is expected that dust will result in approximately 24.21 tons of PM_{10} emissions and 2.42 tons of $PM_{2.5}$ emissions during construction (SWCA 2021). It is expected that construction will temporarily disturb up to 4,950.4 acres with an estimated area of actual ground disturbance (e.g., clearing and grading, trenching, and ground penetrations) of 470.3 acres. A breakdown of the disturbed areas can be seen below in **Table 1**.

Table 1. Disturbed Areas Due to Construction Activities

PROPOSED PROJECT COMPONENTS	DISTURBED AREA *(in acres)*
Proposed Solar Array Area 1	888.1
Proposed Solar Array Area 2	4,013.9
Proposed Substation/BESS Area	2.6
Proposed Gen Tie Segment East	13.2
Proposed Gen Tie Segment West	4.8
Proposed Moenkopi Substation Expansion	0.8
Access Road 1	0.8
Access Road 2 South	1.7
Access Road 2 North	5.3

PROPOSED PROJECT COMPONENTS	DISTURBED AREA *(in acres)*
Area 2 Connector	0.3
BIA RT 6730 Improvement and Widening	9.1
SR 89 Turnout Expansion	0.2
East Connector	4.8
West Connector	4.8
Totals	4,950.4

The ground disturbing activities and impacts for the proposed project can be seen in **Table 2**.

Table 2. Ground Disturbing Activities and Impacts

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Proposed Solar Array Area 1	Road	Clear [1] and Grade [2]	13.07	16"
	AC Station	Clear and Excavate [3]	0.12	10-18'
	Pile	Ground Penetration	0.11	8-10'
	Trench	Trenching [4]	8.41	3-5'
	Grading	Clear and Grade	41.28	1'
	Facilities	Clear	0.11	10"
Proposed Solar Array Area 2	Road	Clear and Grade	43.31	16"
	AC Station	Clear and Excavate	0.43	10-18'
	Pile	Ground Penetration	0.38	8-10'
	Trench	Trenching	37.56	3-5'
	Grading	Clear and Grade	281.55	3'
Proposed Substation / BESS Area	Substation	Clear and Excavate	14.70	10-18'
	Road	Clear and Grade	0.43	16"
	MV Connector	Ground Penetration	0.001	10-14'
Proposed Gen Tie Segment East	Tower Footings	Clear, Grade, and Ground Penetration	0.05	8-10'

[1] Land clearing is the process of removing trees, stumps, brush, stones, and other obstacles from an area as required.
[2] Land grading is a leveling of the surface: dirt from higher up is moved into lower-lying areas to create a level surface to serve as a foundation.
[3] Land excavation is the clearing of all vegetation, brush, rocks, and debris.
[4] Trenching is digging a narrow trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Proposed Gen Tie Segment West	Tower Footings	Clear, Grade, and Ground Penetration	0.02	8-10'
Proposed Moenkopi Expansion Area	Substation Expansion	Clear and Excavate	1.34	10-18'
Access Road 1	Road	Clear and Grade	1.26	16"
Access Road 2 South	Road	Clear and Grade	2.54	16"
Access Road 2 North	Road	Clear and Grade	7.96	16"
Area 2 Connector	Road	Clear and Grade	0.42	16"
BIA RT 6730 Improvement and Widening	Road	Clear and Grade	13.71	16"
US 89 Turnout Improvement	Road	Clear, Grade, and Pave [5]	0.48	16"
West Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4' [6]
East Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4' [7]

During the operational phase of the Project, PDP will continue to monitor and control dust from ongoing dust-generating activities. As provided in the air quality and noise section of the PDSP threshold determination document, it is anticipated that operational activities related to maintenance and inspections will result in approximately 1.29 tons of PM_{10} and 0.15 tons of $PM_{2.5}$ on an annual basis. It is expected that the Project will result in permanently disturbed areas of up to 423.27 acres. A breakdown of the permanently disturbed areas can be seen below in **Table 3**.

[5] Paving is the use of material such as stone, tar, or concrete to form the hard surface of a road, driveway, etc.
[6] Drilling a horizontal underground bore will avoid any surface disturbance. The expected diameter of the conduit to be placed within each bore hole is approximately 8 inches.
[7] Drilling a horizontal underground bore will avoid any surface disturbance. The expected diameter of the conduit to be placed within each bore hole is approximately 8 inches.

Table 3. Permanently Disturbed Areas Associated with the Project

PROPOSED PROJECT COMPONENTS	PERMANENTLY DISTURBED AREA *(in acres)*
Proposed Solar Array Area 1	54.7
Proposed Solar Array Area 2	325.7
Proposed Substation/BESS Area	15.1
Proposed Gen Tie Segment East	0.05
Proposed Gen Tie Segment West	0.02
Proposed Moenkopi Substation Expansion	1.3
Access Road 1	1.3
Access Road 2 South	2.5
Access Road 2 North	8.0
Area 2 Connector	0.4
BIA RT 6730 Improvement and Widening	13.7
SR 89 Turnout Expansion	0.5
East Connector	0.002
West Connector	0.002
Totals	423.27

3. Mitigation Measures

Mitigation measures to minimize dust emissions specified in the Applicant Proposed Design Feature AIR-1 include the following:

- Effective watering prior to earthmoving. For active operations, techniques to be considered include: application of water 15-30 minutes before starting operations, application of water at the end of the day (e.g., soak overnight the next day's work area, water before and after grading using a water truck), and significant watering prior to any forecasted wind event.
- Application of water to unpaved roads in sufficient quantity to maintain a moist surface while in use, or application of other environmentally appropriate, non-hazardous dust suppressant. Trucks will be available to water unpaved surfaces, as necessary.
- Application of water, or another environmentally appropriate, non-hazardous dust suppressant, to soil piles along the right-of-way, if necessary. Operator will stabilize storage piles and disturbed surfaces which are idle for two weeks or more.
- Reducing speed limits to less than or equal to 15 miles per hour on private, unpaved roads and surfaces along the right-of-way. Traveling at reduced speeds on unpaved roads will

limit the amount of dust suspended into the air. Personnel traveling on public roads will adhere to posted speed limits.

- Limiting idling of diesel-fueled vehicles greater than 10,000 pounds to less than 5 minutes where practical. Posting signs in designated areas of job site to remind drivers and operators.
- Covering haul truck loads or using water or an environmentally appropriate, non-hazardous dust suppressant to limit dust from becoming airborne during soil transport. Ensuring loads are 3 to 6 inches below the freeboard to minimize spillage. Checking belly-dump truck seals regularly and removing any trapped rocks to prevent spillage.
- Limiting the amount of area graded at any one time. Lessening the amount of surface being disturbed at any one time reduces the amount of control required and the amount of water, or environmentally appropriate, non-hazardous dust suppressant, needed.
- To prevent the possibility of uranium transport, vehicle washing will be implemented if vehicles operating in a suspected uranium contaminated area have accumulated dust.

Other best management procedures that may be implemented at the Project will include:

- Use of trackout prevention best management practices. Paved surfaces used as exits from the Project Site will be cleaned at the end of each day. Gravel pads and rumble strips may be installed adjacent to paved roads to reduce trackouts.
- Limiting and stopping soil-disturbing construction activities during very high winds. If soil-disturbing activities cannot be halted during high winds, apply water (or other environmentally appropriate, non-hazardous dust suppressant) and/or other appropriate mitigation measures prior to anticipated high winds to reduce the potential for airborne dust.
- Equipment and proper maintenance. Most of the construction and operation equipment onsite will be modern equipment with selective catalytic reduction (SCR) technology, which utilizes diesel exhaust fluid, an emissions control liquid, to reduce emissions. In addition, the equipment will be properly maintained through the manufacturer's specified engine-maintenance procedures to reduce emissions. Other maintenance procedures may include washing the equipment prior to hauling from the Project Site, if needed.

4. Monitoring and Inspection

Visual inspections and observations will be completed by the Dust Inspector periodically during the workday. If dust is visible, the appropriate mitigation measure will be utilized depending on the source or cause. If initial mitigation is unsuccessful and does not adequately abate airborne dust, additional measures may be required at the direction and discretion of the environmental inspector (EI). **Table 4** provides a list of the Project dust contacts responsible for the implementation of Applicant Proposed Design Feature AIR-1.

Table 4. Painted Desert Solar Project Dust Contacts (To Be Completed Prior to Construction)

NAME & TITLE/POSITION	PHONE NUMBER(S)
Environmental Inspector(s)	
Construction Contractor Superintendent	
Dust Inspector	
Lead Construction Specialist	
Other Project Construction Representatives	

4.1 EI Responsibilities

The environmental inspector will have stop-work authority in order to address persistent or serious dust issues. The EI will determine which mitigation/control measure is appropriate to correct the issue and, upon completion of the corrective action and successful dust abatement, approve resumption of construction activities.

4.2 Reporting and Recordkeeping

Complaints of dust will be forwarded to the EI and investigated. The EI's observations of significant dust and corrective actions will be included in the EI's daily report. All reports and other records associated with dust control will be maintained by PDP for review by the Navajo Nation, if requested.

5. Exhibits (To Be Completed Prior to Construction)

Site Plan: A Project Site plan showing the targeted boundaries, public crossroads, staging areas, areas for stockpiles, haul roads, storage and parking areas, and ingress/egress locations will be prepared and added to the plan prior to the commencement of construction.

Safety Data Sheets: Safety Data Sheets for any environmentally appropriate, non-hazardous soil binders will be added to the plan prior to the commencement of construction.

Appendix J

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
March 23, 2018	Meeting with the Cameron Chapter
March 25, 2018	Presentation to the Cameron Chapter
July 23, 2018	Meeting with the Cameron Chapter Community Land Use Planning Committee (CLUPC)
July 30, 2018	Preliminary feasibility study presentation to the Cameron Chapter CLUPC
August 1, 2018	Presentation to the Cameron Chapter meeting; site visit with Cameron grazing permittees
August 8, 2018	Passage of a feasibility resolution in support of the Painted Desert Power Solar Project (Project) by the Cameron Chapter
August 23, 2018	Meeting with the Navajo Land Department (NLD) to discuss land clearance
August 25, 2018	Meeting with the Cameron Chapter Farm Board
September 20, 2018	Meeting with the NLD
October 3, 2018	Meeting with Cameron Chapter officials
October 15, 2018	Site tour of Cameron grazing areas with Cameron Chapter officials
October 27, 2018	Community celebration and BBQ in Cameron
January 29, 2019	Meeting with Cameron grazing permittees and officials
February 8, 2019	Site visit with Cameron grazing permittees and officials
March 2, 2019	Meeting with Cameron grazing permittees
March 7, 2019	Meeting with the Navajo Nation Division of Natural Resources (NNDNR)
March 11, 2019	Meeting with Cameron grazing permittees
March 17, 2019	Meeting with regional chapter officials at Twin Arrows
March 24, 2019	Meeting with Cameron Chapter officials
April 3, 2019	Meeting with the Cameron Chapter CLUPC
April 15, 2019	Site tour with Cameron grazing permittees
April 17, 2019	Cameron Chapter meeting
April 25, 2019	Meeting with the Cameron Chapter CLUPC

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
May 1, 2019	Meeting with Cameron Chapter officials
May 15, 2019	Presentation at the Cameron Chapter meeting
May 16, 2019	Site visit with Cameron grazing permittees and chapter officials
May 24, 2019	Meeting with grazing permittees
May 30, 2019	Cameron Chapter CLUPC meeting
June 1, 2019	Site visit with environmental consultants
July 6, 2019	Resources & Development Committee (RDC) meeting
July 16, 2019	Presentation to the Háyoołkáál Work Group
August 5, 2019	Meeting with grazing permittees
August 23, 2019	Cameron Chapter meeting
September 16, 2019	Presentation to the Háyoołkáál Work Group
September 25, 2019	Meeting with grazing permittees
September 28, 2019	Cameron Community Celebration BBQ
November 15, 2019	Meeting with the Háyoołkáál Work Group at the Project Site
November 18, 2019	Meeting with grazing permittees and community members in Flagstaff, Arizona
November 20, 2019	Community benefit session at the Cameron Senior Center
December 4, 2019	RDC meeting
December 9, 2019	Presentation to the Háyoołkáál Work Group
December 11, 2019	Meeting with Cameron community members
December 23, 2019	Meeting with the Office of the President and Vice President (OPVP), NNDNR, and Navajo Nation Washington Office in Window Rock, Arizona
January 7, 2020	Meeting with grazing permittees
January 13, 2020	Meeting with the General Land Development Department (GLDD)
January 15, 2020	Presentation to the Coalmine Canyon Chapter CLUPC meeting
January 16, 2020	Presentation at the Coalmine Canyon Chapter planning meeting
January 24, 2020	Update for Cameron community members

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
February 3, 2020	Work session for the Coalmine Canyon Chapter
February 13, 2020	Coalmine Canyon Chapter planning meeting
February 14, 2020	Meeting with grazing permittees
February 16, 2020	Presentation to the Coalmine Canyon Chapter meeting
February 24, 2020	Meeting with grazing permittees
February 26, 2020	Cameron Chapter meeting
February 28, 2020	Site tour with the engineering team and grazing permittees
March 3, 2020	Call with GLDD regarding the environmental review
March 10, 2020	Presentation at the Coalmine Canyon Chapter meeting
March 11, 2020	Meeting with grazing permittees
March 16, 2020	Meeting with grazing permittees and Project engineers
April 29, 2020	Meeting with grazing permittees
April 2020 - November 2021	Delivery of hand sanitizer, food, personal protective equipment (PPE), and firewood to community members in response to the Covid-19 emergency
May 19, 2020	Call with GLDD regarding the environmental review
July 15, 2020	Meeting with grazing permittees
July 23, 2020	Call with GLDD regarding the environmental review
August 2, 2020	Meeting with the Cameron Agricultural Ad Hoc Committee
August 6, 2020	Call with GLDD regarding the environmental review
August 14, 2020	Meeting with grazing permittees
August 23, 2020	Cameron Chapter meeting; Coalmine Canyon Chapter Steering Committee meeting
August 27, 2020	Call with GLDD regarding the environmental review
September 17, 2020	Call with GLDD regarding the environmental review
September 22, 2020	Meeting with the Navajo Nation Department of Fish and Wildlife (NNDFW) to discuss the Project Site
September 27, 2020	Cameron Chapter meeting

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
October 1, 2020	Call with GLDD regarding the environmental review
October 22, 2020	Coalmine Canyon Chapter meeting
October 25, 2020	Coalmine Canyon Chapter Steering Committee meeting
October 29, 2020	Cameron Chapter CLUPC meeting
November 5, 2020	Meeting with Cameron community members
November 6, 2020	Meeting with Cameron community members
November 25, 2020	Presentation to the RDC
December 12, 2020	Meeting with the OPVP, Cameron community officials, and Cameron community
December 28, 2020	Work session with the RDC
January 13, 2021	Meeting with grazing permittees
January 28, 2021	Cameron Chapter CLUPC meeting
February 9, 2021	RDC meeting
February 11, 2021	Meeting with Cameron community members
February 18, 2021	Call with GLDD regarding the environmental review
March 21, 2021	Meeting with Cameron community members
March 30, 2021	Call with Cameron Chapter officials
April 3, 2021	Presentation at the Coalmine Canyon Chapter meeting
May 4, 2021	Meeting with grazing permittees
June 4, 2021	Meeting with grazing permittees
June 24, 2021	Call with GLDD regarding the environmental review
July 24, 2021	Call with the NNDFW and Cameron Farm Project
August 14, 2021	Meeting with grazing permittees
August 18, 2021	Presentation to the Coalmine Canyon Chapter CLUPC on findings from environmental surveys
August 19, 2021	Call with GLDD regarding the environmental review
August 20, 2021	Meeting with Coalmine Canyon Chapter President Rena Dodson

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
August 27, 2021	Meeting with grazing permittees
September 2, 2021	Meeting with Cameron Chapter President Charlie Smith, Jr
September 18, 2021	Meeting with grazing permittees
September 21, 2021	Call with GLDD regarding the environmental review
October 7, 2021	Bi-weekly Cameron community member outreach session
October 21, 2021	Bi-weekly Cameron community member outreach session; meeting with GLDD and the Navajo Nation Minerals Department to discuss the lease
October 22, 2021	Meeting with Coalmine Canyon Chapter officials
November 4, 2021	Bi-weekly Cameron community member outreach session
November 11, 2021	Bi-weekly Cameron community member outreach session
November 14, 2021	Cameron Chapter planning meeting
November 18, 2021	Meeting with Cameron grazing permittees in their hogan
November 21, 2021	Presentation at the Cameron Chapter meeting
December 2, 2021	Bi-weekly Cameron community member outreach session
December 6, 2021	Presentation on taxes with Navajo Transitional Energy Company before the RDC
December 8, 2021	Meeting with Cameron and Coalmine Canyon chapter grazing officials
December 10, 2021	Meeting with Cameron Chapter President Smith
December 12, 2021	Cameron Chapter planning meeting
December 16, 2021	Bi-weekly Cameron community member outreach session
December 21, 2021	Meeting with Coalmine Canyon Chapter officials
January 13, 2022	Bi-weekly Cameron community member outreach session
February 1, 2022	Field clearance checklist signed by the GLDD land agent and grazing permittees and officials for the Cameron and Coalmine Canyon chapters
February 10, 2022	Meeting with Cameron Chapter officials; bi-weekly Cameron community member outreach session
February 13, 2022	Cameron Chapter planning meeting
February 17, 2022	Meeting with Cameron Chapter President Smith

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
February 18, 2022	Meeting with the RDC at Twin Arrows
February 24, 2022	Bi-weekly Cameron community member outreach session
February 27, 2022	Residential solar installation in Cameron
March 10, 2022	Bi-weekly Cameron community member outreach session
March 13, 2022	Cameron Chapter planning meeting
March 23, 2022	Cameron Chapter CLUPC meeting
March 24, 2022	Bi-weekly Cameron community member outreach session
April 3, 2022	Cameron Chapter planning meeting
April 5, 2022	Coalmine Canyon Chapter CLUPC community benefits presentation
April 7, 2022	Bi-weekly Cameron community member outreach session
April 11, 2022	Coalmine Canyon Chapter Local Governance Act (LGA) session
April 15, 2022	Meeting with Cameron Chapter President Smith
April 21, 2022	Bi-weekly Cameron community member outreach session
April 24, 2022	Cameron Chapter meeting
May 1, 2022	Cameron Chapter planning meeting with announcement of Navajo Power office hours for questions from Cameron community members
May 5, 2022	Office hours for the Cameron community
May 19, 2022	Office hours for the Cameron community
May 24, 2022	Cameron Chapter meeting with announcement by chapter leadership of the Navajo Nation Department of Justice review of Navajo Power's right-of-way (ROW) resolution and announcement by Navajo Power of Navajo Power office hours for questions from Cameron community members
June 2, 2022	Office hours for the Cameron community
June 16, 2022	Office hours for the Cameron community
June 26, 2022	Cameron Chapter meeting in which the ROW resolution (CA-177-188 #4) was added to the agenda by a community member and passed 16-15-0
June 30, 2022	Office hours for the Cameron community

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
July 10, 2022	Cameron Chapter planning meeting; Coalmine Canyon Chapter planning meeting in which Navajo Power requested a spot on the agenda for the monthly chapter meeting
July 12, 2022	Presentation about Painted Desert Power and the Project to Coalmine Canyon Chapter leadership (President Dodson was unavailable, in another meeting)
July 14, 2022	Office hours for the Cameron community
July 20, 2022	Coalmine Canyon Chapter meeting in which Navajo Power's agenda item was moved to the August meeting
July 21, 2022	Cameron Chapter planning meeting
July 22, 2022	Meeting to discuss the LGA certification plan held at the request of Cameron Chapter President Smith
July 23, 2022	Information table at the Cameron roundabout
July 26, 2022	Presentation about the Project and a question-and-answer session for Coalmine Canyon Chapter leadership at Navajo Power headquarters in Flagstaff
August 7, 2022	Cameron Chapter planning meeting at which the August 21 informational session was announced (it was subsequently cancelled)
August 11, 2022	Office hours for the Cameron community
August 23, 2022	Meeting to discuss the Project, a path forward for a resolution supporting withdrawal of additional acreage, and community questions and concerns with Coalmine Canyon Chapter officials at Navajo Power headquarters
September 27, 2022	Meeting to discuss community questions and concerns and next steps toward a resolution supporting withdrawal of additional acreage with the Coalmine Canyon Chapter President Dodson and AES Clean Energy at Navajo Power headquarters
October 16, 2022	Presentation about Navajo Power's corporate structure, Painted Desert Power, and additional acreage for the Project to a community meeting at the Coalmine Canyon Chapter House
November 10, 2022	Presentation about the Project and its need for additional acreage with a question-and-answer session for Coconino County District 4 Supervisor Judy Begay with Coalmine Canyon Chapter President Dodson at the Coconino County offices in Flagstaff
November 20, 2022	Cameron Chapter meeting; Coalmine Canyon Chapter planning meeting with an update regarding community engagement and upcoming meetings
November 27, 2022	Coalmine Canyon Chapter meeting

NAVAJO POWER AND PAINTED DESERT POWER
COMMUNITY MEETING HISTORY

DATE	DETAILS
December 10, 2022	Coalmine Canyon Chapter planning meeting in which community members voted to add the resolution on Project expansion to the planning meeting agenda but the meeting adjourned before adding the expansion to the monthly chapter meeting agenda could be passed (no quorum); Navajo Power offered community informational meetings
December 18, 2022	Coalmine Canyon Chapter meeting in which community members attempted to add the resolution on Project expansion to the meeting agenda; it was not added and the meeting adjourned early; Navajo Power attended the meeting virtually but did not speak
March 3, 2023	Navajo Power-hosted informational webinar for Coalmine Canyon Chapter members featuring presentations by Navajo Power and AES Clean Energy about the Project and its proposed expansion, followed by a Q&A moderated by Arizona State Senator and Coalmine Canyon Resident Theresa Hatathlie, with Navajo interpretation by David Delmar

Appendix K DETAILS OF THE ALTERNATIVE SOLAR GENERATING FACILITY

Like the Proposed Solar Generating Facility, the Alternative Solar Generating Facility (**Figure 2.1-2**) is a 750MW solar PV facility arranged in two distinct solar generating areas, Area 1A and Area 2A, but the Alternative Facility would require significantly more grading work to accommodate the increased tracker row spacing that would allow for greater annual energy production relative to the Proposed Facility (**Section 2.1.2**).

The civil work on the Project Site required for the Alternative Facility is illustrated in **Table K- 1**.

Table K-1 Ground Disturbing Activities and Impacts for the Alternative Solar Generating Facility

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Alternative Solar Array Area 1A	Road	Clear[1] and Grade[2]	13.54	16"
	AC Station	Clear and Excavate[3]	0.12	10-18'
	Pile	Ground Penetration	0.13	8-10'
	Trench	Trenching[4]	8.41	3-5'
	Grading	Clear and Grade	45.52	1'
	Facilities	Clear	0.11	10"
Alternative Solar Array Area 2A	Road	Clear and Grade	40.36	16"
	AC Station	Clear and Excavate	0.43	10-18'
	Pile	Ground Penetration	0.42	8-10'
	Trench	Trenching	37.56	3-5'
	Grading	Clear and Grade	487.63	3'
Proposed Substation / BESS Area	Substation	Clear and Excavate	14.7	10-18"
	Road	Clear and Grade	0.43	16"
	MV Connector	Ground Penetration	0.001	10-14'
Proposed Gen Tie	Tower Footings	Clear, Grade, and Ground Penetration	0.1	8-10'

[1] Land clearing is the process of removing trees, stumps, brush, stones, and other obstacles from an area as required.
[2] Land grading is a leveling of the surface: dirt from higher up is moved into lower-lying areas to create a level surface to serve as a foundation.
[3] Land excavation is the clearing of all vegetation, brush, rocks, and debris.
[4] Trenching is digging a narrow trench in the ground for the installation, maintenance, or inspection of pipelines, conduits, or cables.

AREA	SECTION	DISTURBANCE TYPE	ESTIMATED AREA OF DISTURBANCE *(in acres)*	ESTIMATED DEPTH OF DISTURBANCE
Proposed Moenkopi Expansion Area	Substation Expansion	Clear and Excavate	1.3	10-18'
Access Road 1	Road	Clear and Grade	1.0	16"
Access Road 2 South	Road	Clear and Grade	2.1	16"
Access Road 2 North	Road	Clear and Grade	6.2	16"
Area 2 Connector	Road	Clear and Grade	0.4	16"
BIA RT 6730 Improvement and Widening	Road	Clear and Grade	11.4	16"
US 89 Turnout Improvement and Expansion[5]	Road	Clear, Grade, and Pave[6]	0.5	16"
West Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4'[7]
East Connector	MV Poles	Ground Penetration	0.002	10-14'
	Bore	Boring	0.53	4'[8]

[5] Options for access to BIA RT 6730 from US 89 are currently being reviewed with ADOT.
[6] Paving is the use of material such as stone, tar, or concrete to form the hard surface of a road, driveway, etc.
[7] Drilling a horizontal bore hole under a sensitive area will avoid surface disturbance. The expected diameter of the MV conduit to be place within the bore hole is 8 inches.
[8] Drilling a horizontal bore hole under a sensitive area will avoid surface disturbance. The expected diameter of the MV conduit to be place within the bore hole is 8 inches.

Appendix L PAINTED DESERT POWER SOLAR PROJECT DOCUMENTS

2023-03-27_iiná bá-Painted Desert Power Solar Project Survey
2023-03_Terabase-Exhibit PDF Files
2022-12-13_Horrocks-Painted Desert Power Solar Project Traffic Analysis
2022-12_SWCA-Phase I Environmental Site Assessment
2022-10-16_Coalmine Canyon Chapter-Resolution Supporting Land Withdrawal for the Entire Solar Array (with Feb 2020 resolution and maps)
2022-06-26_Cameron Chapter-Resolution Supporting the Grant of Right-of-Way for the Project (with map)
2022-04-07_Mangum Economics-Painted Desert Power Economic and Fiscal Contribution to Coconino County, Arizona and the Navajo Nation
2022-02_SWCA-Phase I Environmental Site Assessment
2022-01-19_Terabase-Permit Area Civil Analysis for the Proposed Solar Generating Facility_Revised 2023-05-01
2022-01-19_Terabase-Permit Area Civil Analysis for the Alternative Solar Generating Facility_Revised 2023-05-02
2021-10_SWCA-Dust Control Plan_Revised 2022-02
2021-08-04_Terabase-Map of Visual Simulation Viewpoints
2021-07-21_FAA-Notice Criteria Tool Screening Result
2021-06-10_Terabase-Conceptual Gen Tie Alignment with Indicative Tower Locations
2021-03-31_NNHHPD-Cultural Resources Compliance Form
2021-03-29_USACE-Determination of Need for Department of the Army Permit
2021-03-18_NNEPA-Letter Regarding Clean Water Act Section 401 Water Quality Certification
2021-02-08_NNDFW-Biological Resources Compliance Form
2021-02-04_NNDFW-Conditional Approval
2020-11-13_Ecosphere-Letter Requesting Approved Jurisdictional Determination
2020-11-13_Ecosphere-Request for Jurisdictional Determination Form
2020-11_Ecosphere-Aquatic Resources Delineation Report
2020-10-14_Terabase-Visual Simulation Viewpoint A
2020-10-14_Terabase-Visual Simulation Viewpoint B
2020-10-14_Terabase-Visual Simulation Viewpoint C East
2020-10-14_Terabase-Visual Simulation Viewpoint C West
2020-09-24_Terabase-Visual Simulation Viewpoint A Before
2020-09-24_Terabase-Visual Simulation Viewpoint B Before
2020-09-24_Terabase-Visual Simulation Viewpoint C East Before
2020-09-24_Terabase-Visual Simulation Viewpoint C West Before
2020-06-17_SWCA-Phase I Environmental Site Assessment
2020-06_Ecosphere-Biological Evaluation
2020-05-22_Stantec-Draft Preliminary Geotechnical Investigation Report
2020-04-30_Haley&Aldrich-Preliminary Uranium Exclusion Area Mapping and Existing Site Condition Assessment
2020-04-09_AP-Corrosion Test Results
2020-04_Love Appraisals-Restricted Appraisal Report

2020-04_Stantec-Pile Load Test Field Forms
2020-03-23_Stantec-Pile Test Locations
2020-03-13_Stantec-Test Pits Piles
2020-03-09_Stantec-Radiation Monitoring Field Report
2020-02-25_NNHP-Biological Resources Analysis
2020-02-11_SEAS-Cultural Resource Survey Reconnaissance Results
2019-11-07_Stuart Consulting & ZGlobal-Power Flow Studies
2019-10-25_Arrowhead-Desktop Review of Cameron, Arizona Drainage
2019-10-02_Terabase Energy-Topographic Drone Survey
2019-09-05_Arrowhead-Desktop Review of Potential Flooding Areas of Arizona and New Mexico Locations
2019-08-19_Stuart Consulting & ZGlobal-Interconnection and Transmission Study
2019-08-06_ATEK-Geotechnical Desktop Study
2019-08-06_ATEK-Geotechnical Desktop Study Appendix
2019-08-06_ATEK-Desktop Geotechnical Study Shapefiles
2019-07-12_Ecosphere-Biological Resources Review
2019-05-29_SEAS-Class I Records Review for Cultural Resources
2019-05-23_NNHP-Biological Resources Analysis

Appendix M FEDERAL AVIATION ADMINISTRATION NOTICE CRITERIA TOOL SCREENING RESULT

Federal Aviation Administration

« OE/AAA

Notice Criteria Tool

Notice Criteria Tool - Desk Reference Guide V_2018.2.0

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors: height, proximity to an airport, location, and frequencies emitted from the structure, etc. For more details, please reference CFR Title 14 Part 77.9.

You must file with the FAA at least 45 days prior to construction if:

- your structure will exceed 200ft above ground level
- your structure will be in proximity to an airport and will exceed the slope ratio
- your structure involves construction of a traverseway (i.e. highway, railroad, waterway etc...) and once adjusted upward with the appropriate vertical distance would exceed a standard of 77.9(a) or (b)
- your structure will emit frequencies, and does not meet the conditions of the FAA Co-location Policy
- your structure will be in an instrument approach area and might exceed part 77 Subpart C
- your proposed structure will be in proximity to a navigation facility and may impact the assurance of navigation signal reception
- your structure will be on an airport or heliport
- filing has been requested by the FAA

If you require additional information regarding the filing requirements for your structure, please identify and contact the appropriate FAA representative using the Air Traffic Areas of Responsibility map for Off Airport construction, or contact the FAA Airports Region / District Office for On Airport construction.

The tool below will assist in applying Part 77 Notice Criteria.

Latitude:	35 Deg 50 M 0.502 S N
Longitude:	111 Deg 26 M 5.438 S W
Horizontal Datum:	NAD83
Site Elevation (SE):	4495 (nearest foot)
Unadjusted Structure Height :	140 (nearest foot)
Height Adjustment:	15 (nearest foot)
Total Structure Height (AGL):	155 (nearest foot)
Traverseway:	Public Roadway (Additional height is added to certain structures under 77.9(c)) User can increase the default height adjustment for Traverseway, Private Roadway and Waterway
Is structure on airport:	● No ○ Yes

Results

You do not exceed Notice Criteria.

Appendix N CAMERON CHAPTER RESOLUTION SUPPORTING THE GRANT OF RIGHT-OF-WAY FOR THE PROJECT

RESOLUTION SUPPORTING A GRANT OF RIGHT OF WAY FOR THE PROPOSED PAINTED DESERT POWER SOLAR PROJECT

WHEREAS:

Pursuant to 26 N.N.C., Section 3: Chapter Certification and 11 N.N.C. Part 1, Section 10, the Cameron Chapter is a duly recognized and certified chapter of the Navajo Nation Government; and,

The Cameron Chapter has been impacted by both the Navajo Hopi Land Settlement Act of 1974 and the Bennett Freeze Act of 1966 prohibiting development or improvements of any infrastructure. These areas are now designated as the Former Bennett Freeze Areas (FBFA); and,

Painted Desert Power LLC, a subsidiary of Navajo Power PBC, has proposed at duly called chapter meetings and in community settings a resolution approving a grant of right of way for a high voltage electrical transmission line for a utility scale solar and battery project located within the FBFA; and,

The proposed electrical transmission line is in Sections 1-4 of Township 28 North, Range 9 East; and Sections 35-36 of Township 29 North, Range 9 East; in Coconino County, Arizona, in the Cameron chapter of the Navajo Nation; and,

The proposed right of way grant parallels an existing Arizona Public Service (APS) transmission line, is approximately four miles long, and would not exceed 600 acres as shown in the attached map; and,

WHEREAS, the proposed transmission line in Cameron Chapter would have minimal ground disturbance and would not limit or restrict the grazing activities of Chapter members; and,

The Cameron Chapter's support of this grant of right of way is conditioned upon economic benefits in the form of land payments from the Painted Desert Power Solar Project and employment opportunities during the construction and operation of the solar project for the chapter residents, as shown in the attached table.

NOW THEREFORE BE IT RESOLVED THAT:

The Cameron Chapter supports the grant of right of way for the Painted Desert Power Solar Project that will bring economic benefits to the region and the Navajo people.

The Cameron chapter requests that the Navajo Nation Resources and Development Committee and the Bureau of Indian Affairs grant the right of way for the Painted Desert Power Solar project.

CERTIFICATION:

We hereby certify that the foregoing resolution was duly considered by the Cameron Chapter, Navajo Nation, Arizona, at which a quorum was present and that the same was passed by a Vote of_____ In Favor, _____ Opposed, and _____ Abstained, this_____Day of *June 2022*.

Motion to Approve:

____

Second:

____

PRELIMINARY
NOT FOR
CONSTRUCTION

ENGINEER'S STAMP

Terabase Energy, Inc.
2222 Haraold Way
Berkeley, CA 94704 USA
+1 (415) 763-7181

REVISIONS

REV	DESIGN #	DESCRIPTION	DATE	DB	CB
H	2020-00144	GEN TIE EXHIBIT	9-OCT-2020	CA	CB

PAINTED DESERT NAVAJO POWER

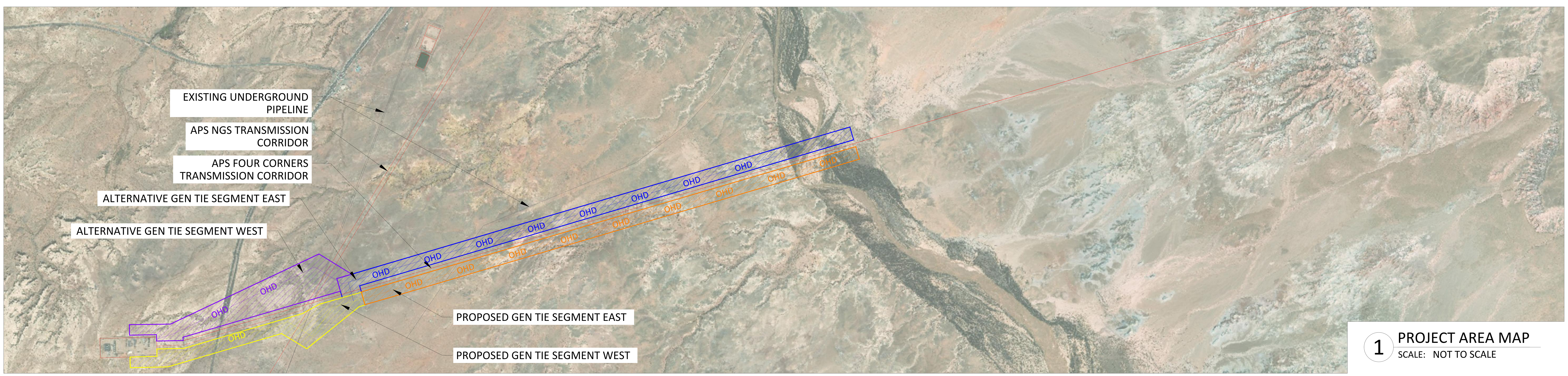
CAMERON, AZ
USA

PLAN OF DEVELOPMENT PROJECT ALTERNATIVES MAP

DESIGNED BY	JB
PROJECT	2020-0054
DATE	12FEB2020
FORMAT	ARCH-D

0 1/2" 1"
IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET
POD-02



1 PROJECT AREA MAP
SCALE: NOT TO SCALE

Appendix O COALMINE CANYON CHAPTER RESOLUTION SUPPORTING LAND WITHDRAWAL FOR THE ENTIRE SOLAR ARRAY

Resolution of the Coalmine Canyon Chapter CCC-__________

IN SUPPORT ADDITIONAL ACREAGE FOR THE PAINTED DESERT POWER LLC SOLAR AND BATTERY STORAGE PROJECT IN THE AMOUNT OF 1683 ACRES FOR A TOTAL OF 4563 ACRES

WHEREAS:

1. Pursuant to 26 N.N.C., Section 3: Chapter Certification and 11 N.N.C. Part 1, Section 10, the Coalmine Canyon Chapter is a duly recognized and certified chapter of the Navajo Nation Government; and,

2. Pursuant to 26 N.N.C., Chapter 1: Navajo Nation Chapters, Section 1., (B) Purpose: (1) & (2), the Navajo Nation Council delegated to Chapter governmental authority with respect to local matters consistent with Navajo law, including custom and tradition and allows Chapters to make decisions to govern with responsibility and accountability to community membership; and,

3. The Painted Desert Power Solar and Battery Storage Project (the "Solar Project" or "Painted Desert Power") has been in development since 2019. The Solar Project is a subsidiary company created by Navajo Power. Navajo Power is a solar developer whose mission is to maximize the economic benefits of clean energy for tribal and impacted communities.

4. On February 16, 2020 The Coalmine Chapter passed a resolution in support for the Solar Project. That resolution supported a land withdrawal for 2880 acres. That resolution and map showing the 2880 acres is attached to this resolution as Exhibit A.

5. Painted Desert Power requests an additional 1683 acres of Chapter land, bringing the total acreage to 4563 acres, as shown in Exhibit B. Painted Desert Power needs an increase in size because portions of the original Exhibit A were removed due to locations

of Abandoned Uranium Mine Sites (AUMs), cultural resources, and topography. Additionally, the area requires a larger size in order to maintain the 750MW size necessary that was determined during the final assessment phase of the site.

6.. Painted Desert Power has received a signed biological resources compliance form from the Navajo Nation Department of Fish and Wildlife and a signed Cultural Resources Compliance Form from the Navajo Nation Department of Heritage and Historic Preservation for the 4563 acre site. The 4563 acre site has been studied for hazards, AUMs, floodplain, hydrology, geotechnical, drone topography, workforce needs, appraisal value, and project economic impact.

7. Painted Desert Power has received sign off from all grazing permit holders in the 4563 acre site. On February 1, 2022, the elected Grazing Official from Coalmine Canyon Chapter and Land Agent from the General Land Development Department of the Navajo Nation signed the Field Clearance Checklist and certified that all land users with land use rights in the affected 4563 acres have consented to development of the Solar Project.

8. The Chapter's support of this land withdrawal is conditioned upon portions of revenues from the Solar Project being used for the benefit of Chapter residents. The amount the Chapter receives will be determined by the size of the built solar project (in acres) multiplied by the dollar figure in Exhibit C. The project will likely be constructed in three phases over a five year period. Project construction is estimated to begin in 2025.

9. Once the Chapter receives LGA certification it shall be entitled to fully receive, maintain, administer, and control the lease revenues outlined in Exhibit A, as allowed under Navajo Law, and as envisioned by Title 26 of NN Code.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Coalmine Canyon Chapter hereby supports Painted Desert Power, LLC in its application to the Navajo Land Department for land withdrawal for the Solar Project in the amount of 4563 acres, as described above and shown in the map in Exhibit B; and,

2. The Coalmine Canyon Chapter hereby supports and recognizes the Land Withdrawal Designation for the sole purpose of industrial development. Industrial development shall be considered the economic activity concerned with the manufacture and processing of materials or construction.

3. The Coalmine Canyon Chapter will continue to play a leadership role with Painted Desert Power LLC, and work collaboratively with the Coalmine Canyon elected officials,

the Coalmine Canyon Community Land Use Planning committee, and Coalmine members to support the Solar Project and bring economic development to Coalmine Canyon Chapter membership.

CERTIFICATION:

We hereby certify that the foregoing resolution was duly considered by the Coalmine Canyon Chapter, Navajo Nation, Arizona, at which a quorum was present and that the same was passed by a Vote of_____ In Favor, _____ Opposed, and _____ Abstained, this 16 th day of October 2022.

Motion to Approve:

____

Second:

____

Exhibit A:
February 2020
Resolution and Map

COALMINE CANYON CHAPTER

Chapter President
Dorothy Dale

Chapter Vice-President
Phillip Zahne

Secretary/Treasurer
Vacant

Council Delegate
Thomas Walker Jr.

Grazing Official
Harry J. Goldtooth

WESTERN NAVAJO AGENCY – NAVAJO NATION
PO Box 742, Tuba City, AZ 86045

Augusta Gillwood- Community Service Coordinator

Vacant - Account Maintenance Specialist

Resolution of the Coalmine Canyon Chapter
CCC-02-0048-20

RESOLUTION SUPPORTING PAINTED DESERT POWER, LLC IN THEIR APPLICATION TO NAVAJO LAND DEPARTMENT FOR THE PURPOSE OF LAND WITHDRAWAL FOR A SOLAR ENERGY AND BATTERY STORAGE PROJECT LOCATED WITHIN THE COALMINE CANYON CHAPTER AND TO SUPPORT LAND WITHDRAWAL DESIGNATION.

WHEREAS:

1. Pursuant to 26 N.N.C., Section 3: Chapter Certification and 11 N.N.C. Part 1, Section 10, the Coalmine Canyon Chapter is a duly recognized and certified chapter of the Navajo Nation Government; and,

2. Pursuant to 26 N.N.C., Chapter 1: Navajo Nation Chapters, Section 1., (B) Purpose: (1) & (2), the Navajo Nation Council delegated to Chapter governmental authority with respect to local matters consistent with Navajo law, including custom and tradition and allows chapters to make decisions to govern with responsibility and accountability to community membership; and,

3. The Coalmine Canyon Chapter has been impacted by both the Navajo Hopi Land Settlement Act of 1974 and the Bennett Freeze Act of 1966 prohibiting development or improvements of any infrastructure. These areas are now designated as the Former Bennett Freeze Areas (FBFA); and,

4. The Coalmine Canyon Chapter Land Use Planning Committee is vested with the duty to develop and approve the process for local land use planning including economic development, oversight of land use planning activities and conduct a thorough review and analysis on behalf of the community members; and,

5. The goal of the Coalmine Canyon Chapter is to provide adequate community facilities and services ensuring the well-being for a safe, healthful and attractive living environment to enrich the lives of community members; and,

6. The Resource and Development Committee has approved the Coalmine Canyon Chapter Community Based Land Use Plan on January 11, 2017 per RDCJA-09-17 pursuant to 26 N.N.C. § 2004 (D) (2) certifying planning within Grazing District III Unit 1; and,

7. Painted Desert Power, LLC, a subsidiary of Navajo Power PBC, has presented to the Coalmine Canyon Chapter Community Land Use Planning Committee, community members and the Chapter Planning Committee regarding proposed utility scale solar and battery project located within the Coalmine Canyon Chapter as shown in the attached map; and,

8. Painted Desert Power, LLC has presented a plan that would ensure that the utility scale solar and battery project located within the Coalmine Canyon Chapter would provide economic benefits to the Coalmine Canyon Chapter and its residents; and,

9. Painted Desert LLC will continue to provide ongoing dialogue with the Coalmine Canyon Chapter residents in development of this project and associated community benefits; and,

10. The Coalmine Canyon Chapter plans to utilize the economic benefits from the utility scale solar and battery project to support critical community needs to include education, thoroughfare, water infrastructure, scholarships, housing, public facilities, broadband infrastructure, regenerative agriculture for farming and ranching, recreation centers, senior centers and other community needs; and,

11. The Coalmine Canyon Chapter's support of the Painted Desert Power, LLC Solar and Battery Storage Project is conditioned upon economic benefits - in the form of land payments and employment opportunities - for the Chapter and its residents.

NOW THEREFORE BE IT RESOLVED THAT:

1. Approval to support Painted Desert Power, LLC in their application to Navajo Land Department for the Purpose of Land Withdrawal for a Solar Energy and Battery Storage Project located within the Coalmine Canyon Chapter; and,

2. The Coalmine Canyon Chapter hereby supports and recognizes the Land Withdrawal Designation for the sole purpose of industrial development. Industrial development shall be considered the economic activity concerned with the manufacture and

processing of materials or construction; and,

3. The Coalmine Canyon Chapter approves this resolution in accordance with the attachments of Terms and Maps.

CERTIFICATION:

We hereby certify that the foregoing resolution was duly considered by the Coalmine Canyon Chapter, Navajo Nation, Arizona, at which a quorum was present and that the same was passed by a Vote of *30* In Favor, *00* Opposed, and *02* Abstained, this *16th* Day of *February 2020*.

Motion to Approve: Glenmore Begaye
Second: Lenora Hatathlie

Dorothy Dale, President

Phillip Zahne, Vice-President

Wanda Begody, Secretary/Treasurer

Thomas Walker Jr., Council Delegate

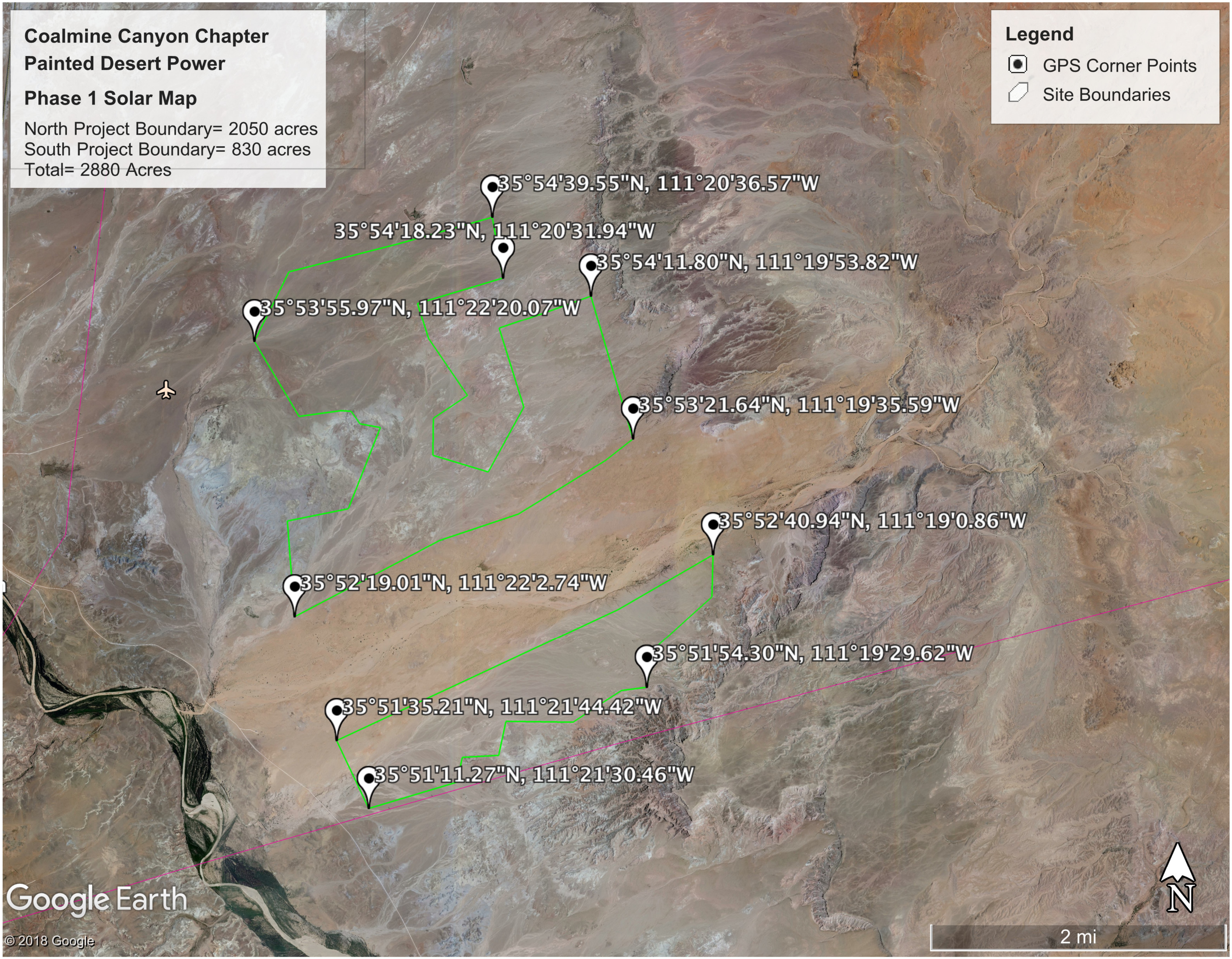

Coalmine Canyon Chapter
Painted Desert Power
Phase 1 Solar Map
North Project Boundary= 2050 acres
South Project Boundary= 830 acres
Total= 2880 Acres
Legend
GPS Corner Points
Site Boundaries
35°54'39.55"N, 111°20'36.57"W
35°54'18.23"N, 111°20'31.94"W
35°54'11.80"N, 111°19'53.82"W
35°53'55.97"N, 111°22'20.07"W
35°53'21.64"N, 111°19'35.59"W
35°52'40.94"N, 111°19'0.86"W
35°52'19.01"N, 111°22'2.74"W
35°51'54.30"N, 111°19'29.62"W
35°51'35.21"N, 111°21'44.42"W
35°51'11.27"N, 111°21'30.46"W
Google Earth
© 2018 Google
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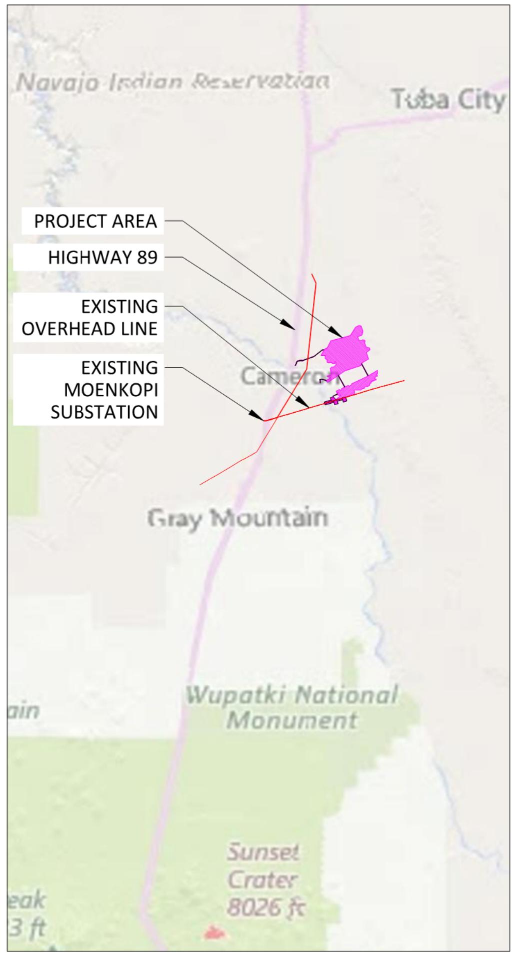
Exhibit B:

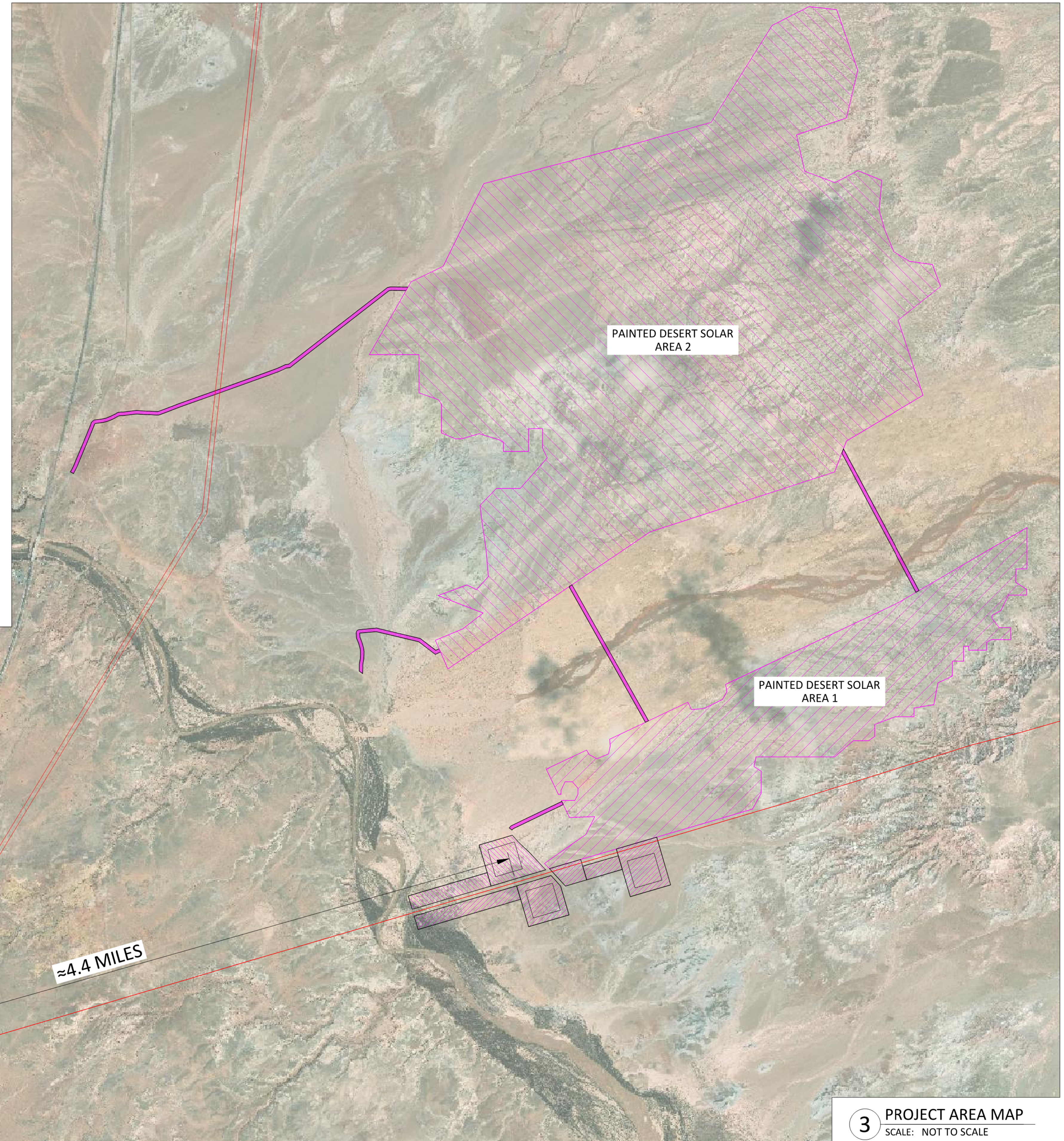
Expanded site map

4563 Acres

1 VICINITY MAP
SCALE: NOT TO SCALE



2 LOCAL VICINITY MAP
SCALE: NOT TO SCALE



3 PROJECT AREA MAP
SCALE: NOT TO SCALE

PRELIMINARY
NOT FOR CONSTRUCTION

ENGINEER'S STAMP

terabase
Terabase Energy, Inc.
2222 Harold Way
Berkeley, CA 94704 USA
+1 (415) 763-7181

REVISIONS

REV	DESIGN #	DESCRIPTION	DATE	DB	CB
F	2020-00076	PERMIT HOLDER AREA EXHIBIT	21-MAY-2020	JB	CB

PAINTED DESERT
NAVAJO POWER

CAMERON, AZ
USA

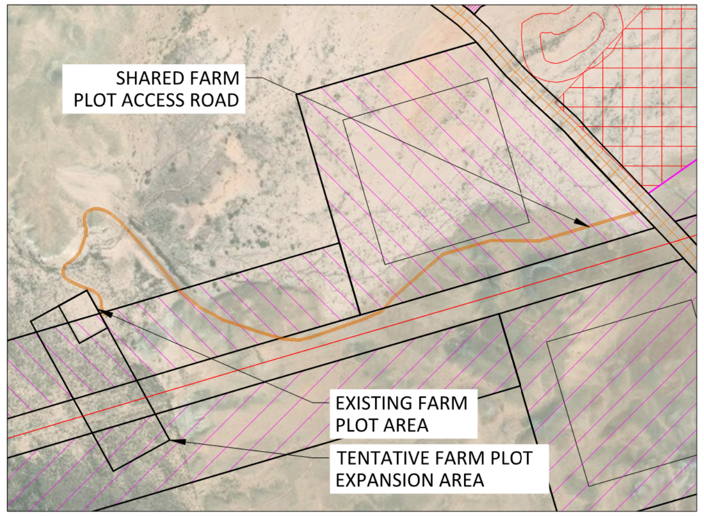
PROJECT AREA
OVERVIEW

DESIGNED BY	JB
PROJECT	2020-0054
DATE	12FEB2020
FORMAT	ARCH-D

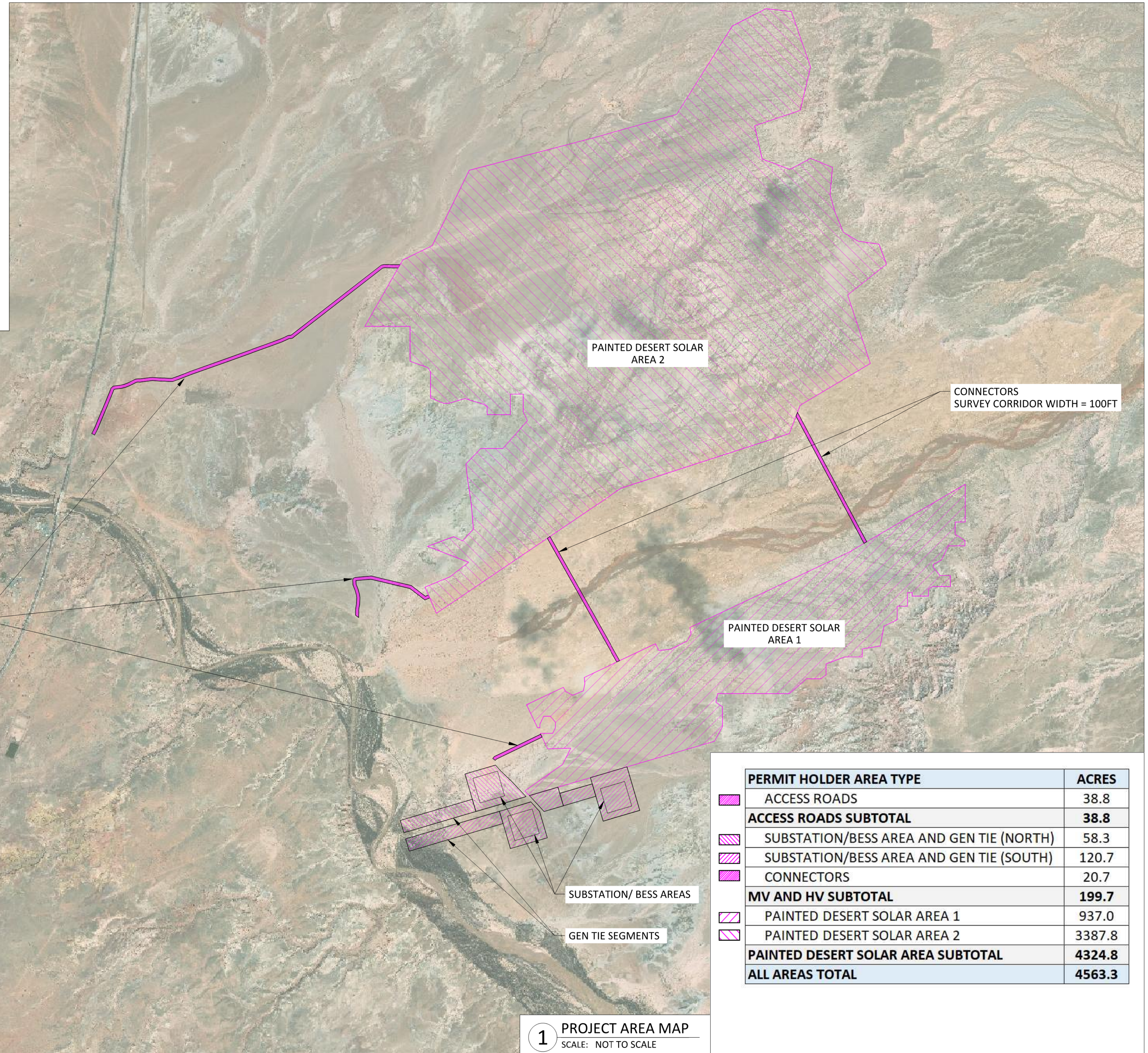
0 ½" 1"
IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET
SURV-01

2020-00076 PAINTED DESERT - PERMIT HOLDER EXHIBIT REV F.DWG 5/21/2020 12:20 PM



2 VIEW OF EXISTING FARM PLOT
SCALE: NOT TO SCALE



PERMIT HOLDER AREA TYPE	ACRES
ACCESS ROADS	38.8
ACCESS ROADS SUBTOTAL	**38.8**
SUBSTATION/BESS AREA AND GEN TIE (NORTH)	58.3
SUBSTATION/BESS AREA AND GEN TIE (SOUTH)	120.7
CONNECTORS	20.7
MV AND HV SUBTOTAL	**199.7**
PAINTED DESERT SOLAR AREA 1	937.0
PAINTED DESERT SOLAR AREA 2	3387.8
PAINTED DESERT SOLAR AREA SUBTOTAL	**4324.8**
ALL AREAS TOTAL	**4563.3**

1 PROJECT AREA MAP
SCALE: NOT TO SCALE

PRELIMINARY
NOT FOR
CONSTRUCTION

ENGINEER'S STAMP

terabase
Terabase Energy, Inc.
2222 Haraold Way
Berkeley, CA 94704 USA
+1 (415) 763-7181

REVISIONS

REV	DESIGN #	DESCRIPTION	DATE	DB	CB
F	2020-00076	PERMIT HOLDER AREA EXHIBIT	21-MAY-2020	JB	CB

PAINTED DESERT NAVAJO POWER

CAMERON, AZ
USA

PERMIT HOLDER AREA EXHIBIT

DESIGNED BY	JB
PROJECT	2020-0054
DATE	12FEB2020
FORMAT	ARCH-D

0 ½" 1"
IF BAR IS NOT ONE INCH, DRAWING IS NOT TO SCALE

SHEET
SURV-02

Appendix P TRAFFIC ANALYSIS

Horrocks.

MEMORANDUM

TO: Jennifer Rouda, Navajo Power

FROM: Aron Baker, PE

DATE: December 13, 2022

SUBJECT: **Painted Desert Power Solar Project Traffic Analysis**

The purpose of this memo is to address the potential traffic impacts of the Painted Desert Power Solar Project in Cameron, Arizona. This memo will detail the number of trips that will be generated by the construction traffic and the trips expected after construction is complete, evaluate the project access on US-89, and provide any recommendations to mitigate potential traffic impacts in the area.

INTRODUCTION

The Painted Desert Solar Project is planned to be approximately 5,000 acres of solar fields approximately four miles east of Cameron, Arizona. The project access is proposed at the existing intersection of US-89 and Navajo Department of Transportation (NDOT) Route 6730. NDOT Route 6730 is planned to be improved for construction traffic and provide access to the project, as shown in Figure 1.

Figure 1 also shows the site plan for the solar project. There are two areas planned for solar arrays. The two areas will access NDOT Route 6730 which will connect the entire project to US-89.

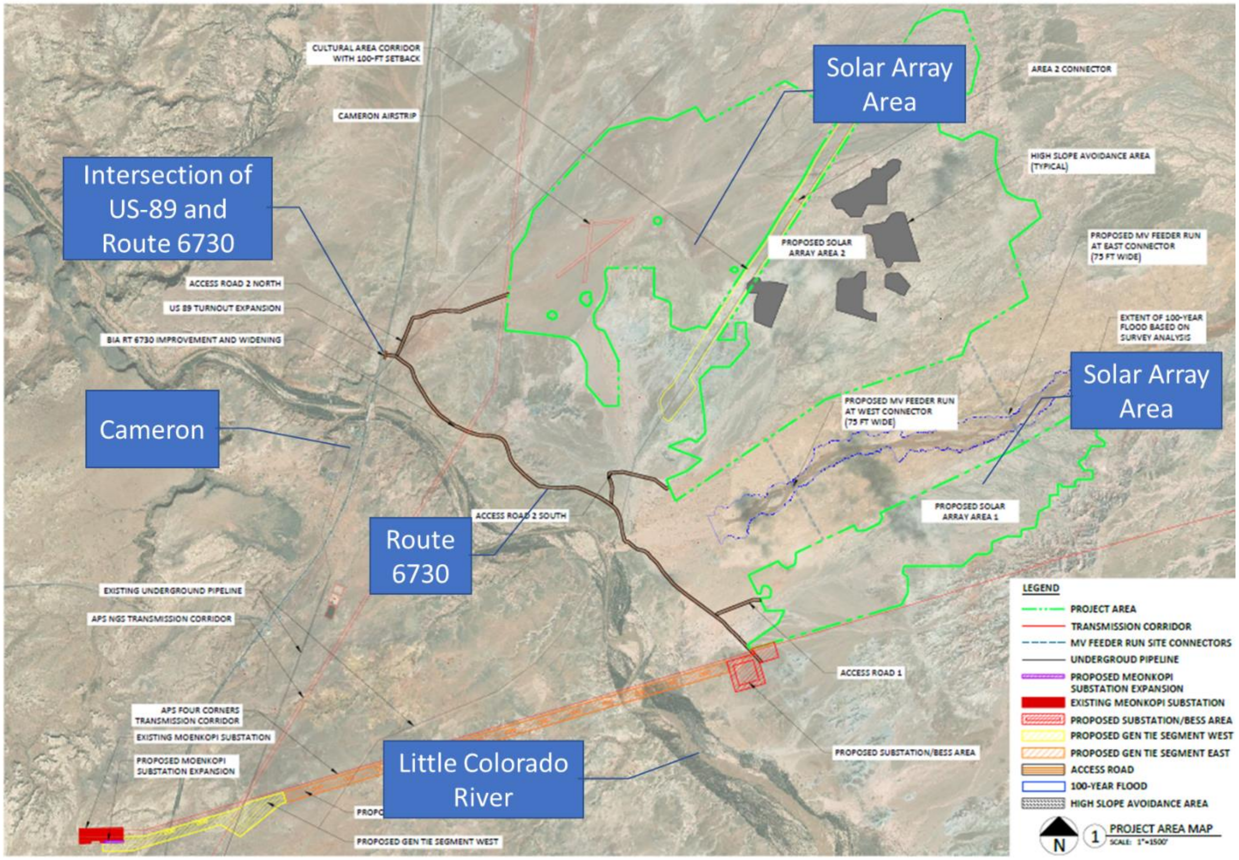


Figure 1: Proposed Development and Project Accesses

At the intersections of US-89 and NDOT Route 6730, US-89 has a daily average of 9836 vehicles according to the Arizona Department of Transportation (ADOT) Average Annual Daily Traffic Report 2021. There is an Automatic Traffic Recorder (ATR) on US-89 just north of the bridge in Cameron. The location of the ATR is shown in Figure 2. Throughout the average day, the directional split is approximately 50 percent of the traffic in each direction. The peak hour volumes can be estimated as 10 percent of the daily volume. It is assumed that there are 980 vehicles on US-89 during the peak hour, with 490 vehicles traveling northbound and 490 traveling southbound.

Figure 2-Location of ADOT Traffic Count Stations

The NDOT provided traffic counts for Route 6730. The average daily traffic averages 49 trips per day, with 3 average trips in the AM peak hour and 4 average trips in the PM peak hour. The intersection is shown in Figure 3.

Figure 3-Intersection of US-89 and NDOT Route 6730

At the intersection of US-89 and NDOT Route 6730, US-89 is paved with two northbound lanes and one southbound lane, and the speed limit transitions from 65 miles per hour (mph) to 55 mph southbound and from 55 mph to 65 mph northbound. NDOT Route 6730 is a two-lane gravel road and the speed limit is 15 miles per hour.

TRIP GENERATION

The number of trips and types of vehicles that will be using the proposed access during construction are detailed in the Navajo Power Threshold Determination Document.

At the height of construction, there are planned to be 500 construction workers on the job site every day which is estimated to bring 250 trips to the job site. Supply deliveries are expected to add an additional 50 trips per day, and management and security are planned to add another 25 to 50 trips per day. Assuming there is a maximum of 350 daily trips at peak construction, there will be approximately 35 trips in the PM peak hour.

Local hotel, motel, recreational vehicle (RV) accommodations, and temporary rental resources are planned to be available in nearby towns and cities, including Cameron, Tuba City, and Flagstaff to support the workforce for the project. Most of the construction traffic will be coming from the Cameron/Flagstaff direction to the south of the project access. No on-site housing facilities are expected to be built.

When construction is completed, the project is expected to generate 25 to 50 trips per day by maintenance and security. During the solar panel cleaning periods, there may be as many as 100 trips per day and approximately 10 trips in the PM peak hour.

TURN LANE ANALYSIS

The ADOT Traffic Guidelines and Processes Section 345-Turn Lane Warrants provide guidelines for the minimum volumes that warrant right and left turn lanes. Figure 4 shows the estimated volumes in the AM and PM peak hours turning onto NDOT Route 6730 from US-89. It is assumed that 70 percent of the construction traffic will be coming from the south from the direction of Cameron and Flagstaff and the rest from the north.

Figure 4-Estimated Trip Distribution during Peak Construction

Table 1 shows the right-turn lane warrants on US-89. Based on the warrants, more than 30 right turns warrant a right turn lane. During peak construction, the intersection is not expected to meet that warrant in the AM or PM peak hours.

Table 2 shows the left-turn lane warrants on US-89. Based on the warrants, more than 12 left turns warrant a left-turn lane. During peak construction, the intersection is not expected to meet that warrant in the AM or PM peak hours.

Table 1-ADOT Right-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Right-turn Traffic Volume				
	# of thru lanes per direction				
	1		2		3
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	All Speeds
≤ 200					
201 – 300	-	30	-	-	-
301 – 400	-	19	-	55	-
401 – 500	85	14	-	30	-
501 – 600	58	12	140	25	-
601 – 700	27	9	80	18	-
701 – 800	20	8	53	15	-
801 – 900	12	7	40	12	-
901 – 1000	9	6	30	11	-
1001 – 1100	8	5	23	9	18
1101 – 1200	7	5	18	8	16
1201 – 1300	6	4	14	8	15
1301 – 1400	6	4	11	6	12
1400+	5	3	8	6	10

Table 2-ADOT Left-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Left-turn Traffic Volume			
	# of thru lanes per direction			
	1		2 (Undivided)*	
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed
≤ 200	30	15	-	-
201 – 300	12	12	40	30
301 – 400	12	12	30	25
401 – 500	12	12	25	18
501 – 600	12	12	15	12
601 – 1000	12	12	10	8
1000+	12	8	10	8

*On non-freeway divided highways, left-turn or U-turn lanes should be provided at median breaks.

When construction is completed, there are expected to be fewer than ten peak hour trips, which would also not meet the turn lane warrants.

The entire solar project is expected to be removed after its lifespan of 35 years.

INTERSECTION OPERATION

In order to quantify the traffic conditions currently exhibited in the study area, the roadway geometries and estimated traffic were entered into the Synchro 11 software package. Using the 6th edition of the Highway Capacity Manual (HCM) method of calculating intersection delay, a Level of Service (LOS) grade was assigned to the intersection for both peak hours.

Level of Service (LOS) is a term used by the HCM to describe the traffic operations of an intersection, based on congestion and delay. LOS ranges from A (almost no congestion or delay) to F (traffic demand exceeds capacity and the intersection experiences long queues and delay). Typically, LOS A through LOS D are considered acceptable. The delay criteria used to assign a Level of Service to an intersection for signalized and unsignalized intersections is shown below in Table 3. The full Synchro reports are included in the Appendix.

Table 3-Intersection Level of Service

Level of Service	Average Control Delay (sec/veh)	
	Signalized	Un-signalized
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

The intersection of US-89 and NDOT Route 6730 is expected to operate at LOS B in the AM and PM peak hours with a stop sign on Route 6730 during the height of construction. LOS B is considered acceptable with minimal delays.

When construction is completed, the intersection is expected to operate at LOS A in the AM and PM peak hours.

SIGHT DISTANCE

The *AASHTO Guidelines for Geometric Design of Highways and Streets* detail the requirements for sight distance from a stop-controlled minor road. These are based on the speed of the highway and the type of vehicles using the intersection. With construction vehicles expected to use the intersection, the left turn sight distance from Route 6730 to US-89 is 990 feet. The right turn sight distance is 850 feet.

Based on visuals from Google Earth, there should be sufficient sight distance at the intersection, but the actual distances should be checked in the field.

SUMMARY

The Painted Desert Power Solar Project is expected to generate approximately 350 daily trips during the height of the construction of the solar fields. When construction is completed, the project is expected to generate, at a maximum, 100 trips per day. With the maximum generated trips, there are no turn lanes warranted on US-89, assuming 70 percent of the project traffic is traveling to and from south of the project. There are no turn lanes or other mitigation recommended at this time.

The intersection is expected to operate at LOS B in the AM and PM peak hours. It is also expected to meet the AASHTO sight distance requirements, however, the actual sight distances should be measured in the field and any mitigation implemented as necessary.

APPENDIX

Multimodal Planning

Arizona Department of Transportation
AVERAGE ANNUAL DAILY TRAFFIC REPORT 2021

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
101816	US 60	30.66	I-10 (exit 31)	31	31.26	I-10	920	856	1,776	3	9	59	74	186	15	2,978
101817	US 60	31.26	I-10	31.53	36.6	Flying Crown Ranch Rd	672	672	1,343	3	7	56	133	168	22	2,123
101818	US 60	36.6	Flying Crown Ranch Rd	37	42.78	Avenue 4e	744	779	1,523	1	16	72	46	68	7	2,407
101819	US 60	42.78	Avenue 4e	44	45.84	Vicksburg Rd	675	645	1,320	3	7	51	490	71	43	2,086
101820	US 60	45.84	Vicksburg Rd	48	49.56	SR 72	686	679	1,365	3	7	51	494	75	42	2,158
101821	US 60	49.56	SR 72	54	56.53	Salome Rd	1,180	1,123	2,303	3	7	51	176	176	15	3,640
101822	US 60	56.53	Salome Rd	59	61.49	2nd St - Wenden	1,132	1,024	2,156	3	7	54	179	179	17	3,408
101823	US 60	61.49	2nd St - Wenden	82.57	84.17	Eagle Eye Rd	973	949	1,922	1	14	50	165	198	19	3,038
101824	US 60	84.17	Eagle Eye Rd	85	85.81	SR 71 North - East of Aguila	1,415	1,420	2,835	1	6	50	348	189	19	4,035
101825	US 60	85.81	SR 71 North - East of Aguila	87	105.66	Wickenburg Airport Rd	848	842	1,690	1	7	50	201	201	24	2,405
101826	US 60	105.66	Wickenburg Airport Rd	107	107.71	Vulture Mine Rd	2,270	2,646	4,916	3	6	50	640	194	17	6,997
101827	US 60	107.71	Vulture Mine Rd	108	108.45	Country Club Dr / Saguaro Dr	6,697	6,579	13,276	3	7	50	1,106	334	11	18,896
101829	US 60	108.45	Country Club Dr / Saguaro Dr	109	109.25	Mariposa Dr	7,703	8,316	16,019	3	6	57	2,227	427	17	22,800
101831	US 60	109.25	Mariposa Dr	109.44	110.33	US 93 (Tegner St) / Center St - Wickenburg	7,192	7,416	14,608	3	6	50	1,793	477	16	20,792
101833	US 60	110.33	US 93 (Tegner St) / Center St - Wickenburg	110.41	110.7	Jack Burden Rd	5,776	6,361	12,137	3	6	51	1,001	431	12	17,275
101835	US 60	110.7	Jack Burden Rd	112.27	112.94	Mockingbird Rd	10,485	10,532	21,017	1	10	56	891	1,962	14	37,581
101837	US 60	112.94	Mockingbird Rd	115	115.6	Rocking Horse Ln	9,500	9,825	19,325	1	7	58	1,492	1,397	15	34,556
101838	US 60	115.6	Rocking Horse Ln	116.12	117.86	San Domingo Peak Trl	6,572	9,802	16,374	3	5	57	1,740	543	14	29,279
101839	US 60	117.86	San Domingo Peak Trl	118.16	118.5	McCarrall Rd	8,181	7,854	16,035	3	5	53	719	404	7	28,673
101840	US 60	118.5	McCarrall Rd	119.22	120.13	SR 74 East - Morristown	7,691	7,467	15,158	3	5	54	1,188	490	11	27,104
101841	US 60	120.13	SR 74 East - Morristown	120.69	121	Gales Rd / Rockaway Hills Dr	8,108	7,820	15,928	3	4	51	1,621	516	13	28,481
101842	US 60	121	Gales Rd / Rockaway Hills Dr	124.22	124.5	London Rd	9,850	8,183	18,033	3	4	52	784	2,217	17	32,245
101843	US 60	124.5	London Rd	128.48	128.7	Center St - Wittman	7,499	6,948	14,447	3	6	71	816	2,222	21	25,833
101844	US 60	128.7	Center St - Wittman	130.56	130.92	203rd Ave	8,942	8,607	17,549	3	6	56	998	2,376	19	31,380
101845	US 60	130.92	203rd Ave	131.26	132.4	Patton Rd	10,240	9,903	20,143	3	4	52	994	2,376	17	36,018
101846	US 60	132.4	Patton Rd	133	133.9	Jomax Rd	11,926	11,872	23,798	1	6	50	942	2,528	15	42,554
101847	US 60	133.9	Jomax Rd	134.55	135.2	Happy Valley Rd	13,367	11,176	24,543	3	6	52	990	2,412	14	31,155
101848	US 60	135.2	Happy Valley Rd	136	136.95	Deer Valley Rd	13,522	12,745	26,267	3	5	52	2,015	2,314	16	33,344
101849	US 60	136.95	Happy Valley Rd	137.63	137.8	163rd Ave	10,691	10,776	21,467	3	7	50	2,329	2,366	22	27,250
101850	US 60	137.8	163rd Ave	138.3	138.6	SR 303 Connector Rd	15,428	14,511	29,939	3	8	51	1,589	2,316	13	38,005
101851	US 60	138.6	SR 303	139.1	139.61	Sunrise Blvd / RH Johnson Blvd	13,946	15,731	29,677	1	8	59	1,954	437	8	37,672
101852	US 60	139.61	Sunrise Blvd / RH Johnson Blvd	140.29	140.93	Meeker Blvd / Reems Rd	14,380	13,697	28,077	1	8	55	1,427	586	7	35,641
101853	US 60	140.93	Meeker Blvd / Reems Rd	141.9	142.76	Bell Rd	18,903	18,441	37,344	1	8	52	1,770	1,096	8	47,405
101854	US 60	142.76	Bell Rd	143	143.41	Dysart Rd (Surprise Ave)	18,165	18,165	36,329	3	7	50	1,004	883	5	46,116
101855	US 60	143.41	Dysart Rd (Surprise Ave)	143.7	144.3	Greenway Rd	13,112	12,502	25,614	1	8	55	1,274	481	7	32,515
101856	US 60	144.3	Greenway Rd	145.3	145.76	Thompson Ranch Rd	12,390	13,984	26,374	3	7	53	4,805	1,153	23	33,479
101857	US 60	145.76	Thompson Ranch Rd / Thunderbird Rd	146	146.6	111th Ave	26,541	21,981	48,522	3	6	53	6,237	2,220	17	61,594
101858	US 60	146.6	111th Ave	146.95	147.1	Del Webb Blvd / 107th Ave	25,830	25,071	50,901	1	7	56	1,377	2,482	8	64,614
101859	US 60	147.1	Del Webb Blvd / 107th Ave	147.39	147.6	103rd Ave	18,065	15,313	33,378	1	7	52	3,660	2,935	20	42,370
101860	US 60	147.6	103rd Ave	148	148.2	99th Ave	26,708	25,004	51,712	1	7	54	4,053	661	9	65,644
101861	US 60	148.2	99th Ave	148.44	148.92	SR 101 South (Exit 11)	28,814	27,868	56,682	3	7	51	1,978	2,383	8	71,953
101862	US 60	148.92	SR 101 South (Exit 11)	149.15	149.2	91st Ave / SR 101 North (Exit xx)	16,096	22,473	38,569	3	5	64	1,157	578	4	48,960
101863	US 60	149.2	91st Ave / SR 101 North (Exit xx)	149.53	149.92	87th Ave	15,433	14,920	30,353	1	9	55	2,797	455	11	38,530
101864	US 60	149.92	87th Ave	149.84	150.23	85th Ave	16,067	15,411	31,478	1	9	57	1,408	393	6	39,958

Source: ADOT Highway Performance Monitoring System
Printed: 6/15/2022

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
102303	US 60	150.23	85th Ave	0	150.5	Peoria Ave	15,350	15,108	30,458	1	8	58	1,192	1,438	9	38,664
101865	US 60	150.6	83rd Ave / Peoria Ave	151	151.91	Cotton Crossing	15,065	14,086	29,151	1	8	61	944	472	5	37,005
102304	US 60	150.91	Cotton Crossing	151.6	151.96	75th Ave / Olive Ave	14,887	14,171	29,058	1	8	63	1,233	1,486	9	36,887
101866	US 60	151.97	75th Ave / Olive Ave	152	153.36	67th Ave / Northern Ave	17,611	18,039	35,650	1	9	61	952	246	3	45,254
101867	US 60	153.36	67th Ave / Northern Ave	153.6	154.75	59th Ave / Glendale Ave	12,707	13,633	26,340	3	8	83	1,170	566	7	33,436
101868	US 60	154.75	59th Ave / Glendale Ave	155.48	156.21	51st Ave / Bethany Home Rd	22,054	23,849	45,903	1	8	68	1,405	467	4	58,270
101869	US 60	156.21	51st Ave / Bethany Home Rd	156.89	157.6	43rd Ave / Camelback Rd	21,665	22,217	43,882	1	8	63	971	284	3	55,704
101870	US 60	157.6	43rd Ave / Camelback Rd	158.28	159.01	35th Ave / Indian School Rd	23,064	21,356	44,420	1	9	73	3,937	641	10	56,387
101871	US 60	159.01	35th Ave / Indian School Rd	159.41	160.41	27th Ave / Thomas Rd	20,239	18,750	38,989	1	9	66	3,896	635	12	49,493
102316	US 60	159.72	31st Ave / Osborn Rd	159.93	160.41	27th Ave / Thomas Rd (EB end at Thomas Rd)	19,153	17,238	36,391	1	8	68	3,784	617	12	46,195
101872	US 60	171.63	Exit 172 I-10 (Exit 154)	172.43	172.5	Exit 172 Priest Dr (WB only)	62,800	61,510	124,310	3	6	68	4,144	3,489	6	164,777
101873	US 60	172.5	Exit xxx Priest Dr	172.91	173.68	Exit 173 Mill Ave	89,515	97,752	187,267	1	8	51	7,037	5,924	7	248,228
101874	US 60	173.68	Exit 173 Mill Ave	174.6	174.42	Exit 174 Rural Rd	90,029	86,815	176,844	1	8	57	7,641	6,433	8	234,412
101875	US 60	174.42	Exit 174 Rural Rd	174.74	175.42	Exit 175 McClintock Dr	91,880	81,346	173,226	2	10	61	7,802	6,569	8	229,616
101876	US 60	175.42	Exit 175 McClintock Dr	176.02	176.45	Exit 176 SL 101 (Exit 55) Price Rd	84,804	84,804	169,608	1	8	54	12,614	10,620	14	224,821
101877	US 60	176.45	Exit176 Price Rd / SL 101 (Exit 55)	176.71	177.41	Exit 177 Dobson Rd	73,160	101,095	174,255	3	5	62	4,954	4,172	5	230,980
101878	US 60	177.41	Exit 177 Dobson Rd	177.67	178.41	Exit 178 Alma School Rd	124,210	129,146	253,356	1	7	54	5,595	5,595	4	335,831
101879	US 60	178.41	Exit 178 Alma School Rd	178.75	179.41	Exit 179 Country Club Dr (Ex SR 87)	123,444	99,102	222,546	1	9	53	6,339	5,762	5	294,991
101880	US 60	179.41	Exit 179 Country Club Dr (Ex SR 87)	179.7	180.4	Exit 180 Mesa Dr	122,551	116,569	239,120	1	8	58	7,533	6,344	6	316,961
101881	US 60	180.4	Exit 180 Mesa Dr	180.64	181.41	Exit 181 Stapley Dr	122,570	126,169	248,739	1	8	55	6,951	6,951	6	329,711
101882	US 60	181.41	Exit 181 Stapley Dr	181.65	182.41	Exit 182 Gilbert Rd	113,780	116,936	230,716	1	8	55	8,919	7,510	7	305,821
101883	US 60	182.41	Exit 182 Gilbert Rd	183	184.4	Exit 184 Val Vista Dr	104,150	110,740	214,890	1	8	57	7,932	6,681	7	284,843
101884	US 60	184.4	Exit 184 Val Vista Dr	184.69	185.4	Exit 185 Greenfield Rd	95,154	102,742	197,896	1	8	56	827	695	1	262,317
101885	US 60	185.4	Exit 185 Greenfield Rd	185.68	186.39	Exit 186 Higley Rd	106,448	99,021	205,469	3	5	51	7,026	5,916	6	272,355
101886	US 60	186.39	Exit 186 Higley Rd	186.99	187.87	Exit 187 Superstition Springs Blvd	87,959	91,872	179,831	1	8	56	5,952	5,012	6	238,371
101887	US 60	187.87	Exit 187 Superstition Springs Blvd	188.07	188.39	Exit 188 Power Rd	83,812	83,812	167,624	1	9	57	9,986	8,410	11	222,191
101888	US 60	188.39	Exit 188 Power Rd	189.3	189.39	Exit 189 Sossaman Rd	77,558	83,527	161,085	1	8	57	5,796	4,881	7	213,523
101889	US 60	189.39	Exit 189 Sossaman Rd	189.7	190.54	Exit 190A SR 202 (Exit 30A)	56,983	39,105	96,088	1	8	66	4,120	3,468	8	127,368
101890	US 60	190.53	Exit 190A SR 202 (Exit 30A)	191.31	191.4	Exit 191 Ellsworth Rd	52,493	50,633	103,126	3	5	56	3,433	2,890	6	136,697
101891	US 60	191.4	Exit 191 Ellsworth Rd	191.68	192.39	Exit 192 Crismon Rd	62,291	49,409	111,700	3	6	61	3,443	2,900	6	148,062
101892	US 60	192.39	Exit 192 Crismon Rd	193	193.41	Exit 193 Signal Butte Rd	50,972	53,337	104,309	3	7	68	4,172	3,129	7	138,265
101893	US 60	193.41	Exit 193 Signal Butte Rd	194.82	195.41	Exit 195 Ironwood Dr	38,573	42,774	81,347	1	8	66	4,511	1,677	8	121,451
101894	US 60	195.41	Exit 195 Ironwood Dr	195.98	196.41	Exit196 SR 88 / Idaho Rd	26,858	26,629	53,487	3	8	58	2,787	1,766	9	79,856
101895	US 60	196.41	Exit196 SR 88 / Idaho Rd	196.94	197.41	Exit 197 Tomahawk Rd	18,256	19,376	37,632	3	7	62	2,295	1,615	10	56,185
101896	US 60	197.41	Exit 197 Tomahawk Rd	197.86	198.42	Exit 198 Goldfield Rd	17,548	17,170	34,718	3	7	58	1,909	1,735	10	51,834
101897	US 60	198.42	Exit 198 Goldfield Rd	198.82	199.05	Gold Canyon Rd	16,089	14,197	30,286	3	8	60	1,424	908	8	45,217
101898	US 60	199.05	Gold Canyon Rd	200.67	201.17	Superstition Mountain Dr	15,739	16,588	32,327	1	10	51	1,792	859	8	79,698
101899	US 60	201.17	Superstition Mountain Dr	201.34	202.05	Mountain Brook Dr	13,124	11,832	24,956	3	8	51	1,218	913	9	61,526
101900	US 60	202.05	Mountain Brook Dr	202.39	202.7	Kings Ranch Rd	9,680	12,967	22,647	1	8	55	1,085	844	9	55,833
101901	US 60	202.7	Kings Ranch Rd	203	204.18	Peralta Dr	11,414	10,475	21,889	3	9	72	984	875	8	53,965
101902	US 60	204.18	Peralta Dr	208.1	208.25	El Camino Viejo Rd	7,467	6,571	14,038	3	6	55	1,000	917	14	29,961
101903	US 60	208.25	El Camino Viejo Rd	210.2	212.23	SR 79 - Florence Jct	8,022	8,831	16,853	1	11	63	1,271	929	13	38,650
101904	US 60	212.23	SR 79 - Florence Junction	213	213.5	MP 213.65	8,122	8,318	16,440	3	5	62	871	862	11	37,703
101905	US 60	213.5	MP 213.65	224.8	225.82	Mary Drive	5,622	5,582	11,204	1	10	54	704	664	12	23,913
101906	US 60	225.82	Mary Drive	226.2	226.89	SR 177 South	3,466	3,463	6,929	3	6	60	1,767	969	39	14,788
101907	US 60	226.89	SR 177 South	234.59	242.7	Meckey Camp Rd	4,111	3,888	7,999	3	7	60	546	682	15	17,072
101908	US 60	242.7	Meckey Camp Rd	244	244.34	Miami Ave	4,712	4,718	9,430	1	8	50	473	599	11	11,933

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
101909	US 60	244.34	Miami Ave	244.6	245.6	New St	6,810	7,555	14,365	3	6	54	422	350	5	18,178
101912	US 60	247.05	SR 188 / Golden Hill Rd - Claypool	247.64	248.12	Escodilla Dr	9,685	9,174	18,859	1	8	53	1,120	563	9	23,865
101916	US 60	249.46	Evans St	249.9	250.06	Broad St / Silver St	12,168	11,853	24,021	1	7	53	1,119	509	7	30,398
101920	US 60	250.46	Cedar St	250.72	251.03	Broad St - Globe	9,422	8,709	18,131	3	6	52	911	473	8	22,944
			-													
101924	US 60	252.14	US 70	253	255.56	Fairgrounds Access Rd - East of Globe	1,747	1,884	3,631	3	7	52	242	185	12	4,814
			-													
101927	US 60	318.15	SR 73	328.47	337	MP 337	1,566	1,600	3,166	3	6	59	491	201	22	4,643
101929	US 60	338.68	MP 338.68	339.51	339.72	SR 260 West - South end of Show Low	3,407	3,312	6,719	3	9	50	248	199	7	8,226
			-			-										
101932	US 60	340.87	Central Ave - Show Low	341.22	341.69	SR 260 East	11,717	9,346	21,063	3	10	53	1,736	697	12	27,452
						-										
101936	US 60	342.26	SR 77 - East end of Show Low	342.56	343.35	Show Low Airport Rd	2,380	2,862	5,242	3	8	62	815	134	18	6,832
101938	US 60	345	MP 345	346.28	347.15	Boundon Ranch Rd	3,831	4,202	8,033	3	9	66	523	610	14	11,731
101940	US 60	353.16	SR 61	354.77	356.37	County Rte 148	1,913	1,940	3,853	1	8	53	264	189	12	5,119
101942	US 60	361.31	Vernon McNary Rd	363	363.3	Concho Lakeland Hwy	1,074	1,074	2,147	3	9	64	134	106	11	2,852
101944	US 60	384.45	US 180 / US 191 North	385.43	387.83	South Mountain Ave (Old SS 260) - Springerville	1,731	1,813	3,544	3	10	50	362	181	15	5,139
101947	US 60	388.7	US 180 / US-191 South	388.99	389.2	B St - East of Springerville	1,057	1,016	2,073	1	11	50	254	93	17	3,006
102018	US 64	465.4	US 160 - Teec Nos Pos	468	469.57	New Mexico State Line	1,246	1,115	2,361	3	8	61	407	62	20	3,743
			-													
102021	US 70	252.79	Saguaro Dr	253	253.38	Montecito Dr	4,783	4,121	8,904	1	8	54	808	132	11	11,268
						-										
102024	US 70	254.1	SR 77 South - East of Globe	258.99	259.46	BIA Rte 6 - Cutter	3,616	3,818	7,434	3	8	51	744	345	15	9,855
102026	US 70	272.01	BIA 103	272.3	272.55	Geronimo Dr	2,024	2,024	4,047	3	22	56	391	182	14	5,646
102028	US 70	272.55	Geronimo Dr	287	301.52	Wilson Rd / Geronimo Ln	1,693	1,218	2,911	3	7	62	287	404	24	4,061
102030	US 70	313.45	Klondyke Rd	328	328.9	C 645 / Patterson Rd	1,865	1,855	3,720	3	6	51	273	672	25	5,189
102032	US 70	330.32	3rd St (West)	330.52	330.75	Main St - Pima	2,946	2,863	5,809	3	9	50	177	690	15	7,721
			-													
102036	US 70	331.3	2nd St (South)	331.65	331.8	Alder Ln	4,888	4,899	9,787	3	8	54	734	664	14	13,008
102040	US 70	335.5	MP 335.5	335.77	335.98	College Ave	6,194	5,948	12,142	3	8	54	729	364	9	16,138
102044	US 70	336.62	1st Ave	337.29	337.94	20th Ave	9,097	8,735	17,832	1	9	56	657	792	8	23,700

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
102046	US 70	337.94	20th Ave	338.15	338.32	14th Ave	10,678	10,360	21,038	3	9	52	1,919	823	13	27,961
102048	US 70	338.32	14th Ave	338.68	338.97	8th Ave - Safford	10,627	10,230	20,857	3	9	51	704	662	7	27,721
102050	US 70	338.97	8th Ave - Safford	339.29	339.46	US 191 South	8,295	8,045	16,340	3	9	50	822	448	8	21,717
102052	US 70	339.46	US 191 South	339.62	339.75	Main St	6,919	6,247	13,166	3	9	55	574	718	10	17,499
102054	US 70	339.75	Main St	339.95	340.05	Hollywood Rd	7,202	6,763	13,965	3	8	50	698	559	9	18,561
102056	US 70	340.05	Hollywood Rd	340.9	341.71	Lone Star Rd	4,177	4,279	8,456	3	10	55	596	356	11	11,239
102057	US 70	341.71	Lone Star Rd	343.22	344.37	Bowie Ave / Sanchez Rd	3,235	3,528	6,763	1	11	63	453	416	13	8,989
102058	US 70	344.37	Bowie Ave / Sanchez Rd	345.2	346.43	San Jose Rd	2,905	3,163	6,068	3	11	61	1,372	405	29	8,065
102059	US 70	346.43	San Jose Rd	346.9	349.48	US 191 North	2,397	2,449	4,846	3	10	62	635	381	21	6,760
102060	US 70	349.48	US 191 North	373	378.48	Wilson St	480	572	1,052	3	9	55	96	114	20	1,468
102061	US 70	378.48	Wilson St	378.6	378.91	SR 75 - Duncan	809	781	1,590	3	10	52	114	159	17	2,059
102063	US 70	378.91	SR 75 - Duncan	379.15	379.48	2nd St	1,294	1,294	2,587	3	8	63	150	150	12	3,350
102062	US 70	379.48	2nd St	379.6	379.8	7th St	691	815	1,506	3	8	53	156	111	18	1,950
102064	US 70	379.8	7th St	382.65	385.25	New Mexico State Line	480	566	1,046	3	9	52	155	137	28	1,355
102065	US 89	418.74	SB 40 (4) / Country Club Dr	419	419.11	East Flagstaff Mall Entrance	14,507	14,825	29,332	3	6	58	1,421	963	8	55,133
102066	US 89	420.38	MP 420.38 (Beg Seg N Flag CL)	420.69	420.88	Townsend - Winona Rd	14,001	13,619	27,620	1	8	55	1,296	1,462	10	51,915
102068	US 89	420.88	Townsend - Winona Rd	421.98	422.77	Silver Saddle Rd	9,365	9,609	18,974	1	9	57	2,502	587	16	35,664
102070	US 89	422.77	Silver Saddle Rd	426	426.8	Brandis Way	5,411	5,854	11,265	1	7	54	613	1,061	15	13,153
102072	US 89	426.8	Brandis Way	438.89	444.79	Sunset Crater Wupatki NF-545	4,225	4,036	8,261	1	8	51	515	259	9	9,646
102073	US 89	444.79	Sunset Crater Wupatki NF-545	447	457.11	Grey Mountain Trading Post	4,077	4,126	8,203	1	11	51	439	270	9	9,578
102074	US 89	457.11	Gray MountainTrading Post	464.6	465.21	SR 64	4,402	1,695	6,097	1	9	65	419	723	19	7,119
102075	US 89	465.21	SR 64	467.05	480.8	US 160 East	4,809	4,229	9,038	1	8	51	432	605	11	10,553
102076	US 89	480.8	US 160 East	496	498.05	US 89 &#65533; The Gap	2,287	2,231	4,518	1	13	62	274	357	14	5,275
102320	US 89	498.05	US 89 &#65533; The Gap	501.55	523.92	US 89A - Bitter Springs	1,897	1,527	3,424	1	10	54	588	292	26	3,998
102077	US 89	523.92	US 89A - Bitter Springs	531	546.19	SR 98 - Page	2,148	2,058	4,206	1	13	63	310	234	13	4,911
102078	US 89	546.19	SR 98 - Page	546.67	546.94	Haul Rd	2,919	2,940	5,859	1	9	55	508	279	13	11,013
102079	US 89	546.94	Haul Rd	547.11	547.23	Lake Powell Blvd (South Leg) - Page	5,089	5,089	10,177	1	8	53	283	234	5	19,129
102080	US 89	547.23	Lake Powell Blvd (South Leg) - Page	548.13	548.51	Lake Powell Blvd (North Leg) - Page	3,291	3,381	6,672	1	9	52	242	202	7	12,541
102081	US 89	548.51	Lake Powell Blvd (North Leg) - Page	549	549.84	Wahweap Rd and Visitor Center entrance	4,008	4,044	8,052	1	8	51	1,046	341	17	9,402
102082	US 89	549.84	Wahweap Rd and Visitor Center entrance	553	556.99	Utah State Line	2,713	2,713	5,426	1	9	56	615	228	16	6,336
102096	US 93	0	Nevada State Line / Hoover Dam	1.2	2.05	Kingman Wash Rd	9,439	10,270	19,709	1	8	53	1,079	3,336	22	30,488
102084	US 93	2.05	Kingman Wash Rd	3.57	41.84	Pierce Ferry Rd	9,254	9,113	18,367	1	12	51	1,016	3,205	23	26,873
102085	US 93	41.84	Pierce Ferry Rd	47	52.76	Chloride Rd / Old Highway 62	8,522	8,751	17,273	1	12	51	898	3,162	24	25,273
102086	US 93	52.76	Chloride Rd / Old Highway 62	57.1	62.05	Cerbat Rd	8,142	8,038	16,180	1	12	64	780	3,120	24	23,673
102087	US 93	62.05	Cerbat Rd	64	67.03	SR 68	7,785	7,876	15,661	1	12	56	446	1,278	11	22,914
102088	US 93	67.03	SR 68	70.7	71.04	I-40 (Exit 5X) / SB 40 (0)	15,090	15,892	30,982	1	7	50	1,053	7,900	29	45,331
102098	US 93	71.04	I-40 (Exit 48) / SB 40(0)		71.33	Grandview Ave	4,408	4,748	9,156	3	9	51	491	181	7	12,497
102089	US 93	91.73	I-40 (Exit 71) - Round Valley	113.2	123.67	Chicken Springs Rd - Wickieup	4,876	4,899	9,775	1	13	57	219	2,035	23	14,302
102090	US 93	123.67	Chicken Springs Rd - Wickieup	129.99	154.84	SR 97	4,769	4,738	9,507	1	10	66	1,098	1,910	32	13,910
102091	US 93	154.84	SR 97	169	182.91	SR 71	4,215	5,173	9,388	1	7	63	1,492	1,591	33	14,326
102092	US 93	182.91	SR 71	188	192.07	Caballero Dr	4,875	4,454	9,329	1	7	56	1,172	1,935	33	14,236
102093	US 93	192.07	Caballero Dr	193	193.62	SR 89	6,281	6,938	13,219	1	6	63	1,657	1,854	27	20,173
102094	US 93	193.62	SR 89	193.87	196.16	Vulture Mine Rd	7,264	7,086	14,350	1	11	56	1,001	1,968	21	21,899
102095	US 93	196.16	Vulture Mine Rd	196.17	198.47	Tegner Rd	7,336	7,321	14,657	1	7	59	1,076	537	11	26,209
102290	US 93	198.47	Tegner Rd	199	199.65	US 60 - Wickenburg	6,790	7,055	13,845	1	7	61	725	392	8	24,757
102102	US 95	0	International Border and POE - San Luis	0.33	0.46	US 95T / D St - San Luis	10,185	9,701	19,886	3	7	54	344	466	4	29,059
102104	US 95	0.46	US 95T / D St - San Luis	0.54	0.62	Juan Sanchez Blvd / G Street	10,114	9,612	19,726	3	7	56	203	444	3	21,067

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
102106	US 95	0.62	Juan Sanchez Blvd / G Street	1.6	1.67	County 22nd St	6,857	6,683	13,540	1	9	62	168	191	3	14,460
102108	US 95	1.67	County 22nd St	2.48	2.68	County 21st St	8,641	9,007	17,648	1	8	68	884	228	6	27,021
102110	US 95	2.68	County 21st St	4.64	4.72	County 19th St	8,607	8,641	17,248	1	8	67	369	161	3	26,408
102112	US 95	4.72	County 19th St	5	7.54	County 17th St	5,906	5,720	11,626	1	8	62	472	101	5	17,800
102114	US 95	7.54	County 17th St	8	10.54	Avenue G	6,676	3,670	10,346	3	6	58	295	115	4	15,841
102116	US 95	10.54	Avenue G	11.04	11.54	Avenue F	4,101	3,970	8,071	1	7	58	323	185	6	8,620
102118	US 95	11.54	Avenue F - Somerton	11.7	11.8	4th Ave -Somerton	5,387	4,888	10,275	1	8	57	710	163	8	10,973
102120	US 95	11.8	4th Ave -Somerton	11.9	11.99	Somerton Ave -Somerton	6,956	6,956	13,912	1	8	59	1,094	139	9	14,858
102122	US 95	11.99	Somerton Ave - Somerton	12.24	12.49	Avenue E	7,293	6,998	14,291	1	9	55	520	229	5	15,262
102124	US 95	12.49	Avenue E	14.21	14.33	County 16th St	9,057	8,728	17,785	1	8	56	441	343	4	18,994
102126	US 95	14.33	County 16th St	15.68	15.93	County 15th St	6,966	6,610	13,576	1	8	72	305	332	5	14,499
102128	US 95	15.93	County 15th St	16.41	16.89	County 14th St	7,870	7,810	15,680	1	8	63	474	303	5	16,746
102130	US 95	16.89	County 14th St	17.55	17.89	County 13th St	7,617	7,759	15,376	1	8	59	374	186	4	16,421
102132	US 95	17.89	County 13th St	18.39	18.89	County 12th St	7,877	8,038	15,915	1	9	59	994	272	8	16,997
102134	US 95	18.89	County 12th St	19.75	19.9	32nd St / County 11th St - Yuma	8,537	8,612	17,149	1	9	59	520	289	5	18,315
102136	US 95	19.9	32nd St / County 11th St - Yuma	20.46	20.99	24th St - Yuma	8,803	8,646	17,449	1	8	50	1,129	231	8	18,635
102138	US 95	20.99	24th St - Yuma	20.99	21.86	Avenue B / 16th St - Yuma	13,363	12,850	26,213	1	8	50	873	305	4	27,995
102140	US 95	21.86	Avenue B / 16th St - Yuma	22.34	22.88	Avenue A - Yuma	13,859	13,680	27,539	1	9	50	856	315	4	29,411
102142	US 95	22.88	Avenue A - Yuma	23.22	23.37	SB 8 (1) / 4th Avenue - Yuma	15,875	15,033	30,908	1	8	51	1,249	500	6	33,009
102144	US 95	23.37	SB 8 (1) / 4th Avenue - Yuma	23.62	23.88	Arizona Avenue -Yuma	17,154	15,799	32,953	1	8	50	1,515	733	7	35,193
102146	US 95	23.88	Arizona Avenue -Yuma	24.24	24.32	I-8 ((Exit 2) EB On/Off Ramp - Yuma)	20,026	19,007	39,033	1	8	50	832	1,117	5	41,686
102148	US 95	24.32	I-8 ((Exit 2) EB On/Off Ramp - Yuma)	24.51	24.87	Avenue 2E / Pacific Avenue - Yuma	10,860	11,889	22,749	1	8	61	682	988	7	24,295
102150	US 95	24.87	Avenue 2E / Pacific Avenue -Yuma	25.08	25.87	Avenue 3E	7,805	7,973	15,778	1	9	59	957	771	11	16,850
102152	US 95	25.87	Avenue 3E	26	27.89	Avenue 5E	6,422	5,891	12,313	1	9	58	609	609	10	13,150
102154	US 95	27.89	Avenue 5E	29.2	29.38	Araby Rd	6,610	5,795	12,405	1	9	58	1,217	481	14	13,248
102156	US 95	29.38	Araby Rd	29.5	29.85	Avenue 7E / Laguna Dam Rd	7,292	6,570	13,862	1	9	68	1,023	783	13	14,804
102158	US 95	29.85	Avenue 7E / Laguna Dam Rd	30	30.87	Avenue 8E	5,870	5,053	10,923	1	9	68	1,503	623	19	11,665
102160	US 95	30.87	Avenue 8E	31	31.87	Avenue 9E	5,104	4,488	9,592	1	9	80	1,234	201	15	10,244
102162	US 95	31.87	Avenue 9E	33	33.71	Avenue 11E	4,534	4,231	8,765	1	10	54	1,034	852	22	9,361
102163	US 95	33.71	Avenue 11E	39	40.51	Dome Valley Rd / County 4th St	3,152	3,644	6,796	1	13	53	1,337	1,066	35	10,405
102164	US 95	40.51	Dome Valley Rd / County 4th St	42	44.11	Yuma Proving Ground Rd (Imperial Dam Rd)	3,572	3,576	7,148	1	16	89	1,807	1,025	40	10,944
102165	US 95	44.11	Yuma Proving Ground Rd (Imperial Dam Rd)	45	46.72	Martinez Lake Rd	2,338	2,444	4,782	1	13	54	1,322	989	48	7,322
102166	US 95	46.72	Martinez Lake Rd	50	54.93	Castle Dome Mine Rd / Kofa Range Rd	1,118	1,247	2,365	1	9	68	97	419	22	3,621
102167	US 95	54.93	Castle Dome Mine Rd / Kofa Range Rd	79	98.57	La Paz Valley Rd /County 53rd St	898	840	1,738	1	12	60	195	274	27	2,661
102168	US 95	98.57	La Paz Valley Rd /County 53rd St	103.9	104.06	Kuehn Rd (I-10 Frontage Rd)	1,603	1,533	3,136	1	26	55	461	263	23	3,967
102169	US 95	104.06	Kuehn Rd (I-10 Frontage Rd)	104.42	104.51	SR 10B (1)	1,318	1,031	2,349	1	9	61	565	442	43	2,971
102171	US 160	311.46	US 89	312.01	318.49	SR 264 East - Tuba City	2,942	2,979	5,921	1	10	57	339	214	9	6,914
102172	US 160	318.49	SR 264 - Tuba City	319.5	321.95	Peshlakai Ave	3,194	3,329	6,523	1	8	53	1,089	180	19	12,261
102173	US 160	321.95	Peshlakai Ave	322.14	322.35	Warrior Dr	2,723	2,800	5,523	2	9	60	1,137	187	24	10,381
102174	US 160	322.35	Warrior Dr	326.98	343.58	BIA 21	2,250	2,273	4,523	1	11	50	275	170	10	5,281
102175	US 160	343.58	BIA 21	353	361.62	SR 98	1,739	1,661	3,400	1	9	50	246	268	15	3,970
102176	US 160	361.62	SR 98 West	372.8	374.28	SR 564	2,336	2,145	4,481	1	10	51	308	297	14	6,544
102177	US 160	374.28	SR 564	0	382.27	US 163 - Kayenta	2,439	2,395	4,834	1	10	51	352	246	12	7,060
102178	US 160	382.97	US 163 North - Kayenta	391.68	393.55	BIA 59	2,588	2,595	5,183	1	11	53	475	290	15	7,569
102286	US 160	393.55	US 163 North - Kayenta	398	401.46	BIA 59	2,372	2,301	4,673	1	10	50	271	232	11	6,824
102179	US 160	401.46	BIA 59	403	413	Indian Reservation Road	1,672	1,552	3,224	1	9	60	175	190	11	4,708
102287	US 160	413	Indian Reservation Road	415	434.83	US 191 South - Mexican Water	1,594	1,613	3,207	1	12	57	178	204	12	4,260

Source: ADOT Highway Performance Monitoring System
Printed: 6/15/2022

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102180	US 160	434.83	US 191 - Mexican Water	436	437.15	BIA Rte 12 North - Red Mesa	1,973	1,819	3,792	1	8	60	208	252	12	5,038
102181	US 160	437.15	BIA Rte 12 - Red Mesa	452	465.4	US 64 East - Teec Nos Pos	1,807	1,796	3,603	1	10	54	350	244	16	4,787
102182	US 160	465.4	US 64 East - Teec Nos Pos	470.5	470.73	New Mexico State Line	976	942	1,918	1	9	63	160	224	20	2,548
102183	US 163	393.52	US 160 - Kayenta	394	394.86	BIA Rte 6485 - Kayenta	4,503	4,654	9,157	1	10	52	750	191	10	15,567
102185	US 163	394.86	BIA Rte 6485 - Kayenta	396.4	397	MP 397	3,675	3,688	7,363	3	5	60	368	73	6	12,517
102186	US 163	397	MP 397	406	416.71	Utah State Line	1,027	1,033	2,060	1	11	56	239	23	13	3,502
102188	US 180	215.44	SB 40 (4) - Flagstaff	215.9	216.06	Columbus Ave	5,882	6,486	12,368	3	12	50	1,130	186	11	26,413
102189	US 180	216.06	Columbus Ave	216.26	216.9	Meade Ln	6,346	6,108	12,454	1	11	59	552	42	5	26,597
102190	US 180	216.9	Meade Ln	217.6	218.57	Country Club Spur / Schultz Pass Rd	6,095	6,297	12,392	3	8	55	791	102	7	26,464
102191	US 180	218.57	Country Club Spur / Schultz Pass Rd	219.1	219.84	Meadow Ln	3,998	2,774	6,772	3	8	53	227	188	6	11,584
102192	US 180	219.84	Meadow Ln	221.2	222.88	Arizona Snow Bowl Rd	2,968	2,196	5,164	3	9	54	211	355	11	7,991
102193	US 180	222.88	Arizona Snow Bowl Rd	223	223.97	Roundtree Rd / Bader Rd	1,785	1,818	3,603	3	9	55	181	311	14	5,575
102194	US 180	223.97	Roundtree Rd / Bader Rd	226	238.58	Curley Seep Spring	843	843	1,686	3	10	55	56	191	15	2,609
102195	US 180	238.58	Curley Seep Spring	240.84	265.77	SR 64 - Valle	637	642	1,279	1	15	76	68	41	9	1,979
102196	US 180	307.3	SR 77 - Holbrook	308	311.76	Woodruff 180 Rd	446	457	903	3	11	52	155	87	27	1,324
102197	US 180	311.76	Woodruff 180 Rd	316	324.86	Petrified Forest National Park Rd	376	365	741	3	12	52	73	44	16	1,087
102198	US 180	324.86	Petrified Forest National Park Rd	334	343.14	SR 180A	169	262	431	3	11	57	41	28	16	683
102199	US 180	343.14	SR 180A	357.82	358.48	SR 61	376	222	598	1	34	90	41	28	12	948
102200	US 180	363.96	SR 61	364.4	366.45	C 345 / Moon Mead	1,066	1,045	2,111	3	9	59	71	124	9	3,346
102201	US 180	366.45	C 345 / Moon Mead	367.2	367.59	13th West St	1,433	1,465	2,898	3	9	59	115	171	10	4,594
102202	US 180	367.59	13th West St	368	368.44	2nd West St	2,714	2,726	5,440	3	10	53	553	254	15	8,624
102203	US 180	368.44	2nd West St	368.6	368.93	US 191	2,571	2,481	5,052	3	10	52	203	162	7	8,009
102204	US 180	368.93	US 191	369.5	369.82	7th South St	778	836	1,614	3	9	55	79	46	8	2,559
102205	US 180	369.82	7th South St	370	370.44	7th West St / Stokes Ave	580	881	1,461	3	10	52	77	59	9	2,316
102206	US 180	370.44	7th West St / Stokes Ave	375.5	380.3	Lyman Lake Rd (Ex SR 81)	784	740	1,524	3	10	55	72	51	8	2,416
102207	US 180	387.45	Richville Rd	387.5	394.36	US 60 - Springerville	877	877	1,754	3	13	64	87	29	7	2,781
102302	US 180	380.3	SR 81 (Lyman Lake Rd)	384	387.45	Richville Rd	495	866	1,361	3	11	52	161	65	17	2,158
102208	US 180	400.61	US 60 (Springerville)	401	401.26	Maricopa Dr	1,339	1,367	2,706	3	9	52	217	36	9	4,533
102209	US 180	401.26	Maricopa Dr	402	402.75	SR 260	923	957	1,880	3	8	51	150	25	9	3,149
102210	US 180	402.75	SR 260	409.11	417.12	Auger Canyon Rd	785	800	1,585	1	14	53	158	40	12	2,513
102211	US 180	417.12	Auger Canyon Rd	424.03	426.39	US 191 South	566	639	1,205	3	10	53	168	43	18	1,910
102212	US 180	426.39	US 191 South	430	433.26	New Mexico State Line	467	510	977	3	12	50	94	35	13	1,549
102213	US 191	0	SR 80	2	3.9	Glenn Rd	1,736	1,663	3,399	3	9	60	247	138	11	5,535
102214	US 191	3.9	Glenn Rd	5	7.4	Double Adobe Rd	1,635	1,750	3,385	3	9	66	183	137	9	5,512
102215	US 191	7.4	Double Adobe Rd	13	18.33	Davis Rd	924	1,019	1,943	3	10	65	174	86	13	3,164
102216	US 191	18.33	Davis Rd	21	24.53	Jefferson St	647	647	1,294	3	10	64	207	43	19	2,107
102217	US 191	24.53	Jefferson Rd	38	38.14	SR 181	880	831	1,711	3	8	62	409	112	30	2,786
102218	US 191	38.14	SR 181	39	42.95	Kansas Settlement Rd	940	886	1,826	3	8	52	397	123	28	2,974
102219	US 191	42.95	Kansas Settlement Rd	47.17	48.04	Treasure Rd	576	563	1,139	1	10	52	119	80	17	1,855
102220	US 191	48.04	Treasure Rd	49	55.67	Dragoon Rd	1,044	1,056	2,100	3	10	59	249	93	16	3,420
102221	US 191	55.67	Dragoon Rd	62	66.26	I-10 (West end of Willcox)	656	656	1,312	3	12	59	270	85	27	2,137
102222	US 191	87.43	I-10 (Exit 352)	88	89.98	US 191Y	1,200	1,228	2,428	3	9	56	315	169	20	3,954
102223	US 191	89.98	US 191Y	104	104.36	SR 266	1,427	1,405	2,832	3	7	57	312	283	21	3,951
102224	US 191	104.36	SR 266	111	113.68	SR 366	1,453	1,419	2,872	3	7	54	286	258	19	4,006
102225	US 191	113.68	SR 366	115	118.83	Upper Solomonville Rd	3,837	3,813	7,650	1	9	53	608	242	11	10,672
102226	US 191	118.83	Upper Solomonville Rd	120	120.32	Relation St / 14th St - Safford	3,453	4,392	7,845	3	7	62	510	235	9	10,427
102228	US 191	120.32	Relation St / 14th St - Safford	120.5	121.02	US 70 - Safford	5,943	4,803	10,746	3	6	54	989	162	11	14,282

Source: ADOT Highway Performance Monitoring System
Printed: 6/15/2022

Loc ID	Route	BMP	Start	TCS MP	EMP	End	Pos Dir AADT	Neg Dir AADT	AADT 2021	AADT Souce Code	K Factor %	D Factor %	AADT Single Trucks	AADT Combo Trucks	T Factor %	2040 Future AADT
102230	US 191	130.64	US 70 (MP 349.49) - East of Safford	154.01	154.52	SR 75 / SR 78 - Guthrie	1,870	2,290	4,160	1	13	69	375	218	14	5,803
102231	US 191	154.52	SR 75 / SR 78 - Guthrie	160.07	162.95	7th St	2,466	2,488	4,954	1	15	77	204	144	7	6,415
102232	US 191	162.95	7th St	163	163.95	US 191X	3,881	4,081	7,962	3	9	91	772	359	14	10,311
102233	US 191	173	US 191X (Near Granville)	199	207.44	Rose Peak Ranger Station Rd	14	14	27	1	25	100	5	1	22	35
102234	US 191	207.44	Rose Peak Ranger Station Rd	220	253.74	US 180 - Alpine	95	115	210	3	16	56	12	3	7	271
102235	US 191	315.55	US 180 / White Mountain Dr - St Johns	317	320.58	Coronado Power Plant entrance	624	660	1,284	3	9	62	64	45	8	2,035
102236	US 191	320.58	Coronado Power Plant entrance	322	344.62	SR 61 - Witch Well	387	387	773	1	11	56	32	18	6	1,225
102237	US 191	344.62	SR 61 - Witch Well	356	368.5	I-40 (Exit 339)	218	216	434	1	12	57	49	29	18	688
102238	US 191	374	I-40 (Exit 333) - Chambers	374.27	374.51	C-7060 / McConnell Rd - Chambers	469	497	966	1	10	53	59	39	10	1,531
102239	US 191	374.51	County Rte 7060 / McConnell Rd - Chambers	385	397.17	BIA Rte 28	482	379	861	3	9	66	146	32	21	1,365
102240	US 191	397.17	BIA Rte 28	407	411.63	SR 264 East - East end of Ganado	682	667	1,349	3	9	54	134	93	17	2,138
102241	US 191	417.55	SR 264 / BIA Rte 15 - West of Ganado	432	441.79	BIA Rte 4	1,526	1,606	3,132	1	10	50	199	93	9	4,965
102242	US 191	441.79	BIA Rte 4	446	446.7	BIA Rte 102 / Rd to Chinle Hospital	2,248	2,254	4,502	3	15	52	420	67	11	7,137
102243	US 191	446.7	BIA Rte 102 / Chinle Hospital entrance	446.9	447.85	BIA Rte 7 - Chinle	2,288	2,331	4,619	2	10	60	328	176	11	7,322
102245	US 191	447.85	BIA Rte 7 - Chinle	455	461.75	BIA Rte 59 - Many Farms	2,423	2,313	4,736	3	9	62	236	284	11	7,508
102246	US 191	461.75	BIA Rte 59 - Many Farms	469	477.9	BIA Rte 12 - Roound Rock	793	757	1,550	3	9	52	77	108	12	2,457
102247	US 191	477.9	BIA Rte 12 - Round Rock	486	495.14	BIA Rte 35 - Rock Point	619	572	1,191	3	9	52	58	94	13	1,888
102248	US 191	495.14	BIA Rte 35 - Rock Point	502	510.34	US 160 - Mexican Water	598	549	1,147	3	9	57	56	91	13	1,818
102251	US 89A	523.92	US 89 - Bitter Springs	527	537.96	Marble Canyon	729	734	1,463	1	11	50	68	96	11	1,941
102252	US 89A	537.96	Marble Canyon	566.06	579.29	SR 67 - Jacob Lake	598	516	1,114	1	11	53	60	68	11	1,478
102253	US 89A	579.29	SR 67 - Jacob Lake	583	607.72	Ryan Rd	628	692	1,320	1	10	60	88	70	12	1,751
102254	US 89A	607.72	Ryan Rd	608	609.56	SR 389 - Fredonia	1,003	649	1,652	1	9	58	193	131	20	2,192
102306	US 89A	609.23	SR 389 / Pratt St - Fredonia	609.56	610.04	McKinney St	2,621	2,632	5,253	1	8	50	584	314	17	6,969
102255	US 89A	610.04	SR 389 - Fredonia	612.75	613.03	Utah State Line	2,532	2,616	5,148	1	10	53	451	150	12	6,829
102256	US 191B	0	International Border and POE - Douglas	0.3	0.38	5th St	6,429	6,400	12,829	3	8	58	641	1,795	19	15,929
102258	US 191B	0.38	5th St	0.5	0.6	8th St	6,762	5,856	12,618	3	8	50	603	1,885	20	15,667
102260	US 191B	0.6	8th St	0.74	0.76	10th St	7,591	6,470	14,061	1	9	51	451	1,753	16	17,459
102262	US 191B	0.76	10th St	1	1.15	SR 80	5,479	4,389	9,868	3	8	50	296	1,383	17	12,253
102264	US 95T	0	A St / International Border & POE - San Luis	0.18	0.36	D St	5,715	5,715	11,429	3	8	51	228	113	3	12,206
102265	US 95T	0.36	D St / 1st St	0.37	0.46	US 95	8,074	8,074	16,147	3	9	63	968	322	8	17,245
102266	US 60X	160.41	Thomas Rd	160.8	161	Encanto Blvd	14,775	13,488	28,263	1	9	68	1,243	1,605	10	52,056
102267	US 60X	161	Encanto Blvd	161.54	161.88	18th Ave	9,809	8,830	18,639	3	9	72	540	2,090	14	34,330
102268	US 60X (1) Mai	189.01	Sossaman Rd	189.64	189.99	Hawes Rd	5,208	5,743	10,951	3	10	53	1,829	1,219	28	20,170
102269	US 60X (1) Mai	189.99	Hawes Rd	190.46	190.99	Ellsworth Rd	5,517	6,085	11,602	3	10	53	1,848	1,209	26	21,369
102270	US 60X (1) Mai	190.99	Ellsworth Rd	191.47	192	Crimson Rd	7,165	6,506	13,671	3	10	50	1,845	1,210	22	25,180
102271	US 60X (1) Mai	192	Crismon Rd	192.51	193	Signal Butte Rd	6,375	5,730	12,105	3	11	52	986	1,003	16	22,296
102272	US 60X (1) Mai	193	Signal Butte Rd	193.26	194.01	Meridian Rd	7,351	6,686	14,037	3	10	53	1,392	1,093	18	25,854
102280	US 191X	163.95	US 191	164.4	164.85	Chase Creek St	4,432	4,365	8,797	3	8	70	1,852	417	26	11,361
102281	US 191X	164.85	Chase Creek St	166	167.35	Mountain View Rd (To Morenci Mountain)	3,118	4,443	7,561	3	10	90	756	453	16	9,764
102282	US 191X	167.35	Mountain View Rd (To Morenci Mountain)	168	169.07	Smelter Mine Rd (Mine HQ entrance)	3,013	4,253	7,266	3	9	73	799	435	17	9,384
102283	US 191X	169.07	Smelter Mine Rd (Mine HQ entrance)	170	170.88	Cedar Loop / Cedar St / Stargo Rd	520	518	1,038	1	18	51	467	303	74	1,341
102284	US 191X	170.88	Cedar Loop / Cedar St / Stargo Rd	179	179.57	US 191	281	307	588	3	16	54	47	36	14	759
102285	US 191Y (1)	86.67	I-10 (Exit 355)	87.2	90.13	US 191	105	84	189	3	14	61	4	31	19	308

Source: ADOT Highway Performance Monitoring System
Printed: 6/15/2022

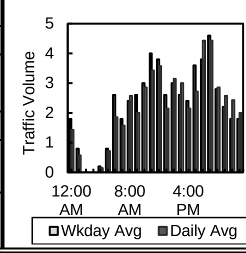
NAVAJO DIVISION OF TRANSPORTATION
TRIBAL TRANSPORTATION PLANNING PROGRAM
ANNUAL AVERAGE DAILY TRAFFIC (AADT) REPORT

Agency:	N33 - Western Navajo	**Class:**	5	**Mile Post:**	0.10	**AADT Mon-Yr:**	May-18
Reservation:	780	**County:**	005 - Coconino	**Surface Type:**	1 - Earth Road	**Start Date:**	5/2/2018
Route:	**6730**	**State:**	04 - Arizona	**Roadway Width (ft.):**	25.0	**Start Time:**	00:00
Section:	10	**Chapter:**	Cameron			**End Date:**	5/8/2018
Data File:	'n6730_mp0-1.rdf'			***Seasonal Factor:**	**0.939**	**End Time:**	24:00

ATR Location Coordinates	
(Degree-Minute-Seconds)	**(N or W)**
35° 52' 57.0"	N
111° 24' 25.2"	W

Location: 0.1 mile east of Jct. US89 & N6730

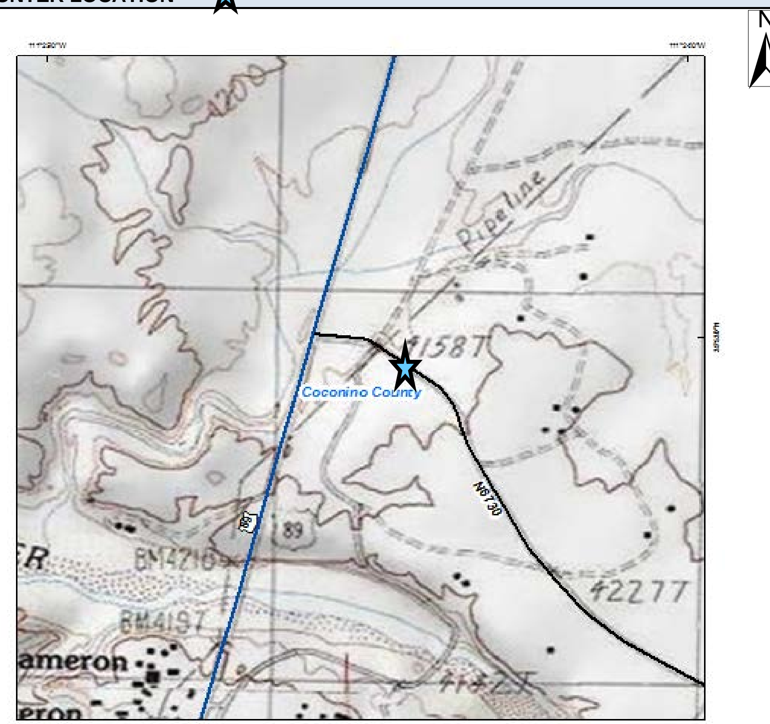
DATE START TIME \ DAY	6 Sun	7 Mon	8 Tue	2 Wed	3 Thu	4 Fri	5 Sat	Wkdy Avg	Daily Avg
12:00 AM	0	6	0	2	0	1	1	2	1
1:00 AM	0	0	0	1	3	0	0	1	1
2:00 AM	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	1	0	0	0
5:00 AM	1	0	1	0	2	1	0	1	1
6:00 AM	0	5	3	0	1	4	0	3	2
7:00 AM	0	1	3	1	3	1	2	2	2
8:00 AM	3	2	3	2	3	2	3	2	3
9:00 AM	1	2	4	3	2	2	0	3	2
10:00 AM	4	3	1	5	2	4	1	3	3
11:00 AM	2	4	5	2	7	2	2	4	3
12:00 PM	4	1	6	4	4	4	2	4	4
1:00 PM	1	6	4	0	3	0	1	3	2
2:00 PM	3	0	1	9	2	3	4	3	3
3:00 PM	5	4	4	1	0	4	3	3	3
4:00 PM	2	3	2	3	4	0	1	2	2
5:00 PM	1	3	5	2	4	4	0	4	3
6:00 PM	3	0	6	4	7	2	9	4	4
7:00 PM	3	5	4	5	7	2	5	5	4
8:00 PM	3	2	1	3	4	4	3	3	3
9:00 PM	4	1	6	2	1	1	3	2	3
10:00 PM	7	1	3	2	2	1	1	2	2
11:00 PM	1	1	5	1	0	2	4	2	2
TOTALS	48	50	67	52	61	45	45	55	53
Daily Factors	*1.0952*	*1.0514*	*0.7846*	*1.0110*	*0.8618*	*1.1683*	*1.1683*	**52**	**49**
Seven-day Total:	*368*			**Adjusted ADT, AADT:**					
% TRKS	**	**	**	**	**	**	**		
AM									
PEAK CT	4	6	5	5	7	4	3		
PEAK HR	10:00 AM	12:00 AM	11:00 AM	10:00 AM	11:00 AM	6:00 AM	8:00 AM		
PM									
PEAK CT	7	6	6	9	7	4	9		
PEAK HR	10:00 PM	1:00 PM	12:00 PM	2:00 PM	6:00 PM	12:00 PM	6:00 PM		
YEAR	2023		2028		2033		2038		
FADT (02%)	55		60		66		73		



COMMENTS:

1.) * - Seasonal factors obtain from 2002 ADOT Traffic Year Group-14
2.) % TRKS = Percent Trucks (** - No Truck Study Performed).
3.) Counter location is drawn utilizing the Map from either TOPO or ArcView program.
4.) AADT = Raw ADT x Seasonal Factor.
5.) Daily Factor = 7 day avg. / daily total.
6.) ATR = Automatic Traffic Recorder

COUNTER LOCATION =



Counter Type:	Gamma	**Number:**	4982	**Battery Volt:**	6.3'	**Hose layout:**	'21'

Report By: V_Henderson

245 TURN LANE WARRANTS

The intent of this document is to offer guidance to warrant the installation of dedicated left or right turn lanes on state routes, whether during new construction, major reconstruction, or in the course of the encroachment permitting process. **The primary determining factors to warrant an exclusive turn lane shall be: (a) the combination of through traffic volume and turning traffic volume, (b) the posted roadway speed, and (c) the number of through lanes on the roadway.** Note: Dual right- or left-turn lanes should be considered when the turning volume exceeds 300 vehicles per hour. In addition to the criteria presented in the tables below, other factors should be taken into consideration when performing a warrant study such as: shoulder width, percentage of trucks, sight distance, highway grade, horizontal and vertical curvature and crash history.

Right-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Right-turn Traffic Volume				
	# of thru lanes per direction				
	1		2		3
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	All Speeds
≤ 200					
201 – 300	-	30	-	-	-
301 – 400	-	19	-	55	-
401 – 500	85	14	-	30	-
501 – 600	58	12	140	25	-
601 – 700	27	9	80	18	-
701 – 800	20	8	53	15	-
801 – 900	12	7	40	12	-
901 – 1000	9	6	30	11	-
1001 – 1100	8	5	23	9	18
1101 – 1200	7	5	18	8	16
1201 – 1300	6	4	14	8	15
1301 – 1400	6	4	11	6	12
1400+	5	3	8	6	10

Left-Turn Lane Warrants

Peak Hour Traffic Volume on the Highway in Advancing Direction	Minimum Peak Hour Left-turn Traffic Volume			
	# of thru lanes per direction			
	1		2 (Undivided)*	
	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed	< 45 MPH Posted Speed	≥ 45 MPH Posted Speed
≤ 200	30	15	-	-
201 – 300	12	12	40	30
301 – 400	12	12	30	25
401 – 500	12	12	25	18
501 – 600	12	12	15	12
601 – 1000	12	12	10	8
1000+	12	8	10	8

*On non-freeway divided highways, left-turn or U-turn lanes should be provided at median breaks.

Volumes and traffic factors utilized should be based on data from ADOT's Multimodal Planning Division, or should be based on current traffic counts as approved by the Regional Traffic Engineer. For encroachment permits, analysis of the relevant through and turning traffic volumes should be completed in the design year as identified in ADOT Traffic Guidelines and Processes (TGP) 240. For new construction and major reconstruction, analysis should be performed based on data for the appropriate design year. Turn lane warrant studies should be reviewed and approved by the Regional Traffic Engineer. In cases where the State Highway section in question intersects a route under other jurisdiction, it is recommended that a turning movement analysis be performed on the intersecting route as well.

When it is determined that a turn lane is warranted, shoulder width should be provided as part of the turn lane design in accordance with the ADOT Roadway Design Guidelines, which should be used to determine the minimum continuous usable width of paved shoulder along the turn lanes. Turn lane design should also conform to the guidance in ADOT TGP430.

3: US-89 & BIA RT 6730 Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.3	0.3	0.2
Total Del/Veh (s)	13.2	2.4	1.8	0.0	2.9	2.1	2.0

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.0

Intersection: 3: US-89 & BIA RT 6730

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (ft)	28	52
Average Queue (ft)	4	7
95th Queue (ft)	20	32
Link Distance (ft)	191	310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

3: US-89 & BIA RT 6730 Performance by movement

Movement	WBL	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.2	0.1	0.1	0.4	0.3
Total Del/Veh (s)	12.5	8.9	1.8	2.1	2.3

Total Network Performance

Denied Del/Veh (s)	0.3
Total Del/Veh (s)	2.4

Intersection: 3: US-89 & BIA RT 6730

Movement	WB
Directions Served	LR
Maximum Queue (ft)	90
Average Queue (ft)	22
95th Queue (ft)	60
Link Distance (ft)	191
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

3: US-89 & BIA RT 6730 Performance by movement

Movement	WBL	WBR	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.2	0.2
Total Del/Veh (s)	9.5	3.3	1.8	0.0	2.0	2.0

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.0

Intersection: 3: US-89 & BIA RT 6730

Movement	WB
Directions Served	LR
Maximum Queue (ft)	29
Average Queue (ft)	11
95th Queue (ft)	33
Link Distance (ft)	191
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

3: US-89 & BIA RT 6730 Performance by movement

Movement	WBL	WBR	NBT	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.1	0.3	0.2
Total Del/Veh (s)	9.6	2.5	1.8	2.1	2.0

Total Network Performance

Denied Del/Veh (s)	0.2
Total Del/Veh (s)	2.1

Intersection: 3: US-89 & BIA RT 6730

Movement	WB
Directions Served	LR
Maximum Queue (ft)	29
Average Queue (ft)	8
95th Queue (ft)	28
Link Distance (ft)	191
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Appendix Q UNITED STATES ARMY CORPS OF ENGINEERS DETERMINATION OF NEED FOR DEPARTMENT OF THE ARMY PERMIT

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT
3636 N CENTRAL AVENUE, SUITE 900
PHOENIX , AZ 85012-1939

March 29, 2021

SUBJECT: Determination of Need for Department of the Army Permit

John Lauer
Navajo Power
2700 Woodlands Village Blvd
Flagstaff, AZ 86001

Dear Mr. Lauer:

I am responding to your request dated November 13, 2020 for a determination of Department of the Army permit requirements regarding the proposed Painted Desert Solar Development (File No. SPL-2018-00831). This proposed project is located in portions of Sections 7-9, 16-22, and 27-32 of Township 28 and 29 North, Range 9 and 10 East (Latitude 35.863706, Longitude -111.368208), near the town of Cameron, within Navajo Nation, Coconino County, Arizona.

Based on the information provided, we have determined that a Department of the Army permit is not required since the project would not result in the discharge of dredged/fill material into waters of the United States. However, it is incumbent upon you to remain informed of any changes in the U.S. Army Corps of Engineers (Corps) Regulatory Program regulations and policy as they relate to your project. If your plans change such that waters of the U.S. could be impacted by the proposed project, please contact our office for a reevaluation of permit requirements.

This decision is based on an approved jurisdictional determination (JD) (attached) that there are no waters of the United States on the project site. The basis for this JD is that the project site contains ephemeral features, swales, and areas where sheet flow occurs. This approved JD is valid for five years unless new information warrants revision of the determination before the expiration date.

The delineation included herein has been conducted to identify the location and extent of the aquatic resource boundaries and/or the jurisdictional status of aquatic resources for purposes of the Clean Water Act for the particular site identified in your request. This delineation and/or jurisdictional determination may not be valid for the Wetland Conservation Provisions of the Food Security Act of 1985, as amended. If you or your tenant are United States Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should discuss the applicability of a certified wetland determination with the local USDA service center, prior to starting work.

You may accept or appeal this approved JD or provide new information in accordance with the attached Notification of Administration Appeal Options and Process and Request for Appeal (NAAOP-RFA). If you elect to appeal this approved JD, you must complete Section II of the form and return it to the U.S. Army Corps of Engineers, South Pacific Division, CESPD-PDS-O, 2052B, Attn: Tom Cavanaugh, Administrative Appeal Review Officer, P.O. Box 36023, 450 Golden Gate Ave, San Francisco, CA 94102 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

Thank you for participating in the regulatory program. If you have any questions concerning our regulatory program, please contact Ann Palaruan at (602) 230-6955 or by e-mail at Cynthia.A.Palaruan@usace.army.mil. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

Sallie Diebolt

Sallie Diebolt
Chief, Arizona Branch
Regulatory Division

Enclosures

Appeal Form
Approved Jurisdictional Determination

Appendix R NAVAJO NATION ENVIRONMENTAL PROTECTION AGENCY LETTER REGARDING CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION

NAVAJO NATION ENVIRONMENTAL PROTECTION AGENCY
Water Quality/NNPDES Program
P.O. Box 339
Window Rock, Arizona 86515
Phone: (928) 871-7690
FAX: (928) 871-7599

March 18, 2021

Mike Fitzgerald, Principal
Ecosphere Environmental Services
776 E. 2nd Avenue
Durango, CO 81301

RE: Clean Water Act Section 401 Water Quality Certification (WQC) for the Proposed Painted Desert Solar Project near Cameron, Coconino County, Arizona

Dear Mike:

In communicating with Ann Palaruan from the U.S. Army Corps of Engineers on the referenced project, she has informed me that the large wash that divides the project site is identified as ephemeral and therefore is not authorized to be regulated by Clean Water Act Section 404. If Section 404 does not apply, there is no need for Section 401 WQC for the project. As such, we will stop processing the Section 401 WQC application for the project.

If you have any questions, please contact me at (928) 871-7185 or at patrickantonio@navajo-nsn.gov.

Sincerely,

Patrick Antonio, Principal Hydrologist
Navajo EPA – WQ/NPDES Program