U.S. Department of the Interior
Bureau of Land Management

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SUNZIA SOUTHWEST TRANSMISSION PROJECT

Right-of-Way Amendment

Draft Environmental Impact Statement and Draft Resource Management Plan Amendment

Volume 1: Executive Summary, Chapters 1-6

April 2022

Total Cost to Date:
$2,200,000

The Bureau of Land Management is responsible for the stewardship of our public lands. The BLM's mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
New Mexico State Office
301 Dinosaur Trail
Santa Fe, NM 87508
505-954-2000

Dear Reader:

Enclosed for your review and comment is the Draft Environmental Impact Statement (EIS) and Draft Resource Management Plan (RMP) Amendment for the SunZia Southwest Transmission Project. The Draft EIS was prepared by the U.S. Department of the Interior, Bureau of Land Management (BLM) pursuant to the Federal Land Policy and Management Act of 1976 and the National Environmental Policy Act of 1969. SunZia Transmission, LLC (the Applicant) submitted an application to the BLM New Mexico State Office and the U.S. Forest Service (USFS) on March 27, 2020, to request amendment of their existing right-of-way on public land (Serial Number NM-114438, cross references BLM AZA-35058) issued September 2016; updated applications were subsequently submitted on December 21, 2020, and September 14, 2021. The project includes 1) approximately 40 miles of localized route modifications in Pinal County, Arizona, and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico; 2) access roads and temporary work areas outside the granted right-of-way in Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Torrance, and Lincoln Counties, New Mexico; 3) a reroute of the 2015 Selected Route within Socorro, Valencia, and Torrance Counties, New Mexico for Component 3; and 4) the addition of a high-voltage direct-current (HVDC) substation (SunZia West) at a newly identified west-end receiving terminal in Pinal County, Arizona. The proposed project facilities are located on public lands administered by the BLM in New Mexico and Arizona.

In preparing the Draft EIS, the BLM has developed a range of alternatives to resolve resource conflicts by considering: 1) issues raised through the public scoping and public comment periods and consultation and coordination with participating and cooperating agencies and American Indian tribes, 2) issues raised by agency resource specialists, and 3) applicable planning criteria. This process has resulted in the identification of six alternatives that have various combinations of 16 subroutes or local alternatives to be carried forward for detailed analysis. These alternatives carried forward for analysis include all proposed alternatives and subroutes proposed by the Applicant in the right-of-way amendment request to BLM in 2021, as well as one new alternative to a portion of Alternative 1 across the Inventoried Roadless Area on the Cibola National Forest (Subroute 1A-6). The BLM's *SunZia Southwest Transmission Project Right-of-way Alternatives Development Report* summarizes these routes and the supporting rationale in more detail. The BLM has identified the agency preferred alternative as follows:

- **Component 1:** Localized Route Modifications 1–5, and the 2015 Selected Route (the no action alternative in this EIS) for Local Route Modification 6 in the Pinal Central Area.
- **Component 2:** All access roads and temporary workspaces outside the granted right-of-way.
- **Component 3:** Alternative Route 2 with Subroute 2A-4 and Alternative Route 3 with Subroute 3A-4, which include crossing the Sevilleta National Wildlife Refuge as well as co-locating the proposed SunZia transmission line with the Western Spirit transmission line at the Rio Grande crossing. For Subroute 3A-4, the agency preferred alternative includes Local Alternative 3B-2 to avoid two private residences in close proximity to the project.
- **Component 4:** The revised location for the SunZia West Substation.

Chapter 3 presents the affected environment and analyzes the potential impacts on resources or resource uses from implementation of the project alternatives. Chapter 4 describes proposed Land Use Plan amendments and analyzes the potential impacts on resources or resource uses from implementation of the RMP amendment alternatives. Chapter 5 describes the BLM's consultation and coordination efforts throughout the right-of-way amendment process.

The BLM decision maker may select various components from each of the alternatives analyzed in the Draft EIS that best meet the purpose and need for the project. The decision maker considers the identified impacts, public comments, and information from cooperating agencies and consulting parties to make a decision that protects resource values and provides for multiple uses.

The BLM encourages the public to review and provide comments on the Draft EIS related to the adequacy of the alternatives, analysis of effects, and any new information that would help the BLM disclose potential impacts of the Project in the Final EIS.

The Draft EIS is available on the project website at: https://eplanning.blm.gov/eplanning-ui/project/2011785/570. Virtual public meetings will be held to provide the public with opportunities to submit comments and seek additional information. The locations, dates, and times of these meetings will be announced at least 15 days prior to the first meeting via a press release and on the project website Draft EIS hard copies will also be available for public review at the BLM New Mexico and Arizona State Offices. Following guidance from the White House, Centers for Disease Control and Prevention, and state and local public health authorities, the BLM State Offices are temporarily restricting in-person public access. Before making plans to visit the office, please contact BLM Project Manager, Adrian Garcia at agarcia@blm.gov or 1-888-959-2510 to determine if the office is open for review of hard copies or for alternative methods to review the documents for this project.

Public comments will be accepted for 90 calendar days following the U.S. Environmental Protection Agency's publication of the Notice of Availability in the Federal Register. Opportunities to submit public comments during the 90-day Draft EIS public review period include:

- Submit comments on ePlanning (web address is provided above)
- Mail or hand deliver comments to: BLM NMSO; Attn: SunZia Southwest Transmission Project, Project Manager Adrian Garcia; 301 Dinosaur Trail; Santa Fe, NM 87508
- Record a telephone message at 1-888-959-2510

Before including your address, telephone number, email address, or other personal identifying information in your comment, be advised that your entire comment, including your personal identifying information, may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Thank you for your continued interest in the SunZia Southwest Transmission Project.

Sincerely,

Melanie G. Barnes

Digitally signed by MELANIE BARNES
Date: 2022.04.15 11:37:48 -06'00'

Melanie G. Barnes
Acting New Mexico State Director

DRAFT ENVIRONMENTAL IMPACT STATEMENT AND DRAFT RESOURCE MANAGEMENT PLAN AMENDMENT FOR THE SUNZIA SOUTHWEST TRANSMISSION PROJECT RIGHT-OF-WAY AMENDMENT

Responsible Agency: United States Department of the Interior, Bureau of Land Management

Document Status: Draft (X) Final ()

Abstract: SunZia Transmission, LLC (Applicant or SunZia) submitted an application to the Bureau of Land Management (BLM) New Mexico State Office and the U.S. Forest Service (USFS) on March 27, 2020, to request amendment of their existing right-of-way on public land (Serial Number NM-114438, cross references BLM AZA-35058) issued September 2016; updated applications were subsequently submitted on December 21, 2020, and September 14, 2021. The application to amend the existing right-of-way grant authorization includes proposed right-of-way components of the SunZia Southwest Transmission Project (project) located outside of the previously granted right-of-way, and is the subject of this environmental impact statement (EIS). The proposed amendment, consistent with the original right-of-way grant, would include up to two 500-kilovolt transmission lines located on federal, state, and private lands between Torrance County, New Mexico, and Pinal County, Arizona.

This Draft EIS provides additional and revised analysis for the four project components contained within the application to amend the existing right-of-way authorization: Component 1 includes approximately 40 miles of localized route modifications in Pinal County, Arizona, and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico. Component 2 includes access roads and temporary work areas outside the granted right-of-way in Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Torrance, and Lincoln Counties, New Mexico. Component 3 is a reroute of the 2015 Selected Route within Socorro, Valencia, and Torrance Counties, New Mexico. Component 4 is the addition of a high-voltage direct-current (HVDC) substation (SunZia West) at a newly identified west-end receiving terminal in Pinal County, Arizona.

The proposed project Component 3 alternatives include rerouting portions of the project through the U.S. Fish and Wildlife Service (USFWS) Sevilleta National Wildlife Refuge, or through lands managed by the USFS Cibola National Forest in New Mexico.

The decision whether to amend the existing right-of-way and/or issue new authorizations is a major federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code 4321). This Draft EIS has been prepared in compliance with the Council on Environmental Quality's Regulations for Implementing NEPA (40 Code of Federal Regulations 1500-1508).

Availability Period: The Draft EIS for the SunZia Southwest Transmission Project will be made available for 90 calendar days following publication of the U.S. Environmental Protection Agency's Notice of Availability in the *Federal Register*.

For further information, please contact: Adrian Garcia, Project Manager, BLM New Mexico State Office, 301 Dinosaur Trail, Santa Fe, New Mexico 87508
Telephone: 1-888-959-2510
Email: agarcia@blm.gov
ePlanning website: https://eplanning.blm.gov/eplanning-ui/project/2011785/570

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

SunZia Transmission, LLC (Applicant or SunZia) submitted an application to the Bureau of Land Management (BLM) New Mexico State Office and the U.S. Forest Service (USFS) on March 27, 2020, to request amendment of their existing right-of-way on public land (Serial Number NM-114438, cross references BLM AZA-35058) issued September 2016; updated applications were subsequently submitted on December 21, 2020, and September 14, 2021. The application to amend the existing right-of-way grant authorization includes proposed right-of-way components of the SunZia Southwest Transmission Project (project) located outside of the previously granted right-of-way, and is the subject of this environmental impact statement (EIS). The proposed amendment, consistent with the original right-of-way grant, would include up to two 500-kilovolt (kV) transmission lines located on federal, state, and private lands between Torrance County, New Mexico, and Pinal County, Arizona.

As a result of advanced design and engineering review since the right-of-way grant was issued in 2016, the Applicant has identified the following components to improve constructability and minimize variances during construction:

1. Approximately 40 miles of localized route modifications in Pinal County, Arizona, and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico
2. Access roads and temporary work areas outside the granted right-of-way in Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Torrance, and Lincoln Counties, New Mexico
3. A reroute of the 2015 Selected Route within Socorro, Valencia, and Torrance Counties, New Mexico
4. The addition of a high-voltage direct-current (HVDC) substation (SunZia West) at a newly identified west-end receiving terminal in Pinal County, Arizona.

The proposed project Component 3 alternatives include rerouting portions of the project through the U.S. Fish and Wildlife Service (USFWS)–administered Sevilleta National Wildlife Refuge (NWR or Refuge), or through lands managed by the U.S. Department of Agriculture (USDA) Forest Service Cibola National Forest in New Mexico. These new alternatives provide opportunities for co-locating portions of the 2015 Selected Route with newly constructed transmission infrastructure in Socorro, Valencia, and Torrance Counties, New Mexico. Additionally, Component 3 alternatives present opportunities to address ongoing military concerns associated with the White Sands Missile Range (WSMR) Northern Call Up Area (NCUA), to address issues obtaining private property rights-of-way, to reduce costs associated with undergrounding transmission infrastructure, and to identify a better siting location for the SunZia East Substation. This draft environmental impact statement (Draft EIS) provides additional and revised analysis for the four project components contained within the application to amend the existing right-of-way authorization.

The decision whether to amend the existing right-of-way and/or issue new authorizations is a major federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321). To comply with the requirements of NEPA, this Draft EIS has been prepared to disclose the potential environmental impacts associated with construction, operation, maintenance, and decommissioning of the four proposed project components described in the right-of-way application. This Draft EIS also analyzes alternatives to the proposed project components. This Draft EIS has been prepared in compliance with the Council on Environmental Quality (CEQ) Regulations for

Implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508). As a result, this Draft EIS is tiered to the BLM's final EIS (2013 FEIS) and record of decision (2015 ROD).

This Draft EIS only analyzes the impacts from the right-of-way amendment application for new right-of-way for components of the SunZia Southwest Transmission Project located outside of the previously granted right-of-way. This Draft EIS does not revisit or reanalyze the previously analyzed and approved route from 2015 unless conditions have changed that warrant new analysis. The reader is referred to Chapter 2 for additional details describing the project components analyzed in this Draft EIS and the components approved in the BLM's 2015 ROD that will not change as a result of the right-of-way amendment application analyzed herein.

The BLM, through its New Mexico State Office, is the lead federal agency responsible for preparing this EIS and associated analyses. Cooperating agencies include the USDA Forest Service (Cibola National Forest and National Grasslands); U.S. Army Corps of Engineers; U.S. Department of the Army, Fort Huachuca; U.S. Department of the Army, WSMR; U.S. Department of Energy; USFWS; National Park Service; Arizona Game and Fish Department; Arizona State Land Department; New Mexico Department of Game and Fish; New Mexico Office of Military Base Planning and Support; New Mexico State Land Office; Graham County, Arizona; Pinal County, Arizona; Grant County, New Mexico; Lincoln County, New Mexico; Luna County, New Mexico; Socorro County, New Mexico; Valencia County, New Mexico; Claunch-Pinto Soil and Water Conservation District; and the City of Belen, New Mexico. The following agencies have been identified as participating or cooperating agencies under the Fixing America's Surface Transportation Act (FAST-41): Advisory Council on Historic Preservation (participating), and USDA Forest Service (Cibola National Forest and National Grasslands), U.S. Army Corps of Engineers, U.S. Department of Defense (DOD) Siting Clearinghouse, U.S. Environmental Protection Agency Region 6, USFWS, and National Park Service (cooperating). FAST-41 establishes new procedures that standardize interagency consultation and coordination practices.

ES.2 APPLICANT'S OBJECTIVES

The Applicant's objectives have not changed since the 2013 FEIS (BLM 2013) was written. In summary, the Applicant's objectives are:

- to increase available transfer capability, including, but not limited to, areas of potential renewable energy generation;
- to assist load-serving utilities in meeting the requirements to address energy delivery obligations and meet state renewable portfolio standards; and
- to alleviate transmission congestion in southern New Mexico.

ES.3 AGENCY PURPOSE AND NEED

The following section describes the purpose and need for the BLM, Cibola National Forest and National Grasslands, and Sevilleta NWR's federal real estate actions associated with the proposed project. The purpose and need statements for the three federal agencies are provided below because the focus of this Draft EIS is to disclose impacts associated with the federal real estate actions requested in the associated applications from the Applicant.

Bureau of Land Management

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple uses including the long-term needs for renewable and non-renewable resources.

The BLM is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electrical energy (FLPMA Section 501(a)(4)). Taking into account the BLM's multiple-use mandate, the BLM's purpose and need for this action is to respond to the FLPMA right-of-way application submitted by the Applicant under Title V of FLPMA (43 USC 1761) to modify the existing Right-of-Way Grant NM114438 for the construction and operation of two 500-kV transmission lines located on federal, state, and private lands between central New Mexico and central Arizona, in compliance with FLPMA, BLM right-of-way regulations, the BLM NEPA Handbook (BLM 2008), U.S. Department of the Interior NEPA regulations, and other applicable federal and state laws and policies. Other applicable regulations and guidelines are listed in Appendix B.

Cibola National Forest and National Grasslands

The purpose of the USFS federal action is to respond to the Applicant's application for a right-of-way to construct, operate, maintain, and decommission a transmission line on federal lands. The need for this action is to fulfill USFS responsibility under FLPMA and National Forest Management Act (16 USC 1601-1614), the 1985 Amended Cibola National Forest Land and Resource Management Plan (LRMP), the 2001 Roadless Rule, 66 Federal Register 3244 (January 12, 2001), and USFS Special Use Authorization regulations at 36 CFR 251 Subpart B - Land uses and its implementing polices in Forest Service Manual (FSM) 2700, Forest Service Handbook (FSH) 2709.11, and related environmental policy direction in FSM 1900 and FSH 1900.

The USFS's purpose and need also must consider further guidance from the Energy Policy Act of 2005, which recognized the need to improve domestic energy production, develop renewable energy resources, and enhance the infrastructure (e.g., transmission lines) for collection and distribution of energy resources across the nation. To support this, the USFS is charged with analyzing applications for utility and transportation systems on federal lands it administers, while balancing the other beneficial uses for which the federal lands may be needed.

Sevilleta National Wildlife Refuge

The purpose and need of the USFWS federal action is to respond to requests to co-locate the SunZia transmission line with existing transmission corridors across the Sevilleta National Wildlife Refuge. Currently, Sevilleta NWR has received an application from Tri-State Generation and Transmission Association Inc. (Tri-State) to reconstruct the existing line, and is awaiting application from El Paso Electric Company (El Paso Electric or EPE) to reconstruct their existing transmission line to allow SunZia's transmission infrastructure. National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS) as stated in the Refuge Recreation Act of 1962 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997.

The USFWS needs to ensure this action is consistent with the priorities and mandates as outlined by the NWRS as stated in the Refuge Recreation Act of 1962 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997.

ES.4 PROPOSED ACTION

The 2015 Selected Route is organized in four segments, as follows:

- Segment 1 – Pinal Central Substation to Willow 500-kV Substation (Appendix A, Maps 1–50)

- Segment 2 – Willow 500-kV Substation to SunZia South Substation (Segment 2a in Arizona, Segment 2b in New Mexico) (Appendix A, Maps 51–81)
- Segment 3 – SunZia South Substation to New Mexico Institute of Mining and Technology (New Mexico Tech) (Appendix A, Maps 82–129)
- Segment 4 – New Mexico Tech to SunZia East Substation (Appendix A, Maps 130–193)

The project consists of the following four components and their alternatives: Component 1—localized route modifications in Segments 1, 2 and 3; Component 2—access roads and temporary work areas outside the granted right-of-way in Segments 1, 2, and 3; Component 3—transmission line reroutes in Segment 4; and Component 4—the SunZia West Substation in Segment 1.

The proposed action is for the BLM to amend the current right-of-way authorization to include proposed project components outside of the existing granted right-of-way for the construction, operation, maintenance, and decommissioning of the project. The USFWS and Cibola National Forest may need to issue new authorizations, depending on the alternatives under proposed Component 3, which includes a proposed, approximately 150-mile reroute of the 2015 Selected Route in Socorro, Valencia, and Torrance Counties, New Mexico.

ES.5 PROJECT COMPONENTS

Component 1: Localized Route Modifications

Component 1 consists of proposed modifications of the 2015 Selected Route in six localized areas in Segments 1, 2, and 3 in Pinal County, Arizona and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico. After the right-of-way grant was issued in September 2016, and pursuant to the requirements in the BLM's 2015 ROD, subsequent ground-controlled surveys and engineering were conducted in conjunction with environmental resource surveys to refine locations of project facilities and refine the limits of the transmission line right-of-way alignment. Route Modifications 1–5 are located on public lands administered by the BLM, and are proposed due to inability to obtain private rights-of-way or easements, changes in land use, or physical constraints. Route Modification 6 includes route modifications on private and state lands.

The six proposed route modifications are:

- Route Modification 1 – Mavericks Area (BLM) (Appendix A, Map 66)
- Route Modification 2 – SunZia South Area (BLM) (Appendix A, Maps 81–83)
- Route Modification 3 – Macho Springs Area (BLM) (Appendix A, Maps 86–90)
- Route Modification 4 – Las Palomas Area (BLM) (Appendix A, Maps 103–105)
- Route Modification 5 – Highlands Area (BLM) (Appendix A, Maps 119–120)
- Route Modification 6 – Pinal Central Area (Private and State) (Appendix A, Maps 1–3)

Component 2: Access Roads and temporary work areas Outside Granted Right-of-Way

Access Roads

Component 2 includes access roads that are on public lands administered by the BLM outside the existing 400-foot-wide granted right-of way. Access roads for construction, operation, and maintenance of the transmission lines were planned within the 400-foot-wide right-of-way as much as practicable, however, access to the right-of-way, constraints due to steep or rugged terrain, and/or avoidance of sensitive resources may necessitate the use of roads outside the 400-foot-wide granted right-of-way.

There are three types of access roads (unpaved) proposed outside the 400-foot right-of-way:

- Access Type 1 = existing road, no improvement required
- Access Type 2 = existing road, improvement required
- Access Type 3 = construction of new road

Temporary Work Areas

In Segments 1, 2, and 3, temporary work areas (TWAs), or portions of TWAs, are outside the 400-foot granted right-of-way for the 2015 Selected Route, requiring short-term right-of-way for temporary use. TWAs include structure work areas, construction yards, and wire pulling/tensioning/splicing areas.

Component 3: Segment 4 Reroute Alternatives

Reroute Alternatives

The Applicant has continued to coordinate with the DOD regarding the location of the 2015 Selected Route along Segment 4 that overlaps with the WSMR NCUA. During coordination meetings between SunZia and WSMR staff, ongoing concerns regarding impacts to current and future national security priorities were discussed (McMahon 2018 and Office of the Assistant Secretary of Defense 2022). Additionally, coincidental construction of the Western Spirit 345-kV Transmission Line Project (Western Spirit Project) north of the WSMR NCUA boundary presented a potential new co-location opportunity for the project on separate structures, but in the same area as the Western Spirit Project transmission line. Given the new opportunity for co-locating portions of the project and the ability to address ongoing concerns, including minimizing potential conflicts between transmission facilities and DOD test and training missions, DOD national security issues, issues obtaining private property rights-of-way along the Selected Route, and opportunity to reduce costs of undergrounding, the Applicant has opted to pursue potential alternative routes that would relocate the project's proposed transmission line and associated facilities from the WSMR NCUA (see Appendix A, Map 181).

In the fall of 2019, the Applicant performed a siting study to develop and evaluate alternative routes for the affected portion of Segment 4 that would allow the Applicant to: partially locate within an existing utility corridor; minimize potential conflicts with transmission facilities and DOD training and testing missions; address concerns with obtaining private property rights-of-way; and avoid areas of building the transmission line underground (POWER Engineers, Inc. 2020). Alternatives that co-locate with existing utility easements across the Sevilleta NWR would address the BLM's basis for eliminating certain alternatives from detailed analysis in the 2013 FEIS (BLM 2013). In addition, based on the recent development of proposed wind-generation facilities, the Applicant determined that relocating the planned 40-acre SunZia East Substation to the north near Corona in Torrance County would optimize the potential interconnection of future renewable resources, and allow an opportunity to co-locate Segment 4 with the Western Spirit Project transmission line by paralleling the Western Spirit Project where feasible.

Three alternative routes with various combinations of subroutes are carried forward for detailed analysis in this Draft EIS. One alternative route (Alternative Route 1) would site typical project facilities and right-of-way configurations across BLM, Cibola National Forest, state, and private lands. Two alternative routes (Alternative Routes 2 and 3) would co-locate within existing transmission line corridors that pass north-south through the Sevilleta NWR. Due to the limited width of the existing corridors through the Sevilleta NWR, only one new SunZia transmission line could be routed within each existing corridor. SunZia's intent is to replace the existing transmission-line infrastructure with new transmission-line infrastructure that could accommodate the existing transmission line and a proposed SunZia 500-kV transmission line vertically on one set of structures in each existing corridor easement. Both alternative routes across the Sevilleta NWR would be necessary for the Applicant's proposed project; however, depending on the result of this NEPA process, there is the potential that only one of either Alternative Route 2 or Alternative Route 3 crossing the Sevilleta NWR would be selected in combination with a single transmission alternative on Cibola National Forest (Alternative Route 1). Currently, Sevilleta NWR has received application from Tri-Sate to reconstruct the existing line and is awaiting application from EPE to reconstruct existing line to allow SunZia's transmission infrastructure.

During internal and external scoping, additional local alternatives were identified to avoid areas where land management conflicts could be avoided. Local alternatives are site-specific, exchangeable segments that do not require the creation of a new alternative route or subroute.

Table ES.1 and Table ES.2 summarize the length and acreage, respectively, of new right-of-way that would be required for each Segment 4 alternative. See Appendix A, Maps 130–193 for Segment 4 alternatives.

Table ES.1. Segment 4 Reroute Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	BLM	USFS	USFWS	State	Private	Total (miles)
2015 Selected Route	20	0	0	22	49	**92**
Alternative Route 1 with Subroute 1A-1	21	5	0	37	84	**147**
Alternative Route 1 with Subroute 1A-2	21	5	0	37	83	**145**
Alternative Route 1 with Subroute 1A-3	24	5	0	37	81	**146**
Alternative Route 1 with Subroute 1A-4	21	5	0	37	83	**146**
Local Alternative 1A-6	0.3	0.2	0	0	0	**0.5**
Local Alternative 1A-7	0.5	0	0	0	0	**0.5**
Alternative Route 2 with Subroute 2A-1	6	0	14	24	79	**123**
Alternative Route 2 with Subroute 2A-2	6	0	14	24	75	**120**
Alternative Route 2 with Subroute 2A-3	6	0	14	24	71	**115**
Alternative Route 2 with Subroute 2A-4	6	0	14	24	78	**123**
Alternative Route 3 with Subroute 3A-1	10	0	12	20	85	**126**
Alternative Route 3 with Subroute 3A-2	10	0	12	20	81	**123**
Alternative Route 3 with Subroute 3A-3	10	0	12	20	77	**119**
Alternative Route 3 with Subroute 3A-4	10	0	12	20	84	**126**
Local Alternative 3B-1	4	0	0	0	2	**5.5**
Local Alternative 3B-2	5	0	0	0	1	**5.7**

Note: Local Alternatives are exchangeable within their associated alternative route. Numbers may not sum due to rounding.

Table ES.2. Surface Disturbance Estimates for Segment 4 Reroute Alternatives (in acres) by Route and Subroute

Alternative Route/Subroute	BLM	USFS	USFWS[1]	State	Private	Total (acres)
2015 Selected Route[2]	271	0	0	297	661	**1,229**
Alternative Route 1 with Subroute 1A-1	183	41	0	327	734	**1,285**
Alternative Route 1 with Subroute 1A-2	181	41	0	327	727	**1,276**
Alternative Route 1 with Subroute 1A-3	210	41	0	325	708	**1,284**
Alternative Route 1 with Subroute 1A-4	182	41	0	327	732	**1,282**
Local Alternative 1A-6	3	0	0	0	0	**3**
Local Alternative 1A-7	5	0	0	0	0	**5**
Alternative Route 2 with Subroute 2A-1	52	0	83	207	670	**1,012**
Alternative Route 2 with Subroute 2A-2	52	0	83	207	640	**982**
Alternative Route 2 with Subroute 2A-3	52	0	83	207	603	**945**
Alternative Route 2 with Subroute 2A-4	52	0	83	207	667	**1,009**
Alternative Route 3 with Subroute 3A-1	83	0	57	174	731	**1,045**
Alternative Route 3 with Subroute 3A-2	83	0	57	174	701	**1,015**
Alternative Route 3 with Subroute 3A-3	83	0	57	174	664	**978**
Alternative Route 3 with Subroute 3A-4	83	0	57	174	728	**1,042**
Local Alternative 3B-1	4	0	0	0	12	**16**
Local Alternative 3B-2	5	0	0	0	9	**14**

Note: Local Alternatives are exchangeable within their associated alternative route. Numbers may not sum due to rounding.

1. Surface disturbance estimates for the Sevilleta NWR are presented for areas outside the existing transmission line footprints.

2. Surface disturbance estimates for the no action alternative are based on surface disturbance factors presented in the 2013 FEIS (BLM 2013:2-111). Surface disturbance estimates for Alternative Routes 1, 2, and 3 were updated for this Draft EIS.

Access Roads for Segment 4

If a federal decision is issued for any of the proposed Segment 4 alternatives, a final design for a network of access roads (access road plan) would be developed. Therefore, for purposes of this analysis, use of a predictive model estimates ground disturbance associated with improvements to existing roads and construction of new roads.

Access-level disturbance predictions were developed to be conservative, to ensure predictions for ground disturbance are not underestimated in relation to actual disturbance and impacts. For purposes of analyzing impacts to resources and assessing likely ground disturbance associated with the Segment 4 alternative routes, the following six access levels were developed, based primarily on slope and information provided in the description of the project:

- Access Level 1: Use existing roads (0 to 15 percent slope)
- Access Level 2: Use existing roads (greater than 15 percent slope)
- Access Level 3: Construct new access, flat to rolling terrain (0 to 8 percent slope)
- Access Level 4: Construct new access, rolling terrain (8 to 15 percent slope)
- Access Level 5: Construct new access, steep terrain (15 to 30 percent slope)

- Access Level 6: Construct new access, very steep terrain (greater than 30 percent slope)

SunZia East Substation

The SunZia East Substation would be located on 40 acres of private land. The ultimate size of the substation and its footprint is dependent on whether an alternating current (AC) only or an alternating current/direct current (AC/DC)-converter facility is installed at the site. If one of the transmission lines is DC, the AC transmission line would enter the DC converter from the east from a nearby substation constructed by the wind-generation developer to collect the wind power from (planned) generating facilities nearby, convert from AC power to DC power, and the DC transmission line would leave the substation to the north and continue west along Segment 4. The footprint of the equipment, inside the fenced yard, would be approximately 20 to 22 acres—approximately 12 acres for the DC converter units and 8 to 10 acres to accommodate the immediately adjacent 500-kV AC switchyard. If the SunZia East Substation eventually contains equipment for DC and AC transmission lines, permanent disturbance would be approximately 85 acres and temporary disturbance would be approximately 105 acres (which includes the 85 permanent acres).

If the two SunZia transmission lines are both AC, then the lines would enter the SunZia East Substation from the east directly into a 500-kV AC yard, then continue on to the next substation to the southwest (SunZia South Substation). If the SunZia East Substation contains equipment for two AC transmission lines (and no DC), permanent disturbance is estimated to be approximately 45 acres and temporary disturbance is estimated to be approximately 60 acres (which includes the 45 permanent acres).

Component 4: SunZia West Substation

The Applicant also identified the need for an HVDC substation, the SunZia West Substation, at a newly identified alternate location for the west-end receiving terminal in Arizona. A DC transmission line would require equipment at each DC terminus location to convert the power from AC to DC (SunZia East HVDC converter) and DC to AC (SunZia West HVDC converter). The revised location of the SunZia West Substation is needed because operation and interconnection capabilities for the west-end HVDC receiving terminal could be better served at a dedicated and separate site rather than near Salt River Project's Pinal Central Substation, as previously proposed. Based on how market conditions evolve, the HVDC converter may ultimately be constructed and operate within the previously analyzed location near the Pinal Central Substation. SunZia maintains the ability to locate the SunZia West converter station at either location.

The project is planned as two nominal 500-kV transmission lines: one line would be an AC line with the transfer capability of 1,500 megawatts (MW); the other line would be either an additional AC transmission line with a 1,500-MW capacity or a DC transmission line with a 3,000-MW capacity.

The Applicant has identified an area within which to site an alternate SunZia West HVDC converter but has not yet determined a specific location of the substation within the siting area (see Appendix A, Map 14). The location was identified considering proximity to the proposed transmission line alignment, existing access to the area, availability of electricity for station service, and feasibility for interconnection with the 500-kV grid. The southern portion of the current siting area for the SunZia West Substation overlaps with the permitted 400-foot-wide right-of-way and is located entirely on Arizona State Trust Land just east of Red Rock, Arizona. No federal authorization is needed. Adjustment of the permitted right-of-way would be addressed with the State of Arizona. The siting area is approximately 80.7 acres. The footprint of the equipment, inside a fenced substation yard, would be approximately 20 to 22 acres. More details on the SunZia West Substation can be found in Section 2.2.4 of Resource Report 1 (POWER Engineers, Inc. 2021a).

ES.6 AGENCY PREFERRED ALTERNATIVE

Under NEPA, the agency preferred alternative is a preliminary indication of the lead federal agency's preference among the proposed action and alternatives. The BLM has identified parts of the four proposed project components as the agency's preferred alternative. The agency's preferred alternative is as follows:

- **Component 1:** Localized Route Modifications 1–5, and the 2015 Selected Route (the no action alternative in this Draft EIS) for Local Route Modification 6 in the Pinal Central Area.
- **Component 2:** All access roads and temporary workspaces outside the granted right-of-way.
- **Component 3:** Alternative Route 2 with Subroute 2A-4 and Alternative Route 3 with Subroute 3A-4, which include crossing the Sevilleta NWR as well as co-locating the proposed SunZia transmission line with the Western Spirit transmission line at the Rio Grande crossing. For Subroute 3A-4, the agency preferred alternative includes Local Alternative 3B-2 to avoid two private residences in close proximity to the project.
- **Component 4:** The revised location for the SunZia West Substation.

ES.7 NO ACTION ALTERNATIVE

Under the no action alternative, the project would continue to be authorized through the 2015 ROD and the 2016 Right-of-Way Grant (Serial Number NM-114438). The 2016 right-of-way grant was authorized to allow for the construction, operation, maintenance, and termination of two 500-kV transmission lines, including access roads and other ancillary facilities, following the route of the BLM Selected Route. The term of the right-of-way is for 50 years, followed by decommissioning at the end of the useful life of the project, subject to a new grant of renewal. The typical right-of-way width is 400 feet. However, according to design conditions, the right-of-way width may be up to 1,000 feet in certain situations, such as terrain conditions, separation criteria, and final design (BLM 2013:2-64). The granted right-of-way crosses approximately 183 miles of public lands administered by the BLM.

Under the no action alternative, the BLM and other federal decision makers would not approve the localized route modifications, access roads and TWAs outside the granted right-of-way, the Segment 4 reroute, and the new location for the SunZia West Substation.

The 2015 Selected Route is described in the 2015 ROD as Subroutes 1A2, 3A2, and 4C2c (BLM 2015a: 20–25). As noted in Section 2.2 of this Draft EIS, a total of 5 miles of the 2015 Selected Route would be buried through the WSMR NCUA.

ES.8 DESIGN FEATURES AND APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

Appendix C provides a full list of design features and applicant-committed environmental protection measures (EPMs). Design features are specific means, measures, or practices that would reduce or eliminate effects of the proposed action or alternatives (BLM 2008a:44). Design features apply to all proposed project components.

Applicant-committed EPMs were developed in collaboration with the BLM and cooperating agencies and include measures or techniques recommended or required by the agencies or landowners. These measures would be modified as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual) associated with the selected route, and would be included prior to project construction in the Final Plan of Development.

ES.9 CONFORMANCE WITH LAND USE PLANS

BLM Land Use Plans

Alternatives have been evaluated for conformance with existing BLM resource management plans (RMPs). The proposed alternatives would not be in conformance with the Socorro RMP due to one of the following conditions: the right-of-way would cross an area designated in the RMP as right-of-way avoidance or exclusion, the right-of-way would cross a special designation, or the project would not comply with Visual Resource Management (VRM) objectives. Plan amendments would be required for alternatives where no conforming alternatives could be developed that would meet the purpose and need of the project.

In addition to the alternative transmission line routes, two plan amendment alternatives have been identified for each of the affected RMPs, as follows:

- No Action: If no action is taken, then the right-of-way for the project would not be granted and no amendment to the affected RMP would be granted.
- 400-foot-wide right-of-way: The affected RMP would be amended to designate a 400-foot-wide right-of-way for the proposed project through the BLM right-of-way avoidance areas and one exclusion area associated with an ACEC. The VRM classes would be modified within the right-of-way. The Ladron Mountain-Devil's Backbone Complex ACEC would be reduced by up to 4.7 acres to accommodate the right-of-way.

Minor deviations from the limits of the right-of-way may be required to accommodate site-specific considerations, and any new rights-of-way would be subject to case-by-case evaluations according to future project applications.

The necessary RMP amendments are listed in Table ES.3.

Table ES.3. Summary of Proposed RMP Amendments Necessary for the Project

Project Area Segment	Proposed Project Component	Associated RMP* and Reason for Amendment	Covered in 2013 FEIS?	New Amendment Required?
Segment 1	Component 1: Pinal Central Area	N/A- Pinal Central Route Modifications on Private and State Land	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Phoenix RMP None	No	No
	Component 2b: TWAs	Phoenix RMP None	No	No
	Component 4: SunZia West Substation	N/A- substation is located on Arizona State Land	No	No
Segment 2	Component 1: Mavericks Area	Mimbres RMP None	No	No
	Component 1: SunZia South Area	Mimbres RMP None	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Safford RMP, Mimbres RMP None	No	No

Project Area Segment	Proposed Project Component	Associated RMP* and Reason for Amendment	Covered in 2013 FEIS?	New Amendment Required?
	Component 2b: TWAs	Safford RMP, Mimbres RMP None	No	No
Segment 3	Component 1: Macho Springs Area	Mimbres RMP None	No	No
	Component 1: Las Palomas Area	Mimbres RMP None	No	No
	Component 1: Highlands Area	Socorro RMP None	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Mimbres RMP Avoidance Area, VRM II, VRM III Socorro RMP Avoidance area	No	Yes
	Component 2b: TWAs	Mimbres RMP Avoidance Area, VRM II, VRM III Socorro RMP Avoidance area	No	Yes (Socorro RMP)
Segment 4	Alt Route 1 with Subroute 1A-1	Socorro RMP Avoidance area, VRM II	No	Yes (Socorro RMP)
	Alt Route 1 with Subroute 1A-2	Socorro RMP Avoidance area, VRM II	No	Yes
	Alt Route 1 with Subroute 1A-3	Socorro RMP Avoidance area, VRM II	No	Yes
	Alt Route 1 with Subroute 1A-4	Socorro RMP Avoidance area, VRM II	No	Yes
	Local Alternative 1A-6	Socorro RMP Avoidance area, VRM II	No	Yes
	Local Alternative 1A-7	Socorro RMP Exclusion area (ACEC†), VRM II	No	Yes
	Alt Route 2 with Subroute 2A-1	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-2	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-3	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-4	Socorro RMP Avoidance area	No	Yes
	Alt Route 3 with Subroute 3A-1	None	No	No
	Alt Route 3 with Subroute 3A-2	None	No	No
	Alt Route 3 with Subroute 3A-3	None	No	No
	Alt Route 3 with Subroute 3A-4	None	No	No
	Local Alternative 3B-1	None	No	No
	Local Alternative 3B-2	Socorro RMP Avoidance area	No	Yes

* Socorro RMP (BLM 2010), Mimbres RMP (BLM 1993a), White Sands RMP (BLM 1986a), Safford District RMP Planning Area (BLM 1991), Phoenix RMP Planning Area (BLM 1989).

† ACEC indicates the Ladron Mountain-Devil's Backbone Complex Area of Critical Environmental Concern, which is a BLM special designation.

Cibola National Forest and National Grasslands LRMP

The Amended 1985 Cibola National Forest Land and Resource Management Plan currently provides direction for management of Cibola National Forest lands. The project as proposed on the Cibola National Forest is currently in conformance with the Amended 1985 LRMP (USFS 1985).

Sevilleta NWR Comprehensive Conservation Plan

The 2000 Sevilleta National Wildlife Refuge Comprehensive Conservation Plan (CCP) provides management tools, directions, and priorities for the 230,000-acre Sevilleta NWR. Decisions made within the CCP "are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management" (USFWS 2000a:17).

The USFWS is evaluating SunZia's proposal to utilize easements held by Tri-State and EPE that burden the Refuge in accordance with applicable law, regulation, and policy.

ES.10 ISSUES AND SUMMARY OF ENVIRONMENTAL IMPACTS

The CEQ regulations at 40 CFR 1500.4(i) direct that the scoping process should be used "not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the [NEPA] process accordingly." Title 40 CFR 1501.9 (f)(1) indicates the lead agency "shall identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere". Through scoping, 23 issues were identified for analysis in detail (AID) and 26 issues were identified for analysis in brief (AIB). These issues are presented in Table ES-4.

The summary of impacts for each issue statement is provided in Chapter 2, Table 2-18 through Table 2-21.

Table ES.4. Issues Analyzed in EIS Chapter 3

Issue Analyzed in Brief in this EIS	Issue Analyzed in Detail in this EIS
AIB-1 Regional Air Quality	AID-1 Climate Change
AIB-2 Fugitive Dust	AID-2 Paleontological Resources
AIB-3 Locatable Minerals	AID-3 Avian Collisions
AIB-4 Common Variety Minerals	AID-4 Migratory Bird Corridors
AIB-5 Sensitive Soils	AID-5 Federally Listed Wildlife Species
AIB-6 Water Quality	AID-6 New Mexico Meadow Jumping Mouse
AIB-7 Sedimentation to Surface Water Resources	AID-7 BLM Sensitive Wildlife Species
AIB-8 Native Vegetation	AID-8 Federally Listed Plant Species
AIB-9 Vegetation Monitoring Transects	AID-9 BLM Sensitive Plant Species
AIB-10 Riparian Habitat	AID-10 Cultural Resources
AIB-11 Invasive Species (Noxious Weeds)	AID-11 National Scenic and Historic Trails
AIB-12 Desert Bighorn Sheep Habitat	AID-12 Visual Resources
AIB-13 Grasslands and Pronghorn Habitat	AID-13 Existing and Future Land Uses
AIB-14 Sensitive Time Periods and Habitat Fragmentation	AID-14 Proposed and Future Rights-of-Way
AIB-15 Wildlife Corridors	AID-15 Military Operations
AIB-16 Sandhill Crane Habitat	AID-16 BLM Special Designations
AIB-17 Sonoran Desert Tortoise Habitat	AID-17 USFS Inventoried Roadless Area
AIB-18 Monarch Butterfly Breeding Habitat	AID-18 Sevilleta National Wildlife Refuge
AIB-19 Nectar Bats	AID-19 Fiscal Economics and Job Creation
AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	AID-20 Environmental Justice
AIB-21 Recreation	AID-21 Noise
AIB-22 Hunting Access	AID-22 Electric and Magnetic Fields
AIB-23 Livestock Grazing	
AIB-24 Transportation	
AIB-25 Civilian Airports and Flight Paths	
AIB-26 Hazardous Materials	

ES.11 SCOPING, CONSULTATION, AND COORDINATION

The Notice of Intent (NOI) for this project was published in the Federal Register on June 4, 2021, notifying the public of the BLM’s intent to prepare an EIS (BLM 2021a:A-1-A-3). The NOI also signified the beginning of the 30-day scoping period, ending July 6, 2021. In addition to the NOI, various outreach methods were utilized, which included a pre-NOI postcard mailed to the BLM’s interested party list, online project information, a media release, and a project newsletter (also mailed to the BLM’s interested party list) announcing the publication of the NOI and public scoping meetings (BLM 2021a: Appendix B). Additionally, project introduction letters were sent on December 7, 2020, to 29 tribes (BLM 2021a:4).

The BLM hosted a total of three virtual public meetings, on June 22, 23, and 24, 2021.The public, agencies, and tribes also had the opportunity to submit comments during the scoping period through the BLM’s ePlanning website, by mailing individual letters to the BLM New Mexico State Office, providing telephone messages to the BLM project manager or project hotline, or emailing the BLM’s project manager.

Following the scoping period, the BLM received 186 submissions from the public. Of these 186 submissions, 130 were from individuals, 26 were from organizations or businesses, and 8 were from agencies, with some entities providing more than one submission (BLM 2021a:5). Once comment-level coding took place, 835 total comments were identified. Approximately 167 comments were coded as out of scope, 137 comments were coded for wildlife resources, and 101 comments were coded for alternatives (BLM 2021a:6–7). Remaining comments were coded for issues such as socioeconomics, the NEPA process, purpose and need, climate change, etc. (BLM 2021a:6–7). Scoping comments have been used to identify issues and resource conflicts for analysis in this Draft EIS.

See Chapter 5 of this Draft EIS for additional details on tribal consultation and coordination.

ES.12 DECISIONS TO BE MADE

Bureau of Land Management

The purpose of the BLM's action is to respond to SunZia's application for use of BLM-administered lands for the amended right-of-way. Specifically, the BLM authorized officer will decide whether to grant, grant with conditions, or deny the application for an amended right-of-way on BLM lands. Pursuant to 43 CFR 2805.10, if the BLM issues a grant, the BLM decision maker may include terms, conditions, and stipulations determined to be in the public interest on BLM lands. This includes modifying the proposed use or changing the route or location of the facilities on BLM public land. If the decision is made to grant the right-of-way, the BLM will also decide any mitigation requirements, terms, conditions, and stipulations of the grant on BLM lands.

The BLM also must decide whether or not to amend any of the existing RMPs to achieve conformity with the land use plan and allow for a right-of-way grant of a major utility right-of-way for this proposed transmission line. The BLM's decision on the right-of-way grant and any associated RMP amendments would be outlined in a ROD, based on the findings identified in the EIS.

Cibola National Forest and National Grasslands

The USFS decision maker would use this EIS to inform his/her decision regarding: whether to issue a Special Use Authorization under the National Forest Management Act (16 USC 1601-1614); and under what terms and conditions a special use permit should be issued. Under 36 CFR 218, upon issuance of the Final EIS, the USFS also issues a draft ROD for its project-related decision and any associated project-specific amendments. This will start a 45-day objection filing period before the USFS can issue a decision.

Sevilleta National Wildlife Refuge

The USFWS decision maker would use this EIS to inform his/her decision regarding: 1) whether SunZia's proposal to utilize easements held by Tri-State and EPE that burden the Refuge complies with applicable law, regulation, and/or policy; and 2) what, if any, permitting will be required of SunZia, Tri-State, and/or EPE, including, but not limited to, construction and long-term maintenance needs outside of the existing transmission line footprint.

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ACRONYMS AND ABBREVIATIONS

°C	degree(s) Celsius
°F	degree(s) Fahrenheit
$\mu g/m^3$	microgram(s) per cubic meter
μV/m	microvolt(s) per meter
AAAQS	Arizona Ambient Air Quality Standards
AAC	Arizona Administrative Code
AC	alternating current
ACAS	Avian Collision Avoidance System
ACEC	area of critical environmental concern
ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AFB	Air Force Base
AIB	analyzed in brief
AID	analyzed in detail
amsl	above mean sea level
Anza NHT	Juan Bautista de Anza National Historic Trail
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
Applicant	SunZia Transmission, LLC
AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
ARS	Arizona Revised Statutes
ASLD	Arizona State Land Department
ASM	Arizona State Museum
ATV	all-terrain vehicle
AUM	animal unit month
AZ	Arizona
AZGFD	Arizona Game and Fish Department
BCHA	Bird Conservation Habitat Area
BGEPA	Bald and Golden Eagle Protection Act
BHCA	Bird Habitat Conservation Area
BLM	Bureau of Land Management
BMPs	best management practices
BOR	Bureau of Reclamation
Butterfield Trail	Butterfield Overland Mail and Stage Route
ca.	circa

CCP	Comprehensive Conservation Plan
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
dBµV/m	decibel-microvolts per meter
DC	direct current
DO	District Office
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DPS	distinct population segment
EIS	environmental impact statement
El Camino Real NHT	El Camino Real de Tierra Adentro National Historic Trail
El Paso Electric	El Paso Electric Company
EMF	electric and magnetic field
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPE	El Paso Electric Company
EPG	Environmental Planning Group, LLC
EPM	environmental protection measure
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FAST-41	Fixing America’s Surface Transportation Act
FCC	Federal Communications Commission
FEIS	BLM (2013) final environmental impact statement and proposed resource management plan amendments
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FLIGHT	Facility Level Information on GreenHouse Gases Tool
FLPMA	Federal Land Policy and Management Act of 1976
FO	Field Office
FSH	Forest Service Handbook

FSM	Forest Service Manual
gartersnake	Northern Mexican gartersnake
GHG	greenhouse gas
GIS	geographic information system
Gran Quivira	Gran Quivira Unit of Salinas Pueblo Missions National Monument
GWP	Global Warming Potential
HVDC	high-voltage direct-current
I-	Interstate
IBA	Important Bird Area
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID team	interdisciplinary team
IM	Instruction Memorandum
IPCC	Intergovernmental Panel on Climate Change
IRA	Inventoried Roadless Area
kHz	kilohertz
km	kilometer(s)
KOP	key observation point
kV	kilovolt(s)
kV/m	kilovolt(s) per meter
Kw	raindrop impact
LRMP	Land and Resource Management Plan
LWA-SV	University of New Mexico Long Wavelength Array
LWC	Land with Wilderness Characteristics
m	meter(s)
MARC MoRIS	Mobile Antenna for RFI Characterization and Mobile RFI Identification System
MBTA	Migratory Bird Treaty Act
mG	milligauss
MHz	megahertz
minnow	Rio Grande silvery minnow
mm	millimeter(s)
MOU	Memorandum of Understanding
mph	miles per hour
MT	metric ton(s)
MW	megawatt(s)
N_2	nitrogen
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act

NCUA	Northern Call-up Area
NEPA	National Environmental Policy Act of 1969
NERC	North American Reliability Council
NESC	National Electric Safety Code
New Mexico Tech	New Mexico Institute of Mining and Technology
NHPA	National Historic Preservation Act of 1966
NHT	National Historic Trail
NM	New Mexico
NMAAQS	New Mexico Ambient Air Quality Standards
NMAC	New Mexico Administrative Code
NMDA	New Mexico Department of Agriculture
NMDGF	New Mexico Department of Game and Fish
NMDOT	New Mexico Department of Transportation
NMMJM	New Mexico meadow jumping mouse
NMRipMap	New Mexico Riparian Habitat Map
NMSA	New Mexico Statutes Annotated
NMSLO	New Mexico State Land Office
NOI	Notice of Intent
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NST	National Scenic Trail
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
NWRS	National Wildlife Refuge System
OHGW	overhead groundwire
OHV	off-highway vehicle
OPGW	fiber-optic groundwire
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAO	Public Affairs Officer
PFYC	Potential Fossil Yield Classification
PL	Public Law
PM	particulate matter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter

POD	Plan of Development
ppb	parts per billion
ppm	parts per million
project	SunZia Southwest Transmission Project
proposed action	SunZia Southwest Transmission Project, or project
RCPs	Representative Concentration Pathways
Refuge	Sevilleta National Wildlife Refuge
RF	radiative forcing
RFI	Radio Frequency Interference
RMP	resource management plan
RMPA	resource management plan amendment
RN	roaded natural
RNA	Research Natural Area
ROD	record of decision
ROS	recreation opportunity spectrum
ROW	right-of-way
RPS	renewable portfolio standards
Scoping Report	SunZia Southwest Transmission Project EIS Scoping Report
SEMS	Superfund Enterprise Management System
SF_6	sulfur hexafluoride
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SLRU	Sensitivity Level Rating Unit
SO_2	sulfur dioxide
SPM	Semi-Primitive Motorized
SPNM	Semi-Primitive Non-Motorized
SQRU	Scenic Quality Rating Unit
SRMA	special recreation management area
SSURGO	Soil Survey Geographic
ST	standard mitigation
SunZia	SunZia Transmission, LLC
SWCA	SWCA Environmental Consultants
SWReGAP	Southwest Regional Gap Analysis Project
TCP	Traditional Cultural Property
TMDL	Total Maximum Daily Load
Tri-State	Tri-State Generation and Transmission Association Inc.
TWA	temporary work area
UNFCCC	United Nations Framework Convention on Climate Change

USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VMS	Visual Management System
VORTAC	Very high-frequency Omnidirectional Range/Tactical Air Navigation
VQO	Visual Quality Objective
VRI	visual resource inventory
VRM	visual resource management
W/m^2	watts per meter squared
WECC	Western Electric Coordinating Council
WEG	wind erodibility group
Western Spirit Project	Western Spirit 345-kV Transmission Line Project
WSA	Wilderness Study Area
WSMR	White Sands Missile Range
WWEC	West-wide Energy Corridors

CHAPTER 1. INTRODUCTION

SunZia Transmission, LLC (Applicant or SunZia), submitted an application to the Bureau of Land Management (BLM) New Mexico State Office and the U.S. Department of Agriculture (USDA) Forest Service (USFS) on March 27, 2020, to request amendment of their existing right-of-way on public land (Serial Number NM-114438, cross references BLM AZA-35058) issued September 2016; updated applications were subsequently submitted on December 21, 2020, and September 14, 2021.
The application to amend the existing right-of-way grant authorization includes proposed right-of-way for components of the SunZia Southwest Transmission Project (project) located outside of the previously granted right-of-way. The proposed amendment, consistent with the original right-of-way grant, would include up to two nominal 500-kilovolt (kV)[1] transmission lines located on federal, state, and private lands between Torrance County, New Mexico, and Pinal County, Arizona.

This environmental impact statement (EIS) includes analysis of the four components described in the application to amend the existing right-of-way grant authorization, including 1) localized route modifications, 2) access roads and temporary work areas (TWAs) outside the granted right-of-way, 3) transmission line reroutes in project Segment 4, and 4) the addition of a SunZia West Substation. The Draft EIS includes the following documents:

- Front matter, executive summary, Chapters 1–5, references cited
- Appendix A. Maps
- Appendix B. Major Federal Authorizing Laws, Regulations, and Guidelines
- Appendix C. Design Features and Applicant-Committed Environmental Protection Measures
- Appendix D. Supporting Material for Air Quality Analysis
- Appendix E. Supporting information for National Historic and Scenic Trails Analysis
- Appendix F. Supporting Information for Visual Resource Analysis, including Key Observation Points and Visual Simulations
- Appendix G. Desktop Eagle Habitat Assessment
- Appendix H. Grazing Allotment Impacts

The decision whether to amend the existing right-of-way and/or issue new authorizations is a major federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321). To comply with the requirements of NEPA, this Draft EIS has been prepared to disclose the potential environmental impacts associated with construction, operation, maintenance, and decommissioning of the four proposed project components described in the right-of-way application. This Draft EIS also analyzed alternatives to the proposed project components. This Draft EIS has been prepared in compliance with the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508). As a result, this Draft EIS is tiered to the BLM's final EIS (2013 FEIS) and record of decision (2015 ROD).

1.1 BACKGROUND

In June 2013, the BLM issued the Final EIS and Proposed Resource Management Plan Amendments (FEIS/RMPA) for the SunZia Southwest Transmission Project, which is referred to herein as the 2013

[1] The voltage level averages 500 kV, but may be slightly lower or higher from time to time depending on system load and operations.

FEIS. In response to the 2013 FEIS, the U.S. Department of Defense (DOD) determined it would be necessary to mitigate impacts on mission capability associated with the White Sands Missile Range (WSMR) by burying at least 5 miles of the transmission lines to accommodate a minimum required set of low-altitude tests in the vicinity of the proposed transmission lines, as they would cross the WSMR Northern Call-up Area (NCUA). An Environmental Assessment (No. DOI-BLM-NM-900-2015-1) was prepared to evaluate the mitigation proposal that included burial of a total of approximately 5 miles of the transmission lines in three locations. The result of the Environmental Assessment was a Finding of No New Significant Impact issued by the BLM New Mexico State Director. In January 2015, the BLM issued the Record of Decision (ROD) for the SunZia Southwest Transmission Project, which identified the BLM preferred alternative evaluated in the 2013 FEIS, incorporating additional mitigation measures that included burial of portions of the transmission lines identified in the mitigation proposal Environmental Assessment as the selected route (referred to as the 2015 Selected Route). The subsequent right-of-way grant was issued on September 1, 2016, for a term of 50 years (BLM 2016c).

Since 2016, the Applicant has continued to develop site-specific engineering for the project, which included updating the Draft Plan of Development (POD) submitted with the 2013 FEIS. During this process the construction of the Western Spirit 345-kV Transmission Line Project (Western Spirit Project) north of the WSMR NCUA boundary presented a potential new co-location opportunity for the SunZia project. Co-locating portions of the SunZia project on separate structures, but in the same area as the Western Spirit Project transmission line, presents a new opportunity to minimize potential conflicts between military training and testing missions and project facilities and issues obtaining private property rights-of-way; thus, the Applicant has opted to pursue potential alternative routes that would relocate the project's proposed transmission line and associated facilities outside of the WSMR NCUA. Additionally, the Applicant has continued to coordinate with the DOD regarding the location of the 2015 Selected Route along Segment 4 that overlaps with the WSMR NCUA. During coordination meetings between SunZia and WSMR staff, ongoing concerns regarding impacts to current and future WSMR testing capabilities were discussed. Due to this new opportunity for co-locating portions of the SunZia project and to address DOD's ongoing concerns, the Applicant has opted to pursue potential alternative routes that would relocate the project's proposed transmission line and associated facilities outside of the WSMR NCUA.

Further, the Applicant has proposed alternative routes across Sevilleta NWR that address issues raised in the previous 2013 FEIS. In Section 2.3.3.1 of the 2013 FEIS, the BLM eliminated from detailed analysis several alternatives crossing through the Sevilleta NWR on the basis that such alternatives would conflict with the Refuge management policy and restrictions that prohibit commercial uses, as stated in the Sevilleta NWR land grant deed (BLM 2013:2-28 through 2-36). However, co-location with the existing utility lines was not considered at that time. EPE has a 345-kV transmission line in a 100-foot-wide easement, and Tri-State has a 115-kV transmission line in a 50-foot-wide easement. Due to existing easement widths, only one new SunZia transmission line could be routed within each easement for Alternative 2 and Alternative 3, requiring modification and replacement of each transmission line. Tri-State and EPE would need to request use of Refuge lands outside of existing easement footprints for construction and long-term maintenance. As proposed and analyzed in this Draft EIS, co-location with existing utility lines within existing easements would address issues previously raised and provide a basis for the BLM's consideration of these new alternatives.

Following issuance of the ROD, SunZia awarded 3,000 megawatts (MW) of transfer capacity of wind generation under development by Pattern Energy pursuant to an Open Solicitation process as required by the Federal Energy Regulatory Commission (FERC). In March 2021, SunZia began a co-development relationship in New Mexico with the New Mexico Renewable Energy Transmission Authority.

As a result of further advanced design and engineering and right-of-way acquisition review since the right-of-way grant was issued in 2016, the Applicant has identified localized transmission line route modifications in Segments 2 and 3 and refined the location and design of access roads and TWAs in Segments 1, 2, and 3 to improve constructability and minimize variances during construction.

1. Approximately 40 miles of localized route modifications in Pinal County, Arizona, and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico
2. Access roads and TWAs outside the granted right-of-way in Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Torrance, and Lincoln Counties, New Mexico
3. A reroute of the 2015 Selected Route within Socorro, Valencia, and Torrance Counties, New Mexico
4. The addition of a high-voltage direct-current (HVDC) substation (SunZia West) at a newly identified west-end receiving terminal in Pinal County, Arizona.

The alternatives presented in Chapter 2 of this Draft EIS include alternatives for rerouting portions of the project through the U.S. Fish and Wildlife Service's (USFWS's) Sevilleta National Wildlife Refuge (NWR or Refuge) or through lands managed by the USFS Cibola National Forest in New Mexico.

The analysis contained in this Draft EIS does not replace the project description, information, and analysis provided in the previous FEIS/RMPA (BLM 2013), the SunZia ROD (BLM 2015a), or the 2016 right-of-way grant (BLM 2016c). This Draft EIS provides additional and revised analysis for the four project components contained within the application to amend the existing right-of-way authorization. As a result, this Draft EIS is tiered to the BLM's 2013 FEIS and 2015 ROD. Per BLM NEPA Handbook H-1790-1, "tiering is appropriate when the analysis for the proposed action will be a more site-specific or project-specific refinement or extension of the existing NEPA document" (BLM 2008a:27). Tiering to appropriate NEPA documents is also consistent with CEQ NEPA regulations at 40 CFR 1500.4 and 40 CFR 1501.11. In this Draft EIS, tiering is indicated by a clear in-text reference to the document's section number and citation, with a summary of the key information being referenced in the earlier document.

This EIS analyzes only the impacts from the right-of-way amendment application for new right-of-way components located outside of the previously granted right-of-way and any necessary land use plan amendments necessary for the new right-of-way components. This EIS does not revisit or reanalyze the previously analyzed and approved route from 2015 unless conditions have changed that warrant new analysis. The reader is referred to Chapter 2 for additional details describing the project components analyzed in this Draft EIS and the components approved in the BLM's 2015 ROD that will not change as a result of the 2020 right-of-way application and subsequent amendments.

1.2 LEAD AGENCY AND COOPERATING AGENCIES

The BLM, through its New Mexico State Office, is the lead federal agency responsible for preparing this EIS and associated analyses. As lead agency, the State Office is responsible for consultations required by Section 7 of the Endangered Species Act of 1973 (ESA), as amended, and Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and all other relevant federal laws. See Chapter 5 of this Draft EIS for a discussion of consultation and coordination activities for the project.

Cooperating agencies include the USFS (Cibola National Forest and National Grasslands); U.S. Army Corps of Engineers (USACE); U.S. Department of the Army, Fort Huachuca; U.S. Department of the Army, WSMR; U.S. Department of Energy; USFWS; National Park Service; Arizona Game and Fish

Department; Arizona State Land Department (ASLD); New Mexico Department of Game and Fish; New Mexico Office of Military Base Planning and Support; New Mexico State Land Office (NMSLO); Graham County, Arizona; Pinal County, Arizona; Grant County, New Mexico; Lincoln County, New Mexico; Luna County, New Mexico; Socorro County, New Mexico; Valencia County, New Mexico; Claunch-Pinto Soil and Water Conservation District; and the City of Belen, New Mexico.

The following agencies have been identified as participating or cooperating agencies under the Fixing America's Surface Transportation Act (FAST-41): Advisory Council on Historic Preservation (participating), and USFS (Cibola National Forest and National Grasslands), USACE, DOD Siting Clearinghouse, U.S. Environmental Protection Agency Region 6, USFWS, and National Park Service (cooperating). FAST-41 establishes new procedures that standardize interagency consultation and coordination practices.

1.3 APPLICANT'S OBJECTIVES

The Applicant's objectives have not changed since the 2013 FEIS was written. The reader is referred to Chapter 1, Section 1.4 of the 2013 FEIS (BLM 2013) for a detailed discussion of the Applicant's objectives. In summary, the Applicant's objectives are:

- to increase available transfer capability, including, but not limited to, areas of potential renewable energy generation;
- to assist load-serving utilities in meeting the requirements to address energy delivery obligations and meet state renewable portfolio standards (RPSs); and
- to alleviate transmission congestion in southern New Mexico.

1.4 PURPOSE AND NEED

The following section describes the purpose and need for the BLM, Cibola National Forest and National Grasslands, and Sevilleta NWR federal real estate actions associated with the proposed project. The purpose and need statements for the three federal agencies are provided below because the focus of this Draft EIS is to disclose impacts associated with the federal real estate actions requested in the associated applications from the Applicant.

1.4.1 Bureau of Land Management

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple uses including the long-term needs for renewable and non-renewable resources. The BLM is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electrical energy (FLPMA Section 501(a)(4)). Taking into account the BLM's multiple-use mandate, the BLM's purpose and need for this action is to respond to the FLPMA right-of-way application submitted by the Applicant under Title V of FLPMA (43 USC 1761) to modify the existing Right-of-Way Grant NM114438 for the construction and operation of two 500-kV transmission lines located on federal, state, and private lands between central New Mexico and central Arizona, in compliance with FLPMA, BLM right-of-way regulations, the BLM NEPA Handbook (BLM 2008), U.S. Department of the Interior NEPA regulations, and other applicable federal and state laws and policies. Other applicable regulations and guidelines are listed in Appendix B.

1.4.2 Cibola National Forest and National Grasslands

The purpose of the USFS federal action is to respond to the Applicant's application for a right-of-way to construct, operate, maintain, and decommission a transmission line on federal lands. The need for this action is to fulfill USFS responsibility under FLPMA and National Forest Management Act (16 USC 1601–1614), the 1985 Amended Cibola National Forest Land and Resource Management Plan (LRMP), the 2001 Roadless Rule, 66 Federal Register 3244 (January 12, 2001), and USFS Special Use Authorization regulations at 36 CFR 251 Subpart B – Land uses and its implementing polices in Forest Service Manual (FSM) 2700, Forest Service Handbook (FSH) 2709.11, and related environmental policy direction in FSM 1900 and FSH 1900.

The USFS's purpose and need also must consider further guidance from the Energy Policy Act of 2005, which recognized the need to improve domestic energy production, develop renewable energy resources, and enhance the infrastructure (e.g., transmission lines) for collection and distribution of energy resources across the nation. To support this, the USFS is charged with analyzing applications for utility and transportation systems on federal lands they administer, while balancing the other beneficial uses for which the federal lands may provide.

1.4.3 Sevilleta National Wildlife Refuge

The purpose and need of the USFWS federal action is to respond to requests to co-locate the SunZia transmission line with existing transmission line corridors across the Sevilleta NWR. Currently, Sevilleta NWR has received an application from Tri-State Generation and Transmission Association Inc. (Tri-State) to reconstruct the existing line, and is awaiting application from El Paso Electric Company (El Paso Electric or EPE) to reconstruct their existing transmission line to allow SunZia's transmission infrastructure. National Wildlife Refuges are guided by the mission and goals of the National Wildlife Refuge System (NWRS) as stated in the Refuge Recreation Act of 1962 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997.

The USFWS needs to ensure this action is consistent with the priorities and mandates as outlined by the NWRS as stated in the Refuge Recreation Act of 1962 and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997.

1.5 DECISIONS TO BE MADE

The alternatives being considered in this Draft EIS (see Chapter 2) are located on federal lands managed by the BLM, USFS, and/or USFWS, depending on the alternative routes considered under Component 3, Segment 4 reroute alternatives. Decisions to be made by each agency are summarized below.

1.5.1 Bureau of Land Management

The purpose of the BLM's action is to respond to SunZia's application for use of BLM-administered lands for the amended right-of-way. Specifically, the BLM authorized officer will decide whether to grant, grant with conditions, or deny the application for an amended right-of-way on BLM lands. Pursuant to 43 CFR 2805.10, if the BLM issues a grant, the BLM decision maker may include terms, conditions, and stipulations determined to be in the public interest on BLM lands. This includes modifying the proposed use or changing the route or location of the facilities on BLM public land. If the decision is made to grant the right-of-way, the BLM will also decide any mitigation requirements, terms, conditions, and stipulations of the grant on BLM lands.

The BLM also must decide whether or not to amend any of the existing RMPs to achieve conformity with the land use plan and allow for a right-of-way grant of a major utility right-of-way for this proposed transmission line. The BLM's decision on the right-of-way grant and any associated RMP amendments would be outlined in a ROD, based on the findings identified in the EIS.

1.5.2 Cibola National Forest and National Grasslands

The USFS decision maker would use this EIS to inform his/her decision regarding: whether to issue a Special Use Authorization under the National Forest Management Act (16 USC 1601–1614); and under what terms and conditions a special use permit should be issued. Under 36 CFR 218, upon issuance of the Final EIS, the USFS also issues a draft ROD for its project-related decision and any associated project-specific amendments. This will start a 45-day objection filing period before the USFS can issue a decision.

1.5.3 Sevilleta National Wildlife Refuge

The USFWS decision maker would use this EIS to inform his/her decision regarding: 1) whether SunZia's proposal to utilize easements held by Tri-State and EPE that burden the Refuge complies with applicable law, regulation, and/or policy; and 2) what, if any, permitting will be required of SunZia, Tri-State, and/or EPE, including, but not limited to, construction and long-term maintenance needs outside of the existing transmission line footprint.

1.6 CONFORMANCE WITH LAND USE PLANS

1.6.1 BLM Land Use Plans

In accordance with Section 202 of the FLPMA, BLM lands are managed through resource management plans (RMPs) by BLM Field or District Offices which establish the goals and objectives for the management of the resources that could be affected by the proposed action. Proposed projects must conform with the management decisions and objectives of applicable RMPs as required by 43 CFR 1610.5-3. If a proposed project is not in conformance, the BLM can either choose to deny the project, adjust the project to conform to the RMP, or amend the plan to ensure conformance.

The project area includes lands administered by five BLM Field Offices (Tucson, Safford, Rio Puerco, Socorro, and Las Cruces) and two District Offices (Las Cruces and Gila). As proposed, the project is not in conformance with the Socorro RMP; therefore the BLM identified a plan amendment that would be needed for any of the alternatives that are fully analyzed in this Draft EIS. The proposed project components conform with all other BLM RMPs. There are three types of plan amendments identified in this Draft EIS that may be required to conform to RMPs, specific to compliance with Visual Resource Management (VRM) classes, crossing an area of critical environmental concern (ACEC), and avoidance/exclusion areas for rights-of-way. The RMP amendment would not designate a utility corridor. See Section 2.9 of this Draft EIS for more information about the proposed RMP amendments.

1.6.2 Cibola National Forest and National Grasslands Land and Resource Management Plan

The Amended 1985 Cibola National Forest LRMP currently provides direction for management of Cibola National Forest lands. The project as proposed on the Cibola National Forest is currently in conformance with the Amended 1985 LRMP.

1.6.3 Sevilleta National Wildlife Refuge Comprehensive Conservation Plan

The 2000 Sevilleta National Wildlife Refuge Comprehensive Conservation Plan (CCP) provides management tools, directions, and priorities for the 230,000-acre Sevilleta NWR. Decisions made within the CCP "are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management" (USFWS 2000a:17). The established purpose of the refuge is guided by the 1972 warranty deed (USFWS and The Nature Conservancy 1973), which states the purpose is "to preserve and enhance the integrity and the natural character of the ecosystems of the property by creating a wildlife refuge managed as nearly as possible in its natural state, employing only those management tools and techniques that are consistent with the maintenance of natural ecological processes."

Subject to pre-existing rights, the warranty deed and CCP state that the:

- property not be subject to commercial exploitation;
- property shall not be sold, exchanged, transferred, or abandoned, nor shall it be leased or used for any commercial purpose other than where deemed appropriate by the USFWS and The Nature Conservancy for the purpose of sound wildlife management; and that the
- Grantor may grant exceptions to [certain enumerated] restrictions that apply to all or any part of the Sevilleta NWR property, provided that any such exception does not impair the natural character of the area (see USFWS 2000a:69).

The USFWS is evaluating SunZia's proposal to utilize easements held by Tri-State and EPE that burden the Refuge in accordance with applicable law, regulation, and policy, including, but not limited to, the terms of the easements and the 1972 warranty deed, and what, if any, permitting will be required.

1.7 PUBLIC AND TRIBAL INVOLVEMENT

The purpose of the public involvement process is to identify potential environmental issues associated with the project and to ensure that all interested and affected parties are aware of the project and are provided meaningful opportunities to participate in the NEPA process. The public is able to do so by participating in public meetings, submitting comments and providing input on a range of issues to be addressed in the EIS. In addition to public involvement, the NEPA process also allows lead federal agencies to invite tribal, state, and local governments, as well as other federal agencies, to serve as cooperating agencies if that agency or government has either jurisdiction by law or special expertise relevant to the environmental analysis (BLM 2021a:3). Requirements for consultation under NHPA are in addition to and independent of the opportunity for qualified entities to cooperate under the provisions of NEPA. See Chapter 5 of this EIS for additional details on tribal consultation and coordination.

The Notice of Intent (NOI) for this project was published in the Federal Register on June 4, 2021, notifying the public of the BLM's intent to prepare an EIS and RMP amendment (BLM 2021a:A-1 through A-3). The NOI also signified the beginning of the 30-day scoping period, ending July 6, 2021. In addition to the NOI, various outreach methods were utilized, which included a pre-NOI postcard mailed to the BLM's interested party list, online project information, a media release, and a project newsletter (also mailed to the BLM's interested party list) announcing the publication of the NOI and public scoping meetings (BLM 2021a:Appendix B). Additionally, project introduction letters were sent on December 7, 2020, to 29 tribes (BLM 2021a:4). The letters provided an overview of the proposed action and invited each tribe to enter into formal government-to-government consultation as well as becoming cooperating agencies.

The BLM hosted a total of three virtual public meetings, on June 22, 23, and 24, 2021 (one per day). Project history, a description of the project, an overview of the NEPA process, and information and methods for providing formal comments were presented by PowerPoint. Following the presentation was a live question and answer period which provided opportunity for the public to ask questions and provide comments on issues to be addressed in the EIS. The public, agencies, and tribes also had the opportunity to submit comments during the scoping period through the BLM's ePlanning website, by mailing individual letters to the BLM New Mexico State Office, by providing telephone messages to the BLM project manager or project hotline, or by emailing the BLM's project manager.

Following the scoping period, the BLM received 186 submissions from the public. Of these 186 submissions, 130 were from individuals, 26 were from organizations or businesses, and eight were from agencies, with some entities providing more than one submission (BLM 2021a:5). Once comment-level coding took place, 835 total comments were identified. Approximately 167 comments were coded as out of scope, 137 comments were coded for wildlife resources, and 101 comments were coded for alternatives (BLM 2021a:6–7). Remaining comments were coded for issues such as socioeconomics, the NEPA process, purpose and need, climate change, etc. (BLM 2021a:6–7). Scoping comments have been used to identify issues and resource conflicts for analysis in this EIS, as summarized in Section 1.8 below. A detailed scoping report was published in July 2021 (BLM 2021a) and is available on the BLM's ePlanning website.

EIS Chapter 5 provides a summary of consultation and coordination efforts that have occurred for the proposed project. The programmatic agreement developed to comply with Section 106 of the NHPA and consultation activities under Section 7 of the ESA are described in EIS Section 5.4.

1.8 ISSUES

The CEQ regulations at 40 CFR 1500.4(i) direct that the scoping process should be used "not only to identify significant environmental issues deserving of study, but also to deemphasize insignificant issues, narrowing the scope of the [NEPA] process accordingly." Title 40 CFR 1501.9 (f)(1) indicates the lead agency "shall identify and eliminate from detailed study the issues that are not significant or have been covered by prior environmental review(s), narrowing the discussion of these issues in the statement to a brief presentation of why they will not have a significant effect on the human environment or providing a reference to their coverage elsewhere". Through scoping, 22 issues were identified for analysis in detail (AID) and 26 issues were identified for analysis in brief (AIB). These issues were vetted and reviewed by the cooperating agencies, and are presented in Sections 3.3 and 3.4 and summarized in Table 1-1. Table 1-2 summarizes the resources or concerns that were determined to be appropriate for dismissal from analysis in this EIS, with rationale.

Table 1-1. Issues Analyzed in EIS Chapter 3

Issue Analyzed in Brief in this EIS	Issue Analyzed in Detail in this EIS
AIB-1 Regional Air Quality	AID-1 Climate Change
AIB-2 Fugitive Dust	AID-2 Paleontological Resources
AIB-3 Locatable Minerals	AID-3 Avian Collisions
AIB-4 Common Variety Minerals	AID-4 Migratory Bird Corridors
AIB-5 Sensitive Soils	AID-5 Federally Listed Wildlife Species
AIB-6 Water Quality	AID-6 New Mexico Meadow Jumping Mouse
AIB-7 Sedimentation to Surface Water Resources	AID-7 BLM Sensitive Wildlife Species
AIB-8 Native Vegetation	AID-8 Federally Listed Plant Species
AIB-9 Vegetation Monitoring Transects	AID-9 BLM Sensitive Plant Species
AIB-10 Riparian Habitat	AID-10 Cultural Resources
AIB-11 Invasive Species (Noxious Weeds)	AID-11 National Scenic and Historic Trails
AIB-12 Desert Bighorn Sheep Habitat	AID-12 Visual Resources
AIB-13 Grasslands and Pronghorn Habitat	AID-13 Existing and Future Land Uses
AIB-14 Sensitive Time Periods and Habitat Fragmentation	AID-14 Proposed and Future Rights-of-Way
AIB-15 Wildlife Corridors	AID-15 Military Operations
AIB-16 Sandhill Crane Habitat	AID-16 BLM Special Designations
AIB-17 Sonoran Desert Tortoise Habitat	AID-17 USFS Inventoried Roadless Area
AIB-18 Monarch Butterfly Breeding Habitat	AID-18 Sevilleta National Wildlife Refuge
AIB-19 Nectar Bats	AID-19 Fiscal Economics and Job Creation
AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	AID-20 Environmental Justice
AIB-21 Recreation	AID-21 Noise
AIB-22 Hunting Access	AID-22 Electric and Magnetic Fields
AIB-23 Livestock Grazing	
AIB-24 Transportation	
AIB-25 Civilian Airports and Flight Paths	
AIB-26 Hazardous Materials	

Table 1-2. Resources and Concerns Dismissed from Analysis in this EIS, with Rationale

Resource or Concern	Rational for Dismissal
Impacts to Wilderness	Wilderness areas are not present within the project area or the area used for impact analysis (analysis area). No impacts to wilderness would occur from the proposed action or alternatives. This issue is dismissed from detailed analysis.
Impacts to Lands with Wilderness Characteristics (LWCs)	LWCs are defined as having a size of at least 5,000 contiguous acres, appear natural, offer outstanding opportunities for solitude or primitive and unconfined recreation, and have supplemental values per Section 2(c) of the Wilderness Act and as incorporated in FLPMA (BLM 2012, 2021e). Five LWC units were identified as being within the area used for impact analysis for the proposed project components. Four of these units were determined not to possess wilderness characteristics and, as a result, are not analyzed in detail: AZ-4-87 (unnamed), NM-30-33a (Pony Hills), NM-030-078 (Cuchillo), and NM-030-088b (unnamed). One unit was determined to possess LWC: Nutt Grassland LWC in the Las Cruces District Office. The Nutt Grassland LWC unit would not be directly impacted by the proposed project components; therefore this issue is dismissed from detailed analysis.
Impacts to Wild and Scenic Rivers, Research Natural Areas	No Wild and Scenic Rivers nor Research Natural Areas are present within the project area or analysis area. No impacts to Wild and Scenic Rivers or Research Natural Areas would occur from the proposed action or alternatives. This issue is dismissed from detailed analysis.

Resource or Concern	Rational for Dismissal
Impacts to night military flying from transmission tower lighting	No lighting is proposed for the transmission towers. The Applicant would install transmission tower lighting if required by any agency. This issue is dismissed from detailed analysis.
Wildland fire impacts from the four project components	Section 4.7 of the 2013 FEIS discloses impacts to wildland fire ecology and management (BLM 2013:4-117 through 4-122). The National Electrical Safety Code (NESC), which governs the design and operation of high-voltage electric utility systems, obligates SunZia to maintain reliable operation of the electrical system. The design, operation, and maintenance of the project would meet or exceed applicable criteria and requirements outlined by the NESC, FERC, Western Electric Coordinating Council (WECC), and U.S. Department of Labor Occupational Safety and Health Standards for the safety and protection of landowners, their property, and the general public. FLPMA Section 512 governs development, review, and approval of proposed operating plans and agreements for vegetation management, inspection, and operation and maintenance of power line facilities on public and National Forest System lands. The application of design features and applicant-committed environmental protection measures (EPMs) (Appendix C) to address human-caused ignitions during construction would mitigate the potential for elevated ignitions, compared with baseline conditions. Prior to the start of construction, a Fire Protection Plan and Emergency Preparedness and Response Plan, which would include response procedures for wildland fires, would be prepared (POWER Engineers, Inc. 2021b). Public access to the project area in specific areas where sensitive habitats or resources occur, would be gated or otherwise blocked from public access (EPM 6); thereby reducing the risk of human-caused ignitions during operation of the project. This issue is dismissed from detailed analysis.
Impacts to existing or future development of oil, gas, coal, geothermal, and other mineral leases	No oil, gas, or coal leases would be crossed by the four project components. Therefore, no impacts to these resources are expected. There are no geothermal wells crossed by project Component 4 (Segment 4 reroute alternatives). Two geothermal wells are within the area analyzed for impacts (analysis area) for Component 1 (localized route modifications). Twenty geothermal wells are within the analysis area for Component 2a (access roads) and one geothermal well is within the analysis area for Component 2b (temporary work areas). One geothermal well is within the analysis area for Component 3 Alternative Route 1 but is outside the 400-foot-wide project right-of-way. Given that the one geothermal well within the analysis area for Component 3 is outside the 400-foot-wide project right-of-way, no impacts to this geothermal well are expected. Geothermal leaseholders could install additional geothermal wells in the vicinity of the project area with little to no conflict with project components, given the potential for flexible siting of new wells enabled by directional drilling and the widespread nature of the resource. The proposed project would require planning and coordination between the project proponent and mineral leaseholders to reduce development conflicts. If leasable mineral resources come in conflict with the route, impacts to mineral resources will be minimized to the extent possible through EPMs such as structure spanning (EPM 8) and proper post-construction reclamation (EPM 5). SunZia would be expected to resolve conflicts regarding mineral ownership and access, including any compensation for economic impacts to leaseholders, etc., through fee mineral and landowner agreements and permissions. This issue is dismissed from detailed analysis.
Conflicts with existing/planned wind and solar energy developments	The proposed project components would not conflict with any existing wind or solar energy developments. Further, there are no known planned wind or solar energy developments within the project area that would be adversely impacted by the proposed project components. The closest energy developments are the existing Macho Springs Wind Energy Farm and Macho Springs Solar Facility, located approximately 0.5 mile and 1.3 miles east, respectively, of the localized route modification. The Macho Springs Localized Route Modification (Component 1) was developed to rectify the constraint of routing project facilities through the Macho Springs Solar Facility. Other planned wind and solar projects that would be avoided by the project include the proposed Saint Solar Project, High Lonesome Mesa Wind Project, and Great Divide Wind Project. Therefore, there would be no adverse impacts to wind or solar energy developments from the proposed project components. This issue is dismissed from detailed analysis.

Resource or Concern	Rational for Dismissal
Impacts to groundwater quantity from water use for dust abatement and access road construction and operation activities	Water for construction activities and fugitive dust abatement, including during access road construction and operation activities, would be obtained from multiple permitted commercial water sources. There are no new water wells associated with the proposed action. The permitted groundwater wells, or commercial water sources, are maintained by state regulating authorities, including the Arizona Department of Water Resources and New Mexico Office of the State Engineer. These regulating authorities are responsible for the protection of groundwater, including groundwater quantity. The Applicant’s dust control plan is captured within Appendix A6 and includes the use of water and other suppression methods, including chemicals (magnesium chloride and polymers) pending the land-management agency approval. Additional details on the Applicant’s proposed dust control measures can be found within POD Section 3.2.6. of Appendix A6 (POWER Engineers, Inc. 2021b).
Would extreme weather events interfere with the operation of the proposed project components?	POD Appendix A8 provides the Emergency Preparedness and Response Plan Guidelines (POWER Engineers, Inc. 2021b). Emergency response procedures would be implemented for the following potential events, or similar events: • downed transmission lines, structures, or equipment failure • fires • sudden loss of power • natural disasters • serious personal injury This issue is dismissed from detailed analysis.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter provides a description of the proposed action (right-of-way amendment for the SunZia Southwest Transmission Project), the alternatives analyzed in this Draft EIS, the process used to identify the alternatives, and the alternatives that were considered but eliminated from detailed study.

The 2015 Selected Route is organized in four segments, as follows:

- Segment 1 – Pinal Central Substation to Willow 500-kV Substation (Appendix A, Maps 1–50)
- Segment 2 – Willow 500-kV Substation to SunZia South Substation (Segment 2a in Arizona, Segment 2b in New Mexico) (Appendix A, Maps 51–81)
- Segment 3 – SunZia South Substation to New Mexico Institute of Mining and Technology (New Mexico Tech) (Appendix A, Maps 82–129)
- Segment 4 – New Mexico Tech to SunZia East Substation (Appendix A, Maps 130–193)

The project consists of the following four components and their alternatives: Component 1—localized route modifications in Segments 1, 2 and 3; Component 2—access roads and TWAs outside the granted right-of-way in Segments 1, 2, and 3; Component 3—transmission line reroutes in Segment 4; and Component 4—addition of the SunZia West Substation in Segment 1 (Figure 2-1). The no action alternative is also analyzed in this EIS, in which the amended right-of-way for the project would not be granted, and the right-of-way grant issued in 2016 (2015 Selected Route) would remain valid.

The description of the proposed action provided in Section 2.3 is consistent among all alternatives. The description of the project components are provided in Section 2.4. The design features and applicant-committed environmental protection measures (EPMs) are listed in Appendix C. These details provide the basis for the assessment of impacts in Chapter 3. A summary comparison of all alternatives is provided in Section 2.10.

Since the publication of the 2015 ROD, some project naming conventions have changed. For comparison purposes, Table 2-1 provides a crosswalk of terms used in the 2015 ROD and their names as used in this Draft EIS.

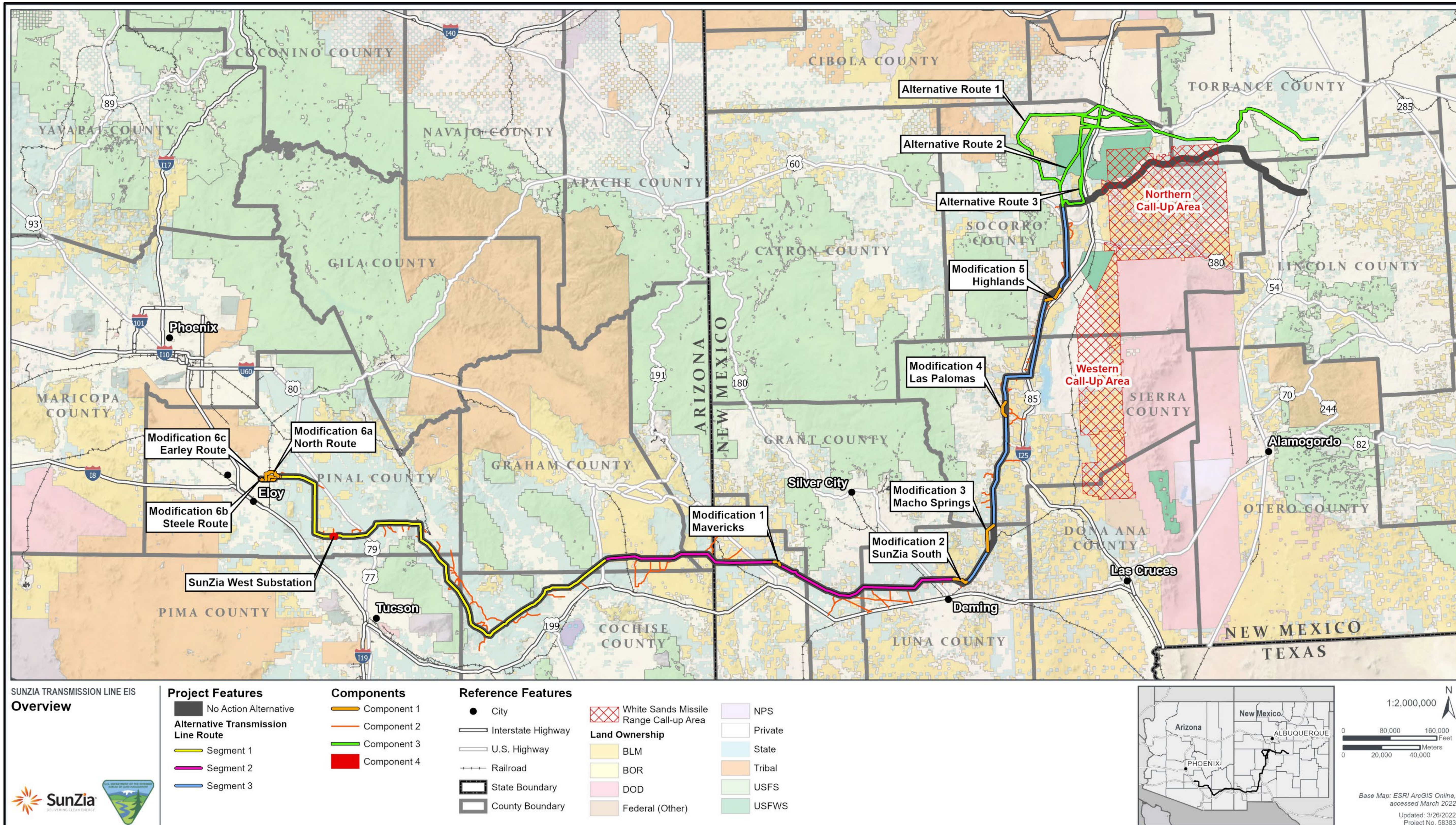

Figure 2-1. Overview of Proposed Project Components.

Table 2-1. Crosswalk of Naming Conventions Used between 2015 ROD and this EIS

2015 Record of Decision Naming Convention (2015 Selected Route)	2022 Draft EIS Naming Conventions
Substations	
SunZia East	SunZia East
Willow 500-kV	Willow 500-kV
Midpoint	SunZia South
Lordsburg	Lordsburg
Pinal Central	Pinal Central
Routes	
Route Groups*	**Segments**
Route Group 1: SunZia East Substation (Lincoln County) to Midpoint Substation	Segment 4 – (New Alternatives) area near New Mexico Tech in Socorro County to SunZia East (new location in Torrance County)
	Segment 4 – (2015 Selected Route) area near New Mexico Tech in Socorro County to SunZia East (Lincoln County)
	Segment 3 – SunZia South to area near New Mexico Tech
Route Group 3: Midpoint Substation to Willow 500-kV Substation	Segment 2 – Willow 500-kV to SunZia South
Route Group 4: Willow 500-kV Substation to Pinal Central Substation	Segment 1 – Pinal Central to Willow 500-kV

* The 2013 FEIS considered but eliminated an alternative group of subroutes (Route Group 2) east of the WSMR originating at the SunZia East Substation location and terminating at the Midpoint Substation.

2.2 DEVELOPMENT OF PROPOSED ACTION

In January 2015, the BLM issued the ROD for the SunZia Southwest Transmission Project, which became the route selected for the SunZia project transmission lines (hereinafter referred to as the 2015 Selected Route). The BLM issued the right-of-way grant on September 1, 2016, for a lease term of 50 years. The four components of the proposed action, and analyzed in this EIS are:

- **Component 1:** Approximately 40 miles of localized route modifications in Pinal County, Arizona, and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico (Appendix A, Maps 1–3, 66, 81–83, 86–90, 103–105, 119, 120)
- **Component 2:** Access roads and TWAs outside the granted right-of-way in Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Torrance, and Lincoln Counties, New Mexico (Appendix A, all maps except 5, 37, 67, 91, 131, 133–193)
- **Component 3:** A reroute of the 2015 Selected Route within Socorro, Valencia, and Torrance Counties, New Mexico (Appendix A, Maps 130–193)
- **Component 4:** The alternate location of the SunZia West HVDC substation in Pinal County, Arizona (Appendix A, Map 14)

Components 1 and 2: As a result of further landowner coordination, advanced project design, and engineering review since the right-of-way grant was issued in 2016, the Applicant has identified localized transmission line route modifications in Segments 1, 2, and 3 and refined the location and design of access roads and TWAs in Segments 1, 2, and 3 to improve constructability and minimize variances during construction.

Component 3: One of the ongoing challenges of the project has been the location of Segment 4 (2015 Selected Route), a segment of the proposed transmission line alignment within the WSMR NCUA, which necessitated a plan for undergrounding approximately 5 miles of the transmission line (BLM 2015b: Section 3.5.2.6). As identified in the 2015 ROD, the 2015 Selected Route was selected because it would maximize the use of existing utility corridors, minimize impacts to sensitive resources, minimize impacts at river crossings, minimize impacts to residential and commercial land uses, and minimize impacts to military operations in the restricted airspace north of the WSMR. The WSMR, approximately 3,200 square miles, is the DOD’s largest domestic range providing support of missile development and test programs critical to national defense and security. The WSMR conducts very-low-altitude test-flight profiles for drones, missiles, and other unmanned vehicles launched from the WSMR or received from launches from off-installation locations. The airspace associated with WSMR is a complex of restricted airspace from surface to unlimited designated to ensure the separation of non-participating aircraft from potentially hazardous operations (Office of the Assistant Secretary of Defense 2022). Areas to the north and west of the WSMR (referred to as “call-up areas”) can be used by the WSMR temporarily if needed for specific missions that cannot be accomplished within the boundaries of the range. From late 2017 through 2019, the Applicant and DOD had numerous discussions about the impacts of the 2015 Selected Route along Segment 4 on the DOD’s “test range infrastructure needed to support emerging technologies and systems identified in the National Defense Strategy” (McMahon 2018). The Applicant and DOD had continuing discussions about potential alternative routes that could reduce or eliminate such impacts. The DOD has acknowledged the national security benefits from reducing impacts to WSMR operations that could result from the Applicant pursuing potential alternative routes for Segment 4 that would relocate the project’s proposed transmission line and associated facilities outside of the WSMR NCUA (McMahon 2018; Office of the Assistant Secretary of Defense 2022).

Coincident with this was the development of the permitted Western Spirit Project located north of the Segment 4 (2015 Selected Route). The Applicant plans to use the SunZia project as the primary transmission system for the electricity generated at wind-generation projects in eastern New Mexico, including the Corona area (Lincoln, Torrance, and Guadalupe Counties). The construction of the Western Spirit Project presented a new opportunity for siting a reroute of Segment 4 of the project to partially parallel the Western Spirit Project. SunZia also identified that rerouting Segment 4 to partially parallel the Western Spirit Project could help to minimize impacts to WSMR operations that might result from the 2015 Selected Route. This is consistent with the FLPMA (Public Law [PL] 94-579, 43 USC 1763), which encourages use of common utility rights-of-way in order to minimize adverse environmental impacts and the proliferation of separate rights-of-way.

Further, the Applicant has proposed alternative routes across the Sevilleta NWR that address issues raised in the previous EIS. In Section 2.3.3.1 of the 2013 FEIS, the BLM eliminated from detailed analysis several alternatives crossing through the Sevilleta NWR on the basis that such alternatives would conflict with the Refuge management policy and restrictions that prohibit commercial uses, as stated in the Sevilleta NWR land grant deed. (BLM 2013:2-28 through 2-36). However, co-location with the existing utility lines was not considered at that time. EPE has a 345-kV transmission line in a 100-foot-wide easement and Tri-State has a 115-kV transmission line in a 50-foot-wide easement. Due to existing easement widths, only one new SunZia transmission line could be routed within each easement for Alternative 2 and Alternative 3, requiring modification and replacement of each transmission line. Tri-State and EPE would need to request use of Refuge lands outside of existing easement footprints for construction and long-term maintenance. As proposed and analyzed in this Draft EIS, co-location with existing utility lines within existing easements would address issues previously raised and provide a basis for the BLM’s consideration of these new alternatives.

Component 4: The Applicant also identified the need for an HVDC substation, the SunZia West Substation, at a newly identified west-end receiving terminal in Arizona (Segment 1). A direct-current (DC) transmission line would require equipment at each DC terminus location to convert the power from alternating current (AC) to DC (SunZia East HVDC converter) and DC to AC (SunZia West HVDC converter). As engineering and design for the project has progressed, the operation and interconnection capabilities for the west-end HVDC receiving terminal could be better served at a dedicated and separate site rather than near Salt River Project's Pinal Central Substation, as previously proposed. Based on how market conditions evolve, the SunZia West HVDC converter may ultimately be constructed and operate within the previously analyzed location near the Pinal Central Substation.

Table 2-2 summarizes the components of the proposed action for this Draft EIS (as in the amended right-of-way application), by segment, along the 2015 Selected Route. The proposed action is also described in detail in Resource Report 1 – Project Background and Methods (POWER Engineers, Inc. 2021a), and the December 2021 POD (POWER Engineers, Inc. 2021b). These two reports (POWER Engineers, Inc. 2021a and 2021b) are incorporated by reference herein.

Table 2-2. Proposed Project Components Summarized by Project Segment

	Segment 1	Segment 2	Segment 3	Segment 4
Component 1: Localized Route Modifications	One proposed localized route modification	Two proposed localized route modifications	Three proposed localized route modifications	None
Component 2: Access Roads and TWAs	Yes	Yes	Yes	None
Component 3: Segment 4 Reroute	None	None	None	12 new subroutes analyzed in this Draft EIS
Component 4: SunZia West Substation	The SunZia HVDC substation is proposed for Arizona State Trust Lands	None	None	None

2.3 PROPOSED ACTION

The proposed action is for the BLM to amend the current right-of-way authorization to include proposed project components outside of the existing granted right-of-way for the construction, operation, maintenance, and decommissioning of the project. The USFWS and Cibola National Forest may need to issue new authorizations, depending on the alternatives under proposed Component 3, which includes a proposed, approximately 150-mile reroute of the 2015 Selected Route in Socorro, Valencia, and Torrance Counties, New Mexico. Project facilities, design characteristics, construction activities, design features, and EPMs generally would be consistent regardless of the route alternative selected. Land-management agencies would issue separate authorizations, which may require additional stipulations associated with their decisions. Features that are common to all action alternatives are described in this section.

The information and analysis contained in this Draft EIS does not replace the project description, information, and analysis provided in the 2013 FEIS, 2015 ROD, and 2016 BLM right-of-way grant. This Draft EIS provides additional and updated analysis for the four project components contained within the application to amend the existing right-of-way authorization. The four project components are the proposed action analyzed within this Draft EIS. Table 2-3 summarizes the project components that would change as a result of the amended right-of-way application, if approved by the BLM.

Table 2-3. New or Revised Project Components Analyzed in this Draft EIS

	Analyzed in 2013 FEIS and Approved in 2015 ROD	Changes Analyzed in this Draft EIS
Counties crossed by the project	Lincoln, Socorro, Sierra, Luna, Grant, and Hidalgo Counties in New Mexico; Cochise, Greenlee, Graham, Pima, and Pinal Counties in Arizona	Socorro, Valencia, and Torrance Counties in New Mexico and Pinal County in Arizona
Land ownership crossed by the project	BLM lands (Arizona and New Mexico) State Trust Lands (Arizona and New Mexico) Private	Cibola National Forest Coronado National Forest USFWS, Sevilleta NWR
Overall project length	515 miles	An additional 30 to 54 miles (depending on the alternative for Component 3)
Transmission line types	One 500-kV AC transmission line and one 500-kV AC or DC transmission line	No change
Right-of-way width	Typically 400 feet wide, up to 1,000 feet wide	Typically 400 feet wide, and 50 to 100 feet wide on the Sevilleta NWR and other areas depending on final right-of-way agreements.
Route modifications	N/A	Up to six localized route modifications in project Segments 1–3
Access routes and temporary work areas outside of right-of-way	Three levels of access were identified and the associated amount of ground disturbance from upgrading or constructing access was estimated. See FEIS/RMPA Table 2-7 and Appendix I – Analysis of Access Conditions and Potential Ground Disturbance.	Specific locations of access routes and TWAs have been identified for analysis in the Draft EIS.
New Mexico route alternatives near project terminus	Subroute 1A2 was approved to cross the Rio Grande south of the Refuge, crossing the DOD restricted airspace, and terminate in Lincoln County, New Mexico	Segment 4 reroute is needed to co-locate a portion of the line with the constructed Western Spirit Project line and further minimize impacts to DOD missions, which would require an alternative Rio Grande crossing location north of the Sevilleta NWR.
New substations	New substations would be constructed on private or state lands in Luna, Hidalgo, and Graham Counties.	New location for the HVDC substation in Pinal County, Arizona
Resource Management Plan Amendments (RMPAs)	The Selected Route requires amendments to portions of the Socorro RMP and the Mimbres RMP and would require amendments as identified in the 2015 ROD and as required by 43 CFR 1610.5-3.	Components 2 and 3 would require amendments to portions of the Socorro RMP and the Mimbres RMP. See EIS Section 2.9 for more information.

2.3.1 Project Design Characteristics

The overall typical project design characteristics have not changed since the 2013 FEIS was written, through site-specific changes have been incorporated. The reader is referred to Sections 2.4.1 through 2.4.8 of the 2013 FEIS as well as Chapter 3 of the POD for the right-of-way amendment (POWER Engineers, Inc. 2021b) for a detailed discussion of the project design characteristics. Table 2-4 briefly summarizes the typical project design characteristics.

Table 2-4. Summary of Typical Project Design Characteristics

Design Characteristic	2013 FEIS Section Reference	2021 POD Section Reference	Description
Overhead transmission lines	2.4.1	3.1.1	Two 500-kV overhead transmission lines (AC and DC) would be constructed for the project between the SunZia East Substation and the permitted Pinal Central Substation for approximately 500 miles.
Structures	2.4.2	3.1.2	Typical 500-kV structure types could be used for the project: guyed lattice, self-supporting lattice, self-supporting tubular, dead-end lattice, dead-end tubular, and dead-end tubular.
Foundations	2.4.3	3.1.3	Structure foundations would range from 10 to 50 feet deep and 3 to 12 feet wide.
Conductors	2.4.4	3.1.4	Minimum conductor height above ground would be 30–38 feet (30–35 feet for the AC transmission line and 38 feet for the DC line).
Insulators and associated hardware	2.4.5	3.1.5	Permanent assembly of insulators, 20 to 28 feet long, used to position and support each of the conductor bundles to the structures. Insulator assemblies may be either “V” shaped or “I” shaped (vertical) for the tangent structures, and “I” shaped (horizontal) for the dead-end structures.
Overhead groundwire (OHGW)	2.4.6	3.1.6 and 3.1.7	Two groundwires of extra-high strength steel wire of approximately 0.5-inch diameter. One or both of the OHGWs would be an approximately 0.5-inch diameter fiber-optic groundwire (OPGW), used for data transfer along the fiber path.
Fiber-optic regeneration station	2.4.7	3.1.8	Fiber-optic regeneration sites for project monitoring and operation would typically be in a fenced area of up to 100 × 100 feet containing a building of 12 × 32 feet long × 9 feet tall. Fiber-optic regeneration station sites would be located within the proposed substations at approximately 175-mile intervals, and at other remote sites located along the transmission line route approximately halfway between each substation.
Substations	2.4.8	3.1.12	Several substations would be associated with the project, constructed on private or state lands. One new substation location (SunZia West) is analyzed in this Draft EIS.

2.3.2 Pre-construction Activities

The overall proposed pre-construction activities have not changed since the 2013 FEIS was written, through site-specific changes have been incorporated. The reader is referred to Section 2.4.90 of the 2013 FEIS (BLM 2013) and the 2021 POD (POWER Engineers, Inc. 2021b) for a detailed discussion of the proposed pre-construction methods. Table 2-5 briefly summarizes the pre-construction activities that are analyzed in this EIS, including geotechnical investigations.

Table 2-5. Summary of Project Pre-Construction Activities

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
Right-of-Way and Land Acquisition	2.4.9.1	3.3.1	New permanent and temporary land rights would be required for project facilities. The amount of right-of-way required could depend on certain site conditions or constraints and selected alternative.
Geotechnical Investigations	2.4.9.2	N/A	Geotechnical investigation would consist of the drilling and sampling of soils with a diameter of 8 inches and to a typical depth of 30–40 feet below the existing ground; however, borehole depth may exceed 50 feet. No new road construction or blading would be required.

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
			Helicopter-transported drill rigs may be used where adequate access does not exist or where overland travel is expressly prohibited.
Centerline Survey	2.4.9.3	N/A	If an action alternative is approved in the ROD, an engineering survey would then be completed, which would involve verifying and staking project components. The centerline may be adjusted to accommodate engineering requirements.

2.3.3 Construction

The overall proposed construction activities have not changed since the 2013 FEIS was written, though site-specific changes have been incorporated. The proposed project would be constructed in two phases: Phase 1 would include the first nominal 500-kV circuit, anticipated to be a DC line, and Phase 2 would be the second nominal 500-kV circuit, an AC line. The reader is referred to Section 2.4.10 of the 2013 FEIS (BLM 2013) and the 2021 POD (POWER Engineers, Inc. 2021b) for a detailed discussion of the proposed construction methods. Table 2-6 briefly summarizes the typical construction activities.

Table 2-6. Summary of Typical Project Construction Activities

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
Construction or improvement of access roads	2.4.10.1	4.1 of Appendix A1	Access roads for the project would consist of a combination of existing and new roads. All access roads would typically be constructed with a travel-surface width of 20 feet, and 2-foot berms and/or drainage ditches on both sides of the travel surface, for a total roadway width of 24 feet. In steep terrain, total disturbance would likely exceed 24 feet (e.g., up to 50 feet for a 2:1 slope). Overland road construction methods may be implemented where feasible. In certain areas, it could be necessary to block roads after construction to restrict future access for general and undesired use. Blocked access routes would have the ability to be reopened when necessary. See Section 2.4.2 of this Draft EIS for more information about access roads.
Establishment of equipment staging and construction yards	2.4.10.2	4.2 of Appendix A1	Construction yards would be located approximately every 40 miles, and concrete batch plants would be located on temporary work sites of approximately 3 to 5 acres, located every 30 miles along the right-of-way.
Structure pad clearing/grading	2.4.10.3	4.2 of Appendix A1	Work areas would require a 200 × 200–foot area of temporary disturbance in most areas. Access within the work area would be overland travel with grading. Clearing of natural vegetation would be required, typically, only vegetation approximately 12 feet or higher. After construction, all temporary work areas would be restored. Permanent disturbance associated with the structures and structure footings would include an area of up to 60 × 60 feet.
Right-of-way clearing/grading	2.4.10.3	4.2 of Appendix A1	Clearing of natural vegetation would be required for construction, clearances for electrical safety, long-term maintenance, and reliability of the transmission line. Within the right-of-way, mature vegetation will be selectively removed under or near the conductors to provide adequate electrical clearance as required by National Electrical Safety Code (NESC).

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
Foundation installation	2.4.10.4	4.3 of Appendix A1	The typical foundation would be a precast foundation that is delivered to the site on a flatbed truck. An area approximately 6 to 8 square feet × 4 to 5 feet deep would be excavated and the base of the foundation will be compacted with select material. The precast foundation would be set into the excavation and onto the compacted base. The excavation would then be backfilled and compacted.
Structure assembly and erection	2.4.10.5	4.4 of Appendix A1	Structures would be assembled and erected on-site using cranes, except where helicopter construction is employed.
Ground rod installation	2.4.10.6	4.6 of Appendix A1	Grounding of structures would be accomplished by installation of driven ground rods, typically ¾ inch × 16 feet deep, or counterpoise (grounds), which consist of cable buried a minimum of 12 inches deep (minimum of 18 inches in cultivated areas), extending from one or more structure legs for approximately 200 feet.
Stringing conductors and groundwire	2.4.10.7	4.5 of Appendix A1	Conductors and groundwires would be placed on the transmission line support structures by a process called stringing. Temporary clearance structures (guard structures) would be erected where required for safety and protection during wire stringing operations. Following the initial stringing operation, pulling and tensioning the wires/conductors would be required to achieve the correct sagging of transmission lines between structure supports. Typically, sites for tensioning and pulling equipment are approximately 200 × 600 feet, and would be required approximately every 18,000 feet. However, smaller 200 × 400–foot pulling, tensioning, and/or splicing sites would be located at 9,000-foot intervals between the larger 200 × 600–foot tensioning and pulling sites. See Section 2.4.2 of this Draft EIS for more information about TWAs outside of the granted right-of-way.
Preparation and construction of substations and AC/DC converter stations	2.10.4.8	5.2 of Appendix A1	Preparation and construction at the substation sites would require grading, placement, and compaction of fill, subsurface grounding grids and control conduits, oil spill containment facilities, gravel-surfaced yard, parking areas (approximately 100 × 100 feet), roads (a minimum of 24 feet wide), fencing and gate, facility construction, and revegetation.
Waste removal	2.10.4.9	6.2.7, Appendix A7	Construction sites, material storage yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of in an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be facilitated. No open burning of construction trash would occur without appropriate approval.
Reclamation	2.4.10.10	Appendix F	The right-of-way would be reclaimed to its original condition as is practicable. In areas of temporary disturbance, all practical means would be made to reclaim the land to its original contour, natural drainage patterns, and vegetation along the right-of-way.

The BLM is authorized to dispose of (permanently transfer through sale) common variety federal mineral materials on split-estate lands in accordance with 43 CFR 3600. As part of the proposed action, the BLM is evaluating proposed disposal of federal mineral materials in accordance with 43 CFR 3600, the Materials Act of 1947 (30 USC 601 et seq.), and associated agency policies, such as the BLM Mineral Materials Disposal Handbook H-3600-1 (BLM 2016a), for construction of the project. The proposed action would use federal common-variety mineral materials as engineered backfill in the construction of transmission structure foundations within project Components 1 and 3.

Using conservative assumptions, the proposed action would include the BLM's authorization to dispose of approximately 23,000 cubic yards of federal common-variety mineral materials from split-estate lands (Table 2-7).

Table 2-7. Split-Estate Mineral Material Disposal Cubic Yard Estimates

Project Component [1, 2]	Project Alternative with Greatest Potential Impacts	Bank Cubic Yards per Mile	Miles of Overlap with Split-Estate Minerals	Total Bank Cubic Yards Disposed
Component 1: Localized Route Modifications	Not applicable. All six localized route modifications are included in this calculation.	531	9.5	5,045
Component 3: Segment 4 Reroute [3]	• Alternate Route 3 with Subroute 3A-1 and Local Alternative 3B-2 • Alternate Route 3 with Subroute 3A-2 and Local Alternative 3B-2 • Alternate Route 3 with Subroute 3A-3 and Local Alternative 3B-2 • Alternate Route 3 with Subroute 3A-4 and Local Alternative 3B-2	531	19.0	10,089
Preliminary maximum split-estate mineral material disposal				15,134
With 50% overrun margin, rounded up to ensure sufficient volume is analyzed				**23,000**

1. These calculations conservatively assume a structure foundation area of 38 square feet and a depth of 50 feet (70 cubic yards per each structure) (POWER Engineers, Inc. 2021b). Two transmission lines per right-of-way are assumed, with approximately 7.5 transmission structures per mile.

2. Components 2 and 4 are not anticipated to use split-estate federal mineral materials during construction.

3. Component 3 also includes fiber-optic regeneration stations which would be constructed every 175 miles along the project right-of-way; given the relatively small amount of split-estate minerals overlapping this portion of the project area (up to 19.0 miles), it is assumed the final project design would locate these stations outside split-estate areas and thus would not contribute to the total amount of split-estate mineral material disposal.

The estimated workforce and equipment required to construct the proposed transmission lines and substations are listed in the 2013 FEIS in Tables 2-8 and 2-9 (BLM 2013:2-83 to 2-86). The proposed project would consist of several phases of construction at various locations, allowing some shared personnel between work sites according to the task schedule. An estimated total of 206 workers would be required for construction of each transmission line. The maximum substation construction workforce would range from 330 to 424. Actual construction workforce at any one time would be less than the maximum.

2.3.4 Operation, Maintenance, and Decommissioning

The overall proposed operation, maintenance, and decommissioning activities have not changed since the 2013 FEIS was written, though site-specific changes have been incorporated. The reader is referred to Section 2.4.11 of the 2013 FEIS (BLM 2013) and the 2021 POD (POWER Engineers, Inc. 2021b) for a detailed discussion of the proposed maintenance and decommissioning activities. Table 2-8 briefly summarizes the operation and maintenance activities.

Table 2-8. Summary of Project Operation and Maintenance Activities

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
Bi-annual maintenance inspections by helicopter or driving patrol	2.4.11.1	5.4	Spring and fall overflight maintenance activities would be conducted to identify and resolve conditions that pose an immediate hazard to the public or employees, or that risk immediate loss of supply or damage to the electrical system. Monitoring and maintenance would be done from approved or existing access roads.

Activity Name	2013 FEIS Section Reference	2021 POD Section Reference	Description
Maintenance, as needed, to structures and conductors	2.4.11.1	5.4.1	The transmission lines would be patrolled bi-annually for maintenance, either by helicopter or by driving patrol. Over-flight line maintenance during the spring and fall of each year is based on weather conditions, helicopter availability, and statutory requirements of the states served by the Applicant. Monitoring and maintenance would be done from approved or existing access roads. When access into the structure locations needs improvement, a tracked bulldozer or other heavy equipment would be used after notifying the land-management agency's Authorized Officer.
Vegetation management and noxious weed treatment	2.4.11.1	Appendix B5	Vegetation management needs would be determined by regular inspection patrols according to NERC standards and Section 512 of FLPMA. Where necessary, maintenance crews would trim trees and other woody vegetation, and remove brush from the right-of-way. Vegetation management would occur periodically (every 2 to 5 years), generally in the summer and fall seasons.
Inspection and maintenance of the communication regeneration site	2.4.11.1	5.4.1	Maintenance of the communication facilities would consist of testing, repairing, and replacing electronic equipment located within the building at the regeneration site.
Inspection and maintenance of substations	2.4.11.1	5.4.2	The substation yards would be maintained and inspected according to best management practices (BMPs) and the Applicant's standards.
Fire protection and emergency response	2.4.11.2	Appendix A4	All applicable fire laws and regulations would be observed during construction and operation. If extreme fire conditions were to occur, access would be restricted. Maintenance personnel would coordinate with the agency representatives and implement practical measures to report, prevent, and suppress fires.

The BLM and other land management agencies would authorize the right-of-way grant amendment and right-of-way authorization(s) for up to 50 years. However, the project facilities would have a useful life up to 75 years. Once the right-of-way expires in 50 years, the right-of-way holder would determine whether the holder still wants to operate/maintain the facilities. If the facilities are no longer needed, at the end of the useful life of the project of 50 years, the right-of-way holder would decommission. Decommissioning would include the right-of-way holder dismantling, and removing conductors, insulators, concrete pads, and hardware from the right-of-way. The holder would excavate/remove tower/pole footings, or the actual poles at least 2 feet below ground level. The holder would restore all disturbed areas according to an approved Termination and Reclamation Plan by the BLM's and other land management agencies' Authorized Officer. To ensure that SunZia complies with reclamation and decommissioning requirements, they will be required to adhere to bonding requirements in accordance with 43 CFR 2805.20 Regulations (Bonding Requirements), and as identified in the currently approved right-of-way grant.

2.4 PROJECT COMPONENTS

2.4.1 Component 1: Localized Route Modifications

Component 1 consists of proposed modifications of the 2015 Selected Route in six localized areas in Segments 1, 2, and 3 in Pinal County, Arizona and Hidalgo, Luna, Sierra, and Socorro Counties, New Mexico. After the right-of-way grant was issued in September 2016, and pursuant to the requirements in the ROD, subsequent ground-controlled surveys and engineering were conducted in conjunction with environmental resource surveys to refine locations of project facility locations and refine the limits of the transmission line right-of-way alignment. Route Modifications 1 through 5 are located on public lands administered by the BLM, and are proposed due to inability to obtain private rights-of-way or easements; changes in land use; or physical constraints. Route Modification 6 includes route modifications on private and state lands. The proposed route modifications are summarized in Table 2-9.

The six proposed route modifications are:

- Route Modification 1 – Mavericks Area (BLM) (Appendix A, Map 66)
- Route Modification 2 – SunZia South Area (BLM) (Appendix A, Maps 81–83)
- Route Modification 3 – Macho Springs Area (BLM) (Appendix A, Maps 86–90)
- Route Modification 4 – Las Palomas Area (BLM) (Appendix A, Maps 103–105)
- Route Modification 5 – Highlands Area (BLM) (Appendix A, Maps 119–120)
- Route Modification 6[2] – Pinal Central Area (Private & State) (Appendix A, Maps 1–3)

See Section 2.2.1 of Resource Report 1 for a detailed description of these six route modifications (POWER Engineers, Inc. 2021a).

[2] Given the current level of development in the area of Localized Route Modification 6, there is insufficient room to locate both transmission lines in their current authorized corridor (2015 Selected Route). One of the proposed Localized Route Modification 6 options, Pinal Central Area-North Route, would contain only one transmission line, while Pinal Central Area-Steele Route or Pinal Central Area-Earley Route could contain either one or two transmission lines. See Resource Report 1, Section 2.2.1 for more information (POWER Engineers, Inc. 2021a:37–39). Depending on the result of this NEPA process, there is the potential that a combination of the 2015 Selected Route and/or Localized Route Modification 6 options would be selected to allow both transmission lines to connect into the Pinal Central Substation.

Table 2-9. Summary of Proposed Localized Route Modifications Subject to BLM Right-of-Way Grant Amendment

Route Modification[3]	County	Segment	BLM		State		Private		Total[2]	
			2015 Selected Route[1]	Proposed Modification	2015 Selected Route[1]	Proposed Modification	2015 Selected Route[1]	Proposed Modification	2015 Selected Route[1]	Proposed Modification
			Miles (Acres)	Miles (Acres)	Miles (Acres)	Miles (Acres)	Miles (Acres)	Miles (Acres)	Miles (Acres)	Miles (Acres)
1. Mavericks Area	Hidalgo	2	1.0 (48.5)	1.1 (53.3)	0.2 (9.7)	1.7 (82.4)	1.0 (48.5)	0 (0)	2.2 (106.7)	2.8 (135.8)
2. SunZia South Area	Luna	2	0 (0)	0.6 (29.1)	2.3 (111.5)	3.1 (150.3)	2.1 (101.8)	0.8 (38.8)	4.4 (213.3)	4.5 (218.2)
3. Macho Springs Area	Luna	3	2.7 (130.9)	0.7 (33.9)	3.6 (174.5)	8.6 (417.0)	2.5 (121.2)	0 (0)	8.8 (426.7)	9.3 (450.9)
4. Las Palomas Area	Sierra	3	1.3 (63.0)	2.8 (135.8)	1.0 (48.5)	0.1 (4.8)	2.0 (97.0)	2.4 (116.4)	4.3 (208.5)	5.3 (257.0)
5. Highlands Area	Socorro	3	5.3 (257.0)	5.9 (286.1)	0 (0)	0 (0)	1.8 (87.3)	0.6 (29.1)	7.1 (344.2)	6.5 (315.2)
6a. Pinal Central Area-North Route[4]	Pinal	1	0 (0)	0 (0)	0.7 (17.8)	2.6 (23.6)	5.3 (128.2)	7.5 (68.2)	6.1 (145.9)	10.1 (91.8)
6b. Pinal Central Area-Steele Route[4]	Pinal	1	0 (0)	0 (0)	0.7 (17.8)	0.1 (0.9)	4.6 (110.9)	6.6 (59.0)	5.4 (128.6)	6.6 (60.0)
6c. Pinal Central Area-Earley Route[4]	Pinal	1	0 (0)	0 (0)	0.7 (17.8)	1.5 (13.6)	5.9 (144.0)	6.0 (54.6)	6.7 (161.7)	7.5 (68.2)
Local Alternative West Tie-in	Pinal	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1.2 (7.3)	0 (0)	1.2 (7.3)
Local Alternative Central Tie-in	Pinal	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.8 (7.3)	0 (0)	0.8 (7.3)
Local Alternative East Tie-in	Pinal	1	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0.8 (10.9)	0 (0)	0.8 (10.9)
		Total[2]	**10.3 (499.4)**	**11.1 (538.2)**	**9.2 (397.6)**	**17.7 (692.6)**	**25.2 (838.9)**	**26.7 (391.6)**	**45.0 (1,735.6)**	**55.4 (1,622.6)**

1. The “2015 Selected Route” is the no action alternative for this EIS.

2. Mileage and acreage calculations are approximate; totals may not sum due to rounding.

3. Calculations address only the permitted 2015 Selected Route and proposed right-of-way for the localized route modifications. Access roads and temporary work areas outside the proposed 400-foot-wide right-of-way are addressed under Draft EIS Section 2.4.2.

4. Localize Route Modifications 6a, 6b, and 6c all include the West Tie-in for conservative mileage/acreage estimates.

2.4.2 Component 2: Access Roads and Temporary Work Areas Outside Granted Right-of-Way

2.4.2.1 Access Roads

Component 2 includes access roads that are on public lands administered by the BLM outside the existing 400-foot-wide granted right-of way. Access roads for construction, operation, and maintenance of the transmission lines were planned within the 400-foot-wide right-of-way as much as practicable, however, access to the right-of-way, constraints due to steep or rugged terrain, and/or avoidance of sensitive resources may necessitate the use of roads outside the 400-foot-wide granted right-of-way.

Typical design characteristics for access road construction, rehabilitation, and maintenance are described in the POD Section 3.1.11 and Appendix A1 Construction Plan and Program (POWER Engineers, Inc. 2021b). There are three types of access roads (unpaved) proposed outside the 400-foot right-of-way:

- Access Type 1 = existing road, no improvement required
- Access Type 2 = existing road, improvement required
- Access Type 3 = construction of new road

Some existing roads may require upgrading to meet agency (federal, state, county, and city) standards for road construction. Road improvements and construction will be in accordance with agency requirements (e.g., BLM requirements for road construction, BLM Manual 9113 [BLM 2015c) and USFWS Roadway Design Guidelines [USFWS 2017]) and applicable mitigation measures (see the Transportation Management Plan, Appendix A3 of the POD; POWER Engineers, Inc. 2021b). For those existing and publicly maintained county roads throughout the project area that the Applicant plans to utilize, it is strongly encouraged and recommended that SunZia coordinate with the respective County Road Departments and enter into County Road Use Agreements to ensure the respective County Government agency is fully aware of anticipated use of County roads during construction.

Table 2-10 details the total miles of permanent access roads in Segments 1–3 outside the granted right-of-way by access type and surface ownership. Table 2-11 details the total miles of temporary access roads in Segments 1–3 outside the granted right-of-way by access type and surface ownership.

Table 2-10. Summary of Total Miles of Permanent Access Roads Outside the Granted Right-of-Way in Segments 1, 2, and 3

Permanent		New Mexico			Arizona				
Access Type	**Description**	**BLM**	**State**	**Private**	**BLM**	**State**	**Private**	**BOR**	**USFS***
1	Existing road, no improvement required	81.4	69.5	85.5	33.6	131.4	69.8	0.3	11.8
2	Existing road, improvement required	74.1	24.2	30.8	7.2	88.2	20.3	2.8	0
3	New road	17.4	7.7	8.0	17.5	66.6	12.5	0	0

Note: BOR = Bureau of Reclamation.

* U.S. Forest Service Road 371 (Redington Road) and Mount Lemmon Road within the Coronado National Forest land would be used to access the project.

Table 2-11. Summary of Total Miles of Temporary Access Roads Outside the Granted Right-of-Way in Segments 1, 2, and 3

Temporary		New Mexico			Arizona			
Access Type	Description	BLM	State	Private	BLM	State	Private	BOR
1	Existing road, no improvement required	0	0	0	0	0	0	0
2	Existing road, improvement required	0	0	0	0.5	5.0	0	0
3	New road	11.1	3.1	6.6	1.7	12.6	4.5	0.2

Note: BOR = Bureau of Reclamation.

TEMPORARY WORK AREAS

In Segments 1, 2, and 3, TWAs, or portions of TWAs, are outside the 400-foot granted right-of-way for the 2015 Selected Route, requiring short-term right-of-way for temporary use. Temporary work areas include structure work areas (described in POD Section 3.1, Table 3-1), construction yards (described in the POD, Appendix A1, Section 4.8.1), and wire pulling/tensioning/splicing areas (described in POD Section 3.1, Table 3-1 and Appendix A1, Section 4.5). Types of TWAs analyzed in this Draft EIS, as occurring outside the granted 400-foot right-of-way, include: structure work areas, construction yards, and wire pulling, tensioning, and splicing sites. Table 2-12 provides a summary of the number and size of each TWA type, by land jurisdiction.

Table 2-12. Summary of Proposed Temporary Work Areas Outside the Granted Right-of-Way in Segments 1, 2, and 3

Temporary Work Area		New Mexico			Arizona		
	Description	BLM Number of Sites (Acres)	State Number of Sites (Acres)	Private Number of Sites (Acres)	BLM Number of Sites (Acres)	State Number of Sites (Acres)	Private Number of Sites (Acres)
Structure work areas	200 × 200 feet	311 (11.1)	196 (4.7)	108 (5.4)	58 (2.6)	520 (76.6)	141 (65.6)
Construction yards	~15–30 acres Every 30 miles	5 (66.3)	2 (46.5)	2 (34.7)	–	7 (155.1)	8 (54.2)
Wire pulling/ tensioning/ splicing areas	200 × 400–600 feet Every 2–4 miles	47 (84.9)	44 (52.2)	21 (24.5)	14 (16.5)	117 (122.2)	65 (92.2)
Total Acres		**162.3**	**103.4**	**64.6**	**19.1**	**353.9**	**212.0**

Note: See Table R1-4 in Report 1-Project Background and Methods (POWER Engineers, Inc. 2021a). The acreages reported in this table reflect the portions of the TWAs that would occur outside the granted right-of-way. The description column provides the typical dimensions of each TWA type both within and outside of the granted right-of-way.

2.4.3 Component 3: Segment 4 Reroute Alternatives

2.4.3.1 Reroute Alternatives

The Applicant has continued to coordinate with the DOD regarding the location of the 2015 Selected Route along Segment 4 that overlaps with the WSMR NCUA. During coordination meetings between

SunZia and WSMR staff, ongoing concerns regarding impacts to current and future National Security priorities were discussed (McMahon 2018; Office of the Assistant Secretary of Defense 2022). Additionally, coincidental construction of the Western Spirit Project north of the WSMR NCUA boundary presented a potential new co-location opportunity for the SunZia project on separate structures, but in the same area as the Western Spirit Transmission line. Given the new opportunity for co-locating portions of the SunZia project and the ability to address ongoing concerns, including a) minimizing potential conflicts between transmission facilities and DOD test and training missions, b) DOD National Security issues, c) issues obtaining private property rights-of-way along the Selected Route, and d) opportunity to reduce costs of undergrounding, the Applicant has opted to pursue potential alternative routes that would relocate the project's proposed transmission line and associated facilities from the WSMR NCUA (see Appendix A, Map 181).

In the fall of 2019, the Applicant performed a siting study to develop and evaluate alternative routes for the affected portion of Segment 4 that would allow the Applicant to partially locate with an existing utility corridor, minimize potential conflicts with transmission facilities and DOD training and testing missions, address concerns with obtaining private property rights-of-way, and avoid areas of building the transmission line underground (POWER Engineers, Inc. 2020). Alternatives that co-locate with existing utility easements across the Sevilleta NWR would address the BLM's basis for eliminating certain alternatives from detailed analysis in the 2013 FEIS (BLM 2013). In addition, based on the recent development of proposed wind-generation facilities, the Applicant determined that relocating the planned 40-acre SunZia East Substation to the north near Corona in Torrance County would optimize the potential interconnection of future renewable resources, and allow an opportunity to co-locate Segment 4 with the Western Spirit Project transmission line by paralleling the Western Spirit Project where feasible.

As a result of the siting study, three alternative routes with various combinations of subroutes are identified and described in Resource Report 1 and the draft POD (POWER Engineers, Inc. 2021a, 2021b). One alternative route (Alternative Route 1; Figure 2-2) would site typical project facilities and right-of-way configurations across public lands administered by the BLM, National Forest System lands administered by the Cibola National Forest, state, and private lands. Two alternative routes being considered (Alternative Routes 2 and 3: Figure 2-3 and Figure 2-4) would co-locate within existing transmission line corridors that pass north-south through National Wildlife Refuge System land administered by Sevilleta NWR. Due to the limited width of the existing corridors through the Sevilleta NWR, only one new SunZia transmission line could be routed within each existing corridor. Depending on the result of this NEPA process, there is the potential that only one of these two Alternative Routes (2 and 3) crossing the Sevilleta NWR would be selected in combination with a single transmission alternative on Cibola National Forest (Alternative Route 1). Currently, Sevilleta NWR has received application from Tri-State to reconstruct the existing line, and is awaiting application from El Paso Electric to reconstruct existing line to allow SunZia's transmission infrastructure. SunZia's intent is to replace the existing transmission line infrastructure with new transmission line infrastructure that could accommodate the existing transmission line and a proposed SunZia nominal 500-kV transmission line vertically on one set of structures in each existing easement through the Sevilleta NWR. During internal and external scoping, additional local alternatives were identified to avoid areas where land management conflicts could be avoided. Local alternatives are site-specific, exchangeable segments that do not require the creation of a new alternative route or subroute.

Table 2-13 summarizes the length of new right-of-way that would be required for each Segment 4 alternative. In order to facilitate characterization of the affected environment and potential environmental impacts (see Chapter 3), the alternative transmission line routes have been divided into three groups of alternative subroutes. The alternative subroutes comprising each of the groups include combinations of the smallest linear units, or links. See Table 2-14 and Figures 2-2 through 2-5 for Segment 4 alternatives.

Table 2-13. Segment 4 Reroute Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	BLM	USFS	USFWS	State	Private	Total (miles)
2015 Selected Route	20	0	0	22	49	**92**
Alternative Route 1 with Subroute 1A-1	21	5	0	37	84	**147**
Alternative Route 1 with Subroute 1A-2	21	5	0	37	83	**145**
Alternative Route 1 with Subroute 1A-3	24	5	0	37	81	**146**
Alternative Route 1 with Subroute 1A-4	21	5	0	37	83	**146**
Local Alternative 1A-6	0.3	0.2	0	0	0	**0.5**
Local Alternative 1A-7	0.5	0	0	0	0	**0.5**
Alternative Route 2 with Subroute 2A-1	6	0	14	24	79	**123**
Alternative Route 2 with Subroute 2A-2	6	0	14	24	75	**120**
Alternative Route 2 with Subroute 2A-3	6	0	14	24	71	**115**
Alternative Route 2 with Subroute 2A-4	6	0	14	24	78	**123**
Alternative Route 3 with Subroute 3A-1	10	0	12	20	85	**126**
Alternative Route 3 with Subroute 3A-2	10	0	12	20	81	**123**
Alternative Route 3 with Subroute 3A-3	10	0	12	20	77	**119**
Alternative Route 3 with Subroute 3A-4	10	0	12	20	84	**126**
Local Alternative 3B-1	4	0	0	0	2	**5.5**
Local Alternative 3B-2	5	0	0	0	1	**5.7**

Note: Local Alternatives are exchangeable within their associated alternative route. Numbers may not sum due to rounding.

Table 2-14. Surface Disturbance Estimates for Segment 4 Reroute Alternatives (in acres) by Route and Subroute

Alternative Route/Subroute	BLM	USFS	USFWS[1]	State	Private	Total (acres)
2015 Selected Route[2]	268	0	0	295	657	**1,233**
Alternative Route 1 with Subroute 1A-1	183	41	0	327	734	**1,285**
Alternative Route 1 with Subroute 1A-2	181	41	0	327	727	**1,276**
Alternative Route 1 with Subroute 1A-3	210	41	0	325	708	**1,284**
Alternative Route 1 with Subroute 1A-4	182	41	0	327	732	**1,282**
Local Alternative 1A-6	3	0	0	0	0	**3**
Local Alternative 1A-7	5	0	0	0	0	**5**
Alternative Route 2 with Subroute 2A-1	52	0	83	207	670	**1,012**
Alternative Route 2 with Subroute 2A-2	52	0	83	207	640	**982**
Alternative Route 2 with Subroute 2A-3	52	0	83	207	603	**945**
Alternative Route 2 with Subroute 2A-4	52	0	83	207	667	**1,009**
Alternative Route 3 with Subroute 3A-1	83	0	57	174	731	**1,045**
Alternative Route 3 with Subroute 3A-2	83	0	57	174	701	**1,015**
Alternative Route 3 with Subroute 3A-3	83	0	57	174	664	**978**
Alternative Route 3 with Subroute 3A-4	83	0	57	174	728	**1,042**

Alternative Route/Subroute	BLM	USFS	USFWS[1]	State	Private	Total (acres)
Local Alternative 3B-1	4	0	0	0	12	**16**
Local Alternative 3B-2	5	0	0	0	9	**14**

Note: Local Alternatives are exchangeable within their associated alternative route. Numbers may not sum due to rounding.

1. Surface disturbance estimates for the Sevilleta NWR are presented for areas outside the existing transmission line footprints.

2. Surface disturbance estimates for the no action alternative are based on surface disturbance factors presented in the 2013 FEIS (BLM 2013:2-111). Surface disturbance estimates for Alternative Routes 1, 2, and 3 were updated for this Draft EIS.

A brief summary of the special considerations for the alternative routes are provided below. These subroutes are described in detail in the SunZia Southwest Transmission Project Right-of-way Alternatives Development Report (BLM 2021b:Section 3.2).

ALTERNATIVE ROUTE 1

Alternative Route 1 has two Local Alternatives, 1A-6 and 1A-7, which are short segments of the alternative that are exchangeable. The Alternative Route 1 Local Alternatives provided options for avoiding the Scott Mesa Inventoried Roadless Area (IRA) or the Ladron Mountain-Devil's Backbone Complex ACEC (see Figure 2-5).

Local Alternative 1A-6 is 0.5 mile in length and would cross 0.3 mile of BLM-managed land and 0.2 mile of the Scott Mesa IRA managed by the Cibola National Forest. The 0.2-mile segment of Alternative Route 1 (Link T) would aerially span the northeastern boundary of the Scott Mesa IRA. It is SunZia's intent to avoid ground disturbance within the IRA by spanning the IRA and placing transmission structures outside the IRA boundary (see EPM 17 in Appendix C; see Appendix A, Map 145). No access from within the IRA would be necessary to construct or operate the project (POWER Engineers, Inc. 2021b). See Figure 2-5 for the Local Alternative 1A-6 location.

Impacts to the Scott Mesa IRA are disclosed in this Draft EIS AID-17, USFS Inventoried Roadless Area. See the Draft POD Section 3.1.13 for construction activities and surface disturbance estimates for non-IRA lands within the Cibola National Forest (POWER Engineers, Inc. 2021b).

Local Alternative 1A-7 would cross 0.5 mile of BLM-managed land, including 0.1 mile of the Ladron Mountain-Devil's Backbone Complex ACEC. See Figure 2-5 for the Local Alternative 1A-7 location. No special construction methods have been identified for Local Alternative 1A-7. Impacts to the ACEC are disclosed in Draft EIS AID-16, BLM Special Designations.

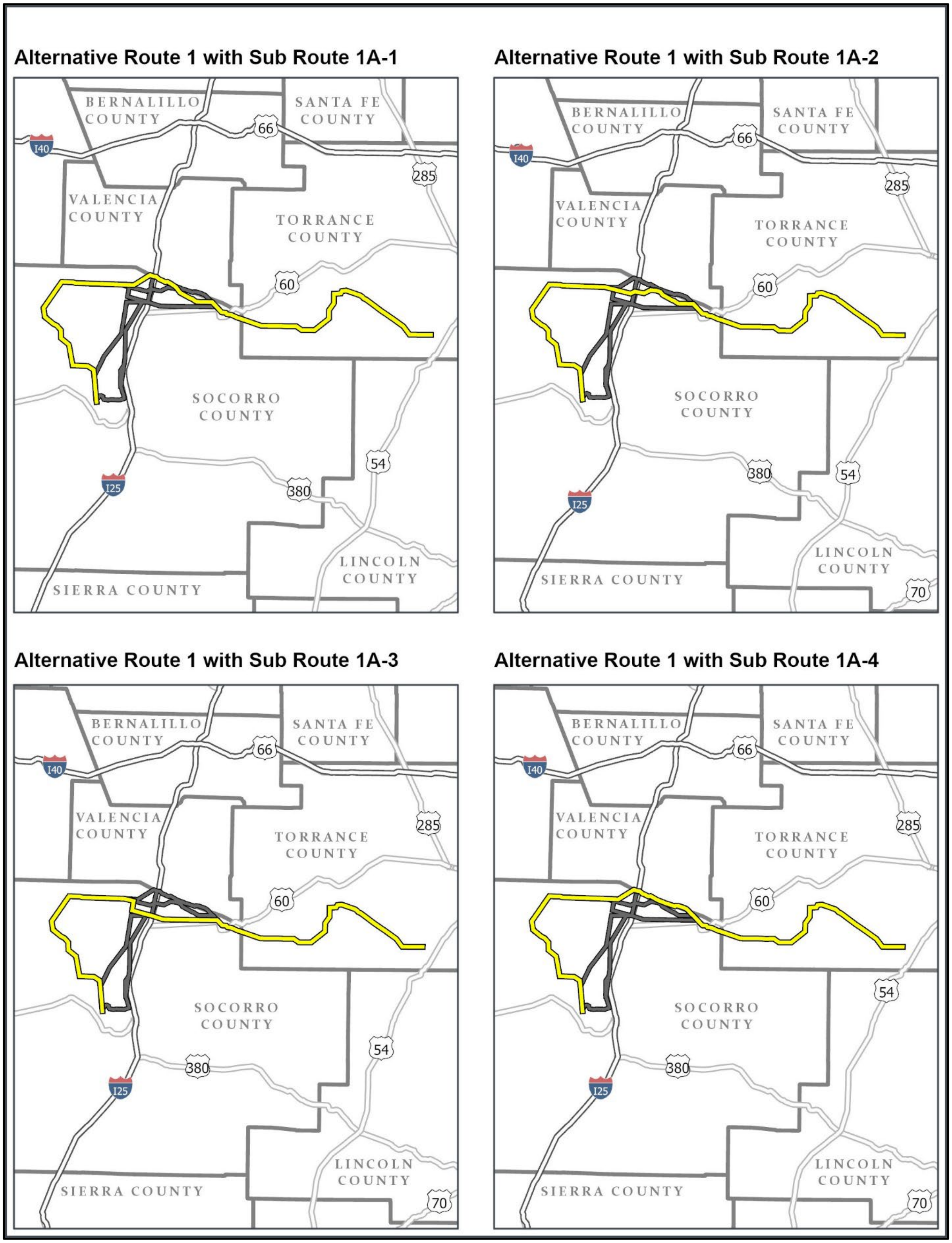

Figure 2-2. Alternative Route 1 Subroutes.

ALTERNATIVE ROUTE 2

Where Alternative Route 2 would cross the Sevilleta NWR, the easement width would be reduced to 100-foot width to conform with the existing EPE 345-kV transmission line easement (100 feet wide). A self-supporting H-frame structure (see Figures 11 to 14 in the Draft POD, POWER Engineers, Inc. 2021b) is proposed to co-locate the existing EPE 345-kV and proposed 500-kV circuits within the existing EPE 345-kV existing easement. The existing 98 wooden H-frame structures would be replaced with monopole or H-frame steel structures. The majority of the new structures would be offset either ahead on-line or back on-line by 20 to 30 feet from the existing structures to allow for foundation micro-pile driving to occur while the 345-kV EPE line remains energized. The two towers located in the Rio Salado Wash and the two sets of dead-end towers would most likely be drilled pier foundations (SunZia 2021a).

Construction crews would need to make temporary use of areas outside of the existing EPE 345-kV transmission line facilities footprint. Crews would use the existing roads and the 200 × 200–foot structure work areas proposed for the new line whenever possible, with 250 × 250–foot structure work areas for dead-end or angle structures. These TWAs would be reclaimed shortly after completion of construction activities following the methods described in the *Reclamation Plan for the Sevilleta National Wildlife Refuge* (see SunZia 2021a). For a description of all project facilities and construction proposed within the Sevilleta NWR, see Section 3.1.12 of the Draft POD (POWER Engineers, Inc. 2021b) and the project Preliminary Construction Plan for the Sevilleta NWR (SunZia 2021a), which have been provided by SunZia on behalf of EPE.

ALTERNATIVE ROUTE 3

Where Alternative Route 3 would cross the Sevilleta NWR, the easement width would be reduced to 50 feet to conform with the existing Tri-State 115-kV transmission line easement (50 feet wide). A double-circuit, monopole structure (see Figure 10 in the Draft POD, POWER Engineers, Inc. 2021b) is proposed to co-locate the existing Tri-State 115-kV and proposed 500-kV circuits within the existing Tri-State 115-kV easement. The existing 94 wooden H-frame structures would be replaced with approximately 68 double-circuit monopole structures. The proposed design allows for a reduced number of permanent structure locations. In areas where the existing 94 wooden H-frame structures are not located in the new structure work area, a 50 × 70–foot temporary work area is needed to dismantle and remove all infrastructure associated with the wooden H-frame structures. Existing structures located in steep terrain and dead-end 3-pole structures may require additional area to set up the crane and safely remove the old wooden poles (SunZia 2021a).

Similar to Alternative Route 2, construction crews would need to make temporary use of areas outside the existing Tri-State transmission line facilities footprint. Crews would use the existing roads and the 200 × 200–foot structure work areas proposed for the new line whenever possible, with 250 × 250–foot structure work areas for dead-end or angle structures. These TWAs would be reclaimed shortly after completion of construction activities following the methods described in the *Reclamation Plan for the Sevilleta National Wildlife Refuge* (see SunZia 2021a). For a description of all project facilities and construction proposed within the Sevilleta NWR, see Section 3.1.12 of the Draft POD (POWER Engineers, Inc. 2021b) and the project Preliminary Construction Plan for the Sevilleta NWR (SunZia 2021a), which have been provided by SunZia on behalf of Tri-State.

Alternative Route 3 has two Local Alternatives, 3B-1 and 3B-2, which are short segments of the alternative that are exchangeable. The Alternative Route 3 Local Alternatives provided options for avoiding a BLM right-of-way avoidance area or private landowner concerns (Figure 2-5).

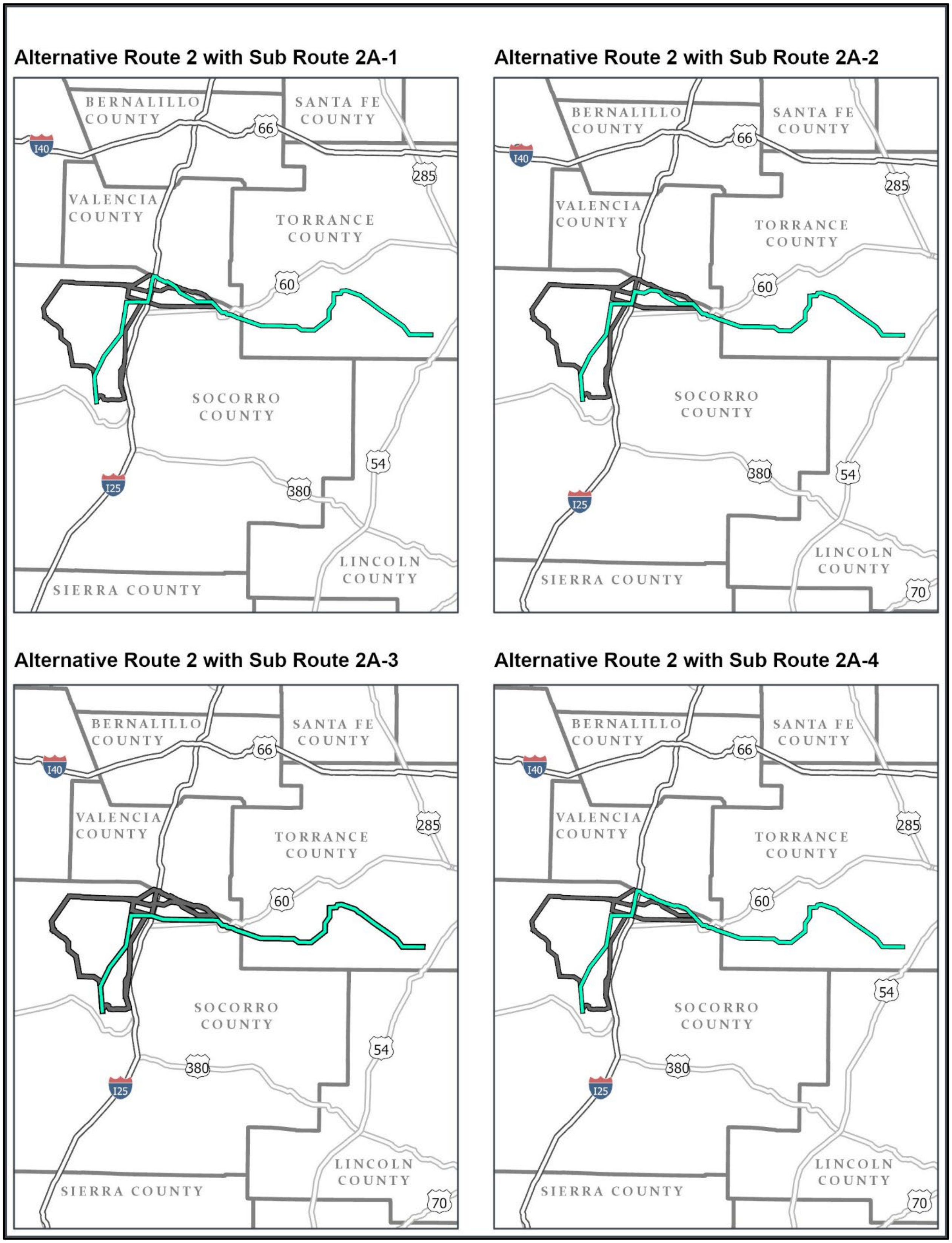

Figure 2-3. Alternative Route 2 Subroutes.

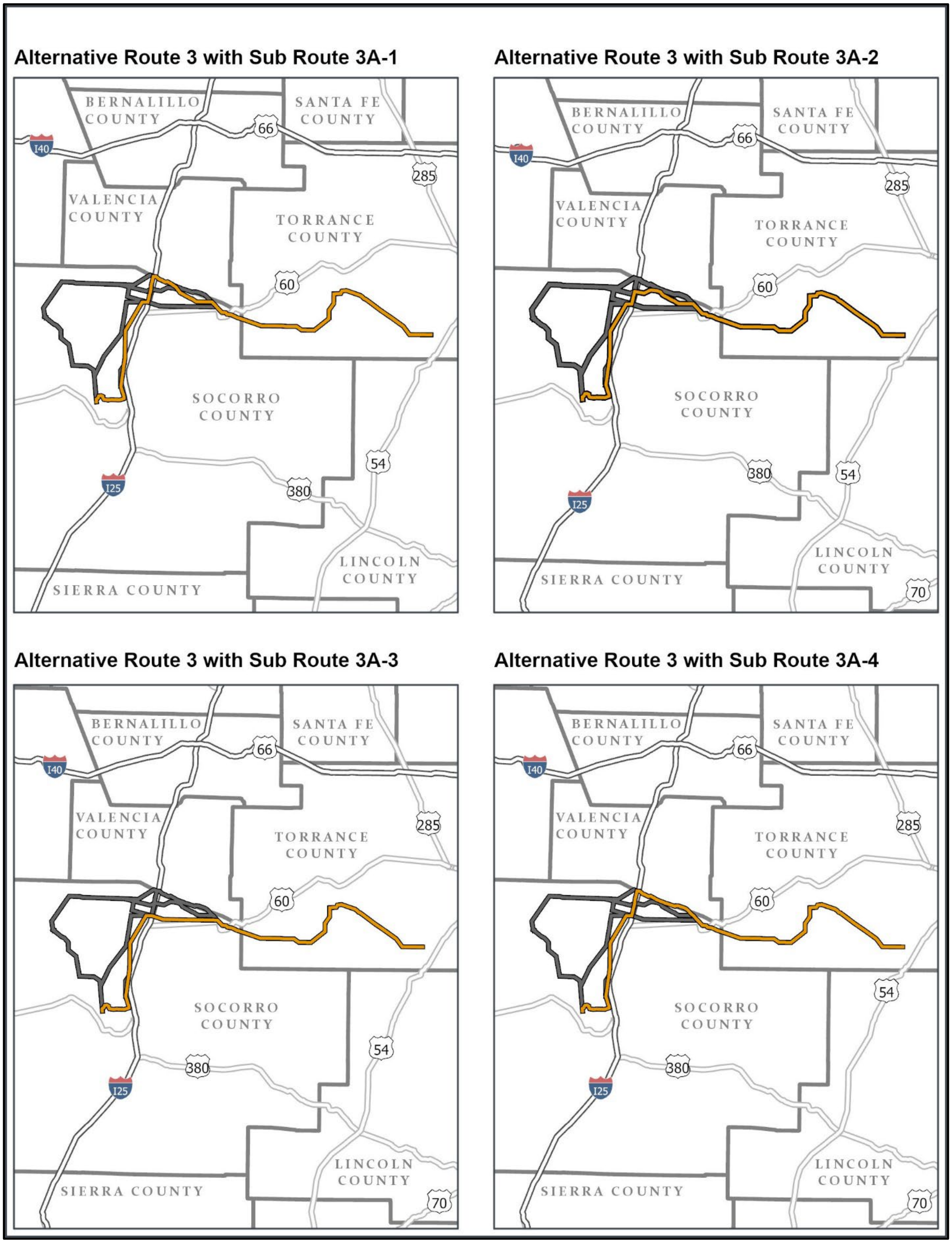

Figure 2-4. Alternative Route 3 Subroutes.

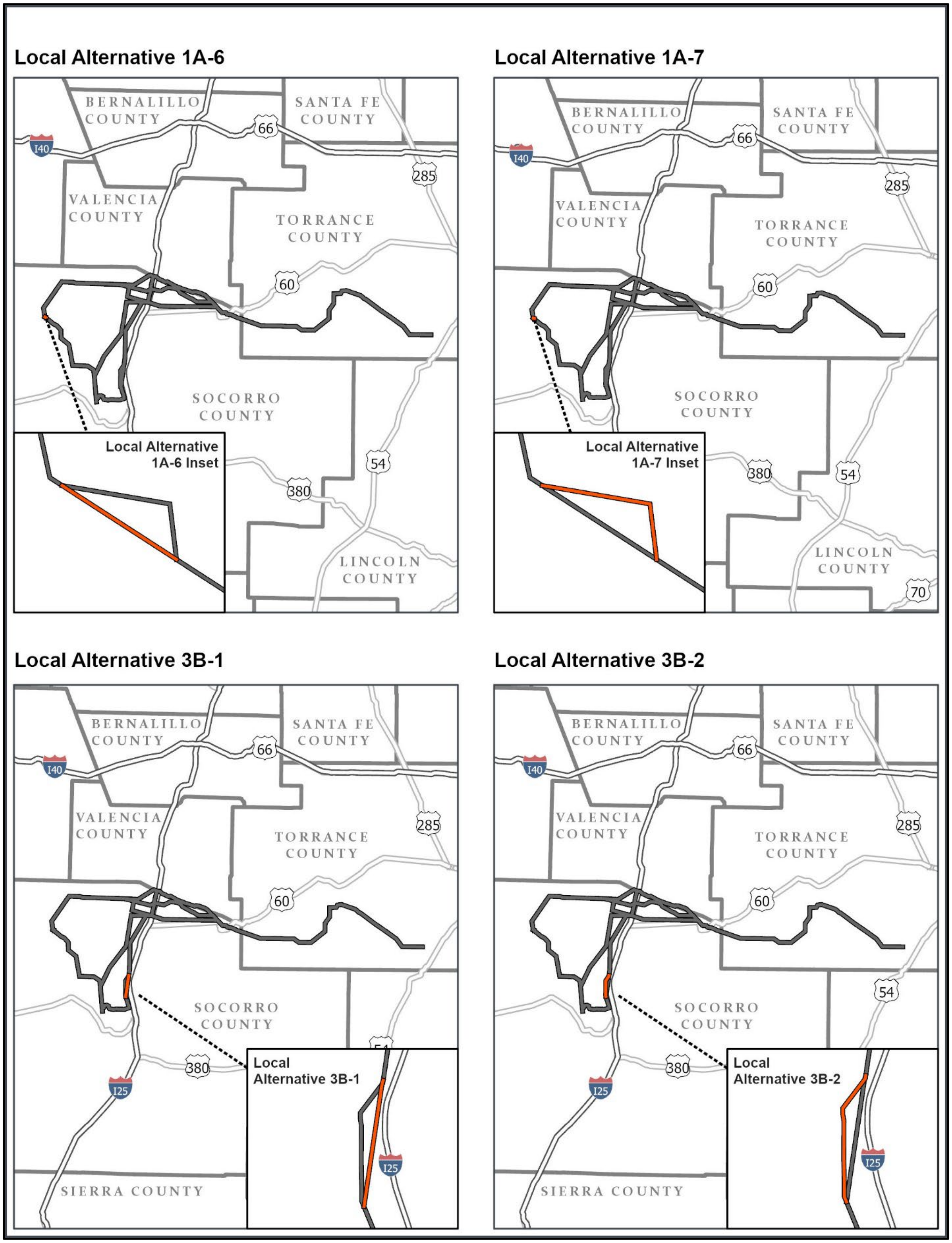

Figure 2-5. Local Alternatives.

DESIGN CHARACTERISTICS FOR SEGMENT 4

The Applicant would proceed with design and engineering of project facilities after a new alternative for Segment 4 has been selected; therefore, locations of the transmission line facilities are not known at this time, and the amount of ground surface that could be disturbed as the result of implementation of the project in Segment 4 is estimated based on the typical design characteristics of 500-kV transmission line projects (Table 2-15), including structure sites, construction yards, access roads, temporary work areas, etc. The details below can also be found in Tables 4 and 5 of the POD (POWER Engineers, Inc. 2021b).

Table 2-15. Typical Design Characteristics of a 500-kV Transmission Line Project

General Description		
Structure type	Guyed and self-supporting steel tubular and lattice structures	
Structure height	Typical 135 feet; not to exceed 200 feet in the Sevilleta NWR; range of height varies with span and terrain	
Span length	1,200 to 1,600 feet (three to four structures per mile)	
Right-of-way width, typical	200 feet per transmission line (circuit); 400 feet total for two transmission lines	
Right-of-way width, narrow due to special conditions	165 feet per transmission line (circuit); 330 feet total for two transmission lines; 50 feet (Tri-State easement) or 100 feet (EPE easement) in Sevilleta NWR	
Electrical Properties		
Structure Base Areas	**Phase 1**	**Phase 2**
Nominal voltage in kilovolts	500 kV DC	500 kV AC
Capacity in megawatts	3,000 MW	1,500 MW
Circuit configuration (preliminary)	Horizontal, vertical, or delta	Horizontal, vertical, or delta
Conductors	3 conductor bundles per phase, plus 2 metallic return conductors	3 conductor bundles per phase
Minimum conductor clearance above ground (per National Electrical Safety Code [NESC] requirements)	29 to 30 feet	30 to 35 feet
Land Permanently Disturbed		
Permanent Structure Base Area Required[1]		
Guyed (lattice or tubular) 4-foot-diameter base plus 4 anchors (1 approximate 45 × 45–foot base area per line)	4,050 square feet (2,025 square feet per structure)	
Self-supporting lattice 3-foot diameter × 4 legs (1 approximate 60 × 60–foot base area per line)	7,200 square feet (3,600 square feet per structure)	
Self-supporting tubular 8-foot diameter (1 approximate 53 × 53–foot base area per line)	5,650 square feet (2,825 square feet per structure)	
Dead-end lattice 6-foot diameter × 4 legs (1 approximate 55 × 55–foot base area per line)	6,050 square feet (3,025 square feet per structure)	
Dead-end tubular AC: 10-foot diameter (diameter indicated for single pole; the dead-end structure could have a single- or two-pole configuration)	**Option A** 4,050 square feet (2,025 square feet per structure)	**Option B** 4,050 square feet (2,025 square feet per structure)

Ancillary Facilities	
Fiber-Optic Communications Regeneration	100 × 100 feet (0.23 acre); located at 75-mile intervals
Access Roads[3]	
New roads or existing road improvement	20 feet total width (14-foot-wide travelway and 2-foot-wide berms/drainage on each side)
Land Temporarily Disturbed	
Structure work area[4]	Each structure site will be 200 × 200 feet (0.9 acre)
Construction yard	One yard every 40 miles; approximately 15 to 30 acres per site
Concrete batch plant	One plant every 30 miles; approximately 3 to 5 acres per site
Wire pulling/tensioning/splicing site (full)	Approximately 200 × 600 feet (2.8 acres); one every 18,000 feet alternating every 9,000 feet with reduced site
Wire pulling/tensioning/splicing site (reduced)	Approximately 200 × 400 feet (1.8 acres); one every 18,000 feet alternating every 9,000 feet with full site
Vegetation Management	
Conductor clearance to meet safety standards[5]	Trimming trees and woody vegetation within the wire zone Trimming may be required within the border zone in riparian and woodland areas

Note: The details provided in this table can also be found in Table 4 of the POD (POWER Engineers, Inc. 2021b).

1. Permanent structure base areas include the area surrounding each structure foundation necessary for project maintenance, rounded up to the nearest 50 square feet.

2. Diameter indicated for each single pole; the dead-end structure for the AC line could have a single-pole or three-pole configuration.

3. Typical main access road or spur road width indicated; maximum road widths will be specified in the POD and are dependent on terrain and construction specifications for selected transmission line route.

4. Temporary structure work area is inclusive of permanent structure base area.

5. NESC standards require minimum ground clearance of 30 feet (AC) to 38 feet (DC) for 500-kV transmission lines at the maximum allowable conductor sag. NERC standards require minimum clearance of approximately 6 feet (AC) to 9 feet (DC) between vegetation and conductors based on the system voltage and elevation. Typical wire zone is 90 feet wide for each circuit, which includes 10 feet on either side of the outside conductor location for blowout. The border zone is the remaining portion of the right-of-way.

2.4.3.2 Access Roads for Segment 4

If a federal decision is issued for any of the proposed Segment 4 alternatives, a final design for network of access roads (access road plan) would be developed. Therefore, for purposes of this analysis, use of a predictive model would estimate ground disturbance associated with improvements to existing roads and construction of new roads. The predictive model is based primarily on slope and length of the transmission line.[3]

Access-level disturbance predictions were developed to be conservative, to ensure predictions for ground disturbance are not underestimated in relation to actual disturbance and impacts. For purposes of analyzing impacts to resources and assessing likely ground disturbance associated with the Segment 4 alternative routes, the following six access levels were developed, based primarily on slope and information provided in the description of the project:

- Access Level 1: Use existing roads (0 to 15 percent slope)

[3] Access levels are predictions of the general type of access (i.e., existing roads – no improvements required, existing roads – improvements required, or new roads) that would be required for every mile of each Segment 4 alternative route, and the associated amount of disturbance the access level would create. Although the method incorporates standard road-design criteria, it does not go to the level of actual road design. As a result, some variation is anticipated between the disturbance predictions generated from the access-level modeling and the actual disturbance of designed and engineered access roads. For further discussion regarding assumptions and parameters of the access road predictive model, please see Appendix I of the 2013 FEIS (BLM 2013).

- Access Level 2: Use existing roads (greater than 15 percent slope)
- Access Level 3: Construct new access, flat to rolling terrain (0 to 8 percent slope)
- Access Level 4: Construct new access, rolling terrain (8 to 15 percent slope)
- Access Level 5: Construct new access, steep terrain (15 to 30 percent slope)
- Access Level 6: Construct new access, very steep terrain (greater than 30 percent slope)

Table 2-16 provides a description and assumptions considered in estimating the area of ground disturbance associated with the various access road levels.

Table 2-16. Summary of Access Road Types, Assumptions, and Surface Disturbance for Access Roads in Segment 4 (Component 3)

Access Level	Descriptions and Assumptions for Analysis	Area of Ground Disturbance (acres)[1]
1	Use existing road (0 to 15 percent slope) within half the distance of the typical span from the project centerline, 1.25 miles of existing access roads per mile of transmission line, 60% of existing access roads would require 8-foot-wide improvements (including cut-and-fill), 0.625 mile of 22-foot-wide spur roads (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas required for every 1,000 feet of access road.[2]	2.8
2	Use existing road (greater than 15 percent slope) within half the distance of the typical span from the project centerline, 2.25 miles of existing access roads per mile of transmission line, 60% existing access roads would require 12-foot-wide improvements (including cut-and-fill), 1.125 miles of 32-foot-wide spur roads (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas required for every 1,000 feet of access road.[2]	6.7
3	Construct new access road (0 to 8 percent slope), 1.25 miles of new 20-foot-wide road (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas would be required for every 1,000 feet of access road.[3]	3.2
4	Construct new access road (8 to 15 percent slope); 1.5 miles of new 24-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas required for every 1,000 feet of access road.[4]	4.5
5	Construct new access road (15 to 30 percent slope); 2.0 miles of new 29-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas would be required for every 1,000 feet of access road.[4]	7.3
6	Construct new access road (greater than 30 percent slope); 2.5 miles of new 55-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas would be required for every 1,000 feet of access road.[4]	17.0

1. Numbers are approximate.
2. Includes Existing Roads – No Improvement Required and Existing Roads – Improvements Required
3. Includes New Roads – Graded/Bladed
4. Includes New Roads – Graded/Bladed and Temporary Roads

2.4.3.3 SunZia East Substation

The SunZia East Substation would be located on 40 acres of private land (see Appendix A, Map 192). As indicated in the 2013 FEIS (BLM 2013:Section 2.4.8), the ultimate size of the substation and its footprint is dependent on whether an AC only or an AC/DC-converter facility is installed at the site. If one of the transmission lines is DC, the AC transmission line would enter the DC converter from the east from a nearby substation constructed by the wind-generation developer to collect the wind power from (planned) generating facilities nearby, convert from AC power to DC power, and the DC transmission line would leave the substation to the north and continue west along Segment 4.

The footprint of the equipment, inside the fenced yard, would be approximately 20 to 22 acres—approximately 12 acres for the DC converter units and 8 to 10 acres to accommodate the immediately adjacent 500-kV AC switchyard. If the SunZia East Substation eventually contains equipment for DC and AC transmission lines, permanent disturbance would be approximately 85 acres and temporary disturbance would be approximately 105 acres (which includes the 85 permanent acres) (POWER Engineers, Inc. 2021a).

If the two SunZia transmission lines are both AC, then the lines would enter the SunZia East Substation from the east directly into a 500-kV AC yard, then continue on to the next substation to the southwest (SunZia South Substation). If the SunZia East Substation contains equipment for two AC transmission lines (and no DC), permanent disturbance is estimated to be approximately 45 acres and temporary disturbance is estimated to be approximately 60 acres (which includes the 45 permanent acres).

Equipment staging and construction would take place within the substation yard, as would be the case with the other substations associated with the project.

The substation yard would include the secure, fenced area containing the electrical equipment, plus sufficient area surrounding the substation components for placement of transmission structures entering and exiting the substation, and to provide setbacks to buffer neighboring lands. The maximum height of structures in the substation would be approximately 170 feet. The substation yard would be open air and include equipment such as transformers, circuit breakers, disconnect switches, lightning/surge arrestors, reactors, capacitors, bus (conductor) structures, and a microwave antenna. Typically, substation components would be surrounded by an 8-foot-high chain-link fence topped with barbed wire.

2.4.4 Component 4: SunZia West Substation

2.4.4.1 Proposed Substation Location

The Applicant also identified the need for an HVDC substation (the SunZia West Substation) at a newly identified alternate location for the west-end receiving terminal in Arizona. A DC transmission line would require equipment at each DC terminus location to convert the power from AC to DC (SunZia East HVDC converter) and DC to AC (SunZia West HVDC converter). The revised location of the SunZia West Substation is needed because operation and interconnection capabilities for the west-end HVDC receiving terminal could be better served at a dedicated and separate site rather than near Salt River Project Pinal Central Substation, as previously proposed. Based on how market conditions evolve, the HVDC converter may ultimately be constructed and operate within the previously analyzed location near the Pinal Central Substation. SunZia maintains the ability to locate the SunZia West converter station at either location.

The project is planned as two nominal 500-kV transmission lines: one line would be an AC line with the transfer capability of 1,500 MW; the other line would be either an additional AC transmission line with a 1,500-MW capacity or a DC line with a 3,000-MW capacity. A DC transmission line would require equipment at each terminus to convert the power from AC to DC (SunZia East HVDC converter) and DC to AC (SunZia West HVDC converter).

The Applicant has identified an area within which to site an alternate SunZia West HVDC converter but has not yet determined a specific location of the substation within the siting area (see Appendix A, Map 14). The location was identified considering proximity to the proposed transmission line alignment, existing access to the area, availability of electricity for station service, and feasibility for interconnection with the 500-kV grid. The southern portion of the current siting area for the SunZia West Substation overlaps with the permitted 400-foot-wide right-of-way and is located entirely on Arizona State Trust

Land just east of Red Rock, Arizona. No federal authorization is needed. Adjustment of the permitted right-of-way would be addressed with the State of Arizona. The siting area is approximately 80.7 acres. The footprint of the equipment, inside a fenced substation yard, would be approximately 20 to 22 acres. More details on the SunZia West Substation can be found in Resource Report 1 in Section 2.2.4 (POWER Engineers, Inc. 2021a).

2.5 NO ACTION ALTERNATIVE

Under the no action alternative, the project would continue to be authorized through the 2015 ROD and the 2016 Right-of-Way Grant (Serial Number NM-114438). The 2016 right-of-way grant was authorized to allow for the construction, operation, maintenance, and termination of two 500-kV transmission lines, including access roads and other ancillary facilities, following the route of the BLM Selected Route. The term of the right-of-way is for 50 years, followed by decommissioning at the end of the useful life of the project, subject to a new grant of renewal. The typical right-of-way width is 400 feet. However, according to design conditions, the right-of-way width may be up to 1,000 feet in certain situations, such as terrain conditions, separation criteria, and final design (BLM 2013:2-64). The granted right-of-way crosses approximately 183 miles of public lands administered by the BLM.

Under the no action alternative, the BLM and other federal decision makers would not approve the localized route modifications, access roads and TWAs outside the granted right-of-way, the Segment 4 reroute, and the new location for the SunZia West Substation.

The 2015 Selected Route is described in the 2015 ROD as Subroutes 1A2, 3A2, and 4C2c (BLM 2015a:20–25). As noted in Section 2.2 of this Draft EIS, a total of 5 miles of the 2015 Selected Route would be buried through the WSMR NCUA. As stated in the Record of Decision, "In response to DOD's Mitigation Proposal, and to mitigate potential impacts to DOD military readiness and operations, BLM has incorporated into the preferred alternative the burial of at least 5 miles along three different segments of the 500-kV transmission lines north of the WSMR in the NCUA. The underground segments will be located in the BLM preferred alternative study corridor, Subroute 1A2 (BLM 2013:Figure 2-4), in portions of Torrance and Socorro Counties. Six transition stations will also be constructed to connect the underground cables with the overhead conductors at each terminal of the underground segments as shown on the map in Figure 3" (BLM 2015a:20).

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

As a requirement of CEQ regulations, an EIS must "evaluate reasonable alternatives to the proposed action, and for alternatives that the agency eliminated from detailed study, briefly discuss the reasons for their elimination" (40 CFR 1502.14(a)). The BLM NEPA Handbook (H-1790-1, Section 6.6.3; BLM 2008a) states that an alternative can be dismissed from detailed analysis if: a) it is ineffective (it would not respond to the purpose and need); b) it is technically or economically infeasible; c) it is inconsistent with the basic policy objectives for the management of the area; d) its implementation is remote or speculative; e) it is substantially similar in design to an alternative that is analyzed; and/or f) it would have substantially similar effects as an alternative that is analyzed. In addition to the BLM screening criteria listed above, alternatives were also screened considering the BLM, USFS, and the Sevilleta NWR's purpose and need (see Section 1.4); and the Applicant's objectives (see Section 1.3).

The BLM identified six alternatives that have various combinations of 16 subroutes or local alternatives to be carried forward for detailed analysis. The remainder of preliminary alternatives and subroutes (Subroutes 1A-9, 3A-5, 3A-6, and 3A-7) were eliminated from detailed analysis. Following is a brief summary of the alternatives to the proposed project that were considered but eliminated from detailed analysis. The *SunZia Southwest Transmission Project Right-of-way Alternatives Development Report* (BLM 2021b) summarizes these routes and the supporting rationale in more detail.

- Subroute 1A-9 was developed as a potential solution to avoid or minimize impacts to military use areas north and east of the Ladron Mountain-Devil's Backbone Complex ACEC along the Applicant's proposed route (Subroute 1A-1). Ultimately this route is not a solution that avoided or minimized impacts to military use areas on the BLM-managed land in the Socorro Field Office, and it is substantially similar in design to an alternative that is proposed for detailed analysis (Subroute 1A-1).
- Subroutes 3A-5, 3A-6, and 3A-7 were developed as a potential options to the Applicant's proposed alternatives across the Sevilleta NWR (Alternative Routes 2 and 3). These three subroutes were considered as options to provide routing alternatives that roughly parallel Interstate 25 (I-25) through the Sevilleta NWR and parallel existing infrastructure (a highway) along the border of the western unit of the Refuge. These three routes are anticipated to have greater environmental impacts than the combination of Alternatives 2 and 3 proposed for detailed analysis; they would likely not result in a compatible land use to the NWR due to the addition of two new high-voltage transmission lines being added to the landscape of the Sevilleta NWR outside of existing easements, in addition to the existing Tri-State and EPE lines (for a total of four transmission lines in the NWR, if approved); and existing deed restrictions prohibit new development outside pre-existing easements on the Sevilleta NWR. Ultimately these routes are substantially similar in design to either Alternative Route 2 or 3 and do not avoid or minimize impacts to the Sevilleta NWR.

2.7 ALTERNATIVES CARRIED FORWARD FOR DETAILED ANALYSIS

As noted above in Section 2.6, the BLM identified six alternatives that have various combinations of 16 subroutes or local alternatives to be carried forward for detailed analysis. These alternatives carried forward for analysis include all proposed alternatives and subroutes proposed by the Applicant in the right-of-way amendment request to BLM in 2021, as well as one new alternative to a portion of Alternative 1 across the Inventoried Roadless Area on the Cibola National Forest (Subroute 1A-6). The Applicant alternatives are summarized in Section 2.4 above. The *SunZia Southwest Transmission Project Right-of-way Alternatives Development Report* (BLM 2021b) also summarizes these routes and the supporting rationale in more detail.

2.7.1 Agency Preferred Alternative

Under NEPA, the agency preferred alternative is a preliminary indication of the lead federal agency's preference among the proposed action and alternatives. The BLM has identified parts of the four proposed project components as the agency's preferred alternative (Figure 2-6). The agency's preferred alternative is as follows:

- **Component 1:** Localized Route Modifications 1–5, and the 2015 Selected Route (the no action alternative in this Draft EIS) for Local Route Modification 6 in the Pinal Central Area.
- **Component 2:** All access roads and temporary workspaces outside the granted right-of-way.
- **Component 3:** Alternative Route 2 with Subroute 2A-4 and Alternative Route 3 with Subroute 3A-4, which include crossing the Sevilleta NWR as well as co-locating the proposed SunZia transmission line with the Western Spirit Project transmission line at the Rio Grande crossing.

For Subroute 3A-4, the agency preferred alternative includes Local Alternative 3B-2 to avoid two private residences in close proximity to the project.

- **Component 4:** The revised location for the SunZia West Substation.

The agency preferred alternative was selected by the BLM for the following reasons:

- For Component 1, it would avoid existing landowner conflicts and constraints that have developed along the six localized route modifications since the 2015 Selected Route was identified.
- For Component 2, it would accommodate the necessary, additional rights-of-way for the Applicant to successfully access, construct, and operate the project.
- For Component 3, the agency preferred alternative
    - is the shortest route within Segment 4 to connect the eastern terminus of the project with the 2015 Selected Route for Segment 3;
    - avoids impacts to the Scott Mesa IRA and Ladron Mountain-Devil's Backbone Complex ACEC;
    - uses existing linear rights-of-way by paralleling existing infrastructure and transmission lines, including:
        - co-location (on the same transmission structures) with 14 miles of the EPE transmission line (Alternative Route 2) and 12 miles of the Tri-State transmission line (Alternative Route 3) within the Sevilleta NWR, and
        - co-location (on separate transmission structures, but in the same area) with 33 miles of the Western Spirit Project north of the Sevilleta NWR, across the Rio Grande, and through portions of the eastern end of Segment 4; and
    - avoids impacts to military operations associated with the WSMR NCUA.
- For Component 4, it would avoid congestion and interconnection constraints at the existing Pinal Central Substation for the project's west-end HVDC receiving terminal.

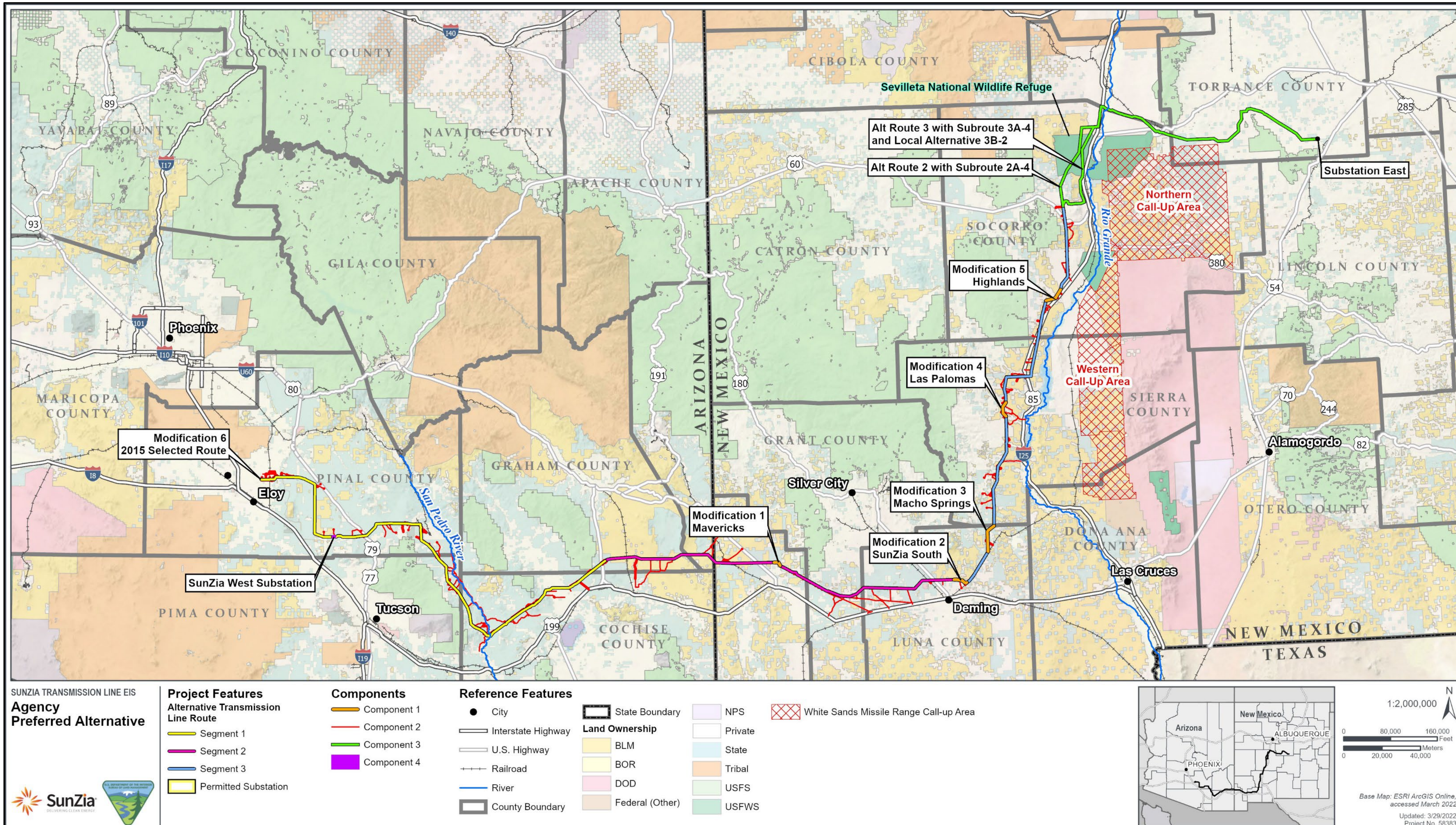

Figure 2-6. Agency Preferred Alternative.

2.8 DESIGN FEATURES, APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES, AND AGENCY REQUIREMENTS

Appendix C provides a full list of design features and EPMs. Design features are specific means, measures, or practices that would reduce or eliminate effects of the proposed action or alternatives (BLM 2008a:44). Design features apply to all proposed project components. These measures typically address specific environmental policies, best management practices (BMPs), planning guidelines, or regulatory requirements. Design features and EPMs are based on industry standard practices intended to minimize or mitigate impacts that cannot be avoided, consistent with BLM policies (Instruction Memorandum IM 2021-046 reinstating Mitigation Manual Section 1794 and Handbook H-1794-1 [BLM 2021i]).

Applicant-committed EPMs were developed in collaboration with the BLM and cooperating agencies and include measures or techniques recommended or required by the agencies or landowners. These measures would be modified as appropriate, to reduce impacts associated with specific resource concerns (e.g., cultural, biological, visual) associated with the selected route, and included prior to project construction in the Final POD.

The 2013 FEIS referred to selective mitigation measures instead of EPMs (BLM 2013:2-88 through 2-99).

2.9 RESOURCE MANAGEMENT PLAN AMENDMENT ALTERNATIVES

As described in Section 1.6 Conformance with Land Use Plans, the proposed action and alternatives have been evaluated for conformance with existing BLM RMPs. First, all applicable BLM RMPs were reviewed for potential conflicts between the proposed project and BLM management decisions contained within each RMP. Then, follow-up meetings were held with BLM staff to evaluate the potential conflicts with RMP management decisions. The evaluation process concluded that the proposed project Component 2 (access roads and temporary work areas) and Component 3 (Segment 4 reroute alternatives) would not be in conformance with the Socorro RMP (Table 2-17, Figure 2-7). The proposed project components and their alternatives would be in conformance with other RMPs associated with the project area.

In each of these areas, the construction and operation of the project alternatives would not conform to the Socorro RMP due to one of the following conditions: the right-of-way would cross an area designated in the RMP as right-of-way avoidance or exclusion, the right-of-way would cross an ACEC, or the project would not comply with VRM objectives. A plan amendment would be required for alternatives where no conforming alternatives could be developed that would meet the purpose of and need for the project.

In addition to the alternative transmission line routes, two plan amendment alternatives have been identified for the Socorro RMP, as follows:

- **No Action:** If no action is taken, then the right-of-way for the project would not be granted and no amendment to the Socorro RMP would be granted.
- **400-foot-wide right-of-way:** The affected RMP would be amended to designate a 400-foot-wide right-of-way for the proposed project through the BLM right-of-way avoidance areas and one exclusion area associated with an ACEC. The VRM classes would be modified as described in Table 2-18 within the right-of-way. The Ladron Mountain-Devil's Backbone Complex ACEC would be reduced by up to 4.7 acres to accommodate the right-of-way.

Minor deviations from the limits of the right-of-way may be required to accommodate site-specific considerations, and any new rights-of-way would be subject to case-by-case evaluations according to future project applications.

Details for the necessary RMP amendment alternatives are described in Chapter 4. RMP amendments for right-of-way avoidance and exclusion areas are described in Section 4.1.1, RMP amendments associated with BLM Special Designations are described in Section 4.1.2, and RMP amendments associated with VRM classifications are described in Section 4.1.3. The locations of the proposed plan amendments are shown in Figure 2-7.

Table 2-17. Summary of Proposed RMP Amendments Necessary for the Project

SunZia Segment	Proposed Project Component	Associated RMP* and Reason for Amendment	Covered in 2013 FEIS?	New Amendment Required?
Segment 1	Component 1: Pinal Central Area	N/A- Pinal Central Route Modifications on Private and State Land	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Phoenix RMP None	No	No
	Component 2b: TWAs	Phoenix RMP None	No	No
	Component 4: SunZia West Substation	N/A- substation is located on Arizona State Land	No	No
Segment 2	Component 1: Mavericks Area	Mimbres RMP None	No	No
	Component 1: SunZia South Area	Mimbres RMP None	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Safford RMP, Mimbres RMP None	No	No
	Component 2b: TWAs	Safford RMP Mimbres RMP None	No	No
Segment 3	Component 1: Macho Springs Area	Mimbres RMP None	No	No
	Component 1: Las Palomas Area	Mimbres RMP None	No	No
	Component 1: Highlands Area	Socorro RMP None	No	No
	Component 2a: Linear Access Roads (new surface disturbance)	Mimbres RMP Avoidance Area, VRM II, VRM III Socorro RMP Avoidance area	No	Yes (Socorro RMP)
	Component 2b: TWAs	Mimbres RMP Avoidance Area, VRM II, VRM III Socorro RMP Avoidance area	No	Yes (Socorro RMP)

SunZia Segment	Proposed Project Component	Associated RMP* and Reason for Amendment	Covered in 2013 FEIS?	New Amendment Required?
Segment 4	Alt Route 1 with Subroute 1A-1	Socorro RMP Avoidance area, VRM II	No	Yes
	Alt Route 1 with Subroute 1A-2	Socorro RMP Avoidance area, VRM II	No	Yes
	Alt Route 1 with Subroute 1A-3	Socorro RMP Avoidance area, VRM II	No	Yes
	Alt Route 1 with Subroute 1A-4	Socorro RMP Avoidance area, VRM II	No	Yes
	Local Alternative 1A-6	Socorro RMP Avoidance area, VRM II	No	Yes
	Local Alternative 1A-7	Socorro RMP Avoidance area, Exclusion area (ACEC†), VRM II	No	Yes
	Alt Route 2 with Subroute 2A-1	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-2	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-3	Socorro RMP Avoidance area	No	Yes
	Alt Route 2 with Subroute 2A-4	Socorro RMP Avoidance area	No	Yes
	Alt Route 3 with Subroute 3A-1	None	No	No
	Alt Route 3 with Subroute 3A-2	None	No	No
	Alt Route 3 with Subroute 3A-3	None	No	No
	Alt Route 3 with Subroute 3A-4	None	No	No
	Local Alternative 3B-1	None	No	No
	Local Alternative 3B-2	Socorro RMP Avoidance area	No	Yes

* Socorro RMP (BLM 2010), Mimbres RMP (BLM 1993a), White Sands RMP (BLM 1986), Safford District RMP Planning Area (BLM 1992, 1994), Phoenix RMP Planning Area (BLM 1989).

† ACEC indicates the Ladron Mountain-Devil's Backbone Complex ACEC, which is a BLM special designation.

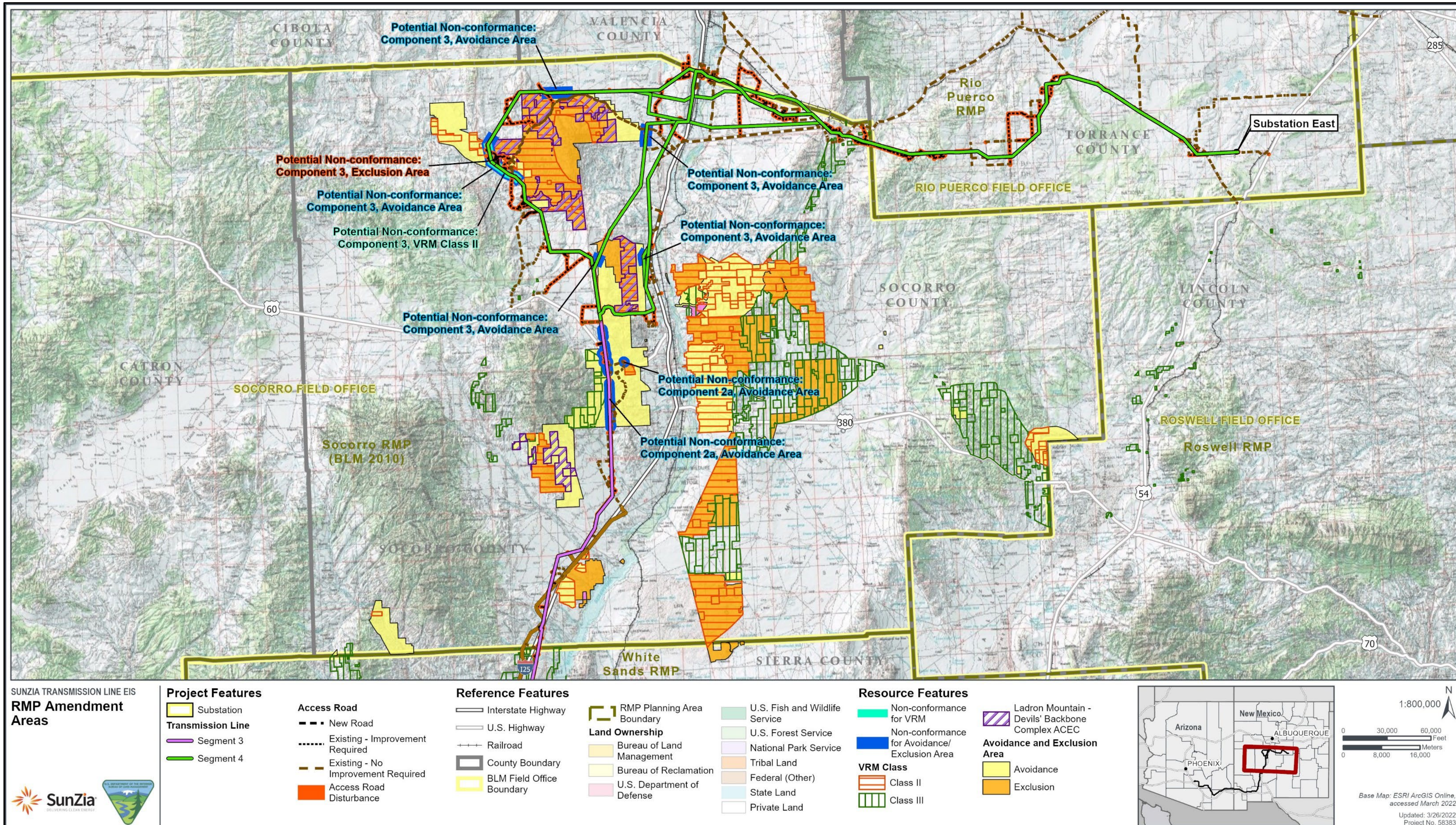

Figure 2-7. BLM RMP Amendment Areas for Segments 3 and 4.

2.9.1 Socorro RMP: Proposed Plan Amendment

The Socorro RMP would be amended to: 1) reduce the acreage of right-of-way avoidance and exclusion areas by the amount of the proposed right-of-way for the project; 2) reduce the acreage of the Ladron Mountain-Devil's Backbone Complex ACEC by 4.7 acres; and 3) reduce the acreage of VRM Class III and Class III lands and increase the acreage of VRM Class IV lands to accommodate the proposed right-of-way.

2.9.1.1 Right-of-Way Avoidance and Exclusion Areas

The proposed project would require an RMP amendment for the Socorro RMP for locations where the proposed project Component 2 (access roads and TWAs) and Component 3 (Segment 4 reroutes) would cross right-of-way avoidance areas. Up to 368 acres of avoidance areas (less than 0.1%) and up to 4.7 acres of exclusion areas (less than 0.01%) would be removed from lands in the Socorro Field Office (Table 2-18). The Socorro RMP (pages 19 and 28 and Map 2) would be amended to reflect the reduction in right-of-way avoidance and exclusion areas, depending on the alternative (see Table 2-18).

2.9.1.2 Special Designations

The right-of-way plan amendment would reduce the size of the Ladron Mountain-Devil's Backbone Complex ACEC by 4.7 acres to avoid fragmentation of the ACEC by the proposed transmission line right-of-way (see Table 2-18). The Socorro RMP (page 53 and Map 4) would be amended to reflect the revised size of the ACEC as 57,459.8 acres (BLM 2010:53).

2.9.1.3 Visual Resource Management

The proposed RMP amendment would affect up to 167 acres of VRM Class II lands, resulting in nonconformance due to project contrast. The proposed plan amendment would result in a reduction of VRM Class II lands by less than 0.1%, whereas VRM Class IV lands would increase by less than 0.1% (see Table 2-18). The Socorro RMP (pages 42 and 43 and Map 6) would be amended to reflect the change in VRM Classes, depending on the alternative (see Table 2-18).

Table 2-18. Summary of Socorro RMP Plan Amendment

Proposed Project Component	Reason for Amendment	Existing RMP	Proposed Plan Amendment
Component 2	Avoidance area[1],	33 acres avoidance area	Decrease avoidance area by 53 acres (0.01%)
Alt Route 1 with Subroute 1A-1	Avoidance area[1], VRM II	335 acres avoidance area 167 acres VRM II	Decrease avoidance area by 335 acres (less than 0.1%) Decrease VRM II by 167 acres (less than 0.1%) Increase VRM IV by 167 acres (less than 0.1%)
Alt Route 1 with Subroute 1A-2	Avoidance area[1], VRM II	335 acres avoidance area 167 acres VRM II	Decrease avoidance area by 335 acres (less than 0.1%) Decrease VRM II by 167 acres (less than 0.1%) Increase VRM IV by 167 acres (less than 0.1%)

Proposed Project Component	Reason for Amendment	Existing RMP	Proposed Plan Amendment
Alt Route 1 with Subroute 1A-3	Avoidance area[1], VRM II	335 acres avoidance area 167 acres VRM II	Decrease avoidance area by 335 acres (less than 0.1%) Decrease VRM II by 167 acres (less than 0.1%) Increase VRM IV by 167 acres (less than 0.1%)
Alt Route 1 with Subroute 1A-4	Avoidance area[1], VRM II	335 acres avoidance area 167 acres VRM II	Decrease avoidance area by 335 acres (less than 0.1%) Decrease VRM II by 167 acres (less than 0.1%) Increase VRM IV by 167 acres (less than 0.1%)
Local Alternative 1A-6	Avoidance area[1], VRM II	12.1 acres avoidance area 12.1 acres VRM II	Decrease avoidance area by 12.1 acres (less than 0.1%) Decrease VRM II by 12.1 acres (less than 0.1%) Increase VRM IV by 12.1 acres (less than 0.1%)
Local Alternative 1A-7	Exclusion area (ACEC), Avoidance area[1], VRM II	4.7 acre exclusion area 20 acres avoidance area 23 acres VRM II	Decrease size of the for Ladron Mountain-Devil's Backbone Complex ACEC and associated exclusion area by 4.7 acres (less than 0.1%) Decrease avoidance area by 20 acres (less than 0.1%) Decrease VRM II by 23 acres (less than 0.1%) Increase VRM IV by 23 acres (less than 0.1%)
Alt Route 2 with Subroute 2A-1	Avoidance area[1]	69 acres avoidance area	Decrease avoidance area by 69 acres (less than 0.1%)
Alt Route 2 with Subroute 2A-2	Avoidance area[1]	69 acres avoidance area	Decrease avoidance area by 69 acres (less than 0.1%)
Alt Route 2 with Subroute 2A-3	Avoidance area[1]	69 acres avoidance area	Decrease avoidance area by 69 acres (less than 0.1%)
Alt Route 2 with Subroute 2A-4	Avoidance area[1]	69 acres avoidance area	Decrease avoidance area by 69 acres (less than 0.1%)
Alt Route 3 with Subroute 3A-1	None	None	None
Alt Route 3 with Subroute 3A-2	None	None	None
Alt Route 3 with Subroute 3A-3	None	None	None
Alt Route 3 with Subroute 3A-4	None	None	None
Local Alternative 3B-2	Avoidance area[1]	59 acres avoidance area	Decrease avoidance area by 59 acres (less than 0.1%)

Note: Local Alternatives are exchangeable within their associated alternative route.

1. Avoidance areas are established for the Bighorn Sheep Corridor and to protect sensitive resource areas.

2.9.2 Cibola National Forest and National Grasslands Land and Resource Management Plan

The Amended 1985 Cibola National Forest LRMP currently provides direction for management of Cibola National Forest lands. The project as proposed on the Cibola National Forest is currently in conformance with the Amended 1985 LRMP (USFS 1985).

2.9.3 Sevilleta NWR Comprehensive Conservation Plan

The 2000 Sevilleta National Wildlife Refuge CCP provides management tools, directions, and priorities for the 230,000-acre Sevilleta NWR. Decisions made within the CCP "are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management" (USFWS 2000a:17).

The USFWS is evaluating the proposal from SunZia to utilize easements held by Tri-State and EPE that burden the Refuge in accordance with applicable laws, regulations, and policies.

2.10 COMPARISON OF ALTERNATIVES

This section of the document provides a comparison of alternatives for each proposed project component. Table 2-19 summarizes impacts from each localized route modification (Component 1). Table 2-20 summarizes impacts from access roads and TWAs (Component 2). Table 2-21 summarizes impacts from the Segment 4 Reroute and Alternatives, as well as the local alternatives (Component 3). A comparison of the no action alternative is also provided in Table 2-21. Table 2-22 summarizes impacts from the SunZia West Substation (Component 4). This summary is based on the impacts analysis in Chapter 3, organized by issue statement.

Table 2-19. Summary of Impacts: Component 1, Localized Route Modifications (* Indicates Agency Preferred Alternative)

Issue Statement	Mavericks*	SunZia South*	Macho Springs*	Las Palomas*	Highlands*	Pinal Central North Route with West Tie-in	Pinal Central Steele Route with West Tie-in	Pinal Central Earley Route with West Tie-in
AIB-1 Air Quality	Construction and operations would result in emissions of criteria air pollutants through surface disturbance activities (fugitive dust) and construction equipment fuel combustion emissions. Fuel combustion would result in emissions of minor quantities of hazardous air pollutants. No exceedances of the primary or secondary National Ambient Air Quality Standards (NAAQS), Arizona Ambient Air Quality Standards (AAAQS), or New Mexico Ambient Air Quality Standards (NMAAQS) would occur.					Same as Mavericks, except for this route modification is located within the West Pinal County PM10 (particulate matter equal to or less than 10 microns in diameter) nonattainment area. The maximum total PM10 emissions in a year is less than the General Conformity de minimis threshold, therefore the proposed route modifications would not cause an exceedance of the General Conformity de minimis thresholds.		
AIB-2 Fugitive Dust	No impacts to visibility in Class I areas or regional haze from construction or operation.	Same as Mavericks	Same as Mavericks	Same as Mavericks	Same as Mavericks	Potential NAAQS exceedances in the West Pinal County PM10 nonattainment area are not anticipated to be exacerbated by the route modification and therefore, the route modification would not be anticipated to impact visibility.	Same as Pinal Central North Route	Same as Pinal Central North Route
AIB-3 Locatable Minerals	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-4 Common Variety Minerals	No impact	Construction and operation would use (dispose of) common-variety minerals on split-estate lands of 213 cubic yards	Construction and operation would use (dispose of) common-variety minerals on split-estate lands of 637 cubic yards	No impact	No impact	Construction and operation would use (dispose of) common-variety minerals on split-estate lands of 3,398 cubic yards	Construction and operation would use (dispose of) common-variety minerals on split-estate lands of 2,177 cubic yards	Construction and operation would use (dispose of) common-variety minerals on split-estate lands of 1,805 cubic yards
AIB-5 Sensitive Soils	No impact	Surface-disturbing activities would impact 0.4 acre of soils highly susceptible to water erosion.	Surface-disturbing activities would impact 2.7 acres of soils highly susceptible to water erosion and 0.1 acre of soils highly susceptible to wind erosion.	Surface-disturbing activities would impact 1.0 acre of soils highly susceptible to water erosion and 0.1 acre of soils highly susceptible to wind erosion.	No impact	Surface-disturbing activities would impact 0.1 acre of soils highly susceptible to water erosion, 0.4 acre of prime farmland soils, and 2.7 acres of unique farmland soils.	Surface-disturbing activities would impact 0.1 acre of soils highly susceptible to water erosion, 0.5 acre of prime farmland soils, and 1.5 acres of unique farmland soils.	Surface-disturbing activities would impact 0.07 acre of soils highly susceptible to water erosion, 0.9 acre of prime farmland soils, and 1.4 acres of unique farmland soils.
AIB-6 Water Quality	No impact	No impact	No impact	No impact	No impact	Construction activities would cross 0.2 mile of National Wetlands Inventory (NWI) wetlands.	No impact	No impact
AIB-7 Sedimentation	Surface water features would be impacted from increased sedimentation quantities during construction.							
AIB-8 Native Vegetation	Construction activities would impact 1 acre of desert vegetation communities.	Construction activities would impact 1 acre of desert vegetation communities.	Construction activities would impact 3 acres of desert vegetation communities.	Construction activities would impact 2 acres of desert vegetation communities.	Construction activities would impact 2 acres of desert vegetation communities.	Construction activities would impact 1 acre of desert vegetation communities and 2 acres of modified vegetation communities.	Construction activities would impact <1 acre of desert vegetation communities and 2 acres of modified vegetation communities.	Construction activities would impact 1 acre of desert vegetation communities and 2 acres of modified vegetation communities.
AIB-9 Vegetation Monitoring Transects	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-10 Riparian Habitat	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-11 Invasive Species	Equipment used for construction and maintenance of the project has the potential to introduce and spread invasive and noxious weeds to the project area.							
AIB-12 Desert Bighorn Sheep Habitat	No bighorn sheep habitat or management area crossed.							
AIB-13 Grasslands and Pronghorn Habitat	The project component would impact 1 acre and cross 3 miles of pronghorn habitat.	No impact	The project component would impact 3 acres and cross 9 miles of pronghorn habitat.	The project component would impact 2 acres and cross 5 miles of pronghorn habitat.	The project component would impact 2 acres and cross 6 miles of pronghorn habitat.	No impact	No impact	No impact
AIB-14 Sensitive Time Periods and Habitat Fragmentation	The route modification and access plan is expected to result in long-term adverse impacts to habitat connectivity and decreased habitat patch size due to vegetation removal, noise, and increased activity during the construction phase and intermittent impacts during operations.							
AIB-15 Wildlife Corridors	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-16 Sandhill Crane Habitat	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-17 Sonoran Desert Tortoise Habitat	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-18 Monarch Butterfly Breeding Habitat	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-19 Nectar Bats	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Issue Statement	Mavericks*	SunZia South*	Macho Springs*	Las Palomas*	Highlands*	Pinal Central North Route with West Tie-in	Pinal Central Steele Route with West Tie-in	Pinal Central Earley Route with West Tie-in
AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	No impact	The route modification would impact two prehistoric archaeological sites.	No impact	The route modification would impact two prehistoric archaeological sites.	No impact	The route modification would impact one prehistoric archaeological site.	The route modification would impact one prehistoric archaeological site.	The route modification would impact one prehistoric archaeological site.
AIB-21 Recreation	No impact	No impact	No impact	No impact	No impact	No impact	Construction activities causing increased traffic, noise, dust, and emissions would temporarily impact the Sunscape RV resort.	Construction activities causing increased traffic, noise, dust, and emissions would temporarily impact the Sunscape RV resort.
AIB-22 Hunting Access	The route modification would impact 3 acres of hunting areas.	The route modification would impact 4 acres of hunting areas.	The route modification would impact 9 acres of hunting areas.	The route modification would impact 3 acres of hunting areas.	The route modification would impact 6 acres of hunting areas.	The route modification would impact 0.8 acre of hunting areas.	The route modification would impact 0.03 acre of hunting areas.	The route modification would impact 0.5 acre of hunting areas.
AIB-23 Livestock Grazing	The route modification would remove 0.8 acre of grazing lands.	The route modification would remove 0.6 acre of grazing lands.	The route modification would remove 2.9 acres of grazing lands.	The route modification would remove 1.6 acres of grazing lands.	The route modification would remove 1.8 acres of grazing lands.	No impact	No impact	The route modification would remove 0.2 acre of grazing lands.
AIB-24 Transportation	The route modification would impact 0.1 mile of transportation facilities.	The route modification would impact 0.3 mile of transportation facilities.	The route modification would impact 0.4 mile of transportation facilities.	The route modification would impact 0.4 mile of transportation facilities.	The route modification would impact 0.2 mile of transportation facilities.	The route modification would impact 0.7 mile of transportation facilities.	The route modification would impact 3.4 miles of transportation facilities.	The route modification would impact 3.4 miles of transportation facilities.
AIB-25 Civilian Airports and Flight Paths	No impact	No impact	No impact	No impact	No impact	Within the clear zone of the Coolidge Municipal Airport; however, the height of the proposed transmission structures is not likely to exceed the runway approach surface elevation	No impact	No impact
AIB-26 Hazardous Materials	All applicable federal, state, and local regulations regarding the use of hazardous substance would be complied with during construction, operation, and decommissioning of the proposed project components. Further, the project owner and construction team would coordinate with land-management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials, as described in the POD.							
AID-1 Climate Change	The additional greenhouse gas emissions from the localized route modifications would be 1,196.6 MT CO2e over the duration of construction. Component 1 operational emissions estimates would be unchanged from those originally disclosed in the 2013 FEIS.							
AID-2 Paleontological Resources	The route modification crosses areas of unknown and low sensitivity.	The route modification crosses areas of unknown sensitivity.	The route modification crosses areas of unknown sensitivity.	The route modification crosses areas of unknown, low, and high sensitivity.	The route modification crosses areas of unknown and high sensitivity.	The route modification crosses areas of high sensitivity.	The route modification crosses areas of high sensitivity.	The route modification crosses areas of high sensitivity.
AID-3 Avian Collisions	Potential impacts to raptors may include collision hazards particularly during aerial pursuit of prey.							
AID-4 Migratory Birds	No impact	No impact	The route modification would impact 9.4 miles and 2.9 acres of the Luna County Grasslands Bird Habitat Conservation Area (BHCA).	No impact	No impact	No impact	No impact	No impact
AID-5 Federally Listed Wildlife Species	The route modification would impact bald and golden eagle habitat.	The route modification would impact golden eagle habitat.	The route modification would impact bald and golden eagle habitat.	The route modification would impact yellow-billed cuckoo, southwestern willow flycatcher, and bald and golden eagle habitat.	The route modification would impact yellow-billed cuckoo, southwestern willow flycatcher, and bald and golden eagle habitat.	The route modification would impact bald and golden eagle habitat.	The route modification would impact bald and golden eagle habitat.	The route modification would impact bald and golden eagle habitat.
AID-6 New Mexico Meadow Jumping Mouse	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-7 BLM Sensitive Wildlife Species	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher and Gunnison's prairie dog habitats.	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher habitat.	The route modification would impact Bendire's thrasher habitat.
AID-8 Federally Listed Plant Species	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-9 BLM Sensitive Plant Species	The route modification would impact Lordsburg noino habitat.	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Issue Statement	Mavericks*	SunZia South*	Macho Springs*	Las Palomas*	Highlands*	Pinal Central North Route with West Tie-in	Pinal Central Steele Route with West Tie-in	Pinal Central Earley Route with West Tie-in
AID-10 Cultural Resources	No impact	The route modification would impact three cultural resources.	No impact	The route modification would impact three cultural resources.	The route modification would impact one cultural resource.	The route modification would impact nine cultural resources.	The route modification would impact four cultural resources.	The route modification would impact nine cultural resources.
AID-11 National Scenic and Historic Trails	No additional impacts as the Continental Divide National Scenic Trail (NST) would be located approximately 3.5 miles away, resulting in similar impacts as the no action alternative.	No impact	Low impacts to the Butterfield Overland Mail and Stage Route	No impact	The route modification would highly impact a short segment of the El Camino Real de Tierra Adentro National Historic Trail (NHT). The project in this area would not substantially interfere with the trail's nature and purpose.	The route modification would moderately impact views from the Juan Bautista de Anza NHT auto tour route; Low impacts to the Butterfield Overland Mail and Stage Route. The project would not substantially interfere with the Juan Bautista de Anza NHT nature and purpose.	The route modification would moderately impact views from the Juan Bautista de Anza NHT auto tour route; Low impacts to the Butterfield Overland Mail and Stage Route. The project would not substantially interfere with the Juan Bautista de Anza NHT nature and purpose.	The route modification would moderately impact views from the Juan Bautista de Anza NHT auto tour route; Low impacts to the Butterfield Overland Mail and Stage Route. The project would not substantially interfere with the Juan Bautista de Anza NHT nature and purpose.
AID-12 Visual Resources	Moderate impacts to Class C landscapes. Compliant with BLM VRM Class III lands crossed (1.1 miles).	Moderate impacts to Class C landscapes. Compliant with BLM VRM Class III lands crossed (0.8 mile).	Moderate impacts to views from a dispersed residence. Compliant with BLM VRM Class III lands crossed (0.7 mile).	Moderate-high impacts to Class B landscapes and on views from a dispersed residence. Compliant with BLM VRM Class IV lands crossed (2.8 miles).	Moderate-high impacts to Class B landscapes and on views from I-25. High impacts to views from New Mexico State Route 107. Compliant with BLM VRM Class IV lands crossed (5.9 miles).	Moderate impacts to views from Arizona State Route 87. The route modification does not cross BLM land.	Moderate impacts to views from Arizona State Route 87. The route modification does not cross BLM land.	Moderate impacts to views from Arizona State Route 87. The route modification does not cross BLM land.
AID-13 Existing and Future Land Uses	No impact	No impact	No impact	No impact	Overlaps with 0.01 acre of development	Three residences within 300 feet of the ROW; overlap with one planned subdivision; overlaps with 1 acre of agricultural land and 1 acre of development	Four residences within 300 feet of the ROW; overlap with one planned subdivision; overlaps with 1 acre of agricultural land and 1 acre of development	Five residences within 300 feet of the ROW; overlap with one planned subdivision; overlaps with 1 acre of agricultural land and 1 acre of development
AID-14 Proposed and Future Rights-of-Way	The route modification would impact 1.0 mile and 0.3 acre of existing ROWs.	The route modification would impact 1.3 miles and 0.4 acre of existing ROWs.	The route modification would impact 0.8 mile and 0.3 acre of existing ROWs.	The route modification would impact 1.4 miles and 0.4 acre of existing ROWs.	The route modification would impact 1.8 miles and 0.5 acre of existing ROWs.	The route modification would impact 0.5 mile and 0.2 acre of existing ROWs.	The route modification would impact 1.3 miles and 0.4 acre of existing ROWs.	The route modification would impact 2.4 miles and 0.7 acre of existing ROWs.
AID-15 Military Operations	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-16 BLM Special Designations	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-17 USFS Inventoried Roadless Area	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-18 Sevilleta National Wildlife Refuge	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-19 Fiscal Economics and Job Creation	No new impact compared to no action alternative							
AID-20 Environmental Justice	No new impact compared to no action alternative					The Pinal Central North Route has more homes from potential environmental justice communities located within 1 mile (55) than the Steele Route (39) or the Earley Route (37).		
AID-21 Noise	No impact	No impact	No impact	No impact	No impact	Noise from construction would impact one residence.	Noise from construction would impact seven residences.	Noise from construction would impact five residences.
AID-22 Electric and Magnetic Fields	The route modification would have electric field levels and magnetic field levels below reference levels for general public exposure.							

Note: * indicates agency preferred alternative. The agency preferred alternative for Localized Route Modification 6 (Pinal Central Area) is the 2015 Selected Route.

Table 2-20. Summary of Impacts: Component 2, Access Roads and Temporary Work Areas (* Indicates Agency Preferred Alternative)

Issue Statement	Access Roads*	Temporary Work Areas*
AIB-1 Air Quality	Construction and operation of access roads and TWAs would be less than significant since impacts are not changing from those originally disclosed in the 2013 FEIS due to the conservative assumptions built into the per-mile transmission line emission factors and because the emission estimates are inclusive of access roads and TWAs. The incremental contribution of emissions from Component 2 within the Rillito and West Pinal County PM10 nonattainment areas would be below the General Conformity de minimis threshold.	
AIB-2 Fugitive Dust	No exceedance of any state or federal ambient air quality standards (including secondary standards) for Component 2 with the exception of the project area within the West Pinal County Nonattainment Area in Arizona. However, these potential exceedances are not anticipated to be exacerbated by the project component, and it is not anticipated that the fugitive dust impacts from the proposed project component would directly result in a detriment to visibility at nearby Class I areas.	
AIB-3 Locatable Minerals	No impacts to mines. The project footprint for Component 2 overlaps 31.4 acres of active mining claims; however, development of these claims may occur underground, reducing direct impacts to locatable minerals from the proposed access roads and TWAs.	
AIB-4 Common Variety Minerals	No direct impacts to common-variety minerals on split-estate lands are expected from Component 2, as this component is not anticipated to use split-estate federal mineral materials during construction.	
AIB-5 Sensitive Soils	Surface-disturbing activities would impact 63.1 acres of soils highly susceptible to water erosion, 40.3 acres of soils highly susceptible to wind erosion, 13.1 acres of prime farmland soils, and 35.4 acres of unique farmland soils.	Surface-disturbing activities would impact 143.4 acres of soils highly susceptible to water erosion, 26.8 acres of soils highly susceptible to wind erosion, 59.8 acres of prime farmland soils, and 172.4 acres of unique farmland soils.
AIB-6 Water Quality	1 mile of impaired waters crossed; 0.5 mile of NWI wetlands crossed	1 mile of impaired waters crossed; 0 mile of NWI wetlands crossed
AIB-7 Sedimentation	Surface water features would be impacted from increased sedimentation quantities during construction for access roads and TWAs. Sedimentation to continue during operation of access roads.	
AIB-8 Native Vegetation	Up to 829 acres of permanent activities within native desert vegetation communities	Up to 1,218 acres of temporary project activities within native desert vegetation communities
AIB-9 Vegetation Monitoring Transects	The proposed project would intersect two vegetation transects, resulting in the need for the BLM to abandon and relocate the impacted transects for long-term monitoring.	
AIB-10 Riparian Habitat	Up to 6 acres of permanent project activities within riparian vegetation communities	Up to 18 acres of temporary project activities within riparian vegetation communities
AIB-11 Invasive Species	Equipment used for construction and maintenance of the project has the potential to introduce and spread invasive and noxious weeds to the project area.	
AIB-12 Desert Bighorn Sheep Habitat	No bighorn sheep habitat crossed; 36 miles of management area crossed and 34 acres of permanent impact within the management area	No bighorn sheep habitat crossed; 7 acres of temporary project activities within the management area
AIB-13 Grasslands and Pronghorn Habitat	The project component would impact 264 acres and cross 356 miles of pronghorn habitat	Temporary impact to 522 acres of pronghorn habitat

Issue Statement	Access Roads*	Temporary Work Areas*
AIB-14 Sensitive Time Periods and Habitat Fragmentation	Access road routes are expected to result in increased fragmentation of habitat for small mammal and insect species and other species with limited or small territory size. Long-term increased habitat fragmentation and reduced patch size of suitable grazing areas for wildlife species including big game would occur as a result of access roads.	No impact
AIB-15 Wildlife Corridors	Component 2 would result in construction-related adverse impacts to wildlife corridors such as incremental loss of vegetation, reduction of forage, incremental increase in noxious and invasive weeds, wildlife avoidance and displacement, and potential increase in wildlife mortalities resulting from vehicle collisions.	
AIB-16 Sandhill Crane Habitat	During the construction phase of the project, impacts within the Sulphur Springs Valley and Rio Grande Corridor would include increased noise disturbance and sandhill crane habitat removal. After construction, vehicle traffic associated with intermittent maintenance activities would occur throughout the life of the project.	No impact
AIB-17 Sonoran Desert Tortoise Habitat	Component 2 access roads cross 46.8 miles (67.7 acres permanent activities; 2.7 acres temporary activities) of Category 3 habitat.	Component 2 TWAs contain 66.0 acres of Category 3 habitat.
AIB-18 Monarch Butterfly Breeding Habitat	Temporary and permanent project activities from the modification and use of access roads and TWAs are less than 1% of suitable breeding and foraging habitat for monarchs.	
AIB-19 Nectar Bats	Suitable nectar bat foraging habitat for the lesser long-nosed bat (*Leptonycteris yerbabuenae*), Mexican long-tongued bat (*Choeronycteris mexicana*), and Mexican long-nosed bat (*Leptonycteris nivalis*) would be impacted by access roads and TWAs in the Arizona portion of the component.	
AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	Impacts to 30 known prehistoric archaeological sites	Impacts to 11 known prehistoric archaeological sites
AIB-21 Recreation	Indirect, temporary impacts to recreation resources may occur during construction as a result of additional construction traffic and the associated noise, fugitive dust, and emissions. New or improved permanent roads could provide additional or improved off-highway vehicle (OHV) and general recreation opportunities and access.	
AIB-22 Hunting Access	768 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS hunting areas	1,049 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS hunting areas
AIB-23Livestock Grazing	Access roads would permanently remove 429 acres of grazing lands	TWAs would temporarily impact 779 acres of grazing lands
AIB-24 Transportation	981 miles of linear transportation facilities crossed	3 miles of linear transportation facilities crossed
AIB-25 Civilian Airports and Flight Paths	No impact	No impact

Issue Statement	Access Roads*	Temporary Work Areas*
AIB-26 Hazardous Materials	All applicable federal, state, and local regulations regarding the use of hazardous substances would be complied with during construction, operation, and decommissioning of the proposed project components. Further, the project owner and construction team would coordinate with land-management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials, as described in the POD.	
AID-1 Climate Change	Greenhouse gas emissions from proposed project Component 2 (access roads and TWAs outside the granted right-of-way) are expected to be substantively similar to the no action alternative greenhouse gas emissions. Proposed project Component 2 operational emissions estimates are unchanged from those originally disclosed in the 2013 FEIS.	
AID-2 Paleontological Resources	311 miles in PFYC Class 4; 11 miles in PFYC Class 3	349 acres in PFYC Class 4; 2 acres in PFYC Class 3
AID-3 Avian Collisions	No impact	No impact
AID-4 Migratory Birds	Impacts to 36 acres of the Luna County Grasslands BHCA; 25 acres of the San Mateo and Magdalena Mountains (SMMM) BHCA; 4 acres of the San Pedro Valley; 1 acre of the Lower San Pedro River IBA	Impacts to 95 acres of the Luna County Grasslands BHCA; 37 acres of the SMMM BHCA; 36 acres of the San Pedro Valley; 28 acres of the Lower San Pedro River IBA
AID-5 Federally Listed Wildlife Species	The project component would impact yellow-billed cuckoo, cactus ferruginous pygmy owl, Rio Grande cutthroat trout, Northern Mexican gartersnake, and bald and golden eagle habitats.	The project would impact southwestern willow flycatcher, yellow-billed cuckoo, cactus ferruginous pygmy-owl, northern Mexican gartersnake, and bald and golden eagle habitats.
AID-6 New Mexico Meadow Jumping Mouse	Access roads would result in approximately 55 acres and 9.9 acres of permanent and temporary project activities within species suitable habitat.	Temporary work areas would result in approximately 50 acres of disturbance within species suitable habitat.
AID-7 BLM Sensitive Wildlife Species	Access roads would result in impacts to Gunnison's prairie dog, pinyon jay, and Bendire's thrasher habitats.	TWAs would result in impacts to Gunnison's prairie dog, pinyon jay, and Bendire's thrasher habitats.
AID-8 Federally Listed Plant Species	No impact	No impact
AID-9 BLM Sensitive Plant Species	4 acres of disturbance within Chihuahua scurfpea habitat; 6 acres of surface disturbance within Lordsburg noino habitat	1 acre of disturbance within Chihuahua scurfpea habitat; 21 acres of surface disturbance within Lordsburg noino habitat
AID-10 Cultural Resources	Impacts to 68 cultural resources	Impacts to 24 cultural resources
AID-11 National Scenic and Historic Trails	Considering the construction of the 2015 Selected Route, the project would minimally increase impacts to the El Camino Real de Tierra Adentro NHT, Butterfield Overland Mail and Stage Route, Continental Divide NST, and Arizona NST through the construction of additional access roads and temporary work areas within their settings. The project would not affect the ability to manage the trails to meet their intended nature and purpose. The project in these areas would not substantially interfere with the trails' nature and purpose.	
AID-12 Visual Resources	Incremental increase in impacts to scenery and viewing locations compared to the no action alternative. The project would be consistent with BLM VRM Class II, III, and IV objectives as analyzed from 14 Key Observation Point locations	
AID-13 Existing and Future Land Uses	12 residences within 300 feet of the ROW; overlap 12 acres of agricultural land and 18 acres of development; overlap 1 conservation easement	8 residences within 300 feet of the ROW; overlap 89 acres of agricultural land and 69 acres of development; overlap 1 conservation easement

Issue Statement	Access Roads*	Temporary Work Areas*
AID-14 Proposed and Future Rights-of-Way	Access roads would impact 280 miles and 258 acres of existing ROWs. Access roads would cross 40 acres of BLM avoidance areas and less than 1 acre of BLM exclusion area.	TWAs would impact 472 acres of existing ROWs. TWAs would cross 14 acres of BLM avoidance areas.
AID-15 Military Operations	No impact	No impact
AID-16 BLM Special Designations	No impact	No impact
AID-17 USFS Inventoried Roadless Area	No impact	No impact
AID-18 Sevilleta National Wildlife Refuge	No impact	No impact
AID-19 Fiscal Economics and Job Creation	No new impact compared to no action alternative	No new impact compared to no action alternative
AID-20 Environmental Justice	No new impact compared to no action alternative	No new impact compared to no action alternative
AID-21 Noise	14 sensitive receptors within 600-foot corridor surrounding access roads	9 sensitive receptors within 600-foot corridor surrounding access roads
AID-22 Electric and Magnetic Fields	No impact	No impact

Note: * indicates agency preferred alternative.

Table 2-21. Summary of Impacts: Component 3, Segment 4 Reroute (* Indicates Agency Preferred Alternative)

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	Subroute 1A-2	Subroute 1A-3	Subroute 1A-4	Local Alt 1A-6	Local Alt 1A-7	Subroute 2A-1	Subroute 2A-2	Subroute 2A-3	Subroute 2A-4*	Subroute 3A-1	Subroute 3A-2	Subroute 3A-3	Subroute 3A-4*	Local Alt 3B-1	Local Alt 3B-2*	
AIB-1 Air Quality	No exceedances of the primary or secondary NAAQS or NMAAQS would occur for Component 3 activities. Air quality impacts would be less than significant since there is not anticipated to be an incremental hourly emissions increase, and thus no increase in ambient air quality impacts from the SunZia East relocation, the transmission line reroute alternatives, or the no action alternative. The activities associated with Component 3 are not located in a nonattainment or maintenance area and thus, no General Conformity Analysis is required.																
AIB-2 Fugitive Dust	No exceedances of the primary or secondary NAAQS or NMAAQS would occur. No visibility impacts are anticipated for Component 3.																
AIB-3 Locatable Minerals	No direct impacts to locatable minerals.																Potential impacts to existing or future development and extraction of locatable minerals where project components overlap with locatable minerals.
AIB-4 Common Variety Minerals	Component 3 would overlap up to 19.0 miles of common-variety mineral materials on split-estate lands, resulting in the disposal of up to 15,333 cubic yards of mineral materials.																Potential impacts to existing or future development and extraction of common-variety minerals on split-estate where project components overlap with common-variety minerals on split-estate.
AIB-5 Sensitive Soils	For Alternative Route 1 subroutes, approximately 4% of soils highly susceptible to water erosion, approximately 3% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities.						For Alternative 2 subroutes, approximately 3% of soils highly susceptible to water erosion, approximately 4% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities.				For Alternative 3 subroutes, approximately 3% of soils highly susceptible to water erosion, approximately 5% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities.						Surface-disturbing activities would impact soils highly susceptible to water erosion, soils highly susceptible to wind erosion, and soils designated as prime and unique farmland soils.
AIB-6 Water Quality	Less than 0.1% of impaired waters and NWI features could be impacted by construction activities.						Less than 0.1% of impaired waters and NWI features could be impacted by construction activities.				Less than 0.1% of impaired waters and NWI features could be impacted by construction activities.						Potential impacts to impaired waters and NWI features.
AIB-7 Sedimentation	Surface water features would be impacted from increased sedimentation quantities during construction.																
AIB-8 Native Vegetation	Permanent impacts to 519 acres of native desert vegetation communities.	Permanent impacts to 519 acres of native desert vegetation communities.	Permanent impacts to 528 acres of native desert vegetation communities.	Permanent impacts to 522 acres of native desert vegetation communities.	Permanent impacts to 2 acres of native desert vegetation communities.	Permanent impacts to 2 acres of native desert vegetation communities.	Permanent impacts to 397 acres of native desert vegetation communities.	Permanent impacts to 387 acres of native desert vegetation communities.	Permanent impacts to 375 acres of native desert vegetation communities.	Permanent impacts to 401 acres of native desert vegetation communities.	Permanent impacts to 435 acres of native desert vegetation communities.	Permanent impacts to 425 acres of native desert vegetation communities.	Permanent impacts to 412 acres of native desert vegetation communities.	Permanent impacts to 439 acres of native desert vegetation communities.	Permanent impacts to 19 acres of native desert vegetation communities.	Permanent impacts to 22 acres of native desert vegetation communities.	Permanent impacts to native desert vegetation communities.
AIB-9 Vegetation Monitoring Transects	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	The proposed project would intersect two vegetation transects, resulting in the need for the BLM to abandon and relocate the impacted transects for long-term monitoring.
AIB-10 Riparian Habitat	Permanent impacts to 16 acres of riparian vegetation communities.	Permanent impacts to 14 acres of riparian vegetation communities.	Permanent impacts to 10 acres of riparian vegetation communities.	Permanent impacts to 11 acres of riparian vegetation communities.	No permanent impacts to riparian vegetation communities.	No permanent impacts to riparian vegetation communities.	Permanent impacts to 12 acres of riparian vegetation communities.	Permanent impacts to 10 acres of riparian vegetation communities.	Permanent impacts to 6 acres of riparian vegetation communities.	Permanent impacts to 7 acres of riparian vegetation communities.	Permanent impacts to 11 acres of riparian vegetation communities.	Permanent impacts to 10 acres of riparian vegetation communities.	Permanent impacts to 5 acres of riparian vegetation communities.	Permanent impacts to 6 acres of riparian vegetation communities.	No permanent impacts to riparian vegetation communities.	No permanent impacts to riparian vegetation communities.	Permanent impacts to riparian vegetation communities.
AIB-11 Invasive Species	Equipment used for construction and maintenance of the project have the potential to introduce and spread invasive and noxious weeds to the project area.																
AIB-12 Desert Bighorn Sheep Habitat	6 miles of bighorn sheep habitat and 5 miles of management area crossed				No bighorn sheep habitat or management area crossed	No bighorn sheep habitat or management area crossed	5 miles of bighorn sheep habitat and 5 miles of management area crossed				6 miles of bighorn sheep habitat and 6 miles of management area crossed				No bighorn sheep habitat or management area crossed	No bighorn sheep habitat crossed, 1 mile of management area crossed	Potential impacts to bighorn sheep habitat and management area

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	**Subroute 1A-2**	**Subroute 1A-3**	**Subroute 1A-4**	**Local Alt 1A-6**	**Local Alt 1A-7**	**Subroute 2A-1**	**Subroute 2A-2**	**Subroute 2A-3**	**Subroute 2A-4***	**Subroute 3A-1**	**Subroute 3A-2**	**Subroute 3A-3**	**Subroute 3A-4***	**Local Alt 3B-1**	**Local Alt 3B-2***	
AIB-13 Grasslands and Pronghorn Habitat	The project component would impact 395 to 396 acres and cross 91 miles of pronghorn habitat				No impact	No impact	The project component would impact 267 to 268 acres and cross 65 miles of pronghorn habitat				The project component would impact 303 to 304 acres and cross 72 miles of pronghorn habitat				Impacts to 5 miles and 18 acres of pronghorn habitat	Impacts to 5 miles and 20 acres of pronghorn habitat	Potential impacts to pronghorn habitat
AIB-14 Sensitive Time Periods and Habitat Fragmentation	Potential increase in habitat fragmentation, especially within areas which contain little to no existing anthropogenic surface disturbance, which may result in wildlife avoiding these areas.																
AIB-15 Wildlife Corridors	Component 3 would result in construction-related adverse impacts to wildlife corridors such as incremental loss of vegetation, reduction of forage, incremental increase in noxious and invasive weeds, wildlife avoidance and displacement, and potential increase in wildlife mortalities resulting from vehicle collisions. These impacts would occur on up to 126 acres of wildlife corridors.																Potential impacts to wildlife corridors
AIB-16 Sandhill Crane Habitat	Within the Rio Grande Corridor, Alternative Route 1 route(s) would result in up to 4.8 acres of permanent and up to 4.4 acres of temporary surface disturbance within sandhill crane habitat.						Within the Rio Grande Corridor, Alternative Route 2 would result in up to 4.8 acres of permanent and up to 4.1 acres of temporary surface disturbance within sandhill crane habitat.				Within the Rio Grande Corridor, Alternative Route 3 subroutes would result in up to 4.8 acres of permanent and up to 4.2 acres of temporary surface disturbance within sandhill crane habitat.						Potential impacts to sandhill crane habitat
AIB-17 Sonoran Desert Tortoise Habitat	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-18 Monarch Butterfly Breeding Habitat	Permanent impacts to 16 acres of suitable habitat	Permanent impacts to 14 acres of suitable habitat	Permanent impacts to 10 acres of suitable habitat	Permanent impacts to 11 acres of suitable habitat	No permanent impacts to suitable habitat	No permanent impacts to suitable habitat	Permanent impacts to 13 acres of suitable habitat	Permanent impacts to 11 acres of suitable habitat	Permanent impacts to 7 acres of suitable habitat	Permanent impacts to 8 acres of suitable habitat	Permanent impacts to 11 acres of suitable habitat	Permanent impacts to 10 acres of suitable habitat	Permanent impacts to 5 acres of suitable habitat	Permanent impacts to 6 acres of suitable habitat	No permanent impacts to suitable habitat	No permanent impacts to suitable habitat	Potential impacts to suitable habitat
AIB-19 Nectar Bats	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	Impacts to 21 known prehistoric archaeological sites	Impacts to 18 known prehistoric archaeological sites	Impacts to 18 known prehistoric archaeological sites	Impacts to 21 known prehistoric archaeological sites	No impact	No impact	Impacts to 21 known prehistoric archaeological sites	Impacts to 19 known prehistoric archaeological sites	Impacts to 19 known prehistoric archaeological sites	Impacts to 21 known prehistoric archaeological sites	Impacts to 28 known prehistoric archaeological sites	Impacts to 26 known prehistoric archaeological sites	Impacts to 26 known prehistoric archaeological sites	Impacts to 28 known prehistoric archaeological sites	No impact	No impact	Potential impacts to known prehistoric archaeological sites
AIB-21 Recreation	Long-term, indirect impacts to recreation resources would occur as a result of the presence of structures and transmission lines within the boundaries and/or viewsheds of recreation areas, which may adversely affect the user experience of these recreation areas and/or deter potential users.																The no action alternative crosses two areas of the Johnston (Gordy's) Hill special recreation management area, which is used for OHV recreation.
AIB-22 Hunting Access	510 acres overlap with BLM and State hunting areas; 31 acres overlap with USFS hunting areas	508 acres overlap with BLM and State hunting areas; 32 acres overlap with USFS hunting areas	536 acres overlap with BLM and State hunting areas; 31 acres overlap with USFS hunting areas	510 acres overlap with BLM and State hunting areas; 31 acres overlap with USFS hunting areas	0.3 acre overlaps with BLM and State hunting areas; 0 acres overlap with USFS hunting areas	0.5 acre overlaps with BLM and State hunting areas; 0 acres overlap with USFS hunting areas	259 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	259 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	258 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	258 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	257 acres overlap with BLM and State hunting areas; 2 acres overlap with USFWS hunting area	257 acres overlap with BLM and State hunting areas; 2 acres overlap with USFWS hunting area	257 acres overlap with BLM and State hunting areas; 2 acres overlap with USFWS hunting area	257 acres overlap with BLM and State hunting areas; 2 acres overlap with USFWS hunting area	4 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	5 acres overlap with BLM and State hunting areas; 0 acres overlap with USFS or USFWS hunting areas	Potential impacts to hunting areas and opportunities. Avoidance of USFS (Cibola National Forest lands) and the Sevilleta NWR.
AIB-23 Livestock Grazing	199 acres of impact to grazing lands	198 acres of impact to grazing lands	212 acres of impact to grazing lands	199 acres of impact to grazing lands	2 acres of impact to grazing lands	3 acres of impact to grazing lands	65 acres of impact to grazing lands				88 acres of impact to grazing lands				16 acres of impact to grazing lands	22 acres of impact to grazing lands	Impacts to grazing lands
AIB-24 Transportation	9 miles of linear transportation facilities crossed				0.2 mile of linear transportation facilities crossed	0.1 mile of linear transportation facilities crossed	9 miles of linear transportation facilities crossed				9 miles of linear transportation facilities crossed				1.1 miles of linear transportation facilities crossed	0.4 mile of linear transportation facilities crossed	Potential impacts to transportation facilities
AIB-25 Civilian Airports and Flight Paths	No impacts to the Belen Regional Airport, Coolidge Municipal Airport, or Sarita Airport. Segment 4 reroute alternatives may cross the clear zone of private airstrips. The project would be designed in accordance with Federal Aviation Administration (FAA) regulations.																Potential impacts to airports

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	**Subroute 1A-2**	**Subroute 1A-3**	**Subroute 1A-4**	**Local Alt 1A-6**	**Local Alt 1A-7**	**Subroute 2A-1**	**Subroute 2A-2**	**Subroute 2A-3**	**Subroute 2A-4***	**Subroute 3A-1**	**Subroute 3A-2**	**Subroute 3A-3**	**Subroute 3A-4***	**Local Alt 3B-1**	**Local Alt 3B-2***	
AIB-26 Hazardous Materials	All applicable federal, state, and local regulations regarding the use of hazardous substance would be complied with during construction, operation, and decommissioning of the proposed project components. Further, the project owner and construction team would coordinate with land-management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials, as described in the POD.																
AID-1 Climate Change	9,374 additional CO_2e emissions (MT) compared to no action.	9,152 additional CO_2e emissions (MT) compared to no action.	9,350 additional CO_2e emissions (MT) compared to no action.	9,337 additional CO_2e emissions (MT) compared to no action.	Not available	Not available	5,365 additional CO_2e emissions (MT) compared to no action.	4,749 additional CO_2e emissions (MT) compared to no action.	4,026 additional CO_2e emissions (MT) compared to no action.	5,310 additional CO_2e emissions (MT) compared to no action.	5,966 additional CO_2e emissions (MT) compared to no action.	5,366 additional CO_2e emissions (MT) compared to no action.	4,644 additional CO_2e emissions (MT) compared to no action.	5,928 additional CO_2e emissions (MT) compared to no action.	Not available	Not available	Combined construction and operational emissions would equate to roughly 66,926 MT CO_2e on an annualized basis.
AID-2 Paleontological Resources	36 miles in PFYC Class 4; 23 miles in PFYC Class 3; 58 miles in PFYC Class U	32 miles in PFYC Class 4; 23 miles in PFYC Class 3; 60 miles in PFYC Class U	36 miles in PFYC Class 4; 23 miles in PFYC Class 3; 56 miles in PFYC U	37 miles in PFYC Class 4; 23 miles in PFYC Class 3; 58 miles in PFYC U	0 miles in PFYC Class 4; 0.4 mile in PFYC Class 3	0 miles in PFYC Class 4; 0.52 mile in PFYC Class 3	20 miles in PFYC Class 4; 8 miles in PFYC Class 3; 61 miles in PFYC U	17 miles in PFYC Class 4; 8 miles in PFYC Class 3; 60 miles in PFYC U	19 miles in PFYC Class 4; 8 miles in PFYC Class 3; 54 miles in PFYC U	22 miles in PFYC Class 4; 8 miles in PFYC Class 3; 60 miles in PFYC U	16 miles in PFYC Class 4; 8 miles in PFYC Class 3; 1 mile in PFYC U	12 miles in PFYC Class 4; 8 miles in PFYC Class 3; 1 mile in PFYC U	14 miles in PFYC Class 4; 8 miles in PFYC Class 3; 1 mile in PFYC U	17 miles in PFYC Class 4; 8 miles in PFYC Class 3; 1 mile in PFYC U	1 mile in PFYC Class 4; 0 miles in PFYC Class 3; 5 miles in PFYC U	1 mile in PFYC Class 4; 0 miles in PFYC Class 3; 4 miles in PFYC U	Potential impacts to paleontological resources
AID-3 Avian Collisions	98 miles within or adjacent to suitable waterfowl/ raptor habitat	107 miles within or adjacent to suitable waterfowl/ raptor habitat	5 miles within or adjacent to suitable waterfowl/ raptor habitat	99 miles within or adjacent to suitable waterfowl/ raptor habitat	Not available	Not available	67 miles within or adjacent to suitable waterfowl/ raptor habitat	65 miles within or adjacent to suitable waterfowl/ raptor habitat	62 miles within or adjacent to suitable waterfowl/ raptor habitat	68 miles within or adjacent to suitable waterfowl/ raptor habitat	72 miles within or adjacent to suitable waterfowl/ raptor habitat	69 miles within or adjacent to suitable waterfowl/ raptor habitat	65 miles within or adjacent to suitable waterfowl/ raptor habitat	72 miles within or adjacent to suitable waterfowl/ raptor habitat	Not available	Not available	Groundwires, conductors, and structures would present collision hazards for birds, particularly large-bodied species such as cranes, geese, and raptors, which cannot make abrupt course corrections when obstacles are encountered in their flight path.
AID-4 Migratory Birds	Impacts to 10 acres of the Rio Grande Valley; 53 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 50 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 35 acres of the Middle Rio Grande BHCA	Impacts to 10 acres of the Rio Grande Valley; 52 acres of the Middle Rio Grande BHCA	No impact	No impact	Impacts to 9 acres of the Rio Grande Valley; 97 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 69 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 34 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 96 acres of the Middle Rio Grande BHCA	Impacts to 10 acres of the Rio Grande Valley; 103 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 76 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 41 acres of the Middle Rio Grande BHCA	Impacts to 9 acres of the Rio Grande Valley; 103 acres of the Middle Rio Grande BHCA	No impact	No impact	Potential impacts to migratory bird habitat
AID-5 Federally Listed Wildlife Species	The project component would impact southwestern willow flycatcher, yellow-billed cuckoo, Rio Grande silvery minnow, Rio Grande cutthroat trout, and bald and golden eagle habitats.																The project component would impact southwestern willow flycatcher, yellow-billed cuckoo, Rio Grande silvery minnow, northern Mexican gartersnake, and bald and golden eagle habitats, and other species listed in the 2013 FEIS Section 4.6.
AID-6 New Mexico Meadow Jumping Mouse	Permanent impacts within 196 acres of species suitable habitat	Permanent impacts within 191 acres of species suitable habitat	Permanent impacts within 182 acres of species suitable habitat	Permanent impacts within 194 acres of species suitable habitat	No impact	No impact	Permanent impacts within 225 acres of species suitable habitat	Permanent impacts within 210 acres of species suitable habitat	Permanent impacts within 193 acres of species suitable habitat	Permanent impacts within 223 acres of species suitable habitat	Permanent impacts within 274 acres of species suitable habitat	Permanent impacts within 259 acres of species suitable habitat	Permanent impacts within 241 acres of species suitable habitat	Permanent impacts within 272 acres of species suitable habitat	Permanent impacts within 22 acres of species suitable habitat	Permanent impacts within 24 acres of species suitable habitat	Potential impacts to New Mexico meadow jumping mouse habitat

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	**Subroute 1A-2**	**Subroute 1A-3**	**Subroute 1A-4**	**Local Alt 1A-6**	**Local Alt 1A-7**	**Subroute 2A-1**	**Subroute 2A-2**	**Subroute 2A-3**	**Subroute 2A-4***	**Subroute 3A-1**	**Subroute 3A-2**	**Subroute 3A-3**	**Subroute 3A-4***	**Local Alt 3B-1**	**Local Alt 3B-2***	
AID-7 BLM Sensitive Wildlife Species	387 acres impacts to pinyon jay; 502 acres impact to Bendire's thrasher; 325 acres impact to Gunnison's prairie dog habitats	388 acres impacts to pinyon jay; 499 acres impact to Bendire's thrasher; 319 acres impact to Gunnison's prairie dog habitats	391 acres impacts to pinyon jay; 511 acres impact to Bendire's thrasher; 320 acres impact to Gunnison's prairie dog habitats	386 acres impacts to pinyon jay; 513 acres impact to Bendire's thrasher; 323 acres impact to Gunnison's prairie dog habitats	3 acres impacts to pinyon jay; 0 acre impact to Bendire's thrasher; 1 acre impact to Gunnison's prairie dog habitats	3 acres impacts to pinyon jay; 0 acre impact to Bendire's thrasher; 1 acre impact to Gunnison's prairie dog habitats	248 acres impacts to pinyon jay; 396 acres impact to Bendire's thrasher; 237 acres impact to Gunnison's prairie dog habitats	249 acres impacts to pinyon jay; 394 acres impact to Bendire's thrasher; 224 acres impact to Gunnison's prairie dog habitats	252 acres impacts to pinyon jay; 399 acres impact to Bendire's thrasher; 204 acres impact to Gunnison's prairie dog habitats	248 acres impacts to pinyon jay; 405 acres impact to Bendire's thrasher; 235 acres impact to Gunnison's prairie dog habitats	223 acres impacts to pinyon jay; 409 acres impact to Bendire's thrasher; 236 acres impact to Gunnison's prairie dog habitats	223 acres impacts to pinyon jay; 408 acres impact to Bendire's thrasher; 223 acres impact to Gunnison's prairie dog habitats	227 acres impacts to pinyon jay; 414 acres impact to Bendire's thrasher; 202 acres impact to Gunnison's prairie dog habitats	222 acres impacts to pinyon jay; 419 acres impact to Bendire's thrasher; 234 acres impact to Gunnison's prairie dog habitats	0 acre impacts to pinyon jay; 0 acres impact to Bendire's thrasher; 19 acres impact to Gunnison's prairie dog habitats	0 acre impacts to pinyon jay; 0 acres impact to Bendire's thrasher; 22 acres impact to Gunnison's prairie dog habitats	Potential impacts to BLM sensitive species
AID-8 Federally Listed Plant Species	Surface disturbance within 1 acre of potential suitable Pecos sunflower habitat				No impact		Surface disturbance within 66 to 67 acres of potential suitable Pecos sunflower habitat				Surface disturbance within 62 to 63 acres of potential suitable Pecos sunflower habitat				No impact	No impact	Potential impacts to federally listed plant species
AID-9 BLM Sensitive Plant Species	17 acres of permanent disturbance within gypsophillic habitat				No impact		1 acre of permanent disturbance within gypsophillic habitat				2 acres of permanent disturbance within gypsophillic habitat				No impact	No impact	Potential impacts to BLM sensitive plants
AID-10 Cultural Resources	Impacts to 31 cultural resources	Impacts to 24 cultural resources	Impacts to 24 cultural resources	Impacts to 31 cultural resources	No impact	No impact	Impacts to 30 cultural resources	Impacts to 25 cultural resources	Impacts to 25 cultural resources	Impacts to 30 cultural resources	Impacts to 40 cultural resources	Impacts to 36 cultural resources	Impacts to 35 cultural resources	Impacts to 41 cultural resources	Impacts to 2 cultural resources	No impact	Potential impacts cultural resources
AID-11 National Scenic and Historic Trails	Moderate/ high impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from a high potential historic site and from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	Moderate/ high impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	No impact	No impact	Moderate/ high impacts to the El Camino Real de Tierra Adentro NHT including views from a high potential historic site and from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from a high potential historic site and from NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	Moderate/ high impacts to the El Camino Real de Tierra Adentro NHT including views from a high potential historic site and from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. Moderate/high impacts to views from a high potential historic site. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from a high potential historic site and from NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route. Moderate/high impacts to views from a high potential historic site. The project could result in substantial interference with the trail's nature and purpose.	High impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route.	Moderate/ high impacts to the El Camino Real de Tierra Adentro NHT including views from the NHT auto tour route.	Potential impacts to El Camino Real de Tierra Adentro NHT, Juan Bautista de Anza NHT, Butterfield Overland Mail and Stage Route, Continental Divide NST, and Arizona NST

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	**Subroute 1A-2**	**Subroute 1A-3**	**Subroute 1A-4**	**Local Alt 1A-6**	**Local Alt 1A-7**	**Subroute 2A-1**	**Subroute 2A-2**	**Subroute 2A-3**	**Subroute 2A-4***	**Subroute 3A-1**	**Subroute 3A-2**	**Subroute 3A-3**	**Subroute 3A-4***	**Local Alt 3B-1**	**Local Alt 3B-2***	
AID-12 Visual Resources	High impacts to high-quality landscapes on the Cibola NF and moderate impacts where the Rio Grande would be crossed. High impacts to residential, recreation, and travel route viewers. Project would not be consistent with BLM VRM Class II objectives for 3.4 miles. The project would meet desired conditions for visual resources on the Cibola NF (maximum modification VQO).	Similar to Subroute 1A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 1A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 1A-1.	High impacts to high-quality landscapes on the Cibola NF. Project would not be consistent with BLM VRM Class II objectives for 0.3 mile. The project would meet desired conditions for visual resources on the Cibola NF (maximum modification VQO).	Project would not be consistent with BLM VRM Class II objectives for 1 mile.	Moderate impacts to scenery where the Rio Grande would be crossed. High impacts to residential, recreation, and travel route viewers including views from the Sevilleta NWR where more robust, co-located structures are proposed. Project would be consistent with BLM VRM Class IV objectives.	Similar to Subroute 2A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 2A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 2A-1.	Moderate impacts to scenery where the Rio Grande would be crossed. High impacts to residential and travel route viewers. Moderate-high impacts to views from recreation areas including views from the Sevilleta NWR. Project would be consistent with BLM VRM Class IV objectives.	Similar to Subroute 3A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 3A-1 except high impacts to the Rio Grande would occur.	Similar to Subroute 3A-1.	Moderate impacts to scenery. High impacts to views from I-25. Project would be consistent with BLM VRM Class IV objectives.	Moderate impacts to scenery. Moderate-high impacts to views from I-25. Project would be consistent with BLM VRM Class IV objectives.	Potential visual resource impacts
AID-13 Existing and Future Land Uses	4 residences within 300 feet of the ROW; overlaps with three subdivisions; 9 acres of agricultural land and 3 acres of development	2 residences within 300 feet of the ROW; overlaps with two subdivisions; 6 acres of agricultural land and 2 acres of development	2 residences within 300 feet of the ROW; overlaps with three subdivisions; 6 acres of agricultural land and 2 acres of development	5 residences within 300 feet of the ROW; overlaps with three subdivisions; 9 acres of agricultural land and 4 acres of development	No impact	No impact	2 residences within 300 feet of the ROW; overlaps with two subdivisions; 10 acres of agricultural land and 3 acres of development	1 residence within 300 feet of the ROW; overlaps with one subdivision; 7 acres of agricultural land and 2 acres of development	1 residence within 300 feet of the ROW; overlaps with three subdivisions; 7 acres of agricultural land and 2 acres of development	4 residences within 300 feet of the ROW; overlaps with two subdivisions; 10 acres of agricultural land and 3 acres of development	6 residences within 300 feet of the ROW; overlaps with two subdivisions; 9 acres of agricultural land and 5 acres of development	4 residences within 300 feet of the ROW; overlaps with one subdivision; 6 acres of agricultural land and 4 acres of development	4 residences within 300 feet of the ROW; overlaps with two subdivisions; 9 acres of agricultural land and 4 acres of development	7 residences within 300 feet of the ROW; overlaps with two subdivisions; 6 acres of agricultural land and 5 acres of development	2 residences within 300 feet of the ROW; overlaps with 2 acres of development	1 residence within 300 feet of the ROW; overlaps with 2 acres of development	Potential impacts to existing and future land uses
AID-14 Proposed and Future Rights-of-Way	Impacts to 28 acres of existing ROWs. Overlap with 105 acres of BLM avoidance areas and 2 acres of BLM exclusion area.	Impacts to 28 acres of existing ROWs. Overlap with 105 acres of BLM avoidance areas and 2 acres of BLM exclusion area.	Impacts to 53 acres of existing ROWs. Overlap with 105 acres of BLM avoidance areas and 2 acres of BLM exclusion area.	Impacts to 28 acres of existing ROWs. Overlap with 105 acres of BLM avoidance areas and 2 acres of BLM exclusion area.	Impacts to 3 acres of BLM avoidance areas	Impacts to 4 acres of BLM avoidance areas and 1 acre of BLM exclusion area	Impacts to 35 acres of existing ROWs. Overlap with 33 acres of BLM avoidance areas and 15 acres of BLM exclusion area.				Impacts to 78 acres of existing ROWs. Overlap with 53 acres of BLM avoidance areas.				Impacts to 33 acres of existing ROWs.	Impacts to 27 acres of existing ROWs. Overlap with 4 acres of BLM avoidance area.	Impacts to existing ROWs and BLM avoidance/ exclusion areas

Issue Statement	Alt Route 1						Alt Route 2				Alt Route 3						No Action Alternative
	Subroute 1A-1	**Subroute 1A-2**	**Subroute 1A-3**	**Subroute 1A-4**	**Local Alt 1A-6**	**Local Alt 1A-7**	**Subroute 2A-1**	**Subroute 2A-2**	**Subroute 2A-3**	**Subroute 2A-4***	**Subroute 3A-1**	**Subroute 3A-2**	**Subroute 3A-3**	**Subroute 3A-4***	**Local Alt 3B-1**	**Local Alt 3B-2***	
AID-15 Military Operations	Within 0.2 mile of military helicopter landing zones on BLM land		Within 0.2 mile of military helicopter landing zones on BLM land		No impact		No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	The project would cross 2,084 acres of the WSMR NCUA and 3,109 acres of restricted airspace (Note: the NCUA and restricted airspace are overlapping boundaries.)
AID-16 BLM Special Designations	Segment 4 alternative Subroutes 1A-1 through 1A-4 would be located adjacent to the southwestern and northern boundaries of the Sierra Ladrones WSA. The wilderness characteristic of *outstanding opportunities for solitude or a primitive and unconfined type of recreation* would be temporarily degraded during construction of the transmission towers under this alternative due to visual impacts and noise. During operation, the project would be visible from 22% of the WSA.					Less than 1 acre permanent impact to ACEC; Same impacts to WSAs as 1A-6	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact to ACECs or backcountry byways; the project would be visible from 19% of the Devil's Backbone WSA, 20% of the Stallion WSA, 15% of the Presilla WSA, and 70% of the Veranito WSA.
AID-17 USFS Inventoried Roadless Area	Adverse impacts to the Roadless Area characteristics due to aerially spanning 0.2 mile of the Scott Mesa IRA					No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact	No impact
AID-18 Sevilleta National Wildlife Refuge	No impact	No impact	No impact	No impact	No impact	No impact	All Alternative Route 2 subroutes would permanently impact 83 acres within the Sevilleta NWR outside the existing transmission line footprint.				All Alternative Route 3 subroutes would permanently impact 57 acres within the Sevilleta NWR outside the existing transmission line footprint.				No impact		No impact
AID-19 Fiscal Economics and Job Creation	Under Alternative Route 1, project construction is projected to support 52 local construction jobs over a 6.5-year construction period, and 38 non-local jobs. Including additional per-diems paid to local and non-local workers, and local purchases of supplies and equipment, Alternative Route 1 is projected to inject over $22 million per year into the New Mexico economy, producing a total of about $35 million per year in additional economic output including indirect effects.						The Alternative Route 2 and Alternative Route 3 combination is projected to support an annual average of about 44 local jobs and 32 non-local jobs. Alternative Route 2 and Alternative Route 3 combination is projected to inject over $19.7 million per year into the New Mexico economy, producing a total of about $30 million per year in additional economic output including indirect effects.										The project (overall) would contribute thousands of jobs in Arizona and New Mexico as well as millions of dollars in property taxes.
AID-20 Environmental Justice	There are five Census Tracts with potential environmental justice populations that include lands that would be within 3 miles of the proposed route under Alternative Route 1 and its subroutes. Alternative Route 1 with Subroute 1A-1 would have approximately 117 residences in potential environmental justice communities within 1 mile of the proposed route and 210 such residences within 1 to 3 miles of the proposed route.						Alternative Route 2 and its sub-alternatives cross the same Census Tracts with potential environmental justice populations as Alternative Route 1 and its sub-alternatives. Alternative Route 2 with Subroute 2A-1 would have approximately 175 residences in potential environmental justice communities within 1 mile of the proposed route and 236 such residences within 1 to 3 miles of the proposed route.				Alternative Route 3 and its sub-alternatives cross all of the same Census Tracts with potential environmental justice populations as Alternative Routes 1 and 2 and their sub-alternatives as well as three additional Census Tracts with potential environmental justice populations. Alternative Route 3 subroutes would have approximately 303 residences in potential environmental justice communities within 1 mile of the proposed route and 467 such residences within 1 to 3 miles of the proposed route.						The 2013 FEIS concluded that no significant impacts to environmental justice populations were expected to result from the construction and operation of the project.
AID-21 Noise	6 sensitive receptors within 600-foot corridor surrounding access roads	4 sensitive receptors within 600-foot corridor surrounding access roads	4 sensitive receptors within 600-foot corridor surrounding access roads	7 sensitive receptors within 600-foot corridor surrounding access roads	1 sensitive receptor within 600-foot corridor surrounding access roads	1 sensitive receptor within 600-foot corridor surrounding access roads	5 sensitive receptors within 600-foot corridor surrounding access roads	3 sensitive receptors within 600-foot corridor surrounding access roads	3 sensitive receptors within 600-foot corridor surrounding access roads	6 sensitive receptors within 600-foot corridor surrounding access roads	8 sensitive receptors within 600-foot corridor surrounding access roads	6 sensitive receptors within 600-foot corridor surrounding access roads	6 sensitive receptors within 600-foot corridor surrounding access roads	9 sensitive receptors within 600-foot corridor surrounding access roads	3 sensitive receptors within 600-foot corridor surrounding access roads	2 sensitive receptors within 600-foot corridor surrounding access roads	Noise from construction activities would impact sensitive receptors. Impacts would be short-term and possibly considered a nuisance.
AID-22 Electric and Magnetic Fields	Exposure to electric and magnetic fields would be below general public and occupational exposure levels.																

Note: * indicates agency preferred alternative.

Table 2-22. Summary of Impacts: Component 4, SunZia West Substation (* Indicates Agency Preferred Alternative)

Issue Statement	SunZia West Substation*
AIB-1 Air Quality	No exceedances of the primary or secondary NAAQS or AAAQS would occur
AIB-2 Fugitive Dust	No exceedances of the primary or secondary NAAQS or AAAQS would occur. No impacts to visibility in Class I areas or regional haze from construction or operation.
AIB-3 Locatable Minerals	No impact
AIB-4 Common Variety Minerals	No impact
AIB-5 Sensitive Soils	No impact
AIB-6 Water Quality	No impact to impaired waters or NWI features.
AIB-7 Sedimentation	Construction and operation activities could contribute to increased sedimentation to nearby surface waters during storm events and contribute to the formation of headcuts and gullies.
AIB-8 Native Vegetation	Construction activities would impact 80 acres of native desert vegetation communities.
AIB-9 Vegetation Monitoring Transects	No impact
AIB-10 Riparian Habitat	No impact
AIB-11 Invasive Species	Equipment used for construction and maintenance of the project have the potential to introduce and spread invasive and noxious weeds to the project area.
AIB-12 Desert Bighorn Sheep Habitat	No bighorn sheep habitat or management area crossed
AIB-13 Grasslands and Pronghorn Habitat	No impact
AIB-14 Sensitive Time Periods and Habitat Fragmentation	No impact
AIB-15 Wildlife Corridors	No impact
AIB-16 Sandhill Crane Habitat	No impact
AIB-17 Sonoran Desert Tortoise Habitat	The SunZia West Substation would permanently impact approximately 80 acres of Category 3 habitat.
AIB-18 Monarch Butterfly Breeding Habitat	No impact
AIB-19 Nectar Bats	Construction activities would impact 80 acres of native desert vegetation communities potentially used by bats.
AiB-20 Traditional Cultural Properties and Resources with Tribal Importance	No impact
AIB-21 Recreation	No impact
AIB-22 Hunting Access	The substation relocation would impact 80 acres of hunting areas.
AIB-23 Livestock Grazing	The substation relocation would remove 80 acres of grazing lands.
AIB-24 Transportation	No impact
AIB-25 Civilian Airports and Flight Paths	No impact
AIB-26 Hazardous Materials	All applicable federal, state, and local regulations regarding the use of hazardous substance would be complied with during construction, operation, and decommissioning of the proposed project components. Further, the project owner and construction team would coordinate with land-management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials, as described in the POD.

Issue Statement	SunZia West Substation*
AID-1 Climate Change	Construction emissions would be approximately 23,859 MT CO_2e and operation emissions would be equal to 58.5 MT/year of CO_2e. Additionally, operations would result in fugitive leaks of SF_6.
AID-2 Paleontological Resources	The substation occurs in areas of unknown and low sensitivity.
AID-3 Avian Collisions	No impact
AID-4 Migratory Birds	No impact
AID-5 Federally Listed Wildlife Species	The project component would impact cactus ferruginous pygmy owl suitable habitat, and bald and golden eagle habitats.
AID-6 New Mexico Meadow Jumping Mouse	No impact
AID-7 BLM Sensitive Wildlife Species	The substation would impact 80 acres of Bendire's thrasher habitat.
AID-8 Federally Listed Plant Species	No impact
AID-9 BLM Sensitive Plant Species	No impact
AID-10 Cultural Resources	No impact
AID-11 National Scenic and Historic Trails	No impact
AID-12 Visual Resources	Low to low/moderate impacts to scenery and on views. Since no BLM or USFS lands are occupied by the SunZia West Substation and there are no state visual requirements for this area, the project would be compliant with agency visual management objectives.
AID-13 Existing and Future Land Uses	No impact
AID-14 Proposed and Future Rights-of-Way	No impact
AID-15 Military Operations	No impact
AID-16 BLM Special Designations	No impact
AID-17 USFS Inventoried Roadless Area	No impact
AID-18 Sevilleta National Wildlife Refuge	No impact
AID-19 Fiscal Economics and Job Creation	The construction of the substation would support a little more than two jobs per year for the 42-month construction schedule and would support three jobs per year during operations.
AID-20 Environmental Justice	No impact
AID-21 Noise	No impact
AID-22 Electric and Magnetic Fields	The substation would have electric field levels and magnetic field levels below reference levels for general public exposure.

Note: * indicates agency preferred alternative.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the existing environmental and human resource conditions that could be impacted by the project and the potential impacts that the project components and alternatives presented in Chapter 2 would have on the issues identified during scoping. The affected environment and environmental consequences were determined through desktop research, field surveys along portions of the alternatives, input from the public scoping period, ongoing coordination with agencies, and baseline resource reports. The resource reports are available for public review on the BLM National NEPA ePlanning project website.[4] Table 3-1 lists each resource report written or the corresponding resource topics.

As discussed in Chapter 1, this Draft EIS is tiered to the 2013 FEIS and 2015 ROD (BLM 2013, 2015a). Tiering to the 2013 FEIS and 2015 ROD in this chapter is indicated by a clear in-text reference to the document's section number and citation, with a summary of the key information being referenced in the earlier document. Furthermore, Table 3-1 provides a guide for how the resources analyzed in the 2013 FEIS are addressed by the project-specific issue statements in this Draft EIS. The potential impacts identified for the proposed project are referred to as "impacts" or "effects" interchangeably throughout this Draft EIS.

3.1.1 Independent Review Process

The BLM, USFWS, and USFS assisted SunZia and its consultant POWER Engineers, Inc., by outlining the types of information required for preparation of the EIS. In the spring and summer of 2021, the BLM, USFWS, and USFS hosted a series of interdisciplinary (ID) team calls with staff from the BLM, USFWS, USFS, Cooperating Agencies, SWCA Environmental Consultants (SWCA), and POWER Engineers, Inc., to provide guidance and data needs for the issue statements to be analyzed in the EIS. The group took into account the resources analyzed in the 2013 FEIS when developing issue statements, since this EIS tiers to the 2013 FEIS. Issue statements were also informed by internal and external scoping.

The BLM, USFWS, and USFS, supported by SWCA, provided guidance worksheets to POWER Engineers, Inc., to outline the types of data needed, as discussed on the spring 2021 ID team calls. The SunZia Resource Reports (see Table 3-1) were submitted in summer 2021; the SWCA team first conducted an initial review of each report and associated data for content and completeness and to identify data gaps. Final review was provided by representatives of the BLM, USFWS, USFS, and Cooperating Agencies prior to utilizing portions of the reports and referencing them in the EIS. Table 3-1 identifies the resource reports used to support the analysis for each issue statement in this EIS.

Subsequent to the development of the resource reports, additional datasets were identified, new analysis was conducted, and agency comments were received that resulted in analysis revisions necessary to finalize this Draft EIS. Therefore, this Draft EIS takes primacy for impacts analysis for the proposed project components.

[4] https://eplanning.blm.gov/eplanning-ui/project/2011785/510

Table 3-1. Crosswalk between Impact Analysis in the 2013 FEIS and this Draft EIS

Resource Section in 2013 FEIS	2013 FEIS Sections	Issue Analyzed in Brief in this EIS	Issue Analyzed in Detail in this EIS	Corresponding Resource Report
Climate and Air Quality	3.2 and 4.2	AIB-1 Regional Air Quality AIB-2 Fugitive Dust	AID-1 Climate Change	POWER Engineers, Inc. 2021c
Earth Resources	3.3 and 4.3	AIB-3 Locatable Minerals AIB-4 Common Variety Minerals AIB-5 Sensitive Soils	None	POWER Engineers, Inc. 2021d
Paleontological Resources	3.4 and 4.4	None	AID-2 Paleontological Resources	POWER Engineers, Inc. 2021e
Water Resources	3.5 and 4.5	AIB-6 Water Quality AIB-7 Sedimentation to Surface Water Resources	None	POWER Engineers, Inc. 2021f
Biological Resources	3.6 and 4.6	AIB-8 Native Vegetation AIB-9 Vegetation Monitoring Transects AIB-10 Riparian Habitat AIB-11 Invasive Species (Noxious Weeds) AIB-12 Desert Bighorn Sheep Habitat AIB-13 Grasslands and Pronghorn Habitat AIB-14 Sensitive Time Periods and Habitat Fragmentation AIB-15 Wildlife Corridors AIB-16 Sandhill Crane Habitat AIB-17 Sonoran Desert Tortoise Habitat AIB-18 Monarch Butterfly Breeding Habitat AIB-19 Nectar Bats	AID-3 Avian Collisions AID-4 Migratory Bird Corridors AID-5 Federally Listed Wildlife Species AID-6 New Mexico Meadow Jumping Mouse AID-7 BLM Sensitive Wildlife Species AID-8 Federally Listed Plant Species AID-9 BLM Sensitive Plant Species	POWER Engineers, Inc. 2021g
Wildland Fire Ecology and Management	3.7 and 4.7	None	None	No resource report
Cultural Resources and Tribal Concerns	3.8 and 4.8	AIB-20 Traditional Cultural Properties and Resources with Tribal Importance	AID-10 Cultural Resources AID-11 National Scenic and Historic Trails	Tremblay 2021
Visual Resources	3.9 and 4.9	None	AID-12 Visual Resources	POWER Engineers, Inc. 2021h

Resource Section in 2013 FEIS	2013 FEIS Sections	Issue Analyzed in Brief in this EIS	Issue Analyzed in Detail in this EIS	Corresponding Resource Report
Land Use and Recreation Resources	3.10 and 4.10	AIB-21 Recreation AIB-22 Hunting Access AIB-23 Livestock Grazing AIB-24 Transportation AIB-25 Civilian Airports and Flight Paths	AID-13 Existing and Future Land Uses AID-14 Proposed and Future Rights-of-Way AID-15 Military Operations	POWER Engineers, Inc. 2021i
Special Designations; Wilderness, Wilderness Study Areas, and Lands with Wilderness Characteristics	3.11 and 4.11 3.12 and 4.12	None	AID-16 BLM Special Designations AID-17 USFS Inventoried Roadless Area AID-18 Sevilleta National Wildlife Refuge	POWER Engineers, Inc. 2021j
Social and Economic Conditions; Environmental Justice	3.13 and 4.13 3.14 and 4.14	None	AID-19 Fiscal Economics and Job Creation AID-20 Environmental Justice	Moss Adams 2021
Health and Safety/Hazardous Waste	3.15 and 4.15	AIB-26 Hazardous Materials	AID-21 Noise AID-22 Electric and Magnetic Fields	POWER Engineers, Inc. 2021k

3.2 ANALYSIS METHODS

3.2.1 Reasonably Foreseeable Environmental Trends and Planned Actions

The cumulative impacts of the SunZia Southwest Transmission Project in its entirety were analyzed in the 2013 FEIS (BLM 2013:Chapter 4). "The construction of new transmission lines through relatively undeveloped areas could cause cumulative impacts, such as the potential for habitat fragmentation and ground disturbance resulting from future access" (BLM 2015a:25). The analysis of reasonably foreseeable environmental trends and planned actions in this EIS is intended to tier to the 2013 FEIS (BLM 2013), as well as provide supporting information for the analysis for the proposed project components. The Reasonably Foreseeable Future Environmental Trends and Planned Actions Technical Report (SWCA 2021) provides an inventory and presentation of reasonably foreseeable environmental trends and planned actions for consideration in the impact analysis in the issue statements below. CEQ NEPA implementing regulations, 40 CFR 1502.15, require that EISs "succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration, including the reasonably foreseeable environmental trends and planned actions in the area(s)."

3.2.2 Impact Duration Definitions

For the purposes of this analysis, short-term or temporary impacts are defined as those that cease after construction and reclamation activities are complete (5 years); long-term or permanent impacts are defined as those associated with operation of the project (50 years) or otherwise extend beyond the short-term (temporary) time period. As such, some long-term effects would cease immediately upon the end of operations, whereas other long-term effects would remain until successful decommissioning is accomplished dependent on the nature of the effect. Note that the time frame for successful reclamation would vary by vegetation type and other factors such as the amount and timing of annual precipitation.

It is important to note that a project activity that is classified as temporary may not always result in a temporary impact. In some cases, a temporary project activity may result in a long-term/permanent impact. For example, the use of a TWA is considered a temporary project activity, but the surface disturbance associated with a TWA could have permanent impacts, depending on the vegetation communities where the TWA is located.

3.2.3 Mitigation and Residual Impacts

Mitigation includes specific means, measures, or practices that would reduce or eliminate effects of a proposed action or alternatives, and may be used to reduce or avoid adverse impacts to environmental resources, whether or not they are significant in nature. Design features, which were referred to as standard mitigation measures in the 2013 FEIS (BLM 2013:2-88 through 2-99) were incorporated in the impact analysis for all alternatives. These design features typically address specific environmental policies, BMPs, planning guidelines, or regulatory requirements. Design features are listed in Appendix C.

Applicant-committed environmental protection measures (EPMs), which were referred to as selective mitigation measures in the 2013 FEIS (BLM 2013:2-88 through 2-99), are intended to reduce or minimize impacts in specific locations. A list of the EPMs is provided in Appendix C.

Residual impacts are the environmental effects that remain after EPMs are applied. The level of residual impact is determined by how effective the mitigation is in reducing or avoiding the initial impact. Locations and intensities of potential residual impacts anticipated to occur from the project were assessed for each alternative and described for each issue statement in this chapter. The disclosure of impacts below are predominantly focused on residual impacts, because it is assumed all necessary design features and EPMs would be applied, where appropriate.

3.3 ISSUES ANALYZED IN BRIEF

Following internal and external scoping, 26 issues were identified, considered, and analyzed in brief (AIB). These issues are analyzed in brief because the impacts represented by the issue statement would be minor and/or less controversial, and impacts can be analyzed concisely while ensuring an informed federal decision per CEQ NEPA regulations (40 CFR 1500.1). The impacts are not expected to be deciding issues in the permitting of the project and are presented here in the spirit of transparency. Each of these issues is outlined below with a concise discussion regarding the context and intensity of the effect related to each issue.

AIB-1 Regional Air Quality

Would the proposed project increase criteria pollutants that would impact regional air quality?

3.3.1 Affected Environment

The analysis area for this issue statement encompasses the airsheds local to the proposed project components in New Mexico and Arizona. This EIS incorporates by reference information from the 2013 FEIS, which includes discussion of ambient air quality standards applicable to the analysis (BLM 2013:3-4 and 3-5). There are two types of standards: primary standards set to protect public health, and secondary standards set to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings (U.S. Environmental Protection Agency [EPA] 2021a).

The proposed project components would be located in areas that are in attainment with the National Ambient Air Quality Standards (NAAQS), Arizona Ambient Air Quality Standards (AAAQS), and New Mexico Ambient Air Quality Standards (NMAAQS) for all criteria pollutants except for in the following areas: Rillito PM_{10} (particulate matter equal to or less than 10 microns in diameter) nonattainment area (located in northeastern Pima County, Arizona); West Pinal County PM_{10} nonattainment area (located in western Pinal County, Arizona); San Manual sulfur dioxide (SO_2) maintenance area (located in southeast Pinal County, Arizona); and Tucson/Pima County carbon dioxide (CO) maintenance area (located in northeast Pima County, Arizona) (Arizona Department of Environmental Quality [ADEQ] 2021).
The General Conformity Rule applies to the portions of the project that would occur within the nonattainment and maintenance areas listed above. Access roads and temporary work areas (proposed project Component 2) would occur within the nonattainment or maintenance areas listed above.
The SunZia West Substation would be constructed within Pinal County, Arizona, approximately 6.5 miles east of the West Pinal County PM_{10} nonattainment area boundary (ADEQ 2021; POWER Engineers, Inc. 2021a). Review of monitoring data at the monitoring locations disclosed in the 2013 FEIS as background concentration monitors indicates that the concentrations of ambient air quality pollutant values are similar or have decreased since the 2013 FEIS (POWER Engineers, Inc. 2021c:4 and Appendix A; BLM 2013:3-16 through 3-19). In 2020, the West Pinal County PM_{10} nonattainment area was redesignated from Moderate to Serious. Therefore, the de minimis General Conformity threshold for the West Pinal County PM_{10} nonattainment area has decreased from 100 tons to 70 tons of PM_{10} per year.

3.3.1.1 Reasonably Foreseeable Future Environmental Trends and Planned Actions

Reasonably foreseeable future environmental trends and planned actions within the SunZia project analysis area include population growth in the counties within Arizona, and population decline in the counties within New Mexico, both of which are expected to impact overall mobile-source and associated on-road fugitive dust emissions in the analysis area (SWCA 2021). There are several planned wind and solar energy development projects and transmission line projects located in various counties within the analysis area (SWCA 2021). Notably, the High Plains Express Transmission Line Project, Southline Transmission Line, and the now constructed Western Spirit Transmission Line may run in proximity to the SunZia project in portions of New Mexico and/or Arizona (SWCA 2021). However, the construction phases of these projects, when the majority of criteria pollutant emissions are likely to occur, are unlikely to overlap. There is also a proposed 1,000-MW natural gas–fired power station located 2 miles north of Bowie, Arizona, which would utilize natural gas–fired electric generating units (SWCA 2021). An ADEQ construction permit for “Phase 1” would have authorized a 525-MW combined-cycle natural gas–fired plant (BLM 2013:4-307). Phase 1 was not built, however, and the full buildout of the planned project would be around 1,000 MW and, though the project was delayed, is still considered reasonably foreseeable. The Bowie Power Station would comply with applicable state and federal air permitting regulations.

3.3.2 Environmental Consequences

3.3.2.1 Methods and Assumptions

The following assumptions were used to analyze impacts to ambient air quality:

- The quantity and character of emissions from project Components 1, 2, and 4 would be similar to those previously analyzed for transmission line route construction in the 2013 FEIS (BLM 2013:Appendix F).
- The quantity and character of emissions from project Component 3 would be similar to those previously analyzed for substation construction in the 2013 FEIS (BLM 2013:Appendix F).
- The impacts to the West Pinal County nonattainment area are based on revised background concentrations based on the nearest ambient air quality monitoring station from the previous 3 years.

The impact indicators used for this analysis are:

- Total tons per year emission estimates for the project as a whole within nonattainment areas for General Conformity Analysis.
- Predicted ambient air quality concentrations which are based on the construction activity type (e.g., transmission line construction, access roads, and work areas and substation construction) and the modeled predictions from the 2013 FEIS (BLM 2013:Appendix F).

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to ambient air quality:

- The 2013 Final Environmental Impact Statement for the SunZia Southwest Transmission Project, Appendix F: Climate and Air Quality Report (BLM 2013:Appendix F)
- The SunZia Southwest Transmission Project Amendment of Federal Right-of-Way Climate and Air Quality Report (POWER Engineers, Inc. 2021c)

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-2. Full design features and EPMs are provided in Appendix C.

Table 3-2. Design Features and Environmental Protection Measures Applicable to Ambient Air Quality

Relevant Design Features	Applicable EPMs
5, 6, 8, 18, 20	1, 2, 3, 4, 5, 6

3.3.2.2 Impacts Common to All Components

The activities associated with each proposed action component would result in emissions of criteria air pollutants through surface disturbance activities (fugitive dust) and construction equipment fuel combustion emissions. Additionally, fuel combustion equipment results in emissions of minor quantities of hazardous air pollutants. Upon completion of construction, operational emissions including worker commuting emissions, infrequent vehicle trips, and off-road equipment emissions from maintenance activities and inspections would contribute to air quality emissions within the analysis area.

Design features and EPMs to reduce project impacts are presented in Appendix C. Design features which would limit fugitive dust generation include leaving vegetation in place whenever possible (Design Feature 5), use of existing access roads where feasible (Design Feature 6), reseeding of disturbed areas (Design Feature 8), conducting construction and operations activities in a manner that would minimize disturbance to vegetation (Design Feature 18), developing and adhering to fugitive dust control plans (Design Feature 20), obtaining permits for construction activities (Design Feature 20), and prohibition of open burning unless permitted by the appropriate authorities (Design Feature 20). EPMs would include avoiding widening or upgrading existing access roads unless necessary (EPM 1), limiting blading of new access roads in select areas to limit ground disturbance impacts (EPM 2), use of drive-and-crush or cut-and-clear techniques where feasible (EPM 3), closing or blocking of access roads (EPMs 4 and 6), and development of a detailed project reclamation plan to restore vegetation (EPM 5) (POWER Engineers, Inc. 2021a). SunZia has also identified additional fugitive dust-reducing activities including watering or application of dust suppressant, limitation of vehicle speeds, and sweeping of access roads (POWER Engineers, Inc. 2021c:8, 9).

3.3.2.3 Impacts of Localized Route Modifications

The localized route modifications in Segments 2 and 3 are changing minimally, compared with the 2015 Selected Route. Table F-1 of the 2013 FEIS Appendix F discloses the per-mile transmission line construction criteria pollutant emissions (BLM 2013:Appendix F, pp. F-1 through F-3). The majority of the proposed localized route modifications would not occur within a nonattainment or maintenance area. However, proposed Route Modification 6 in Pinal County could increase the length of transmission line within the West Pinal County PM_{10} nonattainment area, depending on the selected routing options for the proposed localized route modification. The new route could result in construction of one of the scenarios below:

- One transmission line along the North Route (9.8 miles within the nonattainment area) and one transmission line along the Earley Route (6.7 miles within the nonattainment area), which would result in an additional 4.3 miles total within the nonattainment area compared with the no action alternative (4.3 miles represents the increase from the two 6.1 mile lines [a total of 12.2 miles] within the nonattainment area originally disclosed in the 2013 FEIS to a total of 16.5 miles within the nonattainment area);

- One transmission line along the Earley Route and one transmission line along the Steele Route, which would result in an additional 1.1 miles constructed within the nonattainment area;
- One transmission line along the North Route and one transmission line along the Steele Route, which would result in an additional 4.2 miles constructed within the nonattainment area;
- One transmission line along the North Route and one transmission line along the original route proposed in the 2013 FEIS, which would result in an additional 3.7 miles constructed within the nonattainment area;
- One transmission line along the Earley Route and one transmission line along the original route proposed in the 2013 FEIS, which would result in an additional 0.6 mile constructed within the nonattainment area;
- One transmission line along the Steele Route and one transmission line along the original route proposed in the 2013 FEIS, which would result in an additional 0.5 mile constructed within the nonattainment area;
- Two transmission lines along the Earley Route, which would result in an additional 1.2 miles constructed within the nonattainment area;
- Two transmission lines along the Steele Route, which would result in an additional 1.0 mile constructed within the nonattainment area.

Each of the route alternatives listed above is presented based on the construction of the West Tie-in to the Pinal Central Substation. There are three local alternatives for tie-in to the Pinal Central Substation, the West Tie-In having the longest length within the nonattainment area. The other two local alternatives, the East and Central Tie-ins, are each 0.4 mile shorter than the West Tie-in. Therefore, the West Tie-in length is used to determining potential additional mileage in the nonattainment area for each route alternative listed above.

A revised estimate of total direct and indirect emissions within the West Pinal County PM_{10} nonattainment area is compared with the General Conformity thresholds herein.

Based on the emission rate of 5.44 tons of PM_{10} per mile of transmission line determined in Appendix F of the 2013 EIS (BLM 2013:Appendix F, pp. F-2, F-3), and the worst-case 50.96 tons per year emission rates[5] within the West Pinal County nonattainment area originally disclosed in the 2013 FEIS (BLM 2013:4-22), the maximum total tons per year emissions with the Component 1 Route Modification 6 could be up to 68.9 tons of PM_{10} per year within the West Pinal County PM_{10} nonattainment area, which would be associated with construction of both the Earley Route and North Route in lieu of the no action alternative. Since the maximum total PM_{10} emissions in a year are estimated to be under the General Conformity de minimis threshold of 70 tons of PM_{10} per year for the West Pinal County PM_{10} nonattainment area, the proposed Route Modification 6 would not cause an exceedance of the General Conformity de minimis thresholds. The following dust control measures have been specifically applied to the project emission estimates (BLM 2013:4-17 and 4-18):

- Watering at least twice daily in all disturbed areas undergoing active construction or disturbance
- Watering all unpaved roads at least twice daily in areas of active use

[5] The 50.96 tons per year emission rate, adopted from the 2013 FEIS, includes the construction of an HVDC converter station near the Pinal Central Substation to accommodate the DC option for the SunZia Project. The proposed location of the HVDC converter station has been revised as part of the requested amendment of the existing right-of-way. Proposed project Component 4, the SunZia West Substation, is proposed to be located outside of the nonattainment area. Therefore, this emissions rate is higher than the expected PM_{10} emissions rate for Localized Route Modification 6.

- Application of dust suppressants, if warranted, to unpaved roads and other disturbed areas (i.e., when generation of dust is observed despite application of other control measures, such as speed control and watering)
- Limitation of speeds on unpaved roads to 20 mph in most areas
- Sweeping up tracked-out dirt where unpaved roads or disturbed areas meet paved roads every 14 days, using PM_{10} efficient street sweepers, in areas of active construction or use
- Concrete batch plants will be restricted to areas outside of the West Pinal County and Rillito PM_{10} nonattainment areas.

Furthermore, the Applicant would be required to submit a Pinal County Air Quality Control Dust Permit Application as required by ARS 49-480 and Chapter 4, Article 3, Pinal County Air Quality Control District Code of Regulations (for the portion of the project in the West Pinal County PM_{10} nonattainment area) and a Fugitive Dust Activity Permit in accordance with Pima County Code Title 17.14.040 from Pima County Department of Environmental Quality (for the portion of the project within the Rillito PM_{10} nonattainment area).

Overall, Component 1 of the proposed action would result in a minor incremental change in overall emissions. The maximum daily and maximum hourly emission rates along Component 1 are not anticipated to change from the levels previously analyzed in the 2013 FEIS (BLM 2013:Appendix F, pp. F-1 through F-16). Therefore, the original AERSCREEN analysis assessing impacts is still relevant to the proposed action. The emissions modeled in the 2013 FEIS are within the NAAQS, AAAQS, and the NMAAQS, and are representative of the reasonably foreseeable impacts on air quality from implementation of Component 1 (BLM 2013:4-20, 4-21; Appendix F, pp. F-17 through F-21).

3.3.2.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Air quality impacts from Component 1, Localized Route Modifications, include emissions for Component 2 access roads and temporary work areas, and the impacts would be similar to those previously analyzed in the 2013 FEIS, which were analyzed as part of total transmission line emissions per mile (POWER Engineers, Inc. 2021c). The changes to the access road and work areas associated with Component 2 would not result in a substantial increase in emissions at any one location, and thus the modeling conducted for the 2013 FEIS is representative of reasonably foreseeable impacts on air quality from implementation of Component 2 (BLM 2013:Appendix F, pp. F-17 through F-21). Therefore, proposed action construction and operation of access roads and TWAs would be less than significant since impacts are not changing from those originally disclosed in the 2013 FEIS due to the conservative assumptions built into the per-mile transmission line emission factors and because the emission estimates are inclusive of access roads and TWAs. The incremental contribution of emissions from Component 2 within the Rillito and West Pinal County PM_{10} nonattainment areas are not anticipated to result in a change to the General Conformity results presented in Table 4-2 of the 2013 FEIS (BLM 2013:4-21, 4-22).
The Applicant would be required to submit a Pinal County Air Quality Control Dust Permit Application as required by ARS 49-480 and Chapter 4, Article 3, Pinal County Air Quality Control District Code of Regulations (for the portion of the project in the West Pinal County PM_{10} nonattainment area) and a Fugitive Dust Activity Permit in accordance with Pima County Code Title 17.14.040 from Pima County Department of Environmental Quality (for the portion of the project within the Rillito PM_{10} nonattainment area).

3.3.2.5 Impacts of Segment 4 Reroute Alternatives

The relocation of the SunZia East Substation resulting from Component 3, Segment 4 Reroute Alternatives, would potentially result in a small overall increase in emissions, but would result in less than significant impacts to criteria air pollutant concentrations since the impacts originally presented in 2013 FEIS (based on transmission line per-mile emissions and modeled impacts to ambient pollutant concentrations) are not expected to change (BLM 2013:Appendix F, p. F-19). Table F-19 of the 2013 FEIS remain representative of Component 3 since there would be no change to maximum hourly emission rates during construction (BLM 2013:Appendix F, pp. F-17, F-19). The modeling results in Table F-19 for these activities showed no exceedance of regulatory limits (BLM 2013:Appendix F, pp. F-17 and F-19). Therefore, the degree of impact on air quality from Component 3 activities would be less than significant since there is not anticipated to be an incremental increase in impacts to ambient air quality concentrations from either the SunZia East Substation relocation or the transmission line reroute.
The activities associated with Component 3 are not located in a nonattainment or maintenance area and thus, no General Conformity Analysis is required.

3.3.2.6 Impacts of SunZia West Substation

The SunZia West Substation is located approximately 40 miles from the Pinal Central Substation, which was modeled for the 2013 FEIS (BLM 2013:Appendix F, pp. F-20 and F-21). The project impacts in terms of maximum concentrations of pollutants from construction of the substations, which are disclosed in Table F-20 of Appendix F, are considered an appropriate representation of the potential SunZia West Substation construction impacts. The modeling results displayed in Table F-20 show that the project impacts for the substation plus background pollutant concentrations are estimated to be within the NAAQS, AAAQS, and NMAAQS for the Pinal Central Substation area for all pollutants except for PM_{10}. The 2013 FEIS used the PM_{10} background concentration from the Pinal County Housing Complex (EPA Monitoring Site ID 040213011), located approximately 30 miles from the proposed SunZia West Substation (Pinal County Air Pollution Control District 2020). For this EIS, the PM_{10} 24-hour background concentration for the proposed SunZia West Substation is based on the Pinal Airpark Monitor (EPA monitoring site ID 40213007). This monitoring site was chosen for the analysis since it is located approximately 10 miles away from the SunZia West Substation location and is designed to serve as background PM_{10} site for the central and western portion of the county (Pinal County Air Pollution Control District 2020). To determine PM_{10} background concentration, the average of the second-highest maximum 24-hour concentration value from each of the most recent three consecutive calendar years of complete monitoring data (2018–2020) is used, consistent with the form of the PM_{10} 24-hour standard. The estimated construction impacts for the SunZia West Substation are anticipated to be 21.1 micrograms per cubic meter (µg/m^3), based on modeling of substation construction impacts in the 2013 FEIS, and the background data at the Pinal Airpark Monitoring Station were determined to be 99 µg/m^3 (BLM 2013:Appendix F, p. F-20; EPA 2021b). As shown in Table 3-3, the construction impacts would be less than 150 µg/m^3 (which is the value of the primary and secondary NAAQS, AAAQS, and NMAAQS standards). Therefore, construction impacts from the SunZia West Substation would not be significant.

Table 3-3. Estimated Impacts—SunZia West Substation Construction

Pollutant/ Averaging Time	Estimated Substation Contribution (µg/m^3)*	Background Concentration (µg/m^3)	Project Impact + Background (µg/m^3)	NAAQS (µg/m^3)	AAAQS (µg/m^3)	NMAAQS (µg/m^3)†
NO_2 / 1-hr	49.07	110	159.1	188	188	–
NO_2 / 24-hr	49.07	110	159.1	–	–	188

Pollutant/ Averaging Time	Estimated Substation Contribution (μg/m³)*	Background Concentration (μg/m³)	Project Impact + Background (μg/m³)	NAAQS (μg/m³)	AAAQS (μg/m³)	NMAAQS (μg/m³)†
PM_{10} / 24-hr	21.1	99	120.1	150	150	–
$PM_{2.5}$ / 24-hr	3.14	9.6	12.7	35	35	–
CO / 1-hr†	73.89	2,299	2,373	40,069.6	40,069.6	14,997.5
CO / 8-hr†	73.89	1,034	1,108	10,303.6	10,303.6	9,960.1
SO_2 / 1-hr	0.79	28.95	29.74	196.4	196.4	–
SO_2 / 3-hr	0.79	12.11	12.11	1,309.3	1,309.3	–
SO_2 / 24-hr	0.79	3.68	3.68	26		261.9

* Background concentrations from the 2013 FEIS for the Pinal Central Substation are assumed to be representative based on an analysis of background monitors used in the 2013 FEIS (POWER Engineers, Inc. 2021c) with the exception of PM_{10} since the SunZia West Substation is better represented by the Pinal Airpark Monitoring Station with respect to PM_{10}.

† Standards in μg/m³ from the New Mexico Air Quality Bureau's Air Dispersion Modeling Guidelines (New Mexico Air Quality Bureau 2020).

The SunZia West Substation is located outside of the West Pinal County PM_{10} nonattainment area boundary, therefore the General Conformity Analysis does not apply.

3.3.2.7 No Action Alternative

Under the no action alternative, the impacts disclosed in the 2013 FEIS would be expected to remain unchanged (BLM 2013:4-20 through 4-23). The construction and operation of the project under the no action alternative would not cause an exceedance of the General Conformity Thresholds in any of the nonattainment or maintenance areas where the project would occur (BLM 2013:4-22). Generally, no exceedances of NAAQS, AAAQS, or NMAAQS would occur except for the area near the Pinal Central Substation and the portion of the transmission line construction activities occurring within the West Pinal County nonattainment area. However, because this portion of the project is within a PM_{10} nonattainment area, the more appropriate metrics against which to compare no action impacts are the General Conformity de minimis thresholds. Therefore, under the no action alternative, impacts to air quality would be less than significant because the emissions would not exceed General Conformity de minimis thresholds in any nonattainment area and impacts within attainment areas would be less than the NAAQS, AAAQS, and NMAAQS (BLM 2013:4-20 through 4-23).

3.3.2.8 Summary of Impacts

The proposed action modifications would not be expected to differ substantially from the impacts disclosed in the 2013 FEIS for the regional analysis area of the impacted New Mexico and Arizona counties. Generally, the conclusions from the 2013 FEIS remain valid, since the general amount of surface disturbance and construction activities would be within the range of alternatives analyzed in the 2013 FEIS (BLM 2013). Based on the impact evaluation completed for the 2013 FEIS, impacts from the proposed action would not be expected to cause or contribute to an exceedance of the NAAQS, AAAQS, and NMAAQS, except for with respect to the minor changes to the access roads and work areas in the West Pinal County nonattainment area associated with Component 2. However, this would not significantly change impacts previously disclosed in the 2013 FEIS for the transmission line construction within Pinal County (209.1 μg/m³) because the hourly emission rate per mile from the transmission line is not anticipated to change substantially (BLM 2013:Appendix F, pp. F-18; POWER Engineers, Inc. 2021c). In all locations, fugitive dust mitigation measures would be applied which would mitigate the impacts during construction to the extent feasible. Additionally, this portion of the project is within the

West Pinal County PM_{10} nonattainment area, and therefore, it is more appropriate to compare the project impacts to the General Conformity de minimis thresholds. The PM_{10} emissions within the West Pinal County nonattainment area ranged from 47.65 to 50.96 tons per year in the 2013 FEIS, depending on the alternative analyzed (BLM 2013:4-22). It is anticipated that the total PM_{10} emissions within the West Pinal County nonattainment area would remain below the General Conformity de minimis threshold of 70 tons per year of PM_{10}.

Cumulative impacts to air quality are discussed in Section 4.17.4.2 of the 2013 FEIS (BLM 2013:4-305 through 4-311). Incremental impacts from the proposed project components would not be expected to result in an exceedance of any ambient air quality standards nor result in an exceedance of General Conformity thresholds. Air quality impacts from reasonably foreseeable transmission line, wind energy, solar energy, and residential subdivision development would mainly occur during construction, similar to the proposed project components (described above). However, adverse cumulative air quality impacts due to construction of the proposed project components in addition to other planned infrastructure projects are unlikely since the emissions associated with such projects are temporary, transient, and are unlikely to overlap in time and space. Planned development projects and active construction projects are estimated to total approximately 75,596 acres of development and 2,890.5 miles within the analysis area from 2021 and beyond (SWCA 2021). Operation and maintenance of the transmission lines, renewable energy projects, and miscellaneous development projects could generate minor levels of air quality emissions, mostly from employee commutes in fossil fuel–fired vehicles or infrequent maintenance activities; however, these would dissipate with increasing distance from the project boundary. Therefore, any adverse impacts likely would be infrequent and of short duration.

The proposed 1,000-MW Bowie Power Station was identified as a reasonably foreseeable future planned action and is therefore incorporated into the EIS analysis. This site originally submitted an air permit application to the ADEQ for a 525-MW natural gas–fired, combined-cycle power plant (BLM 2013:4-307). However, the full buildout of the site is anticipated to be 1,000 MW. In order to obtain the necessary construction and operating permits, the Bowie Power Station must demonstrate compliance with the NAAQS standards, meaning that the impacts from the power station emission sources plus the "background" concentration must be below the NAAQS. Any incremental impacts from operation of the SunZia transmission lines and substations would be negligible in their impact upon commencement of operation, and operations of this nature are generally captured as part of the background concentration at nearby ambient air quality monitors. The Bowie Power Station's NAAQS demonstration that would be required in order to obtain an updated construction permit would be sufficient to protect ambient air quality and therefore, it is not anticipated that cumulative air quality impacts would result in an exceedance of the NAAQS.

AIB-2 Fugitive Dust

Would fugitive dust and other emissions from construction and increased traffic associated with the proposed project reduce visibility at nearby Class I areas?

3.3.3 Affected Environment

Detailed discussion of visibility and regional haze is included in the 2013 FEIS (BLM 2013:3-6). Regional haze reduces long-range visibility over a wide region and is caused by fine particulates and their precursors in the air that are so small they settle out slowly. The Regional Haze Rule is designed to prevent degradation of visibility at designated Class I areas. The Class I areas that are within 50 kilometers (km) of the proposed project components in New Mexico include the White Mountain Wilderness in southern Lincoln County and the Bosque del Apache NWR in south-central Socorro County (BLM 2013:3-6). There are four Class I areas within Arizona that are located near Components 2 and 4: the Chiricahua National Monument and the Chiricahua Wilderness in Cochise County, the Galiuro Wilderness in Graham County, and the East and West Units of the Saguaro National Park in Pima County (BLM 2013:3-7 to 3-8).

3.3.3.1 Reasonably Foreseeable Future Environmental Trends and Planned Actions

Reasonably foreseeable future environmental trends and planned actions within the analysis area include population growth in the counties within Arizona and population decline in the counties within New Mexico, both of which are expected to impact overall mobile-source and associated on-road fugitive dust emissions in the analysis area (SWCA 2021). There are several planned wind and solar energy development projects and transmission line projects located in various counties within the analysis area and there is also a proposed 1,000-MW natural gas–fired power station located 2 miles north of Bowie, Arizona, which would utilize natural gas–fired electric generating units (SWCA 2021). The Bowie Power Station would comply with applicable state and federal air permitting regulations.

3.3.4 Environmental Consequences

3.3.4.1 Methods and Assumptions

The following assumptions were used to analyze impacts to ambient air quality:

- The quantity and character of emissions from project Components 1, 2, and 4 would be similar to those previously analyzed for transmission line route construction in the 2013 FEIS (BLM 2013:Appendix F).
- The quantity and character of emissions from project Component 3 would be similar to those previously analyzed for substation construction in the 2013 FEIS (BLM 2013:Appendix F).
- The impacts to the West Pinal County nonattainment area are based on revised background concentration data from the nearest ambient air quality monitoring station from the previous 3 years.

The impact indicators used for this analysis are:

- Predicted ambient air quality concentrations which are based on the construction activity type (e.g., transmission line construction, access roads, and work areas and substation construction) and the modeled predictions from the 2013 FEIS (BLM 2013:Appendix F).
- Criteria pollutant concentrations would be compared against secondary NAAQS, AAAQS, and NMAAQS standards which provide public welfare protection, including protection against decreased visibility (EPA 2021a). This was be used to determine whether the proposed action on its own would potentially impact visibility at Class I areas.
- A qualitative discussion of the project’s potential to contribute to the cumulative issue of regional haze is also included.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to ambient air quality:

- The 2013 Final Environmental Impact Statement for the SunZia Southwest Transmission Project, Appendix F: Climate and Air Quality Report (BLM 2013:Appendix F)

- The SunZia Southwest Transmission Project Amendment of Federal Right-of-Way Climate and Air Quality Report (POWER Engineers, Inc. 2021c)
- AIB-1 Regional Air Quality: Impacts to air quality from project-related activity.

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-4. Full design features and EPMs are provided in Appendix C.

Table 3-4. Design Features and Environmental Protection Measures Applicable to Fugitive Dust

Relevant Design Features	Applicable EPMs
5, 6, 8, 18, 20	1, 2, 3, 4, 5, 6

3.3.4.2 Impacts Common to All Components

The activities associated with the proposed project components would result in fugitive dust emissions of PM_{10} and particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$) as well as PM_{10}, $PM_{2.5}$, nitrogen oxide (NO_x), and SO_2 emissions from mobile source equipment. Upon completion of construction, operational emissions including worker commuting emissions, infrequent vehicle trips, and off-road equipment emissions from maintenance activities and inspections, would contribute to air quality emissions, including pollutants which can contribute to regional haze within the analysis area.

Design features and EPMs to reduce fugitive dust impacts are presented in Appendix C. Design features which would limit fugitive dust generation would include leaving vegetation in place whenever possible (Design Feature 5), use of existing access roads where feasible (Design Feature 6), reseeding of disturbed areas (Design Feature 8), conducting construction and operations activities in a manner that would minimize disturbance to vegetation (Design Feature 18), developing and adhering to fugitive dust control plans (Design Feature 20), obtaining permits for construction activities (Design Feature 20), and prohibition of open burning unless permitted by the appropriate authorities (Design Feature 20). EPMs would include avoiding widening or upgrading existing access roads unless necessary (EPM 1), limiting blading of new access roads in select areas to limit ground disturbance impacts (EPM 2), use of drive-and-crush or cut-and-clear techniques where feasible (EPM 3), closing or blocking of access roads (EPMs 4 and 6), and development of a detailed project reclamation plan to restore vegetation (EPM 5) (POWER Engineers, Inc. 2021a). SunZia has also identified additional fugitive dust reducing activities including watering or application of dust suppressant, limitation of vehicle speeds, and sweeping of access roads (POWER Engineers, Inc. 2021c:8, 9).

The modeling results shown in Appendix F of the 2013 FEIS showed no exceedance of any state or federal ambient air quality standards (including secondary standards) for the project areas associated with Components 1, 2, 3, and 4 with the exception of the transmission line route within the West Pinal County nonattainment area in Arizona. However, these potential exceedances are not anticipated to be exacerbated by the project components for reasons discussed in AIB-1 Regional Air Quality (BLM 2013:4-21). Therefore, it is not anticipated that the fugitive dust impacts from the proposed project components would directly result in a detriment to visibility at nearby Class I areas. Additionally, while regional haze is inherently the result of cumulative emissions within a wide area, it is not anticipated that the proposed project components would result in levels of emissions that would be detrimental to visibility at a Class I area through significant contribution to regional haze, since construction impacts are temporary and transient. Operational emissions would be minimal. Therefore, no visibility impacts are anticipated from Component 1, 2, 3, or 4 of the project.

3.3.4.3 No Action Alternative

Under the no action alternative, the impacts disclosed in the 2013 FEIS would be expected to remain unchanged. Generally, no exceedances of the primary or secondary NAAQS, AAAQS, or NMAAQS would occur except for the area near the Pinal Central Substation and the portion of the transmission line construction activities occurring within the West Pinal County nonattainment area during peak construction (BLM 2013:4-21). Due to the distance to the nearest Class I areas, it is not anticipated that visibility would be impaired at the nearest Class I area due to project construction (BLM 2013:3-7 to 3-8). Due to the large area and temporary nature of the construction emissions, it is not anticipated that the project construction under the no action alternative would contribute substantially to regional haze. Due to the minimal levels of emissions during operation, the project under the no action alternative would not contribute substantially to regional haze formation, and therefore, the project would not be expected to impact visibility at Class I areas.

3.3.4.4 Summary of Impacts

The proposed action modifications would not be expected to differ substantially from the impacts disclosed in the 2013 FEIS (BLM 2013:4-20 through 4-23). Fugitive dust and other emissions from construction and increased traffic associated with the proposed action and no action alternatives would not reduce visibility at nearby Class I areas due to the temporary and transient nature of the construction emissions and the minimal operational emissions.

Cumulative impacts to air quality are discussed in Section 4.17.4.2 of the 2013 FEIS (BLM 2013:4-305 through 4-311). Incremental impacts from the proposed project components would not be expected to result in an exceedance of any ambient air quality standards nor result in an exceedance of General Conformity thresholds, and therefore it is not expected that the project components would result in significant contributions to regional haze. Regional haze is inherently a cumulative issue. The impacts from reasonably foreseeable transmission line, wind energy, solar energy, and residential subdivision development would mainly occur during construction, similar to the proposed project components (described above). Therefore, cumulative regional haze impacts due to construction of the proposed project components in addition to other planned infrastructure projects are unlikely since the emissions associated with such projects are temporary, transient, and are unlikely to overlap in time and space. Planned developments and active construction projects are estimated to total approximately 75,596 acres of development and 2,890.5 miles within the analysis area from 2021 and beyond (SWCA 2021). Operation and maintenance of the transmission lines, renewable energy projects, and miscellaneous development projects could generate minor levels of air quality emissions, mostly from employee commutes in fossil fuel–fired vehicles or infrequent maintenance activities; however, these would dissipate with increasing distance from the project boundary. Therefore, any adverse impacts to visibility likely would be infrequent and of short duration.

The proposed 1,000-MW Bowie Power Station is discussed in more detail in AIB-1. If the site has emissions high enough such that it could significantly impact regional haze formation, it would likely require a prevention of significant deterioration (PSD) major source evaluation. In this case, in addition to the NAAQS analysis discussed in AIB-1, the site would need to undergo an additional impacts analysis, including an evaluation of potential impacts to visibility at Class I areas. The Bowie Power Station's permitting process would be sufficient to protect ambient air quality and therefore, it is not anticipated that cumulative air quality impacts would result in adverse impacts to visibility.

AIB-3 Locatable Minerals

Would construction and operation of the proposed project components prevent or limit access to existing or future development and extraction of locatable minerals, including active mining operations and mining claims?

3.3.5 Affected Environment

The analysis area for locatable minerals (including split-estate lands, where non-federal surface ownership coincides with reserved federal mineral ownership administered by the BLM) utilizes the same analysis area as that of the 2013 FEIS (BLM 2013). The analysis area for each project component is defined as follows: for Component 1 (Localized Route Modifications) and Component 3 (Segment 4 Reroute Alternatives), the analysis area is a 2.0-mile-wide corridor centered on the reference centerline of the transmission line. The analysis area for Component 2 (2a: Access Roads; 2b: Temporary Work Areas Outside of Granted Right-of-Way) includes: 1) a 2.0-mile-wide corridor centered on the reference centerline of the proposed access road alignments; and 2) a 1.0-mile-wide buffer along the boundary of proposed temporary work areas that are outside of the 400-foot-transmission line right-of-way. The analysis area for Component 4 (SunZia West Substation) is the 80.3-acre substation siting area (including 40 acres of the substation siting area in the existing right-of-way).

Locatable minerals include a broad category of economically important minerals, such as precious and base metals (e.g., gold, silver, and lead); fissionable products (e.g., uranium); and industrial minerals. Certain gemstones may also be considered locatable minerals. Locatable mineral resources can be found throughout the analysis area. Mining districts present in the analysis areas represent general areas of declared minerals with potential market value. Most mining districts within the analysis areas were established in the early twentieth century, and any historically producing mines within are now inactive (POWER Engineers, Inc. 2021c). Mining may occur both inside and outside of mining districts under applicable laws and regulations such as the General Mining Act of 1872, as amended.

The BLM has conducted a records search and the proposed project components do not cross any pre-1955 mining claims.

3.3.5.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Four high-voltage transmission lines or energy generating facilities with associated transmission lines are within the spatial boundary for the reasonably foreseeable environmental trends and planned actions, which is an 8-mile-wide corridor buffered around the proposed SunZia project components: Southline Transmission Line, High Plains Express Transmission Line Project, Southwest Transmission Co-op Inc., and Western Spirit Wind (SWCA 2021). Ground disturbance from these projects may affect the same locatable minerals or may affect mineral resources avoided by the SunZia project in the same corridor. Other projects planned within the 8-mile-wide corridor which may impact mineral resources include the Great Divide Wind facility, Bowie Power Station, Storey Solar facility, and several residential subdivisions.

3.3.6 Environmental Consequences

3.3.6.1 Methods and Assumptions

The following assumptions were used to analyze impacts to locatable minerals from development of the proposed project:

- Impacts to locatable minerals are proportional to the amount (acres or miles) of overlap of aboveground project components (e.g., towers and foundations, access roads, substations, etc.).
- However, underground access to and development of locatable minerals below the surface of the project right-of-way is unlikely to be significantly impacted.

The impact indicators used for this analysis are:

- Number of developed mines (active and inactive), and acres or miles of overlap
- Number of active mining claims, and acres or miles of overlap
- Number of mining districts, and acres or miles of overlap

3.3.6.2 Impacts Common to All Components

Impact-causing elements are long-term physical occupation of land containing locatable federal minerals by aboveground project components (e.g., towers and foundations, access roads, substations, etc.); construction of project components may also temporarily impede or obstruct access to or development of land containing locatable federal minerals. Impacts to locatable mineral resources are summarized in Table 3-5 below.

3.3.6.3 Impacts of Localized Route Modifications

Under the proposed action and alternatives, one developed mine (active or inactive), three active mining claims, and one mining district are within the analysis area for Component 1 (see Table 3-5). The developed mine and active mining claims are within the analysis area but outside the proposed project footprint; no direct impacts to locatable minerals are expected from Component 1.

3.3.6.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Under the proposed action and alternatives, 11 developed mines (active or inactive), 562 active mining claims, and 12 mining districts are within the analysis area for Component 2 (see Table 3-5). The project footprint overlaps 31.4 acres of active mining claims; however, development of these claims may occur underground, reducing direct impacts to locatable minerals from the proposed project. The 10 developed mines are within the analysis area but outside the proposed project footprint; no impacts to these mines are expected from Component 2.

3.3.6.5 Impacts of Segment 4 Reroute Alternatives

Under the proposed action and alternatives, up to three developed mines (active or inactive), no active mining claims, and three mining districts are within the analysis area for Component 3 (see Table 3-5). The developed mines and active mining districts are within the analysis area but outside the proposed project footprint; no direct impacts to locatable minerals are expected from Component 3. All Component 3 alternatives have similar potential impacts.

3.3.6.6 Impacts of SunZia West Substation

Under the proposed action and alternatives, no developed mines (active or inactive), four active mining claims, and no mining districts are within the analysis area for Component 4 (see Table 3-5). The active mining claims are within the analysis area but outside the proposed project footprint; no direct impacts to locatable minerals are expected from Component 4.

3.3.6.7 No Action Alternative

Under the no action alternative, up to 25 active mines, 1,204 active mining claims, and 76 mining districts are within the analysis area, including up to 0.4 acre and 2.9 miles of overlap with mine leases (BLM 2013; POWER Engineers, Inc. 2021d:15, 16, 19, 20, 25). Construction of the SunZia project as analyzed in the 2013 FEIS could prevent or limit access to existing or future development and extraction of locatable minerals where project components overlap with locatable minerals.

3.3.6.8 Summary of Impacts

No direct impacts to locatable minerals are expected from Components 1, 3, and 4. In general, Component 2 would have no impact to developed mines and only limited impact to active mining claims, many of which are within the 2-mile-wide analysis area but are not directly within the path of the proposed project's temporary and permanent rights-of-way (see Table 3-5).

Table 3-5. Mineral Resources Crossed by Analysis Area of Project Components

Project Component	Number of Developed Active/Inactive Mines (miles or acres crossed)	Number of Active Mining Claims (miles or acres crossed)	Number of Mining Districts (miles or acres crossed)*
Component 1: Localized Route Modifications			
1. Mavericks Area	0 (0)	0 (0)	0 (0)
2. SunZia South Area	0 (0)	1 (0)	1 (4.2 miles)
3. Macho Springs Area	0 (0)	0 (0)	0 (0)
4. Las Palomas Area	0 (0)	0 (0)	0 (0)
5. Highlands Area	1 (0)	2 (0)	0 (0)
6a. Pinal Central Area- North Route	0 (0)	0 (0)	0 (0)
6b. Pinal Central Area- Steele Route	0 (0)	0 (0)	0 (0)
6c. Pinal Central Area- Earley Route	0 (0)	0 (0)	0 (0)
Local Alternative West Tie-in	0 (0)	0 (0)	0 (0)
Local Alternative Central Tie-in	0 (0)	0 (0)	0 (0)
Local Alternative East Tie-in	0 (0)	0 (0)	0 (0)
Component 2a. Access Roads	7 (0)	267 (20.7 acres)	7 (36.8 acres)
Component 2b. Temporary Work Areas	3 (0)	166 (10.7 acres)	5 (85.6 acres)
Component 3. Segment 4 Reroute Alternatives			
Alt Route 1 with Subroute 1A-1	1 (0)	0 (0)	1 (59.3 acres)
Alt Route 1 with Subroute 1A-2	1 (0)	0 (0)	1 (59.3 acres)
Alt Route 1 with Subroute 1A-3	1 (0)	0 (0)	1 (59.3 acres)

Project Component	Number of Developed Active/Inactive Mines (miles or acres crossed)	Number of Active Mining Claims (miles or acres crossed)	Number of Mining Districts (miles or acres crossed)*
Alt Route 1 with Subroute 1A-4	1 (0)	0 (0)	1 (59.2 acres)
Local Alternative 1A-6	0 (0)	0 (0)	0 (0)
Local Alternative 1A-7	0 (0)	0 (0)	0 (0)
Alt Route 2 with Subroute 2A-1	1 (0)	0 (0)	3 (79.5 acres)
Alt Route 2 with Subroute 2A-2	1 (0)	0 (0)	3 (79.6 acres)
Alt Route 2 with Subroute 2A-3	1 (0)	0 (0)	3 (79.5 acres)
Alt Route 2 with Subroute 2A-4	1 (0)	0 (0)	3 (79.5 acres)
Alt Route 3 with Subroute 3A-1	3 (0)	0 (0)	1 (58.4 acres)
Alt Route 3 with Subroute 3A-2	3 (0)	0 (0)	1 (58.4 acres)
Alt Route 3 with Subroute 3A-3	3 (0)	0 (0)	1 (58.4 acres)
Alt Route 3 with Subroute 3A-4	3 (0)	0 (0)	1 (58.3 acres)
Local Alternative 3B-1	0 (0)	0 (0)	0 (0)
Local Alternative 3B-2	0 (0)	0 (0)	0 (0)
Component 4. SunZia West Substation	**0 (0)**	**4 (0)**	**0 (0)**

* Miles crossed are for linear components; acres are for non-linear components (i.e., temporary work areas). Note: Local Alternatives are exchangeable within their associated alternative route.

Where locatable mineral resources overlap with the project footprint, it is anticipated that locatable mineral resources could be developed underground, below the surface of the project right-of-way. The proposed project may require a small increase in planning and coordination effort between SunZia and locatable mineral rightsholders to reduce development conflicts; development of locatable minerals within the analysis area is unlikely to be entirely precluded as a result of the proposed project. Potential impacts to locatable mineral resources are therefore expected to be mitigated below a level of significance.

In the event that constructing and operating the proposed project causes conflicts with locatable mineral resources, impacts to mineral resources will be minimized to the extent possible through applicant-committed environmental protection measures such as structure spanning (EPM 8) and proper post-construction reclamation (EPM 5). Following reclamation, any impacted locatable mineral resources are anticipated to be once again available for development. In situations where development has been limited by the proposed project, SunZia would be expected to resolve conflicts regarding mineral ownership and access, including any compensation for economic impacts on leaseholders, etc., through fee mineral and landowner agreements and permissions (POWER Engineers, Inc. 2021d:30).

Cumulative impacts to mineral resources are discussed in Section 4.17.4.3 of the 2013 FEIS (BLM 2013:4-312 through 4-314). Incremental impacts from the proposed project components could affect locatable minerals in areas where active mines, mining claims, and mining districts overlap with the project footprint. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project (described above) and would be generally localized and unlikely to extend beyond a given geomorphic feature. Adverse cumulative effects to mineral resources would primarily be associated with ground disturbance and surface occupation from construction of the proposed project components in addition to other planned infrastructure projects including transmission lines, substations, wind and solar farms, and residential subdivisions (planned actions are estimated to total approximately 74,000 acres and 2,890 miles within the analysis area) that would temporarily impede or obstruct access to or development of land containing locatable federal minerals. Cumulative effects associated with construction of potential solar, wind, or geothermal renewable energy developments that could tie into the transmission capability of the project could also be beneficial relative to mineral resources by increasing access in previously undisturbed areas. Operation and maintenance of transmission lines, renewable energy projects, planned infrastructure, and residential subdivisions may exclude present or future mineral resource exploration and extraction; however, whereas solar facilities are contiguous that occupy the entire project footprint, wind and geothermal facilities are more dispersed and would not limit mineral resource extraction outside of the footprint of individual structures. Therefore, adverse cumulative impacts to locatable minerals would be localized, permanent, and long term.

AIB-4 Common Variety Minerals

What quantity of common variety minerals (mineral materials) would be used and no longer available to the federal mineral estate? Would construction and operation of the proposed project components prevent or limit access to the BLM's mineral interest on split-estate lands (private or state surface/federal minerals)?

3.3.7 Affected Environment

The analysis area for common-variety minerals on split-estate lands, (i.e., where non-federal surface ownership coincides with reserved federal mineral ownership administered by the BLM) is defined as follows for each project Component: for Component 1 (Localized Route Modifications) and Component 3 (Segment 4 Reroute Alternatives), the analysis area is a 400-foot-wide right-of-way centered on the centerline of the transmission line. The analysis area for Component 2 (Access Roads and Temporary Work Areas Outside of Granted Right-of-Way) includes: 1) a 2.0-mile-wide study corridor centered on the reference centerline of the proposed access road alignments, and 2) a 1.0-mile-wide buffer along the boundary of proposed temporary work areas that are outside of the 400-foot-transmission line right-of-way. The analysis area for Component 4 (SunZia West Substation) is the 80.3-acre substation siting area (including 40 acres of the substation siting area in the existing right-of-way).

Common-variety mineral resources, also known as salable minerals, include widely available, non-rare minerals that are typically used for construction and industrial purposes, such as sand, gravel, clay, stone, pumice, and cinder. Common-variety mineral resources may be acquired from federally owned mineral estate via free-use permit, by competitive bid, or by negotiated contract (BLM 2016a). The BLM is responsible for overseeing the use and sales for government-owned mineral property. Therefore, the BLM would evaluate the sale of common-variety materials when the need for materials is triggered by construction of projects on split-estate lands.

3.3.7.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Four planned high-voltage transmission lines or energy generating facilities with associated transmission lines are within the spatial boundary for the reasonably foreseeable environmental trends and planned actions, which is an 8-mile-wide corridor buffered around the proposed SunZia project components: Southline Transmission Line, High Plains Express Transmission Line Project, Southwest Transmission Co-op Inc., and Western Spirit Wind (SWCA 2021). Ground disturbance from these projects may affect the same locatable minerals or may affect mineral resources avoided by the SunZia project in the same corridor. Other projects planned within the 8-mile-wide corridor which may impact mineral resources include the Great Divide Wind facility, Bowie Power Station, Storey Solar facility, and several residential subdivisions.

3.3.8 Environmental Consequences

3.3.8.1 Methods and Assumptions

The following assumptions were used to analyze impacts to common-variety minerals on split-estate lands from development of the proposed project:

- No impacts to common-variety minerals on split-estate lands from Components 2 and 4, as these components are not anticipated to use split-estate federal mineral materials during construction.
- Impacts to common-variety minerals on split-estate lands from Components 1 and 3 would result from tower foundation excavation. Calculations conservatively assume a structure foundation area of 38 square feet and a depth of 50 feet (70 cubic yards per each structure) (POWER Engineers, Inc. 2021b). Two transmission lines per right-of-way are assumed, with approximately 7.5 transmission structures per mile.
- Component 3 also includes Fiber-Optic Regeneration Stations which would be constructed every 60 to 75 miles along the project right-of-way; given the relatively small amount of split-estate minerals overlapping this portion of the project area (up to 19.5 miles), it is assumed the final project design would locate these stations outside split-estate areas and thus would not contribute to the total amount of split-estate mineral material disposal.
- However, underground access to and development of locatable minerals below the surface of the project right-of-way is unlikely to be significantly impacted.

The impact indicator used for this analysis is:

- Total bank cubic yards of common-variety mineral materials disposed from split-estate lands.

3.3.8.2 Impacts Common to All Components

Impact-causing elements are the use of federal common-variety mineral materials on split-estate lands, including stone and gravel for road base, aggregate in concrete mix, engineered backfill, and other such materials and uses. Impacts to common-variety minerals on split-estate lands are summarized in Table 3-6.

3.3.8.3 Impacts of Localized Route Modifications

Under the proposed action and alternatives, Component 1 would overlap up to 15.4 miles of common-variety mineral materials on split-estate lands, resulting in the disposal of up to 12,266 cubic yards of mineral materials including a 50% overrun margin, rounded up (see Table 3-6).

3.3.8.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

No direct impacts to common-variety minerals on split-estate lands are expected from Component 2, as this component is not anticipated to use split-estate federal mineral materials during construction.

3.3.8.5 Impacts of Segment 4 Reroute Alternatives

Under the proposed action and alternatives, Component 3 would overlap up to 19.0 miles of common-variety mineral materials on split-estate lands, resulting in the disposal of up to 15,333 cubic yards of mineral materials including a 50% overrun margin, rounded up (see Table 3-6).

3.3.8.6 Impacts of SunZia West Substation

No direct impacts to common-variety minerals on split-estate lands are expected from Component 4, as this component is not anticipated to use split-estate federal mineral materials during construction.

3.3.8.7 No Action Alternative

Under the no action alternative, construction of the SunZia project as analyzed in the 2013 FEIS (BLM 2013) could prevent or limit access to existing or future development and extraction of common-variety minerals on split-estate lands where project components overlap with common-variety minerals on split-estate lands. While the 2013 FEIS did not explicitly analyze overlap of the project route with common-variety minerals on split-estate lands, due to similarity of construction techniques proposed in both the 2013 FEIS and the current proposed project, the overall impact of the no action alternative would likely occur at close to the same per-mile rate (531 cubic yards per mile of overlap) that has been analyzed in this EIS for the proposed project components and the alternatives.

3.3.8.8 Summary of Impacts

No direct impacts to common-variety minerals on split-estate lands are expected from Components 2 and 4, as these components are not anticipated to use split-estate federal mineral materials during construction. Components 1 and 3 would use (dispose of) common-variety minerals on split-estate lands at a rate of 531 cubic yards per mile of overlap. This would result in a maximum of approximately 19,222 cubic yards of disposal in total, or 28,833 cubic yards, including a 50% overrun margin, rounded up (see Table 3-6).

Table 3-6. Mineral Resources Crossed by Analysis Area of Project Components

Project Component	Bank Cubic Yards per Mile	Miles or Acres of Overlap with Split-Estate Minerals	Total Bank Cubic Yards Disposed
Component 1: Localized Route Modifications			
1. Mavericks Area	531	0 miles	0
2. SunZia South Area	531	0.4 miles	213
3. Macho Springs Area	531	1.2 miles	637
4. Las Palomas Area	531	0 miles	0
5. Highlands Area	531	0 miles	0
6a. Pinal Central Area- North Route	531	6.4 miles	3,398
6b. Pinal Central Area- Steele Route	531	4.1 miles	2,177
6c. Pinal Central Area- Earley Route	531	3.4 miles	1,805
Local Alternative West Tie-in	531	0.8 miles	425
Local Alternative Central Tie-in	531	0.8 miles	425

Project Component	Bank Cubic Yards per Mile	Miles or Acres of Overlap with Split-Estate Minerals	Total Bank Cubic Yards Disposed
Local Alternative East Tie-in	531	1.2 miles	637
Component 2a. Access Roads	0	116.0 acres	0
Component 2b. Temporary Work Areas	0	206.3 acres	0
Component 3. Segment 4 Reroute Alternatives			
Alt Route 1 with Subroute 1A-1	531	16.7 miles	8,868
Alt Route 1 with Subroute 1A-2	531	16.7 miles	8,868
Alt Route 1 with Subroute 1A-3	531	16.7 miles	8,868
Alt Route 1 with Subroute 1A-4	531	16.7 miles	8,868
Local Alternative 1A-6	531	0 miles	0
Local Alternative 1A-7	531	0 miles	0
Alt Route 2 with Subroute 2A-1	531	15.8 miles	8,390
Alt Route 2 with Subroute 2A-2	531	15.8 miles	8,390
Alt Route 2 with Subroute 2A-3	531	15.8 miles	8,390
Alt Route 2 with Subroute 2A-4	531	15.8 miles	8,390
Alt Route 3 with Subroute 3A-1	531	18.7 miles	9,930
Alt Route 3 with Subroute 3A-2	531	18.7 miles	9,930
Alt Route 3 with Subroute 3A-3	531	18.7 miles	9,930
Alt Route 3 with Subroute 3A-4	531	18.7 miles	9,930
Local Alternative 3B-1	531	0.5 miles	266
Local Alternative 3B-2	531	0.8 miles	425
Component 4. SunZia West Substation	**0**	**80.3 acres**	**0**

Note: Local Alternatives are exchangeable within their associated alternative route.

Additionally, construction of the project components would temporarily limit access to federal mineral interest on both split-estate and federal lands for the duration of construction due to the presence of construction vehicles, equipment, and construction workers. One active common-variety mineral operation near the eastern end of the localized route modification would be crossed by the Highlands Area local route modification (Component 1) (POWER Engineers, Inc. 2021d:29–26). Due to design features and EPMs, construction and operation of the project is not expected to interfere with this operation because it is approximately 2,000 feet north of the proposed route centerline (POWER Engineers, Inc. 2021d:17, 29).

In the event that existing or future access and operations of common-variety mineral resources conflict with the route, disturbance would be minimized to the extent possible through EPMs such as structure spanning (EPM 8), proper post-construction reclamation (EPM 5), and restricting public access (EPM 6). SunZia would resolve conflicts with regard to mineral ownership and access in areas of pre-existing valid mineral interests, including any compensation for economic impacts on leaseholders, etc., through fee mineral and landowner agreements and permissions. For example, it would be SunZia's responsibility to conduct proper due diligence to ensure that pre-existing valid mineral materials leases are respected, and agreements are made with leaseholders (POWER Engineers, Inc. 2021d:36).

If the BLM decides not to authorize disposal of common-variety minerals on split-estate lands for the SunZia project, common-variety mineral materials are widely available throughout the region and could be obtained outside the project footprint. However, sourcing mineral materials from off-site locations could lead to additional truck traffic to transport the material. Several common-variety mineral material operations are within the study area described in the Earth Resources Report (POWER Engineers, Inc. 2021d), including one active and one apparently inactive operation in Component 1: Segment 1 (POWER Engineers, Inc. 2021d:16, 21) and one active operation in Component 1: Segment 2 (POWER Engineers, Inc. 2021d:29, 36).

Cumulative impacts to mineral resources are discussed in Section 4.17.4.3 of the 2013 FEIS (BLM 2013:4-312 through 4-314). Incremental impacts from the proposed project components could affect common-variety minerals in areas where split-estate lands overlap with the project footprint. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project and would primarily be associated with ground disturbance from construction of the proposed project components, in addition to other planned infrastructure projects including transmission lines, substations, wind and solar farms, and residential subdivisions (described above) that would temporarily limit access to federal mineral interest on both split-estate and federal lands. Cumulative impacts to common variety minerals from construction of the reasonably foreseeable planned actions would permanent and long term. Cumulative impacts to common variety minerals from operation and maintenance are not expected.

AIB-5 Sensitive Soils

Would construction and operation of the proposed project components disturb any sensitive soil resources, especially soils with greater potential for wind and water erosion, biological soil crusts, desert pavements, and important farmlands?

3.3.9 Affected Environment

The analysis area includes the study areas identified within the Earth Resources Report, consistent with the 2013 FEIS, and include the following (POWER Engineers, Inc. 2021d:4):

1. Component 1 and Component 3: 2-mile-wide study corridor centered on the reference centerline of the transmission line
2. Component 2: 150-foot-wide study corridor centered on the centerline of the proposed access road alignments and the boundary of the proposed temporary work areas outside of the 400-foot-transmission line right-of-way
3. Component 4: 80.7-acre substation siting area (including 40 acres of the substation siting area in the existing right-of-way)

When a soil is deemed sensitive, there is a potential for a reduction in the soil's strength, or remolding potential, when subjected to any disturbance (Abuhajar et al. 2010). Soils that are susceptible to wind and water erosion, are designated as prime or unique soils by the USDA, or that exhibit surface biological soil crust or desert pavements, are considered sensitive soils (BLM 2013:3-30).

Sensitive soils include components with increased potential for water and/or wind erosion from either high soil detachment by runoff and raindrop impact (Kw) or large dry surface soil aggregates (larger than 0.84 millimeters [mm] in diameter) to determine the wind erodibility group (WEG) factors respectively (Natural Resources Conservation Service [NRCS] 2012; USDA 2002). Per the 2013 FEIS, biological soil crusts are "a type of thin (<1 cm), desiccation-tolerant microbial mat of cyanobacteria, subsequently colonized by mosses and lichens, living at the soil surface in drylands" (Bowker et al. 2008:831).

Biological soil crust contains gypsiferous soils (at least 10% gypsum), noncalcareous sand soils, and limestone-derived soils. Desert pavements consist of cobbles and pebbles left over from the transportation of fine soil particles and aggregates by water and wind that form over long periods of time (BLM 2013:3-32).

NEPA and the Farmland Protection Policy Act of 1981 require the assessment and possible mitigation for projects inducing soil impacts (BLM 2013:3-24). Additionally, the Farmland Protection Policy Act requires the evaluation of project impacts to farmlands, primarily the conversion of farmland to nonagricultural purposes (BLM 2013:3-24).

3.3.9.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Currently there is existing disturbance and other ongoing actions to sensitive soils within and adjacent to the project that meet the criteria above. Existing disturbance include other transmission lines, solar arrays, and wind turbines. Reasonably foreseeable future trends and planned actions that may contribute to additional sensitive soil impacts within the 8-mile temporal boundary include grazing associated with new and transferred grazing permits/allotments and infrastructure to support grazing permits; construction of new transmission lines, substations, and wind project, and transmission line updates; as well as wildlife waters reconstruction, vegetation management treatment, recreation disposal, forest restoration and fuels reduction, and military projects.

3.3.10 Environmental Consequences

Surface-disturbing impacts, or environmental consequences, to sensitive soils would result from the project footprint.

3.3.10.1 Methods and Assumptions

The following methods and assumptions were used to analyze impacts to sensitive soils:

- NRCS standards allocated to Soil Survey Geographic (SSURGO)-level map units were used to establish criteria for significant water and wind erosion.
- In accordance with the 2013 FEIS and USDA prime or unique farmlands definitions, prime farmlands include the following crops: grain, forage, fiber, oilseed, sugar beets, sugarcane, vegetables, tobacco, orchard, vineyard, and fruit crops.
- Unique farmlands include “land other than Prime Farmland that is used for the production of specific high value food and fiber crops” (BLM 2013:3-31 through 3-32; USDA 2017).
- Although a detailed soil inventory was not completed for the proposed action, the analysis assumes there would be impacts to biological soil crusts and desert pavements from construction activities.
- The quantitative analysis associated with the proposed action incorporated acres of disturbance and the no action alternative analysis was complete using miles crossed.
- The following quantitative analysis compared the amount of sensitive soils (acres) to the entire project footprint to calculate the percentage of impacts.
- To complete the quantitative analysis for Component 3 alternative routes, the most impactful (greatest acreage) subroute configuration was utilized for the sensitive soil resources presented in Table 3-7.

- The entire project footprint, including temporary and permanent surface disturbance, was included for the sensitive soil quantitative analysis.

The impact indicators used for this analysis are:

- Acres of disturbance to soils assigned a Kw value of 0.40 or greater, or soils deemed highly susceptible to water erosion (BLM 2013:3-31; POWER Engineers, Inc. 2021d:8).
- Acres of disturbance to soils assigned a WEG value of 1 or 2, or soils deemed highly susceptible to wind erosion (BLM 2013:3-31; POWER Engineers, Inc. 2021d:8).
- Acres of disturbance to soils characterized as prime farmland soils or unique farmland soils (BLM 2013:3-31; POWER Engineers, Inc. 2021d:8).

The project design features and environmental protection measures detailed within Appendix C and summarized in Table 3-7 below would mitigate direct and indirect project impacts.

Table 3-7. Design Features and Environmental Protection Measures Applicable to Sensitive Soils

Relevant Design Features	Applicable EPMs
1, 4	3, 4, 13

Additionally, in accordance with the 2015 ROD, the Applicant would develop a transportation management plan to address soil compaction, an erosion, dust control, and air quality plan, an environmental compliance management plan, and a right-of-way preparation, reclamation, monitoring and framework plan to mitigate direct impacts to sensitive soils from construction activities and would support prevention of erosion to sensitive soils immediately adjacent to surface disturbance areas.

3.3.10.2 Impacts Common to All Components

The impact-causing elements associated with project construction that would contribute to sensitive soil disturbance and erosion include vegetation removal, excavation and grading for placement of permanent structures, as well as compaction from construction equipment and overland vehicle travel on access roads. Overland vehicle travel on access roads would also be the primary impact to sensitive soils during operation and maintenance activities. Biological soil crusts and desert pavements are susceptible to impacts from surface-disturbing activities, including construction from the project and overland vehicle travel on access roads as well.

3.3.10.3 Impacts of Localized Route Modifications

Sensitive soils would be impacted from localized route modifications associated with the proposed project (Table 3-8).

Table 3-8. Acreage of Impacts within the Localized Route Modifications Project Footprint to Soils Highly Susceptible to Water and Wind Erosion, Prime Farmland Soils, and Unique Farmland Soils

Project Component	Impacts to Soils Highly Susceptible to Water Erosion (acres)*	Impacts to Soils Highly Susceptible to Wind Erosion (acres)†	Impacts to Prime Farmland Soils (acres)	Impacts to Unique Farmland Soils (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	0.0	0.0

Project Component	Impacts to Soils Highly Susceptible to Water Erosion (acres)*	Impacts to Soils Highly Susceptible to Wind Erosion (acres)†	Impacts to Prime Farmland Soils (acres)	Impacts to Unique Farmland Soils (acres)
2. SunZia South Area	0.4	0.0	0.0	0.0
3. Macho Springs Area	2.7	0.1	0.0	0.0
4. Las Palomas Area	1.0	0.1	0.0	0.0
5. Highlands Area	0.0	0.0	0.0	0.0
6a. Pinal Central Area- North Route	0.1	0.0	0.4	2.7
6b. Pinal Central Area- Steele Route	0.1	0.0	0.5	1.5
6c. Pinal Central Area- Earley Route	0.07	0.0	0.9	1.4
Local Alternative West Tie-in	0.0	0.0	0.0	0.3
Local Alternative Central Tie-in	0.0	0.0	0.0	0.3
Local Alternative East Tie-in	0.0	0.0	0.0	0.4
Total	**4.37**	**0.2**	**1.8**	**6.6**

Note: Local Alternatives are exchangeable within their associated alternative route.

Data provided by POWER Engineers, Inc. (2021d) and NRCS (2021).

* Soils highly susceptible to water erosion assigned Kw value ≥ 0.40.

† Soils highly susceptible to wind erosion assigned WEG value = 1, 2.

Within the proposed project area, less than 0.1% of soils highly susceptible to water and soil erosion, as well as soils deemed prime and unique soils would be impacted from surface-disturbing activities associated with Component 1, localized route modifications.

3.3.10.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Sensitive soils would be impacted from access roads and TWAs outside of the granted right-of-way associated with the proposed project (Table 3-9).

Table 3-9. Acreage of Impacts within the Access Roads and TWAs Outside of Granted Right-of-Way Project Footprint to Soils Highly Susceptible to Water and Wind Erosion, Prime Farmland Soils, and Unique Farmland Soils

Project Component	Impacts to Soils Highly Susceptible to Water Erosion (acres)*	Impacts to Soils Highly Susceptible to Wind Erosion (acres)†	Impacts to Prime Farmland Soils (acres)	Impacts to Unique Farmland Soils (acres)
Component 2a. Access Roads	63.1	40.3	13.1	35.4
Component 2b. Temporary Work Areas	143.4	26.8	59.8	172.4
Total	**206.5**	**67.1**	**72.9**	**207.8**

Data provided by POWER Engineers, Inc. (2021d), and NRCS 2021.

* Soils highly susceptible to water erosion assigned Kw value ≥ 0.40.

† Soils highly susceptible to wind erosion assigned WEG value = 1, 2.

Within the proposed project area, approximately 1% of soils highly susceptible to water erosion, less than 1% of soils highly susceptible to wind erosion, less than 1% of soils deemed prime soils, and approximately 1% of soils deemed unique soils would be impacted from surface-disturbing activities associated with Component 2, access roads, and TWA outside of the granted right-of-way.

3.3.10.5 Impacts of Segment 4 Reroute Alternatives

Sensitive soils would be impacted from Segment 4 Reroute Alternatives associated with the proposed project (Table 3-10).

Table 3-10. Acreage of Impacts within the Segment 4 Reroute Alternatives Project Footprint to Soils Highly Susceptible to Water and Wind Erosion, Prime Farmland Soils, and Unique Farmland Soils

Project Component	Impacts to Soils Highly Susceptible to Water Erosion (acres)*	Impacts to Soils Highly Susceptible to Wind Erosion (acres)†	Impacts to Prime Farmland Soils (acres)	Impacts to Unique Farmland Soils (acres)
Component 3. Segment 4 Reroute Alternatives				0.0
Alt Route 1 with Subroute 1A-1	203.3	94.1	81.7	0.0
Alt Route 1 with Subroute 1A-2	182.5	71.5	81.8	0.0
Alt Route 1 with Subroute 1A-3	100.6	164.4	81.7	0.0
Alt Route 1 with Subroute 1A-4	130.4	144.4	81.7	0.0
Local Alternative 1A-6	0.0	0.0	0.0	0.0
Local Alternative 1A-7	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-1	161.7	157.9	79.4	0.0
Alt Route 2 with Subroute 2A-2	141.4	126.1	79.5	0.0
Alt Route 2 with Subroute 2A-3	61.9	193.4	79.4	0.0
Alt Route 2 with Subroute 2A-4	90.9	206.0	79.4	0.0
Alt Route 3 with Subroute 3A-1	163.9	189.6	80.5	0.0
Alt Route 3 with Subroute 3A-2	143.4	157.8	80.6	0.0
Alt Route 3 with Subroute 3A-3	62.8	226.1	80.5	0.0
Alt Route 3 with Subroute 3A-4	92.2	238.7	80.5	0.0
Local Alternative 3B-1	0.0	0.0	0.0	0.0
Local Alternative 3B-2	0.0	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Data provided by POWER Engineers, Inc. (2021d), and NRCS 2021.

* Soils highly susceptible to water erosion assigned Kw value ≥ 0.40.

† Soils highly susceptible to wind erosion assigned WEG value = 1, 2.

IMPACTS OF ALTERNATIVE ROUTE 1

Within the proposed project area, approximately 4% of soils highly susceptible to water erosion, approximately 3% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities associated with Component 3, Alternative Route 1.

IMPACTS OF ALTERNATIVE ROUTE 2

Within the proposed project area, approximately 3% of soils highly susceptible to water erosion, approximately 4% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities associated with Component 3, Alternative Route 2.

IMPACTS OF ALTERNATIVE ROUTE 3

Within the proposed project area, approximately 3% of soils highly susceptible to water erosion, approximately 5% of soils highly susceptible to wind erosion, approximately 2% of soils deemed prime soils, and no soils deemed unique soils would be impacted from surface-disturbing activities associated with Component 3, Alternative Route 3.

3.3.10.6 Impacts of SunZia West Substation

There would be no impacts to soils susceptible to water and wind erosion, or prime or unique farmland soils, associated with construction activities to the SunZia West Substation.

3.3.10.7 No Action Alternative

Under the no action alternative, per the 2013 FEIS, the primary impact of concern includes soils susceptible to erosion, including water and wind erosion, and conversion of farmland soils (BLM 2013:4-32, 4-34, 4-36, 4-38 through 4-47). Under the no action alternative, within the project area, less than 0.1% of soils highly susceptible to water erosion, less than 0.1% of soils highly susceptible to wind erosion, and less than 0.1% of soils designated as prime and unique farmland soils would be directly impacted from surface-disturbing activities (BLM 2013:4-47).

3.3.10.8 Summary of Impacts

Sensitive soils would be impacted from the proposed action and the no action alternative by construction, operation, and maintenance activities associated with the proposed project, including soils susceptible to water and wind erosion, prime and unique farmland soils, biological soil crusts, and desert pavements. The impacts to sensitive soils associated with the proposed action would be greater than the no action alternative. Construction disturbance and erosion to sensitive soils includes vegetation removal, excavation and grading for placement of permanent structures, as well as compaction from construction equipment and overland vehicle travel on access roads. Operation and maintenance disturbance to sensitive soils includes overland vehicle travel on access roads. The project design features and EPMs would mitigate impacts associated with the proposed project. Existing disturbance and other ongoing actions, as well as reasonably foreseeable future trends and planned actions could also contribute to sensitive soil impacts within the vicinity of the proposed project.

Cumulative impacts from soil resources are discussed in Section 4.17.4.3 of the 2013 FEIS (BLM 2013:4-314 through 4-316). Incremental impacts from the proposed project components could adversely impact 1,754.9 acres of soils susceptible to water erosion, 2,036.8 acres of soils susceptible to wind erosion, 1,041.3 acres of prime farmland soils and 214.3 acres of unique farmland soils. Sensitive soils impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative sensitive soils impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 76,000 acres and 2,890 miles within the analysis area).

Construction disturbance to sensitive soils is permanent for the life of the proposed project and other planned infrastructure projects. Operation and maintenance of the proposed project and other planned infrastructure projects include soil compaction, mostly from overland vehicle traffic. Therefore, adverse cumulative impacts to sensitive soils would be localized, permanent, and long term.

AIB-6 Water Quality

Would construction and operation of the proposed project components result in chemical spills that could reduce water quality (groundwater and surface water), including sole-source aquifers, groundwater wells, nearby streams, floodplains, rivers, lakes, ponds and wetlands, or waters of the U.S.?

3.3.11 Affected Environment

The analysis area includes the following:

1. Component 1 (Localized Route Modifications) and Component 3 (Segment 4 Reroute Alternatives): 0.25-mile buffer (0.5-mile-wide study corridor) for impaired and outstanding waters and a 400-foot-wide study corridor for all remaining groundwater and surface water resources (wells, springs, wetlands)
2. Component 2 (Access Roads and Temporary Work Areas): 0.25-mile buffer (0.5-mile-wide study corridor) for impaired and outstanding waters and a 150-foot-wide corridor for all remaining groundwater and surface water features (wells, springs, and wetlands)
3. Component 4 (SunZia West Substation): 0.25-mile buffer for impaired and outstanding waters and no buffer for all the remaining groundwater and surface water resources (wells, springs, and wetlands)

The Clean Water Act (CWA), including Sections 302, 303, 319, 401, 402, 404, as well as Executive Order (EO) 11990 and the Safe Drinking Water Act, require the assessment and possible mitigation from projects to water resources impacts, including water quality (BLM 2013:3-58 through 3-60). In August 2021, the 2020 Navigable Waters Protection Rule, including the elimination of ephemeral drainages from jurisdiction, was vacated. Currently the EPA and USACE are reconsidering the definition of “Waters of the United States” (The National Agricultural Law Center 2021).

Within New Mexico, the analysis area crosses the Basin and Range aquifers, the Rio Grande aquifer system, and Colorado Plateaus aquifers. Within Arizona, the analysis area crosses the Basin and Range aquifer systems. The analysis area crosses nine Underground Water Basins in New Mexico and seven in Arizona. The aquifers and groundwater basins are described in detail within the 2013 FEIS (BLM 2013:3-63 through 3-66). The groundwater basins not captured within the 2013 FEIS are included in the water resources report (POWER Engineers, Inc. 2021f:11). The groundwater level can range between 2 and 1,180 feet below ground surface, pending proximity to major rivers, such as the Rio Grande (BLM 2013:3-64). The analysis area contains one sole-source aquifer, the Upper Santa Cruz and Avra Basin Sole Source Aquifer that would be crossed by the project, including portions of Component 2 (POWER Engineers, Inc. 2021f:11). Groundwater can be accessed within aquifers and basins from digging or drilling wells. Groundwater can also discharge naturally to the surface through springs (U.S. Geological Survey [USGS] 2001). The primary groundwater resources of concern that could be impacted include wells and springs (BLM 213:4-56; POWER Engineers, Inc. 2021f:4). Table 3-11 presents the number of wells and/or springs present within the analysis area.

Table 3-11. Number of Wells and Springs Present within the Analysis Area

Project Component	Number of Wells	Number of Springs
Component 1: Localized Route Modifications		
1. Mavericks Area	0	0
2. SunZia South Area	0	0
3. Macho Springs Area	0	0
4. Las Palomas Area	0	0
5. Highlands Area	0	0
6a. Pinal Central Area- North Route	0	0
6b. Pinal Central Area- Steele Route	0	0
6c. Pinal Central Area- Earley Route	0	0
Local Alternative West Tie-in	0	0
Local Alternative Central Tie-in	0	0
Local Alternative East Tie-in	0	0
Component 2a. Access Roads	23	4
Component 2b. Temporary Work Areas	9	2
Component 3. Segment 4 Reroute Alternatives		
Alt Route 1 with Subroute 1A-1	4	2
Alt Route 1 with Subroute 1A-2	4	2
Alt Route 1 with Subroute 1A-3	4	2
Alt Route 1 with Subroute 1A-4	4	2
Local Alternative 1A-6	0	0
Local Alternative 1A-7	0	0
Alt Route 2 with Subroute 2A-1	4	1
Alt Route 2 with Subroute 2A-2	4	1
Alt Route 2 with Subroute 2A-3	4	1
Alt Route 2 with Subroute 2A-4	4	1
Alt Route 3 with Subroute 3A-1	4	1
Alt Route 3 with Subroute 3A-2	4	1
Alt Route 3 with Subroute 3A-3	4	1
Alt Route 3 with Subroute 3A-4	4	1
Local Alternative 3B-1	0	0
Local Alternative 3B-2	0	0
Component 4. SunZia West Substation	0	0

Data provided by POWER Engineers, Inc. (2021f) and USGS (2021).

The primary surface water resources of concern that could be impacted include State-listed impaired waters, outstanding waters, and wetlands (POWER Engineers, Inc. 2021f:4; BLM 2013:4-56). However, other water resources, such as nearby sole-source aquifers, streams, floodplains, rivers, lakes, and ponds, could also have water quality impacts associated with the project.

The analysis area encompasses 19 watersheds, including 11 within New Mexico and eight within Arizona. There are several large rivers and streams within the analysis area, including the Rio Grande, Rio Puerco, Rio Salado, Mimbres River, San Simon River, and San Pedro River (POWER Engineers, Inc. 2021f:8, 9).

Per Section 303 of the CWA, surface water bodies not meeting State-mandated water quality standards are presented to the EPA for designation as impaired waters and require issuance of federal protection under a Total Maximum Daily Load (TMDL). Impaired waters that could be impacted by the project could require limits from the TMDL for a particular impaired water. A modification to the National Pollutant Discharge Elimination System (NPDES) could be required. There are no impaired waters within the analysis area in Arizona (POWER Engineers, Inc. 2021f:9). Within New Mexico, there are four impaired waters in the analysis area (POWER Engineers, Inc. 2021f:9). Table 3-12 presents the impaired waters, the TMDL requirement, and occurrence within the project area.

Table 3-12. Impaired Waters Occurring within the Study Corridor

New Mexico Impaired Water and Reasoning	TMDL Requirement	Occurrence in Project Area
Caballo Reservoir, including the Rio Grande upstream to Truth or Consequences; impairment from mercury in fish tissue	None	Outside project area, within analysis area
Rio Grande (Rio Puerco to Isleta Pueblo Bend); impairment for marginal warmwater aquatic life due to water temperature; previous impaired for *E. coli*	TMDL for *E. coli* assigned in 2010 and Water Quality Standard attained in 2012	Component 3 – Segment 4 crosses impaired water
Rio Puerco (Non-Pueblo Rio Grande to Arroyo Chico); impairment for primary contact recreation and wildlife habitat from *E. coli* and mercury	None	Component 3 – Segment 4 crosses impaired water
Las Animas Creek (perennial portion of Animas Gulch to Headwaters); impairment for marginal coldwater aquatic life (benthic macroinvertebrates) and warmwater aquatic life from poor dissolved oxygen	None	Outside of project area

3.3.11.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Currently there is existing disturbance and other ongoing actions contributing to indirect and direct groundwater and surface water quality impacts within and adjacent to the project. Existing disturbance include other transmission lines, solar arrays, and wind turbines. Reasonably foreseeable future trends and planned actions that may contribute to additional water quality impacts include grazing associated with new and transferred grazing permits/allotments and infrastructure to support grazing permits; construction of a new communication site, transmission lines, substations and wind projects, natural gas–fired power station, and transmission line upgrades; as well as wildlife waters renovation and reconstruction, vegetation management treatment, recreation disposal, forest restoration, prescribed burns and fuels reduction projects, residential subdivision and development areas, bridge and pavement rehabilitation and preservation projects, and new airspace corridors and other projects associated with ongoing military operations (SWCA 2021). These projects would contribute to similar surface disturbance and water resource impacts as the proposed project components.

3.3.12 Environmental Consequences

Surface-disturbing impacts, or environmental consequences, to water quality for both groundwater and surface water resources would result from the project footprint.

3.3.12.1 Methods and Assumptions

The following methods and assumptions were used to analyze impacts to water quality:

- A surface water resources delineation survey and inventory would be completed to determine potential "Waters of the United States" and the proper permitting strategies. The necessary CWA federal and state permitting would be completed prior to commencing construction activities.
- The Applicant's dust control plan is captured within POD Appendix A6 (POWER Engineers, Inc. 2021b) and includes the use of water and other suppression methods, including chemicals (magnesium chloride and polymers) pending the land management agency approval. The analysis assumes the land management agencies responsible for authoring chemical use for dust control would consider potential impacts and any necessary mitigation measures to water quality.
- Per the POD, the storage and use of hazardous chemicals on-site during construction and operation would be permitted with an EPA Waste Activity EPA ID Number (POWER Engineers, Inc. 2021b). The analysis assumes this EPA permit would mitigate any impacts to water quality associated with chemical use.
- Per the POD, all potentially hazardous waste spills would be attended immediately. Appendices A6 – Erosion, Dust Control, and Air Quality Plan, A7 – Hazardous Materials Management Guidelines; and Appendix E – Stormwater Pollution Prevention Plan methodology address water resources concerns and mitigation in greater detail (POWER Engineers, Inc. 2021b). The analysis assumes these management and prevention plans would mitigate any impacts to water quality associated with chemical use and hazardous waste.

The impact indicators used for this analysis are:

- Miles of impaired waters and National Wetlands Inventory (NWI) wetlands crossed within the analysis area
- Number of groundwater wells and springs within the analysis area

The project design features and environmental protection measures detailed within Appendix C and shown in Table 3-13 below would mitigate direct and indirect project impacts to water quality.

Table 3-13. Design Features and Environmental Protection Measures Applicable to Water Quality

Relevant Design Features	Applicable EPMs
1, 4	1, 2, 3, 4, 5, 8, 13

Additionally, prior to construction, potential groundwater and surface water permitting needs would be identified in coordination and consultation with the applicable state and federal agencies, including ephemeral drainages (POWER Engineer Inc's 2021e: 8). Per the 2015 ROD, the Applicant would develop an environmental compliance management plan, and a monitoring and framework plan to mitigate direct and indirect impacts to groundwater and surface water quality (BLM 2015a).

3.3.12.2 Impacts Common to All Components

The impact-causing elements associated with project construction that would contribute water quality impacts include chemical spills associated with construction equipment traffic, including personnel traffic and equipment/vehicle delivery traffic, the construction of concrete batch plants, as well as the handling, storage, and transport of hazardous materials. Overland vehicle travel on access roads, including potential chemical spills associated with personnel traffic, would be the primary impact to water quality during operation and maintenance activities.

3.3.12.3 Impacts of Localized Route Modifications

Impaired waters and NWI wetlands would be impacted from localized route modifications associated with the proposed project (Table 3-14).

Table 3-14. Acreage of Impacts within the Localized Route Modifications Project Footprint to Impaired Waters and NWI Wetlands

Project Component	Number of Impaired Waters (miles crossed)	NWI Wetlands (miles crossed)
Component 1: Localized Route Modifications		
1. Mavericks Area	0.0	0.0
2. SunZia South Area	0.0	0.0
3. Macho Springs Area	0.0	0.0
4. Las Palomas Area	0.0	0.0
5. Highlands Area	0.0	0.0
6a. Pinal Central Area- North Route	0.0	0.2
6b. Pinal Central Area- Steele Route	0.0	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0
Local Alternative West Tie-in	0.0	0.0
Local Alternative Central Tie-in	0.0	0.0
Local Alternative East Tie-in	0.0	0.0
Total	**0.0**	**0.2**

Data provided by POWER Engineers, Inc. (2021f); EPA (2020a); and NWI (USFWS 2020a).

Within the project area, less than 0.1% of NWI features could be impacted by construction activities associated with Component 1, localized route modifications. No impaired waters occur within the project footprint associated with Component 1, localized route modifications. Table 3-11 captures the number of groundwater wells and springs within the analysis area that could be impacted by the construction of Component 1.

3.3.12.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Table 3-15 summarizes the miles of impaired waters and NWI wetlands crossed by Component 2: Access Roads and TWAs Outside of Granted Right-of-Way.

Table 3-15. Miles of Impacts within the Localized Route Modifications Project Footprint to Impaired Waters and NWI Wetlands

Project Component	Number of Impaired Waters (miles crossed)	NWI Wetlands (miles crossed)
Component 2a. Access Roads	1	0.5

Project Component	Number of Impaired Waters (miles crossed)	NWI Wetlands (miles crossed)
Component 2b. Temporary Work Areas	1	0.0
Total	**2**	**0.5**

Data provided by POWER Engineers, Inc. (2021f); EPA (2020a); and NWI (USFWS 2020a).

Within the project area, less than 0.1% of impaired waters and NWI features could be impacted by construction activities associated with Component 1, localized route modifications. Table 3-11 captures the number of groundwater wells and springs within the analysis area that could be impacted by the construction of Component 2.

3.3.12.5 Impacts of Segment 4 Reroute Alternatives

Table 3-16 summarizes the miles of impaired waters and NWI wetlands crossed by Component 3: Segment 4 reroute alternatives.

Table 3-16. Miles of Impacts within the Segment 4 Reroute Alternatives Footprint to Impaired Waters and NWI Wetlands

Project Component	Number of Impaired Waters (miles crossed)	NWI Wetlands (miles crossed)
Component 3. Segment 4 Reroute Alternatives	2	0.05
Alt Route 1 with Subroute 1A-1	2	0.1
Alt Route 1 with Subroute 1A-2	2	0.2
Alt Route 1 with Subroute 1A-3	2	0.05
Alt Route 1 with Subroute 1A-4	0	0.0
Local Alternative 1A-6	0	0.0
Local Alternative 1A-7	2	0.05
Alt Route 2 with Subroute 2A-1	2	0.05
Alt Route 2 with Subroute 2A-2	2	0.1
Alt Route 2 with Subroute 2A-3	2	0.2
Alt Route 2 with Subroute 2A-4	2	0.05
Alt Route 3 with Subroute 3A-1	2	0.05
Alt Route 3 with Subroute 3A-2	2	0.1
Alt Route 3 with Subroute 3A-3	2	0.2
Alt Route 3 with Subroute 3A-4	2	0.05
Local Alternative 3B-1	0	0.0
Local Alternative 3B-2	0	0.0

Data provided by POWER Engineers, Inc. (2021f), EPA (2020a), and NWI (USFWS 2020a).

IMPACTS OF ALTERNATIVE ROUTE 1

Within the project area, less than 0.1% of impaired waters and NWI features could be impacted by construction activities associated with Component 3, Alternative Route 1. Table 3-11 captures the number of groundwater wells and springs within the analysis area that could be impacted by the construction of Component 3.

IMPACTS OF ALTERNATIVE ROUTE 2

Within the project area, less than 0.1% of impaired waters and NWI features could be impacted by construction activities associated with Component 3, Alternative Route 2. Table 3-11 captures the number of groundwater wells and springs within the analysis area that could be impacted by the construction of Component 3.

IMPACTS OF ALTERNATIVE ROUTE 3

Within the project area, less than 0.1% of impaired waters and NWI features could be impacted by construction activities associated with Component 3, Alternative Route 3. Table 3-11 captures the number of groundwater wells and springs within the analysis area that could be impacted by the construction of Component 3.

3.3.12.6 Impacts of SunZia West Substation

There would be no impacts to impaired waters or wetlands associated from the SunZia West Substation.

3.3.12.7 No Action Alternative

Under the no action alternative, groundwater and surface water quality would be impacted, including the primary water resources of concern, wells, impaired waters, wetlands, and other water resources, such as perennial, intermittent and ephemeral streams, and other water bodies (BLM 2013:4-59 through 4-61). Less than 0.1% of impaired waters and NWI wetlands would be directly or indirectly impacted from the project (BLM 2013:4-59 through 4-61). No springs would be impacted, and 13 wells would be directly or indirectly impacted (BLM 2013:4-59 through 4-61). However, the EPMs listed above would mitigate impacts.

3.3.12.8 Summary of Impacts

Both the proposed action and the no action would impact water quality, including groundwater resources such as wells and springs and surface water features such as impaired waters and NWI wetlands.
The proposed action could impact more wells (up to 44 if the most impactful route were permitted) and springs (up to 10 if the most impactful route were permitted) than the no action alternative (13 wells and no springs). Less than 0.1% of impaired waters and NWI wetlands within the project area would be impacted from both the proposed action and no action alternative. The project design features and EPMs would mitigate impacts associated with the proposed project. Existing disturbance and other ongoing actions, as well as reasonably foreseeable future trends and planned actions could also contribute to water quality impacts within the vicinity of the proposed project.

Cumulative impacts from water resources are discussed in Section 4.17.4.5 of the 2013 FEIS (BLM 2013:4-318 through 4-321). Incremental impacts from the proposed project components could adversely impact groundwater wells, springs, 1.7 miles of impaired waters, and 1.9 miles of NWI wetlands. Water quality impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative water quality impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 76,000 acres and 2,890 miles within portions of the analysis area). Construction, operation, and maintenance that could result in water quality impacts could be long term and could travel to downstream water resources. Therefore, any adverse impacts likely would be distributed and long-term.

AIB-7 Sedimentation to Surface Water Resources

Would increased runoff from construction and operation of the proposed project components lead to increased sedimentation in nearby surface water?

3.3.13 Affected Environment

The analysis area includes all surface water features within a 0.5-mile study corridor of the project area.

Section 402 of the Clean Water Act is the primary law that regulates project impacts related to sedimentation. CWA Sections 302, 303, 319, 401, and 404, as well as EO 11990 and the Safe Drinking Water Act, require the assessment and possible mitigation from projects to water resources impacts, including water quality (BLM 2013:3-58 through 60). In August 2021, the 2020 Navigable Waters Protection Rule, including the elimination of ephemeral drainages from jurisdiction, was vacated. Currently the EPA and USACE are reconsidering the definition of "Waters of the United States" (The National Agricultural Law Center 2021). Impacts to ephemeral drainages are included in this analysis.

There are numerous surface water features within and near the project area, including perennial streams, intermittent streams, ephemeral streams, wetlands, and other water bodies (POWER Engineers, Inc. 2021f:2). Some of the larger rivers and streams within the analysis area include the Rio Grande, Rio Puerco, Rio Salado, Mimbres River, San Simon River, and the San Pedro River (POWER Engineers, Inc. 2021f:8). Refer to AIB-6 Water Quality for hydrology and watershed information within and near the project area, including the aquifers and basins.

3.3.13.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Currently there is existing disturbance and other ongoing actions contributing to increased sedimentation quantities into surface water features. Existing disturbance include other transmission lines, solar arrays, and wind turbines. Reasonably foreseeable future trends and planned actions that may contribute to additional increased sedimentation quantities impacts into surface water features include grazing associated with new and transferred grazing permits/allotments and infrastructure to support grazing permits; construction of a new communication site, transmission lines, substations and wind projects, natural gas–fired power station, and transmission line upgrades; as well as wildlife waters renovation and reconstruction, vegetation management treatment, forest restoration, prescribed burns and fuels reduction projects, residential subdivision and development areas, bridge and pavement rehabilitation and preservation projects, and new airspace corridors and other projects associated with ongoing military operations (SWCA 2021). These projects would contribute to similar surface disturbance and surface water resource increased sedimentation quantities impacts as the proposed project components.

3.3.14 Environmental Consequences

Surface-disturbing impacts, or environmental consequences, could lead to increased sedimentation to nearby surface water features from the proposed action.

3.3.14.1 Methods and Assumptions

The following methods and assumptions were used to analyze sedimentation impacts:

- A qualitative analysis approach was taken to access impacts associated with sedimentation. A detailed sedimentation assessment or discharge measurement was not completed to determine the current environment of nearby surface waters to analyze potential increased sedimentation levels from the proposed project.

The project design features and environmental protection measures detailed in Appendix C and shown in Table 3-17 below would mitigate direct and indirect project impacts associated with sedimentation to nearby surface water features.

Table 3-17. Design Features and Environmental Protection Measures Applicable to Sedimentation to Surface Water Resources

Relevant Design Features	Applicable EPMs
1, 4	1, 2, 3, 4, 5, 8, 13

Additionally, prior to construction, potential surface water permitting needs would be identified in coordination and consultation with the applicable state and federal agencies, including planning and permitting of ephemeral drainages (POWER Engineers, Inc. 2021f: 8). In accordance with the 2015 ROD, the Applicant would develop an environmental compliance management plan, and a monitoring and framework plan to mitigate direct and indirect impacts to groundwater and surface water quality (BLM 2015a).

3.3.14.2 Impacts Common to All Components

Surface water features within and adjacent to the project area could be impacted by increased sedimentation quantities during construction activities, primarily from vegetation removal associated with structure and facility placement, including riparian vegetation, the creation of access roads, especially within stream crossings, the generation of construction equipment traffic, including personnel traffic and equipment/vehicle delivery traffic, blasting, the use of backfill/borrow material, and potential streambank alteration (POWER Engineers, Inc. 2021f:3). During the operational phase, sedimentation quantities could increase due to permanent land disturbance associated with the proposed project, including loss of vegetation and permanent impacts and displacement of native soils. The project has the potential to contribute to the formation of gullies, primarily from the traversing of stormwater through and around the permanent structures, ancillary facilities, access roads, substations, and footings, which would increase sedimentation into downstream surface water features.

The most common contaminant from construction activity is the movement of sediment by stormwater into nearby surface waters, due to ground disturbance and vegetation removal. Construction activities would expose soils, increase the conditions for soil erosion, and contribute to increased sedimentation into nearby water features (rivers, streams, waterbodies, and wetlands) (POWER Engineers, Inc. 2021f:7). The removal of equipment staging and construction yards needed during construction activities could also temporarily increase sedimentation into downstream water features. The construction and use of access roads, particularly within stream crossings, could also contribute sediment to downstream waters, especially during storm events.

Gullies are entrenched channels expanded into areas, often from streams or erosional features, with undefined or feebly defined banks and channels. Gullies are also known as extensions of naturally occurring watershed drainage systems. Gullies can often be recognized by their headcuts and below the headcut exists abrupt decrease in elevation. The channel that occurs below the headcut expands from plunging flows during stormwater events, that leads to erosion and increased sedimentation quantities into naturally occurring surface water features (USDA 2007). If the proper reclamation activities do not occur during and after project construction, including measures taken to prevent erosion during stormwater events and/or adherence to the project-specific SWPPP erosion control guidelines, gullies could form, and sedimentation could increase into naturally occurring downstream surface water features. Potential erosion and gully formation that could contribute to increased sedimentation include vegetation clearing for permanent structures, ancillary facilities, access roads, substations, and footings. If these areas are not properly reclaimed during and after construction, including proper stabilization of slopes and gradients, unchecked movement of stormwater downslope from the project area could largely contribute to gully formation, erosion, and ultimately the movement of sediment into downstream waters (Cook and Hollifield 2008).

3.3.14.3 No Action Alternative

Under the no action alternative, surface water features would be impacted from increased sedimentation, including sedimentation from project-related disturbance as captured within Section 4.5.1.1. of the 2013 FEIS (BLM 2013:4-54 through 4-57). The EPMs listed above would mitigate impacts.

3.3.14.4 Summary of Impacts

Both the proposed action and the no action alternative could increase sedimentation to nearby surface water features during stormwater events, including the potential formation of headcuts and gullies. The project design features and EPMs would mitigate impacts associated with the proposed project. Existing disturbance and other ongoing actions, as well as reasonably foreseeable future trends and planned actions, could also contribute to increased sedimentation impacts within the vicinity of the proposed project.

Cumulative impacts from water resources are discussed in Section 4.17.4.5 of the 2013 FEIS (BLM 2013:4-318 through 4-321). Incremental impacts from sedimentation increase associated with the proposed project components could adversely impact surface water resources. Increased sedimentation to surface waters from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative sedimentation impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. The potential for increased sedimentation to surface water features from construction, operation, and maintenance activities could be long term and continue downstream to other surface water resources due to the nature of the hydrologic regime. Therefore, any adverse impacts would likely be distributed and long term.

AIB-8 Native Vegetation

Would the proposed project reduce the quantity or quality of native vegetation communities within the vicinity of the project, and would this change terrestrial carbon sequestration trends in the project area?

3.3.15 Affected Environment

The analysis area for native vegetation communities is the intersection of an 8-mile-wide study corridor of the four project components with land cover data from the Southwest Regional Gap Analysis Project

(SWReGAP). Land cover data developed by the SWReGAP provide spatial reference for different ecosystem types on the land surface. This analysis area is consistent with the Biological Resources study corridor used in the 2013 FEIS to analyze impacts to vegetation communities (BLM 2013:3-2).

Native vegetation communities overlapping and surrounding the project area vary from Sonoran Desert Scrub and Chihuahuan Desert Scrub to Mixed Conifer Forest and Riparian Woodland and Shrubland. The proposed action crosses 16 different land cover types, 13 of which can be classified as different native vegetation communities. Descriptions of each vegetation community can be found in Appendix B of the Biological Resources Report (POWER Engineers, Inc. 2021g:B95–B106).

3.3.15.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact the same vegetation communities that would be impacted by the project. Ongoing landscape-scale phenomena including climate change, drought, and livestock grazing practices would lead to an increased distribution of altered and degraded vegetation communities in the analysis area over time. Nearby planned actions that would also disturb vegetation have the potential to compound impacts from the proposed action within the same vegetation communities, including approved and constructed transmission line projects such as the Western Spirit 345-kV transmission line (SWCA 2021). Wherever there is vegetation removal or alteration from other planned actions near the project, there is potential for landscape-scale impacts to those respective vegetation communities; however, the severity of said impacts depends on the proximity of the planned action to the proposed action, the sensitivity of the vegetation community, the scale of disturbance, and other biotic and abiotic factors.

3.3.16 Environmental Consequences

3.3.16.1 Methods and Assumptions

The following assumptions were used to analyze impacts to native vegetation communities:

- Mapped vegetation communities are associated with land cover data provided by the SWReGAP.
- Native vegetation communities do not include the agriculture, recently disturbed or modified, or developed/disturbed land cover types under the SWReGAP dataset.
- Areas of disturbance within native vegetation communities equate to loss of native vegetation cover either temporarily or permanently as well as reduction in habitat quality from the potential for spread of noxious weeds during ground-disturbing activities.
- For Component 2a, miles of vegetation crossed equates to miles of access road.
- The Chihuahuan Desert Scrub, Chihuahuan Semi-Desert Grassland, Sonoran Desert Scrub, and Semi-Desert Scrub and Grassland vegetation communities are considered desert vegetation communities.
- All native vegetation communities impacted by the proposed project components have analysis areas that are specific to the vegetation community as well as the project component assessed.
- Reductions in impact potential based on application of design features and EPMs assumes project-related personnel compliance as well as successful reclamation of disturbed areas (see Table 3-18).

The impact indicators used for this analysis are:

- Acres of permanent disturbance in native vegetation communities

- Acres of temporary disturbance in native vegetation communities
- Miles of native vegetation communities crossed by project features

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to native vegetation communities:

- AIB-5 Sensitive Soils: Impacts to sensitive soils.
- AIB-7 Sedimentation to Surface Water Resources: Impacts to water quality from sedimentation.
- AIB-10 Riparian Habitat: Impacts to riparian vegetation.
- AIB-11 Invasive Species (Noxious Weeds): Impacts from the spread of invasive species.
- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species.
- AID-7: BLM Sensitive Wildlife Species: Impacts to BLM sensitive species.
- AID-8 Federally Listed Plant Species: Impacts to federally listed species.
- AID-9 BLM Sensitive Plant Species: Impacts to BLM sensitive species.

The impacts analysis for native vegetation communities assumes application of design features and environmental protection measures contained in Table 3-18.

Table 3-18. Design Features and Environmental Protection Measures Applicable to Native Vegetation Communities

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 8, 14, 18, 20, 26	1, 2, 3, 5, 7, 13, 14, 16

Although some degree of vegetation community disturbance would occur under the proposed action, project design features will be implemented to limit initial impacts. Appendix C lists design features and applicant-committed EPMs intended to minimize impacts from the project. The project design features will mitigate initial impacts by reducing the extent of disturbance (Design Features 2, 3, 4, 5, 6, and 18), preventing noxious weeds from spreading and establishing (Design Features 1 and 26), educating project personnel on the applicable laws and importance of specific resources (Design Feature 14), reducing fugitive dust (Design Feature 20), and implementing surface restoration to restore disturbed areas with native vegetation (Design Feature 8). In addition to project design features, EPMs would be applied where feasible to reduce reasonably foreseeable impacts on vegetation communities. EPMs designed to minimize ground disturbance (EPMs 1, 2, 3, 7, 13, 14, and 16) would reduce the amount of vegetative cover lost. EPM 5 would require that a detailed project reclamation plan be developed to mitigate site-specific resource impacts.

Impacts to vegetation communities from proposed project components are described in Table 3-19 through Table 3-22 below, which break out impacts to vegetation communities by component.

3.3.16.2 Impacts Common to All Components

The removal of vegetation during surface-disturbing activities related to construction and operations activities is the primary long-term, direct impact to native vegetation communities anticipated to result from the project (BLM 2013:4-63). In addition to removal of native plants, construction activities could also result in the mixing of topsoil with subsoil and in loss and alteration of seed banks, which could result in long-term reduction of productivity, alteration of plant community structure, and introduction of invasive plant species. The project activities could also result in long-term and short-term indirect impacts to vegetation communities by contributing to reduced soil productivity, increased fugitive dust, loss of biological soil crusts, increased erosion potential, surface runoff, edge effects, and potential for further invasive plant colonization (BLM 2013:4-63 to 4-64). See AIB-5 for further discussion on impacts to sensitive soils, AIB-11 for further discussion on impacts from the spread of invasive plant species, and AIB-7 for further discussion on impacts to surface water features from increased runoff and erosion potential from the proposed action. Varying degrees of impacts to native vegetation communities are expected to occur within each of the project components. Of the 13 native vegetation communities, some are more susceptible to impact than others due to differential effects from disturbance or less overall reclamation success potential, making reclamation-focused mitigation strategies less salient. Such vegetation communities impacted by the proposed project components are described in detail below.

In the Sonoran and Chihuahuan Deserts, the majority of precipitation events are less than 5 mm and primarily increase microbial activity and carbon dioxide (CO_2) efflux to the atmosphere, whereas precipitation events greater than 10 mm are required for net CO_2 uptake to exceed CO_2 loss through autotrophic and heterotrophic respiration. Furthermore, research has found that plant community structure in these ecosystems is not a primary driver for carbon sequestration, and that variability in net ecosystem exchange is mostly driven by large rainfall events (Thomey et al. 2014). No substantive impact to terrestrial carbon sequestration trends within the project area is expected because precipitation levels limit the ability for arid-semiarid ecosystems to sequester more carbon than is lost through autotrophic and heterotrophic respiration (Thomey et al. 2014).

3.3.16.3 Impacts of Localized Route Modifications

Collectively across all native vegetation communities, Component 1 would result in disturbance to approximately 11 acres of native vegetation. The dominant vegetation communities relative to Component 1 include Chihuahuan Desert Scrub and Chihuahuan Semi-Desert Grassland (see Table 3-19). Of the 13 native vegetation communities discussed in this section, Chihuahuan Desert Scrub, Chihuahuan Semi-Desert Grassland, Sonoran Desert Scrub, and Semi-Desert Scrub and Grassland are considered desert vegetation communities. Desert vegetation communities are characterized by arid and semi-arid soils which inherently have low water and nutrient availability, making them particularly sensitive to disturbance (Ayangbenro and Babalola 2021). Because biological soil crusts are an important component of desert vegetation communities due to their role in soil stabilization, nutrient cycling, and water retention, loss of these crusts through ground disturbance can delay vegetation recovery during reclamation (BLM 2013:4-64). Semidesert vegetation establishment and reclamation potential is heavily tied to precipitation rates as well as soil texture and structure that influence the success of revegetation efforts (Fehmi and Kong 2012; Fehmi et al. 2014); thus, the removal of desert vegetation or overall soil disturbance could result in slower and more complicated reclamation of disturbed areas, increasing the magnitude of impacts to these vegetation communities.

Because both the Chihuahuan Desert Scrub and Chihuahuan Semi-Desert Grassland vegetation communities are considered desert vegetation communities, reclamation potential and success is anticipated to be lower for areas within Component 1 that fall within the Chihuahuan Desert Scrub and Chihuahuan Semi-Desert Grassland vegetation communities. For all localized route modifications and across each affected native vegetation community, the acreage of permanent disturbance is less than 1% of each vegetation community's respective analysis area for that specific localized route modification.

Table 3-19. Impacts to Vegetation Communities within Component 1: Localized Route Modifications

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Mavericks	Permanent Project Activities (acres)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
SunZia South	Permanent Project Activities (acres)	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Macho Springs	Permanent Project Activities (acres)	0	<1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	**3**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	**9**
Las Palomas	Permanent Project Activities (acres)	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	**5**

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Highlands	Permanent Project Activities (acres)	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**2**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	0	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	**7**
Pinal Central Area (North Route)	Permanent Project Activities (acres)	1	0	0	1	0	0	0	0	0	0	0	<1	0	0	<1	1	**3**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	4	0	0	3	0	0	0	0	0	0	0	<1	0	0	1	2	**10**

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Pinal Central Area (Steele Route)	Permanent Project Activities (acres)	1	0	0	1	0	0	0	0	0	0	0	<1	0	0	<1	<1	**2**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	3	0	0	3	0	0	0	0	0	0	0	<1	0	0	1	<1	**7**
Pinal Central Area (Earley Route)	Permanent Project Activities (acres)	1	0	0	1	0	0	0	0	0	<1	0	<1	0	0	<1	<1	**2**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	3	0	0	2	0	0	0	0	0	<1	0	<1	0	0	1	1	**7**

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Local Alternative East Tie-In	Permanent Project Activities (acres)	<1	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1	<1	**<1**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	<1	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1	0	**1**
Local Alternative Central Tie-In	Permanent Project Activities (acres)	<1	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1	<1	**<1**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	<1	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1	<1	**1**

		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Local Alternative West Tie-In	Permanent Project Activities (acres)	<1	0	0	0	0	0	0	0	0	0	0	0	0	0	<1	<1	**<1**
	Temporary Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Vegetation Crossed (miles)	<1	0	0	<1	0	0	0	0	0	0	0	0	0	0	<1	<1	**1**

Note: Local Alternatives are exchangeable within their associated alternative route.

* Mileage and acreage calculations are approximate; totals may not sum due to rounding.

3.3.16.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

The largest acreage of temporary and permanent project activities and resulting removal of native vegetation communities would be associated with Components 2a and 2b: access roads and temporary work areas. Collectively across all native vegetation communities, Component 2a would permanently disturb approximately 889 total acres, of which 829 would be used for permanent activities and infrastructure siting, and 60 acres would be used by temporary project activities, whereas Component 2b would disturb 1,218 acres for temporary activities. Vegetation removal for permanent and temporary activities is expected to be long-term in nature (see Impacts Common to all Components). Dominant vegetation communities relative to Component 2 include Chihuahuan Desert Scrub, Chihuahuan Semi-Desert Grassland, and Sonoran Desert Scrub (see Table 3-20). For both Components 2a and 2b, the permanent and temporary disturbance within the Chihuahuan Desert Scrub, Chihuahuan Semi-Desert Grassland, and Sonoran Desert Scrub vegetation communities would disturb less than 1% of the associated vegetation in the respective analysis areas for each component. Because the Chihuahuan Desert Scrub, Chihuahuan Semi-Desert Grassland, and Sonoran Desert Scrub vegetation communities are considered desert vegetation communities, reclamation potential and success is anticipated to be lower as described above.

Additionally, both Components 2a and 2b would create areas of disturbance within the Riparian Woodland and Shrubland vegetation community. This vegetation community is one of the few impacted by the proposed project components that forms a closed canopy of tree and shrub cover. Because of this feature, the removal of this vegetation type would have different and more pronounced impacts from disturbance as there would be associated changes in light availability and humidity (BLM 2013:4-64) as well as changes to bank stabilization that could have impacts on water quality, basal vegetation, stream morphology, and aquatic and terrestrial species habitat. This magnitude of impact is not likely to result from the removal of other vegetation types such as open rock where vegetation is relatively sparse overall. See AIB-10 for further discussion on impacts to riparian systems from the proposed action. Disturbance from Components 2a and 2b within the Riparian Woodland and Shrubland vegetation community would impact less than 1% of the mapped riparian vegetation in the respective analysis areas for each component.

Similarly, the Marsh, Wet Meadow, and Playa vegetation community would also be impacted by project Component 2a. This vegetation community has greater impact potential due to complications with reclamation potential, as the more complex the hydrology and ecology of a system, the more difficult it is to restore (Yuhas 1996). Additionally, both the Riparian Woodland and Shrubland as well as the Marsh, Wet Meadow, and Playa vegetation communities provide important habitat for migratory waterfowl, wading birds, and other riparian species including sensitive species. See AID-5, AID-7, AID-8, and AID-9 for further discussion on impacts to sensitive wildlife and plant species from the project. The occurrence of sensitive species increases the magnitude of disturbance effects and the likelihood of long-term impacts from surface disturbance and vegetation removal. Permanent and temporary disturbance from Component 2a within the Marsh, Wet Meadow, and Playa vegetation community would impact less than 1% of the mapped wet vegetation types in the respective analysis area. More specifically, disturbance in the Marsh, Wet Meadow, and Playa vegetation community from Component 2a would be less than 1 acre and there would be no disturbance associated with Component 2b. Similar to the desert vegetation communities, both the Riparian Woodland and Shrubland community and the Marsh, Wet Meadow, and Playa vegetation community may have greater challenges for reclamation due to the hydrological complexity of such systems.

Table 3-20. Impacts to Vegetation Communities within Component 2: Access Roads and Temporary Work Areas

Component 2: Access Roads and Temporary Work Areas		**Agriculture**	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
2a. Access Roads	Permanent Project Activities (acres)	12	376	248	18	50	8	<1	0	0	2	1	2	6	0	14	112	**850**
	Temporary Project Activities (acres)	2	28	21	26	<1	<1	0	0	0	<1	<1	<1	<1	0	2	9	**88**
	Vegetation Crossed (miles)	19	347	301	269	17	3	<1	0	<1	3	1	5	5	0	10	117	**1,097**
2b. Temporary Work Areas	Permanent Project Activities (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Temporary Project Activities (acres)	89	493	458	69	21	2	0	0	0	10	0	26	18	0	79	138	**1,402**
	Vegetation Crossed (miles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**

Vegetation Communities: columns Agriculture through Subtotals*.

* Mileage and acreage calculations are approximate; totals may not sum due to rounding.

3.3.16.5 Impacts of Segment 4 Reroute Alternatives

Dominant vegetation communities relative to the Component 3 alternatives include Semi-Desert Scrub and Grassland, Chihuahuan Semi-Desert Grassland, and Juniper Woodland and Shrubland; the Semi-Desert Scrub and Grassland native vegetation community contains the greatest impacts of any vegetation community across all alternatives and subroutes under Component 3 (see Table 3-21). All three alternatives of the Segment 4 reroute contain subroutes that would create disturbance within sensitive vegetation communities, including the Riparian Woodland and Shrubland vegetation community, desert vegetation communities, the Marsh, Wet Meadow, and Playa vegetation community, and the Sagebrush Steppe and Shrubland vegetation community. However, each subroute for each alternative would disturb less than 1% of the associated native vegetation within the respective analysis areas for each subroute and vegetation community. Each subroute of each alternative under Component 3 would create permanent disturbance across each desert vegetation community type, with the greatest surface disturbance within the Semi-Desert Scrub and Grassland vegetation community (Tale 3-21). The same is true for the Riparian Woodland and Shrubland vegetation community; each subroute under Alternative Routes 1–3 would create disturbance within this vegetation community type. Additionally, each subroute of each alternative would create permanent surface disturbance within the Sagebrush Steppe and Shrubland vegetation community type. Reclamation and natural recruitment potential for sagebrush changes by species, but for big sagebrush species (*Artemisia tridentata* spp.) establishment is challenged by a multitude of factors including annual precipitation requirements, high rates of seedling mortality, and sensitivity to microsite conditions (Meyer 1994). Recolonization of big sagebrush species after disturbance, whether occurring naturally or otherwise, is oftentimes challenged due to competition from grasses and forbs and a tendency for big sagebrush species to have short-lived seed banks, among other factors (Brabec et al. 2015; Jacobs et al. 2011). Impacts to sagebrush habitat are likely to be of a greater magnitude than other vegetation communities due to the potential for lowered reclamation success of sagebrush species.

IMPACTS OF ALTERNATIVE ROUTE 1

The greatest permanent and temporary project activities within subroutes associated with Alternative Route 1 are in the Semi-Desert Scrub and Grassland vegetation community over the course of up to 101 miles, resulting in up to 893 acres of ground disturbance, vegetation removal, and associated impacts (see Table 3-21). Alternative Route 1 would not create disturbance in the Marsh, Wet Meadow, and Playa vegetation community.

IMPACTS OF ALTERNATIVE ROUTE 2

The greatest permanent and temporary project activities within subroutes associated with Alternative Route 2 are in the Semi-Desert Scrub and Grassland vegetation community with up to 360 acres of temporary project activities and up to 333 acres of permanent project activities over the course of up to 81 miles, resulting in up to 693 acres of ground disturbance, vegetation removal, and associated impacts. Alternative Route 2 of Component 3 would also create disturbance in the Marsh, Wet Meadow, and Playa vegetation community which is considered to have higher sensitivity to disturbance than other native vegetation communities associated with the project, as described above. Permanent disturbance within the Marsh, Wet Meadow, and Playa vegetation community would be approximately 1 acre for each subroute under Alternative Route 2.

Table 3-21. Impacts to Vegetation Communities within Component 3: Segment 4 Reroute Alternatives

Component 3: Segment 4 Reroute Alternatives		Agriculture	Chihuahuan Desert Scrub	Chihuahuan Semi-Desert Grassland	Developed/ Disturbed	Evergreen Woodland and Shrubland	Juniper Woodland and Shrubland	Marsh, Wet Meadow, and Playa	Mixed Conifer Forest and Woodland	Montane Grassland and Shrubland	Open Rock Vegetation	Open Water	Recently Disturbed or Modified	Riparian Woodland and Shrubland	Sagebrush Steppe and Shrubland	Semi-Desert Scrub and Grassland	Sonoran Desert Scrub	*Subtotals**
Alternative Route 1																		
Alt Route 1 with Subroute 1A-1	Permanent Project Activities (acres)	9	5	80	3	10	67	0	4	0	<1	1	0	16	6	432	2	**636**
	Temporary Project Activities (acres)	10	5	81	3	10	69	0	4	0	<1	1	0	16	6	440	2	**649**
	Vegetation Crossed (miles)	2	1	18	1	2	16	0	1	0	<1	<1	0	4	1	99	<1	**146**
Alt Route 1 with Subroute 1A-2	Permanent Project Activities (acres)	6	5	80	2	10	68	0	4	0	<1	2	1	14	6	429	5	**632**
	Temporary Project Activities (acres)	7	5	81	2	10	69	0	4	0	<1	2	1	14	6	437	5	**643**
	Vegetation Crossed (miles)	1	1	18	1	2	16	0	1	0	<1	<1	<1	3	1	99	1	**145**

Component 3: Segment 4 Reroute Alternatives		Agriculture	Chihuahuan Desert Scrub	Chihuahuan Semi-Desert Grassland	Developed/ Disturbed	Evergreen Woodland and Shrubland	Juniper Woodland and Shrubland	Marsh, Wet Meadow, and Playa	Mixed Conifer Forest and Woodland	Montane Grassland and Shrubland	Open Rock Vegetation	Open Water	Recently Disturbed or Modified	Riparian Woodland and Shrubland	Sagebrush Steppe and Shrubland	Semi-Desert Scrub and Grassland	Sonoran Desert Scrub	*Subtotals**
		Vegetation Communities																
Alt Route 1 with Subroute 1A-3	Permanent Project Activities (acres)	7	1	83	2	10	67	0	4	0	<1	1	<1	10	6	433	11	**636**
	Temporary Project Activities (acres)	7	1	84	2	10	69	0	4	0	<1	1	<1	10	6	441	11	**648**
	Vegetation Crossed (miles)	2	<1	19	1	2	16	0	1	0	<1	<1	<1	2	1	100	3	**146**
Alt Route 1 with Subroute 1A-4	Permanent Project Activities (acres)	9	1	80	4	10	67	0	4	0	<1	1	0	11	6	439	2	**635**
	Temporary Project Activities (acres)	9	2	81	4	10	69	0	4	0	<1	1	0	11	6	448	2	**648**
	Vegetation Crossed (miles)	2	<1	18	1	2	16	0	1	0	<1	<1	0	2	1	101	<1	**146**

Component 3: Segment 4 Reroute Alternatives		Vegetation Communities																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Local Alternative 1A-6	Permanent Project Activities (acres)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	2	0	**2**
	Temporary Project Activities (acres)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Vegetation Crossed (miles)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	<1	0	**<1**
Local Alternative 1A-7	Permanent Project Activities (acres)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	2	0	**2**
	Temporary Project Activities (acres)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	2	0	**2**
	Vegetation Crossed (miles)	0	0	<1	0	0	0	0	0	0	0	0	0	0	0	<1	0	**<1**

Component 3: Segment 4 Reroute Alternatives		**Vegetation Communities**																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Alternative Route 2																		
Alt Route 2 with Subroute 2A-1	Permanent Project Activities (acres)	10	7	55	3	9	63	1	4	0	0	1	0	12	5	326	9	**505**
	Temporary Project Activities (acres)	11	7	59	3	10	68	1	4	0	0	1	0	13	5	352	10	**545**
	Vegetation Crossed (miles)	2	2	13	1	2	15	<1	1	0	0	<1	0	3	1	79	2	**123**
Alt Route 2 with Subroute 2A-2	Permanent Project Activities (acres)	7	7	55	2	9	63	1	4	0	0	2	<1	10	5	315	10	**491**
	Temporary Project Activities (acres)	8	7	59	2	10	68	1	4	0	0	2	1	11	5	340	11	**529**
	Vegetation Crossed (miles)	2	2	13	1	2	15	<1	1	0	0	<1	<1	2	1	77	2	**119**

Component 3: Segment 4 Reroute Alternatives		**Agriculture**	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Alt Route 2 with Subroute 2A-3	Permanent Project Activities (acres)	7	3	58	2	9	63	1	4	0	0	1	<1	6	5	306	8	**472**
	Temporary Project Activities (acres)	8	3	62	2	10	68	1	4	0	0	1	<1	6	5	331	8	**511**
	Vegetation Crossed (miles)	2	1	14	1	2	15	<1	1	0	0	<1	<1	1	1	75	2	**115**
Alt Route 2 with Subroute 2A-4	Permanent Project Activities (acres)	10	4	55	3	9	63	1	4	0	0	1	0	7	5	333	9	**503**
	Temporary Project Activities (acres)	11	4	59	4	10	68	1	4	0	0	1	0	7	5	360	10	**544**
	Vegetation Crossed (miles)	2	1	13	1	2	15	<1	1	0	0	<1	0	2	1	81	2	**123**

(Column group heading: **Vegetation Communities**)

Component 3: Segment 4 Reroute Alternatives		**Vegetation Communities**																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Alternative Route 3																		
Alt Route 3 with Subroute 3A-1	Permanent Project Activities (acres)	9	24	90	5	12	51	0	4	0	0	1	0	11	5	307	14	**533**
	Temporary Project Activities (acres)	10	25	95	5	13	53	0	4	0	0	1	0	12	5	322	15	**560**
	Vegetation Crossed (miles)	2	6	21	1	3	12	0	1	0	0	<1	0	3	1	73	3	**126**
Alt Route 3 with Subroute 3A-2	Permanent Project Activities (acres)	6	24	90	4	12	51	0	4	0	0	2	<1	10	5	296	15	**519**
	Temporary Project Activities (acres)	7	25	95	4	13	53	0	4	0	0	2	1	10	5	310	15	**544**
	Vegetation Crossed (miles)	1	6	21	1	3	12	0	1	0	0	<1	<1	2	1	70	3	**123**

Component 3: Segment 4 Reroute Alternatives		**Vegetation Communities**																
		Agriculture	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Alt Route 3 with Subroute 3A-3	Permanent Project Activities (acres)	6	20	93	4	12	51	0	4	0	0	1	<1	5	5	287	12	**501**
	Temporary Project Activities (acres)	7	21	98	4	13	53	0	4	0	0	1	<1	6	5	301	13	**526**
	Vegetation Crossed (miles)	2	5	22	1	3	12	0	1	0	0	<1	<1	1	1	68	3	**119**
Alt Route 3 with Subroute 3A-4	Permanent Project Activities (acres)	9	21	90	5	12	51	0	4	0	0	1	0	6	5	314	14	**532**
	Temporary Project Activities (acres)	9	22	95	5	13	53	0	4	0	0	1	0	7	5	330	15	**559**
	Vegetation Crossed (miles)	2	5	21	1	3	12	0	1	0	0	<1	0	1	1	74	3	**126**

Component 3: Segment 4 Reroute Alternatives		**Agriculture**	**Chihuahuan Desert Scrub**	**Chihuahuan Semi-Desert Grassland**	**Developed/ Disturbed**	**Evergreen Woodland and Shrubland**	**Juniper Woodland and Shrubland**	**Marsh, Wet Meadow, and Playa**	**Mixed Conifer Forest and Woodland**	**Montane Grassland and Shrubland**	**Open Rock Vegetation**	**Open Water**	**Recently Disturbed or Modified**	**Riparian Woodland and Shrubland**	**Sagebrush Steppe and Shrubland**	**Semi-Desert Scrub and Grassland**	**Sonoran Desert Scrub**	***Subtotals****
Local Alternative 3B-1	Permanent Project Activities (acres)	0	7	10	2	0	0	0	0	0	0	0	0	0	0	<1	2	**21**
	Temporary Project Activities (acres)	0	8	12	2	0	0	0	0	0	0	0	0	0	0	<1	2	**25**
	Vegetation Crossed (miles)	0	2	3	1	0	0	0	0	0	0	0	0	0	0	<1	<1	**6**
Local Alternative 3B-2	Permanent Project Activities (acres)	0	10	12	1	0	0	0	0	0	0	0	0	0	0	<1	0	**23**
	Temporary Project Activities (acres)	0	11	14	1	0	0	0	0	0	0	0	0	0	0	<1	0	**25**
	Vegetation Crossed (miles)	0	2	3	<1	0	0	0	0	0	0	0	0	0	0	<1	0	**6**

Note: Local Alternatives are exchangeable within their associated alternative route.

* Mileage and acreage calculations are approximate; totals may not sum due to rounding

IMPACTS OF ALTERNATIVE ROUTE 3

The greatest permanent and temporary project activities within subroutes associated with Alternative Route 3 are in the Semi-Desert Scrub and Grassland vegetation community with up to 330 acres of temporary project activities and up to 314 acres of permanent project activities over the course of up to 74 miles, resulting in up to 644 acres of ground disturbance, vegetation removal, and associated impacts. Alternative Route 3 would not create disturbance in the Marsh, Wet Meadow, and Playa vegetation community.

IMPACTS OF SUNZIA WEST SUBSTATION

Only one vegetation community is present relative to Component 4—Sonoran Desert Scrub (Table 3-22). Because the Sonoran Desert Scrub vegetation community is considered a desert vegetation community, reclamation potential and success is anticipated to be lower. However, disturbance is less than 1% of the analysis area relative to Component 4 and the Sonoran Desert Scrub vegetation community.

3.3.16.6 No Action Alternative

Under the no action alternative, impacts to vegetation communities would be similar to the proposed action. Specifically, direct impacts to vegetation would include removal of plants during construction and indirect impacts would include erosion, reduction of soil water retention, potential for invasive plant colonization, loss of wildlife habitat, habitat fragmentation, and edge effects (BLM 2013:4-63 to 4-64).

3.3.16.7 Summary of Impacts

Native vegetation communities would be impacted as a result of the proposed action. Adverse impacts include: a loss of vegetative cover within native vegetation communities from surface-disturbing activities, potential for loss and alteration of seed banks, reduced soil productivity, potential loss of biological soil crusts, increased erosion potential and surface runoff, and created edge effects.

Desert vegetation communities, riparian areas, wet vegetation types like marshes, wet meadows, and playas, as well as sagebrush ecosystems are all more sensitive to disturbance than other native vegetation communities impacted by the proposed action. Each of the four project components would result in long-term impacts to these sensitive vegetation communities as follows:

- Component 1, Localized Route Modifications, would impact up to 10 acres of desert vegetation communities, 0 acres of riparian areas and marshes, wet meadows, and playas, and 0 acres of sagebrush communities via ground disturbance and vegetation removal.
- Component 2, Access Roads and TWAs outside of the granted right-of-way, would impact up to 1,978 acres of desert vegetation communities, up to 26 acres of riparian areas and marshes, wet meadows, and playas, and 0 acres of sagebrush communities via ground disturbance and vegetation removal.
- Component 3, under Alternative Route 1, would impact up to 1,091 acres of desert vegetation communities, up to 36 acres of riparian areas and marshes, wet meadows, and playas, and up to 12 acres of sagebrush communities. Alternative Route 2 would impact up to 851 acres of desert vegetation communities, up to 31 acres of acres of riparian areas and marshes, wet meadows, and playas, and up to 10 acres of sagebrush communities. Alternative Route 3 would impact up to 965 acres of desert vegetation communities, up to 27 acres of riparian areas and marshes, wet meadows, and playas, and up to 10 acres of sagebrush communities. Impacts would be due to ground disturbance and vegetation removal.

- Component 4, SunZia West Substation, would impact up to 80 acres of Sonoran Desert Scrub via ground disturbance and vegetation removal.

The no action alternative would also remove native vegetation, including some of the land cover types sensitive to disturbance mentioned above, and would create more disturbance to native vegetation communities than the proposed action due to the longer length of the transmission line and thus more acres of disturbance overall. Under both the no action alternative as well as the proposed action, impacts to desert vegetation communities are anticipated to be the greatest in terms of acres of disturbance out of all native vegetation community types (BLM 2013:4-70). Because reclamation of desert vegetation communities can be challenged by precipitation requirements among other biotic and abiotic factors, reclamation of disturbed areas may be difficult in drought years. Additionally, due to the sensitive nature of arid and semi-arid soils, soil handling and storage practices during construction activities would affect reclamation success (SWCA 2022b). Cumulative impacts on biological resources, including native vegetation, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact up to 13 native vegetation communities. Ongoing landscape-scale phenomena including climate change, drought, and livestock grazing practices would lead to an increased distribution of altered and degraded vegetation communities in the analysis area over time. Ground-disturbing activities from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to native vegetation may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 76,000 acres and 2,890 miles within portions of the analysis area). Disturbances to native vegetation would be both long term and temporary depending on the proposed project component. Permanent infrastructure components would result in permanent loss of native vegetation until the project is completely decommissioned, while temporary impacts during construction would be mitigated during reclamation once construction is complete. The implementation of other infrastructure projects would result in an increased level of permanent and temporary disturbances to vegetation similar to those of the proposed project.

Table 3-22. Impacts to Vegetation Communities within Component 4: SunZia West Substation

Component 4: SunZia West Substation		Vegetation Communities															
		Agriculture	Chihuahuan Desert Scrub	Chihuahuan Semi-Desert Grassland	Developed/ Disturbed	Evergreen Woodland and Shrubland	Juniper Woodland and Shrubland	Marsh, Wet Meadow, and Playa	Mixed Conifer Forest and Woodland	Montane Grassland and Shrubland	Open Rock Vegetation	Open Water	Recently Disturbed or Modified	Riparian Woodland and Shrubland	Sagebrush Steppe and Shrubland	Semi-Desert Scrub and Grassland	Sonoran Desert Scrub
Substation	Permanent Disturbance (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54
	Temporary Disturbance (acres)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26
	Vegetation Crossed (miles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AIB-9 Vegetation Monitoring Transects

Would the proposed project components affect the ability of the BLM to evaluate long-term condition and trend changes to vegetation?

3.3.17 Affected Environment

The analysis area for this issue statement is the extent of the BLM long-term vegetation monitoring transects that overlap with the four project components. The long-term vegetation monitoring plots are valuable to the BLM Las Cruces District Office because the data collected annually at these monitoring plots inform changes in vegetation and range conditions on the larger landscape. The oldest of the vegetation monitoring transects in the vicinity of the project area has been consistently monitored for approximately 40 years (Whitney 2021).

No reasonably foreseeable environmental trends or planned actions have been identified that would overlap with the vegetation monitoring transects.

3.3.18 Environmental Consequences

3.3.18.1 Methods and Assumptions

The following assumption was used to analyze impacts to the vegetation monitoring transects:

- The vegetation transects can continue to be used for long-term vegetation monitoring as long as they are not directly impacted by the proposed project.

The impact indicator used for this analysis is:

- Number of transects intersected by the proposed project.

The impacts analysis for the vegetation monitoring transects assumes application of the design features and EPMs contained in Table 3-23. Full design features and EPMs are provided in Appendix C.

Table 3-23. Design Features and Environmental Protection Measures Applicable to Vegetation Monitoring Transects

Relevant Design Features	Applicable EPMs
2, 3, 5, 6, 14	none

3.3.18.2 Impacts of Localized Route Modifications

Localized route modifications would not impact the vegetation transects.

3.3.18.3 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Six vegetation transects are located in close proximity to project Component 2 (access roads and TWAs; Table 3-24). Two vegetation transects overlap with project Component 2. Therefore, surface disturbance associated with constructing and operating the project would interfere with the purpose of the vegetation monitoring transects, and they would no longer be viable for monitoring long-term vegetation conditions associated with grazing management or other non-utility-related activities within the Las Cruces District Office (see Table 3-24). The BLM would need to abandon the impacted monitoring transections and relocate up to two long-term vegetation monitoring transects outside of the project area. The long-term trend data associated with the original vegetation transect would be terminated, and new monitoring data would be collected at the new transect location.

Table 3-24. Long-term Vegetation Monitoring Transects Impacted by Component 2

Monitoring Transect Name	Year Established	Overlap with Proposed Project?	Summary of Impacts
Flying X Ranch; Plot 6A Allotment 06080	1988	Yes	This transect slightly overlaps with an existing access road (improvement required under Component 2). Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Willow Spring Draw; Plot 4 Allotment 16075	1982	Yes	This transect overlaps with a proposed transmission line pull site (Component 2). This disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Lordsburg Draw; Plot 1 Allotment 01055	1983	No	This transect falls outside of the proposed project components by approximately 50 feet. No direct impact to this transect is expected.
Flying X Ranch; Plot 5A Allotment 06080	1988	No	No impact.
Double S; Plot 1 Allotment 16082	1999	No	No impact.
Canyon de Plata; Plot 4 Allotment 16091	1993	No	This transect falls outside of the project area by approximately 12 feet. No direct impact to this transect is expected.

3.3.18.4 Impacts of Segment 4 Reroute Alternatives

Segment 4 reroutes would not impact the vegetation transects.

3.3.18.5 Impacts of SunZia West Substation

The SunZia West Substation would not impact the vegetation transects.

3.3.18.6 No Action Alternative

Under the no action alternative, the proposed project would intersect two vegetation transects, resulting in the need for the BLM to abandon and relocate the impacted transects for long-term monitoring (Table 3-25).

Table 3-25. Long-term Vegetation Monitoring Transects Impacted by the No Action Alternative

Monitoring Transect Name	Year Established	Overlap with Proposed Project?	Summary of Impacts
Greenleaf; Plot 5 Allotment 02036	1987	Yes*	This transect overlaps with the 2016 granted right-of-way (no action alternative) only. There is no overlap with proposed project components. Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.

Monitoring Transect Name	Year Established	Overlap with Proposed Project?	Summary of Impacts
Goat Mountain; Plot 5 Allotment 02040	1981	Yes*	This transect overlaps with the 2016 granted right-of-way (no action alternative). There is no overlap with the proposed project components. Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.

* Indicates overlap with 2016 granted right-of-way only.

3.3.18.7 Summary of Impacts

Eight vegetation monitoring transects have been identified by the BLM Las Cruces District Office as being in close proximity to the four project components (Table 3-26). Based on review of geographic information system (GIS) data, two transects are located within the same area as the proposed project Component 2 (access roads and TWAs). Four vegetation transects are located outside of the proposed project area, and two vegetation transects overlap with the 2016 granted right-of-way. No cumulative impacts have been identified for the vegetation transects.

Table 3-26. Long-term Vegetation Monitoring Transects Impacted by the Proposed Project

Monitoring Transect Name	Year Established	Overlap with Proposed Project?	Summary of Impacts
Lordsburg Draw; Plot 1 Allotment 01055	1983	No	This transect falls outside of the proposed project components by approximately 50 feet. No impact to this transect is expected.
Greenleaf; Plot 5 Allotment 02036	1987	Yes*	This transect overlaps with the 2016 granted right-of-way (no action alternative) only. There is no overlap with proposed project components. Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Goat Mountain; Plot 5 Allotment 02040	1981	Yes*	This transect overlaps with the 2016 granted right-of-way (no action alternative). There is no overlap with the proposed project components. Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Flying X Ranch; Plot 5A Allotment 06080	1988	No	No impact.
Flying X Ranch; Plot 6A Allotment 06080	1988	Yes	This transect slightly overlaps with an existing access road (improvement required under Component 2). Surface disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Willow Spring Draw; Plot 4 Allotment 16075	1982	Yes	This transect overlaps with a proposed transmission line pull site (Component 2). This disturbance would render the transect no longer viable for long-term vegetation and range trend monitoring.
Double S; Plot 1 Allotment 16082	1999	No	No impact.
Canyon de Plata; Plot 4 Allotment 16091	1993	No	This transect falls outside of the project area by approximately 12 feet. No direct impact to this transect is expected.

* Indicates overlap with 2016 granted right-of-way only.

AIB-10 Riparian Habitat

Would the proposed project components reduce the quantity or quality of riparian vegetation and associated habitat areas, particularly along major waterways such as the Rio Grande and San Pedro River?

3.3.19 Affected Environment

The analysis area for riparian vegetation and habitat is the intersection of an 8-mile-wide study corridor of the four project components with riparian land cover data from the SWReGAP. This analysis area is consistent with the Biological Resources study corridor used in the 2013 FEIS to analyze impacts to vegetation communities (BLM 2013:3-2). While the Open Rock Vegetation; Marsh, Wet Meadow, and Playa; as well as the Riparian Woodland and Shrubland vegetation communities have potential to support riparian vegetation (POWER Engineers, Inc. 2021g:B-99, B-101 to B-104), for the purpose of this analysis, the SWReGAP Riparian Woodland and Shrubland vegetation community is used as a central source for riparian-specific land cover data. Impacts to riparian vegetation as well as other native vegetation communities by component are described in tabular format in AIB-8 Native Vegetation (Tables 3-19 through 3-21). Within the analysis area for Component 1 there are currently between 195 and 1,525 acres of mapped riparian vegetation, or habitat, depending on the local route modification; within the analysis area for Component 2a there are currently 31,253 acres of mapped riparian vegetation and for Component 2b there are 31,679 acres; within the analysis area for Component 3 the acreage of mapped riparian vegetation ranges from 8,501 to 16,489 acres, depending on the alternative; and within the analysis area for Component 4 there are 2 acres of mapped riparian vegetation. In addition to discussion of impacts to riparian vegetation within the analysis area more generally, qualitative analysis was undertaken for riparian areas that surround the Rio Grande and San Pedro River as they are the two major river systems crossed by the project and thus areas likely to contain high densities of riparian vegetation in the analysis area (BLM 2013:3-207 to 3-208).

Riparian vegetation is critical in supporting diverse wildlife habitat, reducing erosion and sedimentation of associated waterways, and recycling nutrients; in the western United States riparian areas account for less than 1% of the land area, but are among the most productive and valuable natural resources (NRCS 1996a, 1996b). Riparian habitat is directly influenced by water and is distinctly different from surrounding upland areas because of unique soil and vegetation characteristics (NRCS 1996b). Due to the requirement for hydrologic flow as well as other biotic and abiotic factors to develop and sustain riparian vegetation communities, they are often uncommon and unique within the larger landscape. As discussed above, they represent only a small percentage of land cover in the western United States but comprise a large proportion of the biodiversity. Therefore, they are more susceptible to impacts than other, relatively open upland vegetation communities (POWER Engineers, Inc. 2021g:9).

3.3.19.1 Reasonably Foreseeable Trends and Planned Actions

Surface disturbance associated with the proposed project components has the potential to result in long-term impacts to riparian vegetation and associated habitat. Additionally, the analysis area is expected to be affected by reasonably foreseeable future trends and planned actions in both the short and long term. These include variations in global and regional environmental conditions related to climate change in line with global trends which could reduce the quality and quantity of riparian habitat. Additionally, continued grazing in the analysis area could compound impacts from loss of riparian vegetation cover, resulting in further increases in erosion and sedimentation, reductions in nearby water quality, and overall reduction in quality of riparian habitat. There are reasonably foreseeable future actions within the analysis area that may also result in loss of riparian vegetative cover, including the recently constructed Western Spirit Project (SWCA 2021).

3.3.20 Environmental Consequences

3.3.20.1 Methods and Assumptions

The following assumptions were used to analyze impacts to riparian vegetation:

- Mapped riparian vegetation refers to Riparian Woodland and Shrubland land cover data provided by SWReGAP.
- A high density of riparian vegetation is likely to occur within 0.5 mile of the Rio Grande and San Pedro River major riverways. Impacts to these areas from the project components are discussed qualitatively as it is assumed that any quantitative impact analysis to these riparian resources will be covered under the SWReGAP dataset Riparian Woodland and Shrubland land cover analysis.
- Disturbance and removal of riparian vegetation equates to reductions in available riparian habitat.
- When comparing the proposed action to the no action alternative, it is assumed that the Floodplains vegetation community analyzed in the 2013 FEIS represents riparian land cover (BLM 2013:4-70).
- Reductions in impact potential based on application of design features and applicant-committed environmental protection measures assumes project-related personnel compliance as well as successful reclamation of disturbed areas (Table 3-27).

The impact indicators used for this analysis are:

- Acres of permanent disturbance in the Riparian Woodland and Shrubland vegetation community
- Acres of temporary disturbance in the Riparian Woodland and Shrubland vegetation community

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to riparian vegetation:

- AIB-7 Sedimentation to Surface Water Resources: Impacts to water quality from sedimentation.
- AIB-8 Native Vegetation: Impacts to native vegetation communities.
- AIB-11 Invasive Species (Noxious Weeds): Impacts from the spread of invasive species.
- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species.
- AID-8 Federally Listed Plant Species: Impacts to federally listed species.

The impacts analysis for riparian vegetation assumes application of the design features and environmental protection measures contained in Table 3-27.

Table 3-27. Design Features and Environmental Protection Measures Applicable to Riparian Vegetation

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 8, 14, 18, 19, 20, 26	1, 2, 3, 4, 5, 8, 14

Although some amount of riparian vegetation disturbance would occur under the proposed action, project design features would be implemented to reduce impacts. Appendix C lists design features and applicant-committed EPMs intended to minimize impacts from the project. Project design features would mitigate initial impacts by reducing the extent of disturbance (Design Features 2, 3, 4, 5, and 6), preventing noxious weeds from spreading and establishing (Design Features 1 and 26), educating project personnel on the applicable laws and importance of specific resources (Design Feature 14), reducing fugitive dust (Design Feature 20), minimizing impacts to streams (Design Features 18 and 19), and implementing surface restoration to restore disturbed areas with native vegetation (Design Feature 8). Additionally, disturbance in riparian areas and wetlands is anticipated to be largely avoided through eliminating surface disturbance where feasible, as described by EPMs 1, 2, 4, and 8. In areas where surface disturbance cannot be avoided, any vegetation removed would be cut in a method that leaves the root crown intact (EPM 3). A detailed project reclamation plan would be developed to mitigate site-specific impacts in riparian areas and wetlands, in addition to standard reseeding and recounting (EPM 5). Appendix F of the POD details construction and post-construction reclamation actions including reclamation actions specific to riparian areas (POWER Engineers, Inc. 2021b). Where the project crosses riparian vegetation, clearing of trees in and adjacent to the right-of-way would be minimized (EPM 14). Reductions in impact potential based on application of design features and applicant-committed EPMs is dependent on project-related personnel compliance as well as successful reclamation of disturbed areas.

Tables 3-19 through 3-22 in AIB-8 Native Vegetation summarize the potential impacts to riparian vegetation, and thus riparian habitat, from the proposed project components under the Riparian Woodland and Shrubland vegetation community type.

3.3.20.2 Impacts Common to All Components

Surface-disturbing activities, primarily anticipated during construction, that remove riparian vegetation cover would result in a long-term loss of riparian habitat. Similarly, the removal of riparian vegetation from areas adjacent to surface water features during construction activities could result in reductions to water quality as well; these are the primary anticipated impacts to riparian zones in the analysis area (BLM 2013:4-57). Riparian vegetation improves water quality of nearby water features by sequestering pollutants through physical and biological processes, capturing sediment to reduce the impacts of sedimentation, and stabilizing stream banks against erosion (Swanson et al. 2017). Vegetation removal within riparian areas would expose soils to potential wind and water erosion which could result in increased sediment loads within waterways, accelerated erosion of stream banks that could alter stream morphology and additionally lead to increases in sediment load, and reduced capabilities for capture of pollutants such as pesticides, agricultural fertilizers, and heavy metals before they enter waterways (NRCS 1996a). Removal of riparian vegetation, and thus canopy cover, could also cause water temperatures to rise in adjacent surface water features as light availability increases (NRCS 1996b); the removal of tall riparian vegetation that provides shade to the nearby water bodies could result in long-term adverse impacts to water quality and thus aquatic habitat, especially if sufficiently tall vegetation cannot be allowed to reestablish or reclamation efforts are unsuccessful. Shrub vegetation would be allowed to regrow under the transmission line up to the North American Electric Reliability Corporation (NERC) clearance standards height of approximately 30 feet (POWER Engineers, Inc. 2021g:B-106). Furthermore, riparian vegetation removal could affect vegetation communities by changing community structure and composition and altering soil moisture or nutrient regimes, including the potential for introduction and colonization of disturbed areas by invasive plant species. See AIB-11 Invasive Species and AIB-8 Native Vegetation, for further discussion on impacts from the spread of invasive plant species and impacts to surface water features due to sedimentation, respectively, from the proposed action. Other indirect impacts to vegetation may result from fugitive dust accumulating immediately adjacent to roads and soil compaction at temporarily impacted areas which could result in lowered individual plant vigor or changes in plant abundance and/or species. Finally, the aforementioned impacts from vegetation removal would reduce the quality and quantity of aquatic and riparian habitat locally for the myriad terrestrial, aquatic, and amphibian species, including special-status species, that use these habitats for forage, shelter and to complete their life-cycles. See AID-5 Federally Listed Wildlife Species and AID-8 Federally

Listed Plant Species, for a discussion of impacts to special-status wildlife species and special-status plant species from the proposed action.

See Appendix A, Maps 2–11, 13, 15, 18–40, 43–48, 50, 53–73, 75, 76, 90–98, 100, 101, 103, 104, 106, 107, 109–111, 113–116, 123–179, 185, and 186 for a visual presentation of impacts to riparian habitat as a result of the proposed action.

3.3.20.3 Impacts of Localized Route Modifications

There would be no impacts to riparian vegetation from the localized route modifications.

3.3.20.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Within the analysis area, surface disturbance as a result of the proposed action would occur within mapped riparian vegetation and habitat under Components 2a and 2b. Both Components 2a and 2b would permanently disturb less than 1% of mapped riparian vegetation in the respective analysis areas.
As discussed above, impacts to riparian vegetation are anticipated to be most acute near major rivers as riparian vegetation is typically densest near major watercourses. Riparian areas associated with the San Pedro River occur within 0.5 mile of project Component 2. No access roads requiring improvement or new access roads would be located in riparian areas directly adjacent to the San Pedro River, reducing the potential for impacts from Component 2a (POWER Engineers, Inc. 2021g:40, 81). Impacts from Component 2b would be temporary for fast-growing riparian vegetation and long term for more mature, slower-growing riparian vegetation, such as cottonwoods.

3.3.20.5 Impacts of Segment 4 Reroute Alternatives

Component 3 temporary and permanent project activities and the associated impacts to riparian vegetation are broken out by alternative in Table 3-21. Areas of the Rio Grande are within 0.5 mile of project Component 3; specifically, all three alternatives cross the Rio Grande. Data from the New Mexico Riparian Habitat Map (NMRipMap) indicate that much of the riparian vegetation surrounding the areas where Component 3 crosses the Rio Grande and other nearby riparian corridors consists of forest and woodland as well as shrubland riparian cover types (Muldavin et al. 2020). The removal of riparian vegetation on the banks of these rivers could adversely impact wildlife species that depend on these specific rivers for completion of their life cycles including breeding, foraging, and migration. Additionally, aquatic species that rely on these river systems could be impacted by resultant reductions in water quality.

IMPACTS OF ALTERNATIVE ROUTE 1

As shown in Table 3-21 under AIB-8, the greatest permanent and temporary project activities within mapped riparian vegetation for Component 3 would occur under Alternative Route 1, Subroute 1A-1, with 16 acres of disturbance from permanent project activities and 16 acres of disturbance from temporary project activities. Subroute 1A-1 would result in approximately 32 acres of permanent impact to riparian vegetation community because it would likely take at least 5 years, if not longer, for the vegetation to return to its pre-construction condition. Subroute 1A-3 would impact the least amount of riparian vegetation under Alternative Route 1, at 10 acres for permanent use and 10 acres for temporary use (see Table 3-21). This surface disturbance would disturb less than 1% of mapped riparian vegetation in the analysis area.

IMPACTS OF ALTERNATIVE ROUTE 2

As shown in Table 3-21 under AIB-8, Alternative Route 2 permanent and temporary project activities and the associated surface disturbances are similar to the disturbance acreages for Alternative Route 3. Subroute 2A-1 would involve 12 acres of disturbance from permanent project activities and 13 acres of disturbance from temporary project activities and would account for the largest area of disturbance for all subroutes associated with Alternative Route 2. Subroute 2A-3 would impact the least amount of riparian vegetation under Alternative Route 2, at 6 acres for permanent use and 6 acres for temporary project activities (see Table 3-21). All subroutes under Alternative Route 2 would disturb less than 1% of riparian habitat for each subroute in their respective analysis areas.

IMPACTS OF ALTERNATIVE ROUTE 3

As shown in Table 3-21 under AIB-8, Alternative Route 3 Subroute 3A-3 would have the least impact to riparian vegetation in terms of temporary and permanent project activities and associated surface disturbance across all subroutes and alternatives, with 5 acres of permanent project activities and 6 acres of disturbance from temporary project activities. Subroute 3A-1 would create the largest disturbance to riparian habitat under Alternative 3 with 11 acres of permanent project activities and 12 acres of disturbance from temporary project activities (see Table 3-21). All subroutes under Alternative Route 3 would disturb less than 1% of riparian habitat in their respective analysis areas.

3.3.20.6 Impacts of SunZia West Substation

There would be no impacts to riparian vegetation from the SunZia West Substation.

3.3.20.7 No Action Alternative

Under the no action alternative, the project would follow the route authorized by the 2015 ROD. Impacts to riparian vegetation and habitat under the no action alternative are described in the 2013 FEIS and would include the loss of riparian vegetative cover, potential for erosion, reduction of soil water retention, invasive plant colonization, loss of wildlife habitat, habitat fragmentation, and edge effects (BLM 2013:4-63 through 4-64). Because riparian areas are one of the few vegetation communities with tree canopy near the no action alternative, edge effects involving changes in humidity and light availability would be more pronounced in riparian areas than in other surrounding vegetation communities (BLM 2013:4-64, 4-72). The no action alternative has proposed crossing sites of the Rio Grande that may disturb riparian vegetation during construction and maintenance activities as well as crossings at the San Pedro River (BLM 2013:4-87, 4-116).

3.3.20.8 Summary of Impacts

Considering the uniqueness of riparian habitat relative to the surrounding landscape and its importance to biodiversity and natural processes, the loss or reduction in quality of riparian vegetation and habitat would have greater impacts than similar land cover losses within other vegetation communities. Removal of large trees would create long-term impacts as these tree canopies take decades to establish, while removal of understory shrubs, forbs, and grasses would create short-term impacts under the assumption that reclamation efforts are successful and allow for reestablishment of native riparian vegetation.

The proposed action would result in the removal of some riparian vegetation, but most of the anticipated project surface disturbance would occur in other vegetation communities. There would be no impacts associated with project Components 1 or 4, and minimal impacts associated with project Component 2a (access roads) including impacts from fugitive dust. Specifically, less than 6 acres of permanent disturbance would occur across approximately 5 miles of access roads under Component 2a. Component

2b would have the largest area of disturbance across all components and alternatives. Assuming the alternative for Component 3 with the greatest impact to riparian vegetation were selected, the total permanent impacts to riparian vegetation across all components would be less than 25 acres in total. The no action alternative would also result in the loss of riparian vegetation cover and habitat (BLM 2013:4-70). Both the no action alternative as well as the proposed action cross the Rio Grande and San Pedro River and would similarly disturb the riparian vegetation along the banks of these major watercourses as well as in other areas of project disturbance. However, impacts from the proposed action are anticipated to be less than the no action alternative, as there would be fewer river crossings and less total acreage of riparian vegetation removed overall.

Cumulative impacts to biological resources, including vegetation, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact riparian vegetation and associated habitat by removing riparian vegetation from the landscape with potential to cause secondary impacts such as reduced water quality, soil erosion, alteration of stream morphology, and changing plant community structure. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to riparian vegetation may result from construction of the proposed project components, in addition to other planned infrastructure projects, including the construction of other nearby transmission lines and substations. Construction activities are temporary and would end upon completion of project construction. Where project infrastructure is permanent, available riparian habitat would be removed from the landscape. Operation and maintenance of the transmission lines could generate new ground disturbance in riparian areas; however, these impacts would be temporary and stochastic in nature. Therefore, any adverse impacts from construction and operations activities disturbances likely would be infrequent and of short duration, while impacts from the removal of available riparian habitat from infrastructure siting would be long term and adverse.

AIB-11 Invasive Species (Noxious Weeds)

Would increased traffic and surface disturbance and activities associated with the construction, operation, and maintenance phases of the proposed project contribute to the spread and establishment of noxious and invasive weed species?

3.3.21 Affected Environment

Noxious and invasive weeds are identified as a major threat to native ecosystems and multiple-use public land resources (BLM 2013:3-83). The 2013 FEIS stated noxious weed impacts include, but are not limited to, adverse effects on productivity, value, and management of publicly administered and private land and water resources; effects on both yield and quality of agriculturally important crops; livestock poisoning; impacts to threatened and endangered species and native biodiversity; adverse effects upon human health as allergens, through poisoning, and by harboring plant disease vectors; reduction of water quality and habitat for fish and wildlife in streams, lakes, and reservoirs; interference with electrical power transmission and other utility functions; and detracting from the aesthetic and recreational values of wildlands, parklands, and other areas (BLM 2013:3-83). Most noxious plant species in New Mexico are found on rangelands and wildlands (New Mexico Department of Agriculture [NMDA] 2021). These invasions result in decreased forage availability for livestock and wildlife. The spread of noxious weeds on public, state trust, and private lands in southeastern Arizona poses risks to native and rangeland animals, threatens biodiversity and native plant species, damages parklands and natural resources, and causes economic hardship for farmers, ranchers, and municipalities (University of Arizona 2021).

The State of New Mexico manages for noxious weeds though the state Noxious Weed Management Act of 1998, which requires the State to implement a noxious weed management program to improve the state economy and environment by managing noxious weeds. The New Mexico Department of Agriculture has a list of species targeted as noxious weeds for control or eradication pursuant to the Noxious Weed Management Act of 1998. The list classifies noxious weeds into three classes which identify the presence of the species, and the management priority (NMDA 2020). The Arizona Department of Agriculture manages noxious weeds through the Arizona Revised Statutes 3-201 and Arizona Administrative Code R3-4-245 (ARS 3-201; AAC R3-4-245), which also define three classes identifying the presence of the species and the management priority.

The analysis area to evaluate the impacts to noxious and invasive weeds includes a 4-mile buffer (8-mile-wide analysis area) around the centerline of the project. This size analysis area is consistent with the 2013 FEIS. The current New Mexico and Arizona Departments of Agriculture and federal noxious weed lists were used as the baseline for review of noxious weed species potentially occurring within the study corridor (Arizona Department of Agriculture 2021; NMDA 2020). Other species of invasive plants, not listed as noxious weeds, may also be present in the study corridor.

3.3.21.1 Reasonably Foreseeable Environmental Trends and Planned Actions

The 2013 FEIS identifies noxious and invasive weeds as major threats to native ecosystems and multiple-use public land resources (BLM 2013:3-83). Noxious and invasive weeds are effective competitors with native plants, therefore disturbance of vegetative cover that facilitates their introduction, spread, and proliferation could alter plant community composition, reduce native plant species cover, and produce monocultures that could alter fire regimes. As infestations develop, they could displace the herbaceous resident vegetation, reducing species biodiversity and transforming soil properties and hydrology. Such changes usually preclude reestablishment of the native plant community in disturbed areas and represent a permanent change in the local ecology (BLM 2013:4-73). Several noxious or invasive weed species likely already occur within the project area, and a Noxious Weed Management Plan would be developed in conjunction with the POD to describe how noxious weeds will be managed (POWER Engineers, Inc. 2021b:Appendix B2).

3.3.22 Environmental Consequences

There are reasonably foreseeable actions that may contribute to the spread and establishment of noxious and invasive species. These actions include the construction and development of communications sites and transmission lines, power stations, wind development, renovation of existing water storage capacity resources, seeding test plots and vegetation management treatments, access road development, livestock grazing and leasing authorizations, and fuels reduction projects (SWCA 2021).

3.3.22.1 Methods and Assumptions

The following assumptions were used to analyze impacts from noxious and invasive weeds:

- There are existing disturbances and other actions within the analysis areas that contribute to invasive and noxious weed spread and establishment, including roads, transmission lines, and agricultural fields.
- A Noxious Weed Management Plan would be developed in conjunction with the POD to describe how noxious weeds will be managed (POWER Engineers, Inc. 2021b:Appendix B2).

The impact indicator used for this analysis is:

- Acres of temporary and permanent surface disturbance.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts from noxious and invasive weeds.

- AIB-5 Sensitive Soils: Impacts to sensitive soil resources
- AIB-8 Native Vegetation: Impacts to native vegetation communities.

The impacts analysis for the noxious and invasive weeds assumes application of the design features and environmental protection measures contained in Table 3-28. Full design features and EPMs are provided in Appendix C.

Table 3-28. Design Features and Environmental Protection Measures Applicable to Noxious and Invasive Weeds

Relevant Design Features	Applicable EPMs
1	1, 2, 3, 5

3.3.22.2 Impacts Common to All Components

Approximately 3,419 to 3,721 acres of new surface disturbance would be introduced into the analysis area from the proposed project components resulting in long-term impacts to site condition related to removal of existing vegetation and the introduction of ground disturbance, which increases the likelihood for establishment of invasive species.

There are no known areas of invasive species treatment areas intersecting the proposed project components. However, equipment used for maintenance of the project has the potential to reintroduce noxious weeds along access roads outside of the project area. Early detection, containment, and control of noxious weeds during and following project construction would minimize the potential for these invasive species colonizing the analysis area and would contain the spread of pre-existing infestations within the project area limits of disturbance. Environmental protection measure EPM 1, the development of a noxious weed plan, would provide methods to control the potential occurrence or infestation of noxious weeds during and following construction of the project area. In addition, the proposed action impacts would be minimized through EPM 2, EPM 3, and EPM 5 (POWER Engineers, Inc. 2021a:R1-B).

3.3.22.3 No Action Alternative

Under the no action alternative, the increased traffic and surface disturbance and activities associated with the construction, operation, and maintenance phases may contribute to the spread and establishment of invasive and noxious weeds. However, the potential presence of noxious weeds was envisioned in the 2013 FEIS and a Noxious Weed Management Plan was developed to describe how noxious weeds will be managed within the project area (BLM 2013:4-73).

3.3.22.4 Summary of Impacts

Increased traffic and surface disturbance along with activities associated with the construction, operation, and maintenance of the proposed project may contribute to the spread and establishment of invasive and noxious weeds. Early detection, containment, and control of noxious weeds during and after project construction would minimize the potential for these invasive species to colonize the analysis area and would contain the spread of pre-existing infestations within the project area.

Cumulative impacts to biological resources, including invasive species and noxious weeds, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact up to 3,721 acres with new surface disturbance susceptible to invasion by invasive and noxious species. Ground-disturbing activities from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts may result from ground-disturbing activities associated with the construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 76,000 acres and 2,890 miles within portions of the analysis area) with an increase in the potential for invasion by noxious weeds. Standard practices during and after construction of the proposed project and other planned infrastructure projects to detect, contain, and control invasive and noxious weeds would limit the potential for invasion and spread.

AIB-12 Desert Bighorn Sheep Habitat

Would the roads and power lines of the proposed project components reduce the quantity or quality of desert bighorn sheep (*Ovis canadensis nelsoni*) habitat enough to affect bighorn sheep populations, compared with the no action alternative?

3.3.23 Affected Environment

The analysis area for this issue statement includes the intersection of the 8-mile-wide study corridor with the project components and BLM mapped range and management areas for the species. This is consistent with the Biological Resources study corridor used in the 2013 FEIS to analyze impacts to desert bighorn sheep (BLM 2013:3-2).

Desert bighorn sheep (*Ovis canadensis nelsoni*) occur in mountainous habitats in southern Arizona and New Mexico (BLM 2013:B1-119). Desert bighorn sheep occupy steep, rocky terrain, often near a water source; suitable habitat typically consists of relatively low vegetation that provides good visibility for predator avoidance, steep terrain that allows an effective route of escape, and high, inaccessible sites for protection from predators during lambing (BLM 2013:B1-120). Water is also a critical component of the habitat, though this species is adapted to arid environments and can go for extended periods without drinking. Populations of desert bighorn sheep in New Mexico are known in only a select few mountain ranges: the Ladron, Fra Cristobal, Caballo, San Andres, Peloncillo, and Big and Little Hatchet Mountains, and at Red Rock on the Gila River (BLM 2013:B1-119, B1-120). The BLM has further identified the Magdalena and Chupadera Mountains as containing suitable habitat for desert bighorn sheep that is occupied by the species. In Arizona, desert bighorn sheep occur in desert ranges of the southern and western portions of the state (Arizona Game and Fish Department [AZGFD] 2021a). Desert bighorn sheep may use the analysis area to move between populations located in surrounding mountain ranges or to access available forage or water resources. The 2010 Approved Resource Management Plan for the Socorro Field Office provides guidance for managing federal mineral estate in Socorro and Catron Counties, including management of desert bighorn sheep habitat and a travel corridor between the Ladron Mountain and the Devil's Backbone. This travel corridor is a management area for the BLM to reduce impacts to desert bighorn sheep resulting from access and surface disturbance (BLM 2010) and is analyzed here as an important feature to desert bighorn sheep survival in the analysis area. The reader is referred to AIB-15 Wildlife Corridors for further information about how the project may impact wildlife corridors in the analysis area.

Potential impacts to desert bighorn sheep from the proposed project components include increased risk of mortality via vehicle strike, potential reductions in survivorship due to displacement and avoidance of habitat from noise and other human-activity disturbances, and loss of available habitat and forage.

3.3.23.1 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable future trends and planned actions that may compound impacts to desert bighorn sheep when considered relative to the proposed action. The analysis area for this issue statement is expected to be affected in both the short and long term by variations in global and regional environmental conditions related to climate change in line with global trends, which could reduce the quality of habitat for use by desert bighorn sheep. Changing climate may also alter water resource availability for desert bighorn sheep which is critical to their survival. Additionally, grazing in the area will continue to remove available forage from the landscape for desert bighorn sheep. There are reasonably foreseeable future actions within the analysis area that may result in loss of available habitat and forage as well as increased risk for mortality and displacement for desert bighorn sheep, including the Great Divide 160-MW wind project, the 240-mile double-circuit 345-kV Southline Transmission Line (involving an additional 120-mile 230-kV upgrade), renewal and authorization of livestock grazing and permit leases including the West Grant County Grazing Permit and Lease Renewals and the Baldy Allotment Grazing Authorization, and the plat-approved 50,000-acre Willow Springs Residential subdivision (SWCA 2021).

3.3.24 Environmental Consequences

3.3.24.1 Methods and Assumptions

The following assumptions were used to analyze impacts to desert bighorn sheep:

- Mapped desert bighorn sheep range in New Mexico refers to range data provided by the BLM Las Cruces District Office. Mapped management areas refer to desert bighorn sheep travel corridor data provided by the BLM Socorro Field Office.
- For purposes of analysis here, it is assumed that wherever there is mapped desert bighorn sheep range there is suitable habitat for desert bighorn sheep. Wherever there is a mapped management area it is assumed that there are travel corridors present that are important for desert bighorn sheep movement across their range.
- Disturbance and removal of vegetation in desert bighorn sheep mapped range and management areas equates to long-term reduction in available forage for the species.
- Miles of habitat crossed by project features represents increased potential for avoidance and displacement from parts of their range.
- For Component 2a, miles of habitat or travel corridor crossed equates to miles of access road in desert bighorn sheep mapped range and management areas, which represents increased risk of vehicle collision.
- Reductions in impact potential based on application of design features and applicant-committed environmental protection measures assumes project-related personnel compliance as well as successful reclamation of disturbed areas (Table 3-29).

The impact indicators used for this analysis are:

- Acres of permanent disturbance in desert bighorn sheep mapped range and management areas
- Acres of temporary disturbance in desert bighorn sheep mapped range and management areas
- Miles of access roads in desert bighorn sheep mapped range and management areas

- Miles of habitat crossed by project features in desert bighorn sheep mapped range and management areas

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to desert bighorn sheep:

- AIB-15 Wildlife Corridors: Impacts to wildlife movement corridors.
- AID-18 Sevilleta National Wildlife Refuge: Impacts to the Sevilleta National Wildlife Refuge.

The impacts analysis for desert bighorn sheep assumes application of design features and environmental protection measures contained in Table 3-29.

Table 3-29. Design Features and Environmental Protection Measures Applicable to Desert Bighorn Sheep

Relevant Design Features	Applicable EPMs
2, 3, 4, 5, 6, 8, 26	1, 3, 4, 5, 6, 13, 16

Appendix C lists design features and EPMs intended to minimize impacts from the project; Design Features 2, 3, and 6 as well as EPMs 1, 4, and 6 are intended to restrict vehicle traffic and construction activity to designated areas and minimize said activity to the extent practicable in order to reduce the amount of ground disturbance from the project, which would resultantly lower the risk of vehicle collisions and potential for avoidance and displacement for desert bighorn sheep as well as loss of available habitat and forage. Design Feature 4 and EPMs 3, 13, and 16 prescribe best practices during construction activities and siting to reduce ground disturbance which would similarly reduce habitat loss. Design Features 5, 8, and 26 and EPM 5 would limit ground disturbance where practicable and restore affected areas to their baseline conditions, which would reduce impacts to vegetation from project-related activities, and resultantly reduce impacts to available forage and habitat for desert bighorn sheep.

3.3.24.2 Impacts Common to All Components

Disturbance of vegetation during project activities and the resultant long-term loss of habitat and forage from construction of project-related features such as transmission line structures, access roads, and substations are the primary anticipated impacts to this species. Project construction and operations activities such as noise and human presence would also have the potential to cause stress or displace desert bighorn sheep from parts of their range for the duration of the activity. Construction and operations activities—specifically, increased vehicular and equipment traffic on new and existing access roads—have the potential to increase the risk of vehicular collisions for desert bighorn sheep. Project infrastructure, noise, and other human-activity disturbances associated with construction and operations of the project could limit mobility of wildlife, disrupt life-cycle activities, and increase energy expenditure if individuals flee the area. The intensity of avoidance would depend on the scale of the activity and proximity to existing populations of desert bighorn sheep or movement corridors. These events would be stochastic in nature but would be more likely to occur in occupied habitat and during times when construction and operations activities increased from baseline conditions. In the operational phase, human activity disturbances would be sporadic and short term.

Desert bighorn sheep are considered game species in New Mexico, and Game Management Units for the species overlap proposed project Components 1, 2, and 3 (New Mexico Department of Game and Fish [NMDGF] 2021). The project could temporarily restrict or close portions of recreation areas, and noise during project construction would be unavoidable and could lead to the startle of big game in the area and resultant avoidance of the area. As a result, hunting opportunities within the analysis area would be temporarily degraded. Impacts to desert bighorn sheep are not anticipated to be of a magnitude to degrade hunting opportunities in the long term.

Impacts to desert bighorn sheep by proposed project components are summarized in Table 3-30 and Table 3-31. Appendix A, Maps 125–133, 135–138, 140, 141, 144–146, 148, 150–153, 155, 161, and 162 show where the proposed project components would overlap with desert bighorn sheep management areas.

Table 3-30. Impacts to Desert Bighorn Sheep Habitat within the Analysis Area per Project Component

Project Component	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0	0	0	0
2. SunZia South Area	0	0	0	0
3. Macho Springs Area	0	0	0	0
4. Las Palomas Area	0	0	0	0
5. Highlands Area	0	0	0	0
6a. Pinal Central Area- North Route	0	0	0	0
6b. Pinal Central Area- Steele Route	0	0	0	0
6c. Pinal Central Area- Earley Route	0	0	0	0
Local Alternative West Tie-in	0	0	0	0
Local Alternative Central Tie-in	0	0	0	0
Local Alternative East Tie-in	0	0	0	0
Component 2a. Access Roads	0	0	0	15,321
Component 2b. Temporary Work Areas	0	0	0	12,419
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	6	25	25	73,867
Alt Route 1 with Subroute 1A-2	6	25	25	73,867
Alt Route 1 with Subroute 1A-3	6	25	25	74,135
Alt Route 1 with Subroute 1A-4	6	25	25	73,871
Local Alternative 1A-6	0	0	0	NA
Local Alternative 1A-7	0	0	0	NA
Alt Route 2 with Subroute 2A-1	5	24	22	61,771
Alt Route 2 with Subroute 2A-2	5	24	22	61,771
Alt Route 2 with Subroute 2A-3	5	24	22	62,040
Alt Route 2 with Subroute 2A-4	5	24	22	61,776
Alt Route 3 with Subroute 3A-1	6	27	26	45,425
Alt Route 3 with Subroute 3A-2	6	27	26	45,425

Project Component	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat within Analysis Area (acres)
Alt Route 3 with Subroute 3A-32	6	27	26	45,693
Alt Route 3 with Subroute 3A-4	6	27	26	45,429
Local Alternative 3B-1	0	0	0	NA
Local Alternative 3B-2	0	0	0	NA
Component 4. SunZia West Substation	0	0	0	0

NA = Not Applicable; Local Alternatives do not have associated analysis area calculations because those calculations are presented for the larger, complete alternative routes. Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-31. Impacts to Desert Bighorn Sheep Management Areas within the Analysis Area per Project Component

Project Component	Management Area Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Management Area within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0	0	0	0
2. SunZia South Area	0	0	0	0
3. Macho Springs Area	0	0	0	0
4. Las Palomas Area	0	0	0	0
5. Highlands Area	0	0	0	255
6a. Pinal Central Area- North Route	0	0	0	0
6b. Pinal Central Area- Steele Route	0	0	0	0
6c. Pinal Central Area- Earley Route	0	0	0	0
Local Alternative West Tie-in	0	0	0	0
Local Alternative Central Tie-in	0	0	0	0
Local Alternative East Tie-in	0	0	0	0
Component 2a. Access Roads	36	6	34	69,837
Component 2b. Temporary Work Areas	0	7	0	65,451
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	5	21	21	80,827
Alt Route 1 with Subroute 1A-2	5	21	21	80,879
Alt Route 1 with Subroute 1A-3	5	21	21	84,998
Alt Route 1 with Subroute 1A-4	5	21	21	80,827
Local Alternative 1A-6	0	0	0	NA
Local Alternative 1A-7	0	0	0	NA
Alt Route 2 with Subroute 2A-1	5	24	22	43,167
Alt Route 2 with Subroute 2A-2	5	24	22	43,167
Alt Route 2 with Subroute 2A-3	5	24	22	43,167

Project Component	Management Area Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Management Area within Analysis Area (acres)
Alt Route 2 with Subroute 2A-4	5	24	22	43,167
Alt Route 3 with Subroute 3A-1	6	27	26	43,158
Alt Route 3 with Subroute 3A-2	6	27	26	43,158
Alt Route 3 with Subroute 3A-32	6	27	26	43,158
Alt Route 3 with Subroute 3A-4	6	27	26	43,158
Local Alternative 3B-1	0	0	0	NA
Local Alternative 3B-2	1	2	2	NA
Component 4. SunZia West Substation	0	0	0	0

NA = Not Applicable; Local Alternatives do not have associated analysis area calculations because those calculations are presented for the larger, complete alternative routes. Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.24.3 Impacts of Localized Route Modifications

Though none of the six localized route modifications fall within mapped desert bighorn sheep range or management areas, there is still potential for impacts from noise and human activity disturbances or risk of mortality from vehicle collision during construction activities if there are desert bighorn sheep migratory movements that cross these project features outside of mapped range and management areas.

3.3.24.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

The use, installation, and improvement of access roads (Component 2a) within management areas and mapped desert bighorn sheep habitat would increase the risk of vehicle collision for desert bighorn sheep and the potential for displacement due to human activity disturbances. The analysis areas for both desert bighorn sheep management areas as well as mapped habitat overlaps with access roads associated with Component 2a, but there would only be direct disturbance within the desert bighorn sheep management areas, or travel corridor (see Tables 3-30 and 3-31). Both Component 2a and Component 2b cross desert bighorn sheep management areas and would each result in temporary and permanent project activities and associated disturbance within less than 1% of the analysis areas. Individuals using the travel corridor during construction and operations activities would be at increased risk for vehicle collision and potential for displacement from the area. Additionally, removal of vegetation may result in loss of available forage for the species.

3.3.24.5 Impacts of Segment 4 Reroute Alternatives

Impacts from the Segment 4 reroute alternatives would likely be the most acute across the project components for desert bighorn sheep as each alternative crosses mapped desert bighorn sheep range that is occupied as well as management areas for the species. The Segment 4 reroute alternatives temporary and permanent project activities acreages and miles crossed for each subroute within desert bighorn sheep habitat and management areas are broken out by alternative in Table 3-30 and Table 3-31, respectively. There is high potential for overlap in acres of disturbance as well as miles crossed within mapped desert bighorn sheep range and the management areas relative to Component 3 within these tables. Hence, acres of project activities and miles crossed by alternatives and subroutes shown in Table 3-30 and Table 3-31 should not be considered additive.

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 crosses occupied desert bighorn sheep habitat as well as desert bighorn sheep management areas. Both temporary and permanent project activities and associated disturbance under Alternative Route 1 within mapped desert bighorn sheep range and management areas, or travel corridor, are less than 1% of the mapped features within their respective analysis areas.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 crosses the Sevilleta NWR where desert bighorn sheep are known to occur (BLM 2013:3-110). The reader is referred to AID-18 Sevilleta National Wildlife Refuge for further information on how the project may impact this area. Both temporary and permanent project activities and associated disturbance under Alternative Route 2 within mapped desert bighorn sheep range and management areas are less than 1% of the mapped features within their respective analysis areas.

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 also crosses the Sevilleta NWR where desert bighorn sheep are known to occur (BLM 2013:3-110). Both temporary and permanent project activities and associated disturbance under Alternative Route 3 within mapped desert bighorn sheep range and management areas are less than 1% of the mapped features within their respective analysis areas.

3.3.24.6 Impacts of SunZia West Substation

There would be no impacts to desert bighorn sheep associated with the SunZia West Substation as it is outside mapped range and management areas for the species (AZGFD 2021a; BLM 2010).

3.3.24.7 No Action Alternative

The no action alternative could affect desert bighorn sheep populations through loss of foraging habitat and disturbance during sensitive seasons (BLM 2013:4-355). The no action alternative would also likely result in disturbances to desert bighorn sheep from construction noise and the presence of humans during project development, intermittent disturbance during maintenance through the life of the project, and increased vehicle access, potentially resulting in disturbance to desert bighorn sheep from the use of access roads (BLM 2013:4-103).

3.3.24.8 Summary of Impacts

Impacts to desert bighorn sheep would be most pronounced within occupied habitat, which is primarily surrounding areas associated with Component 3, the Segment 4 Reroute Alternatives. Impacts to desert bighorn sheep habitat from project disturbance would be greatest for Component 3 while impacts to desert bighorn sheep travel corridors from project disturbance would be greatest for Component 2a, access roads. All three alternatives associated with Component 3 would have similar impacts across both mapped desert bighorn sheep habitat and management areas (see Table 3-30 and Table 3-31). Similarly, impacts from noise and other human activity disturbances would be highest under Components 2 and 3 with some potential for impact from Component 1 if migratory movements of individuals of the species cross these project features. These anthropogenic activity disturbances are not likely to lead to a loss of viability of populations of desert bighorn sheep due to the temporary nature of construction activities, the availability of adjacent suitable habitat, and potential for acclimatation of localized populations to long-term operational activities. The proposed action would have similar impacts to the no action alternative but would be more pronounced, as Component 3 crosses more suitable and occupied habitat for desert bighorn sheep than the no action alternative.

Cumulative impacts to biological resources, including desert bighorn sheep, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact desert bighorn sheep by creating noise and human-activity disturbances and by removing available habitat and forage from the landscape. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to desert bighorn sheep may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, and wind farms. Construction noise and human-activity disturbances are temporary and would end upon completion of project construction. Where project infrastructure is permanent, available forage and habitat would be removed from the landscape. Operation and maintenance of the transmission lines and renewable energy projects could generate periodic noise and human-activity disturbances; however, these would dissipate with increasing distance from the project boundary and would be stochastic in nature. Therefore, any adverse impacts from noise and human-activity disturbances likely would be infrequent and of short duration, while impacts from the removal of available forage and habitat from infrastructure siting would be long term and adverse.

AIB-13 Grasslands and Pronghorn Habitat

Would the roads and power lines associated with the proposed project reduce the quantity or quality of grasslands and pronghorn (*Antilocapra americana*) habitat in the northern Sulphur Springs Valley, Allen Flat, or Nutt Grasslands?

3.3.25 Affected Environment

The analysis area for American pronghorn (*Antilocapra americana americana*) includes the intersection of an 8-mile-wide study corridor of the proposed project components with the Sulphur Springs Valley and Allen Flat area in Arizona, and the Nutt Grasslands and other BLM mapped pronghorn range in New Mexico. This is consistent with the Biological Resources study corridor used in the 2013 FEIS to analyze impacts to pronghorn (BLM 2013:3-2). Within the analysis area for American pronghorn, there are currently 12,041 acres of suitable habitat in the Sulphur Springs Valley relative to Component 2a and 10,765 acres relative to Component 2b, and 14,173 acres of suitable habitat for pronghorn in the Allen Flat analysis area for both Component 2a as well as Component 2b. In the Nutt Grasslands, there are 4,958 acres of suitable habitat within the analysis area relative to Component 2a and 5,023 acres relative to Component 2b; additionally, there are 2,532 acres of mapped American pronghorn habitat in the analysis area for the Nutt Grasslands under a single localized route modification associated with Component 1. The Nutt Grasslands are encompassed by BLM mapped pronghorn range in New Mexico more generally; therefore, the analysis area in New Mexico is broken out by component below and these numbers do not include any overlap with the Nutt Grasslands already reported above. Within the analysis area for Component 1 within New Mexico more generally, there are between 41,732 and 77,944 acres of BLM mapped American pronghorn range depending on localized route modification area; 1,017,043 acres of BLM mapped American pronghorn range within the analysis area for access roads, Component 2a, and 855,827 acres for TWAs, Component 2b, within New Mexico generally; and there are between 373,462 acres and 492,478 acres of mapped range for Component 3 depending on alternative. The analysis area does not have any overlap with project Component 4.

American pronghorn occur in open, short-grass desert habitats and grasslands in Arizona and New Mexico, preferring habitat attributes of open cover, grassland, or grassland with low shrubs where the vegetation has a low profile that provides good visibility for predator avoidance (BLM 2013:B1-118, B1-

119). American pronghorn are well adapted to arid climates and obtain most of their water needs from the vegetation they consume throughout much of the year. The distribution of American pronghorn in New Mexico occurs throughout much of the state in patches of suitable habitat (NMDGF 1992). In Arizona, American pronghorn occur in grasslands of northern and southern Arizona but are found primarily in the northern plains, with scattered herds found in the grasslands of southeastern Arizona (AZGFD 2021b). A population of approximately 100 American pronghorn occur in the northern Sulphur Springs Valley near Willcox, Arizona, and are managed by the AZGFD (BLM 2013:B-119). Another small population of pronghorn west of the Sulphur Springs Valley occur in the Allen Flat area of southeastern Arizona (BLM 2013:3-129). The Luna County Grasslands Bird Habitat Conservation Area (known locally as the Nutt Grasslands) near Deming, New Mexico, also contains suitable grassland habitat for pronghorn (POWER Engineers, Inc. 2021g:33). American pronghorn may use the analysis area to move between populations located in surrounding grasslands or to access available forage.

Potential impacts to American pronghorn from the construction and operation of the project would be increased risk of mortality from vehicle collision or predation, potential for increased stress or displacement from suitable habitat due to noise and other human-activity disturbances, and loss of available habitat and forage.

3.3.25.1 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable future trends and planned actions that may compound impacts to American pronghorn when considered relative to the proposed action. The analysis area is expected to be affected in both the short and long term by variations in global and regional environmental conditions related to climate change in line with global trends, which could reduce the quality of grassland habitat for use by American pronghorn. Grazing in the area would continue to remove available forage from the landscape for pronghorn. In addition, there are planned actions near the proposed action that may result in loss of available habitat and forage as well as increased risk for mortality and displacement for pronghorn including the Great Divide 160 MW wind project, the constructed Western Spirit Wind 1,050-MW wind projects (including a 150-mile 345-kV AC transmission line), the 240-mile double-circuit 345-kV Southline Transmission Line (involving an additional 120 mile 230-kV upgrade), renewal and authorization of livestock grazing and permit leases including the West Grant County Grazing Permit and Lease Renewals and the Baldy Allotment Grazing Authorization, and the plat-approved 50,000 acres Willow Springs Residential subdivision (SWCA 2021).

3.3.26 Environmental Consequences

3.3.26.1 Methods and Assumptions

The following assumptions were used to analyze impacts to American pronghorn:

- Mapped American pronghorn range in New Mexico generally refers to range data provided by the BLM Las Cruces District Office.
- For purposes of analysis here, it is assumed that wherever there is mapped American pronghorn range there is suitable habitat for American pronghorn.
- Similarly, it is assumed that the entire extent of the Allen Flat area, Sulphur Springs Valley, and Nutt Grasslands contain suitable habitat for American pronghorn.
- Acres of disturbance and removal of vegetation in pronghorn mapped range equates to reductions in available habitat and forage as well as reduction in habitat quality for this species from the potential for spread of noxious weeds during ground-disturbing activities.

- For Components 1 and 3, miles of habitat crossed equates to miles of new transmission line in American pronghorn range which equates to increased predation risk for pronghorn young as well as potential for human-activity disturbances.
- For Component 2a, miles of habitat crossed equates to miles of access road in American pronghorn range which is related to increased risk of vehicle collision as well as potential for human-activity disturbances.
- Reductions in impact potential based on application of design features and applicant-committed environmental protection measures assumes project-related personnel compliance as well as successful reclamation of disturbed areas (Table 3-32).

The impact indicators used for this analysis are:

- Acres of permanent disturbance in pronghorn mapped range
- Acres of temporary disturbance in pronghorn mapped range
- Miles of proposed transmission line infrastructure for Components 1 and 3 (miles of habitat crossed) in pronghorn mapped range
- Miles of access roads in pronghorn mapped range

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to American pronghorn:

- AIB-11 Invasive Species (Noxious Weeds): Impacts from the spread of invasive species.
- AIB-14 Sensitive Time Periods and Habitat Fragmentation: Impacts to wildlife and plants from habitat fragmentation and disturbance during critical time periods.
- AIB-15 Wildlife Corridors: Impacts to wildlife movement corridors.

The impacts analysis for American pronghorn assumes application of design features and environmental protection measures contained in Table 3-32.

Table 3-32. Design Features and Environmental Protection Measures Applicable to Pronghorn

Relevant Design Features	Applicable EPMs
2, 3, 4, 5, 6, 8, 26	1, 3, 4, 5, 6, 13, 16

Appendix C lists design features and EPMs intended to minimize impacts from the project; Design Features 2, 3, and 6 as well as EPMs 1, 4, and 6 are intended to restrict vehicle traffic and construction activity to designated areas in order to reduce the amount of ground disturbance and traffic from the project, which would resultantly lower the risk of vehicle collisions, reduce potential for displacement of American pronghorn within their range as well as loss of available habitat and forage, and reduce the potential for spread of noxious weeds that would reduce habitat quality. Design Feature 4 and EPMs 3, 13, and 16 prescribe best practices during construction activities and siting to reduce ground disturbance which would similarly reduce habitat loss and the potential for spread of noxious weeds. Design Features 5, 8, and 26 and EPM 5 would limit ground disturbance where practicable and support the restoration of affected areas to their baseline conditions, which would reduce impacts to vegetation from project-related activities, and resultantly impacts to available forage and habitat for American pronghorn.

Impacts to American pronghorn by proposed project components are summarized in Table 3-33.

Table 3-33. Impacts from the Proposed Project Components to American Pronghorn

Project Component	Allen Flat Area			Sulphur Springs Valley			Nutt Grasslands			Las Cruces District Office Mapped American Pronghorn Range		
	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)
Component 1: Localized Route Modifications												
1. Mavericks Area	0	0	0	0	0	0	0	0	0	3	0	1
2. SunZia South Area	0	0	0	0	0	0	0	0	0	0	0	0
3. Macho Springs Area	0	0	0	0	0	0	0	0	0	9	0	3
4. Las Palomas Area	0	0	0	0	0	0	0	0	0	5	0	2
5. Highlands Area	0	0	0	0	0	0	0	0	0	6	0	2
6a. Pinal Central Area (North Route)	0	0	0	0	0	0	0	0	0	0	0	0
6b. Pinal Central Area (Steele Route)	0	0	0	0	0	0	0	0	0	0	0	0
6c. Pinal Central Area (Earley Route)	0	0	0	0	0	0	0	0	0	0	0	0
Local Alternative West Tie-in	0	0	0	0	0	0	0	0	0	0	0	0
Local Alternative Central Tie-in	0	0	0	0	0	0	0	0	0	0	0	0
Local Alternative East Tie-in	0	0	0	0	0	0	0	0	0	0	0	0

Project Component	Allen Flat Area			Sulphur Springs Valley			Nutt Grasslands			Las Cruces District Office Mapped American Pronghorn Range		
	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)
Component 2a. Access Roads												
	10	5	1	1	0	0	0	0	0	345	36	263
Component 2b. Temporary Work Areas												
	0	16	0	0	0	0	0	0	0	0	506	0
Component 3. Segment 4 Reroute Alternatives												
Alt Route 1 with Subroute 1A-1	0	0	0	0	0	0	0	0	0	91	403	395
Alt Route 1 with Subroute 1A-2	0	0	0	0	0	0	0	0	0	91	403	396
Alt Route 1 with Subroute 1A-3	0	0	0	0	0	0	0	0	0	91	403	395
Alt Route 1 with Subroute 1A-4	0	0	0	0	0	0	0	0	0	91	403	395
Local Alternative 1A-6	0	0	0	0	0	0	0	0	0	0	0	0
Local Alternative 1A-7	0	0	0	0	0	0	0	0	0	0	0	0
Alt Route 2 with Subroute 2A-1	0	0	0	0	0	0	0	0	0	65	289	267
Alt Route 2 with Subroute 2A-2	0	0	0	0	0	0	0	0	0	65	289	268

Project Component	Allen Flat Area			Sulphur Springs Valley			Nutt Grasslands			Las Cruces District Office Mapped American Pronghorn Range		
	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Habitat Crossed (miles)	Temporary Project Activities (acres)	Permanent Project Activities (acres)
Alt Route 2 with Subroute 2A-3	0	0	0	0	0	0	0	0	0	65	289	267
Alt Route 2 with Subroute 2A-4	0	0	0	0	0	0	0	0	0	65	289	267
Alt Route 3 with Subroute 3A-1	0	0	0	0	0	0	0	0	0	72	320	304
Alt Route 3 with Subroute 3A-2	0	0	0	0	0	0	0	0	0	72	320	304
Alt Route 3 with Subroute 3A-3	0	0	0	0	0	0	0	0	0	72	320	304
Alt Route 3 with Subroute 3A-4	0	0	0	0	0	0	0	0	0	72	320	303
Local Alternative 3B-1	0	0	0	0	0	0	0	0	0	5	22	18
Local Alternative 3B-2	0	0	0	0	0	0	0	0	0	5	23	20
Component 4. SunZia West Substation												
	0	0	0	0	0	0	0	0	0	0	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.26.2 Impacts Common to All Components

Ground-disturbing activities during construction that remove vegetation would reduce available habitat and forage and would be a direct impact to the species. Disturbance of grassland vegetation would indirectly affect American pronghorn populations through habitat fragmentation and could provide opportunities for colonization by noxious weed species that may alter the local plant community, and thus available forage (BLM 2013:4-92). See AIB-14 for further discussion on impacts from habitat fragmentation and AIB-11 for a discussion on impacts from the project associated with the spread of invasive species. In contrast, maintenance of vegetation within the transmission line corridor could be beneficial to resident pronghorn populations by maintaining habitat connectivity along the route of the transmission line (BLM 2013:4-97). Construction and operations activities, specifically increased vehicular and equipment traffic on new and existing access roads, have the potential to increase the risk of vehicular collisions while noise and other human-activity disturbances associated with project-related activities could reduce survivorship for American pronghorn by causing displacement from suitable habitat or increased stress levels for the duration of the activity, including disturbance of animals during sensitive seasons (BLM 2013:4-92). See AIB-14 for further discussion on impacts from disturbance during critical time periods. For further discussion on impacts to pronghorn habitat from project disturbance in migratory corridors and within seasonal ranges, see AIB-15.

3.3.26.3 Impacts of Localized Route Modifications

There would be no impacts to American pronghorn from the localized route modifications within the Sulphur Springs Valley, Allen Flat area, or the Nutt Grasslands. Four of the localized route modifications occur within BLM mapped pronghorn range in New Mexico. Both temporary and permanent project activities and associated disturbance for each localized route modification in New Mexico are less than 1% of the respective analysis areas. Other potential impacts to American pronghorn from the project include increased risk of predation on American pronghorn from installation of transmission line structures (BLM 2013:4-92), because the installation of transmission line structures could provide new hunting or nesting perches for golden eagles (*Aquila chrysaetos*) that may prey on pronghorn fawns.

3.3.26.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs outside of the granted right-of-way overlap with mapped pronghorn range as well, which would increase the risk of vehicle collision for pronghorn (Component 2a specifically) as well as the potential for displacement from suitable habitat due to human activity disturbances. There would be no disturbance to American pronghorn from Component 2 within the Nutt Grasslands and the Sulphur Springs Valley and minimal disturbance within the Allen Flat area (16 acres of temporary project activities under Component 2b and 6 acres of permanent and temporary project activities under Component 2a). Within BLM mapped pronghorn range in New Mexico as well as the Allen Flat area, both temporary and permanent project activities and associated surface disturbance for access roads and TWAs are less than 1% of the respective analysis areas (see Table 3-33).

3.3.26.5 Impacts of Segment 4 Reroute Alternatives

There would be no impacts to American pronghorn in the Sulphur Springs Valley, Allen Flat area, or Nutt Grasslands from any of the alternatives associated with the Segment 4 reroute. However, all three alternatives and associated subroutes for the Segment 4 reroute do intersect mapped pronghorn range in New Mexico more generally. Impacts would be similar to those discussed above, namely there would be increased risk for direct mortality from vehicle collision as well as potential for avoidance within mapped range due to project disturbance, removal of available habitat and forage during construction, reductions in habitat quality due to the potential spread of noxious weeds, and potential for predation of pronghorn young from the installation of transmission line towers. Temporary and permanent project activities and miles of new transmission line within American pronghorn habitat are broken out by alternative and subroutes in Table 3-33.

IMPACTS OF ALTERNATIVE ROUTE 1

Subroutes associated with Alternative Route 1 would have the greatest permanent project activities and the most miles of new transmission line. Both temporary and permanent project activities and associated surface disturbance acreages for the Alternative Route 1 subroutes within mapped pronghorn range in New Mexico generally are less than 1% of the respective analysis areas for each subroute (see Table 3-33).

IMPACTS OF ALTERNATIVE ROUTE 2

Subroutes associated with Alternative Route 2 would have the least permanent project activities and the fewest miles of new transmission line. Both temporary and permanent project activities and the associated surface disturbance acreages for the Alternative Route 2 subroutes within mapped pronghorn range in New Mexico generally are less than 1% of the respective analysis areas for each subroute (see Table 3-33).

IMPACTS OF ALTERNATIVE ROUTE 3

Both temporary and permanent project activities and associated surface disturbance for the Alternative Route 3 subroutes within mapped pronghorn range in New Mexico generally are less than 1% of the respective analysis areas for each subroute (see Table 3-33).

3.3.26.6 Impacts of SunZia West Substation

There would be no impacts to American pronghorn associated with the SunZia West Substation as it is outside mapped pronghorn range (AZGFD 2021b).

3.3.26.7 No Action Alternative

Generally, impacts from the no action alternative on American pronghorn would be similar to those described for the proposed action. These include habitat fragmentation, disturbance of grassland vegetation and potential spread of noxious weeds, disturbance of animals during fawning season and potential for increased predation on pronghorn fawns, and recreational traffic and construction or maintenance activities that could potentially disturb pronghorns (BLM 2013:4-92, 4-111).

3.3.26.8 Summary of Impacts

Impacts to American pronghorn from the proposed action would be most pronounced within pronghorn habitat in New Mexico, specifically within areas associated with Components 2 and 3. More specifically, subroutes associated with Alternative Route 1 of Component 3 and access roads and TWAs associated with Component 2 would have the largest impact to American pronghorn habitat in terms of acres of disturbance and miles of habitat crossed. Accordingly, these components and alternatives would have the most impact from noise and human activity disturbance, removal or reduction in quality of available habitat and forage, as well as vulnerability of pronghorn young from the installation of new transmission line structures (see Table 3-33). There would be very minimal disturbance within the Sulphur Springs

Valley and Allen Flat area of Arizona as well as the Nutt Grasslands of New Mexico, with any disturbance associated with Component 2. Considering that construction activities are temporary, operational activities being limited over the life of the project coupled with the potential for habituation of American pronghorn to long-term operational activities, and the consideration that there is suitable habitat adjacent to the proposed project components, it is not likely that American pronghorn populations in the area of the proposed action would lose viability. Individuals would be at increased risk for vehicle collision and reductions in survivorship due to displacement, but these events would be stochastic in nature and not likely to affect populations of American pronghorn. Impacts to American pronghorn from both the proposed action and the no action alternative would likely be most acute in the Sulphur Springs Valley, Allen Flat area, and Nutt Grasslands where pronghorn populations are small and isolated and habitat loss is amplified; however, the proposed action would create very minimal disturbance in these areas (with any disturbance primarily associated with access roads and TWAs). In contrast, the no action alternative crosses directly through the Allen Flat area and crosses a large, relatively unfragmented area of semidesert grassland in the northern Sulphur Springs Valley (BLM 2013:4-110, 4-111). In New Mexico more generally, the no action alternative crosses through mapped American pronghorn range similarly to the proposed action but over longer distances, as the no action alternative requires more miles of new transmission line than the proposed action.

Cumulative impacts to biological resources, including American pronghorn, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact pronghorn by creating noise and human-activity disturbances and by removing available habitat and forage from the landscape. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to pronghorn may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, and wind farms. Construction noise and human-activity disturbances are temporary and would end upon completion of project construction. Where project infrastructure is permanent, available forage and habitat would be removed from the landscape. Operation and maintenance of the transmission lines and renewable energy projects could generate periodic noise and human-activity disturbances; however, these would dissipate with increasing distance from the project boundary and would be stochastic in nature. Therefore, any adverse impacts from noise and human-activity disturbances likely would be infrequent and of short duration while impacts from the removal of available forage and habitat from infrastructure siting would be long term and adverse.

AIB-14 Sensitive Time Periods and Habitat Fragmentation

Would the reduction of habitat related to the proposed project components contribute to conditions of habitat fragmentation and/or disturbance during critical periods for wildlife species, including but not limited to raptors, migratory birds, big game, small mammals, and rare plants?

3.3.27 Affected Environment

The proposed project includes habitat for a wide variety of plant and animal species. It includes parts of the Pacific and Central Flyways for migratory birds, and provides important habitat for large mammals, including American pronghorn, bighorn sheep, mule deer (*Odocoileus hemionus*), mountain lion (*Felis concolor*), Mexican gray wolf (*Canis lupus baileyi*), and black bear (*Ursus americanus*); small mammal species such as Gunnison's prairie dog (*Cynomys gunnisoni*) and least shrew (*Cryptotis parvus*); as well as numerous rodent, avian, and aquatic species (AZGFD 2012; NMDGF 2016a).

Inherent to areas of rich biodiversity, there are times of the year in which species have increased sensitivity to the effects of human-caused disturbance, hereby referred to as "sensitive time periods" for the purposes of this analysis. These sensitive time periods include those that are part of reproductive processes including nesting, mating, flowering, pollination, incubation, gestation, and the early life stages of offspring. For plant species, sensitive time periods include the primary growth season and flowering period(s). Representative sensitive time periods for species habitat present within the proposed project area are included in Table 3-34. Species may be affected during their individual sensitive time periods depending on the timing of construction of individual project components.

Disturbance within otherwise natural areas has the potential to affect the present wildlife and plant species regardless of the time of year. However, disturbance within sensitive time periods has the potential to amplify adverse impacts by not only affecting individuals, but also resulting in increased risk of successional effects on populations and habitat. Successional effects are those which occur at a larger spatial or temporal scale than those immediate to post disturbance; they relate to long-term changes in the ecological trajectory of an ecosystem in addition to more immediate changes following disturbance (McKelvey 2015). Similar to the successional stages of revegetation of plant communities following disturbance, successional impacts encompass the shifts, gradual process of change, and eventual reestablishment and balance within the present ecosystem. Successional impacts are particularly important to consider in the context of disturbance that is expected to have long-term, unpredictable, and complex effects. They also vary depending on species and habitat present, and are population specific depending on present conditions and effects of other environmental processes such as climate trends (McKelvey 2015). Successional impacts may include changes in community composition, nutrient availability, habitat suitability, as well as intra-specific and inter-specific interaction and competition of species.

In addition to sensitive time periods and successional effects, present flora and fauna species habitat is also subject to increased habitat fragmentation as a result of the proposed project. For the purposes of this analysis, habitat fragmentation is defined as “the process during which ‘a large expanse of habitat is transformed into a number of smaller patches of smaller total area, isolated from each other by a matrix of habitat unlike the original’ (Wilcove et al. 1986)” (Fahrig 2003:490). Fragmentation can occur as a result of both physical disturbance of habitat (habitat loss) and as a result of behavioral avoidance of anthropogenic disturbance. The impacts of habitat fragmentation are thought to result in complex effects on species diversity and distribution across a landscape. Impacts to individual species and ecosystem processes depends on an array of factors including present species richness and ecosystem dynamics.

3.3.27.1 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for present wildlife and plant species by increasing habitat fragmentation at the landscape level as well as by resulting in impacts during species sensitive time periods. These include existing and planned transmission line projects including, but not limited to, the constructed Western Spirit 345-kV transmission line and the Southline Transmission Line project as well as other activities disclosed in the Reasonably Foreseeable Future Environmental Trends and Planned Actions Technical Report (SWCA 2021).

Table 3-34. Representative Sensitive Time Periods for Wildlife and Plant Species within the Analysis Area

Species of Concern	Description of Sensitive Time Period	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Bald eagle	Breeding season												
Golden eagle	Breeding season												
Migratory birds	Breeding season												
Burrowing owls	Breeding season												
Southwestern flycatcher and yellow--billed cuckoo													
Bighorn sheep	Breeding												
	Calving												
Pronghorn	Breeding												
	Calving												
Mexican gray wolf	Breeding and pup rearing												
Flowering plants	Primary flowering and growing season												

Note: Months designated gray acknowledge marginal seasons which may be utilized by species of concern dependent on various environmental conditions including seasonal patterns.

3.3.28 Environmental Consequences

3.3.28.1 Methods and Assumptions

The impact indicators used for this analysis are:

- Surface disturbance within otherwise undisturbed species habitat.
- Timing of construction and operation activities.
- Distance to species habitat.

The following analyses are incorporated by reference as they relate to the analysis used to inform impacts to sensitive time periods and habitat fragmentation:

- AIB-12 Desert Bighorn Sheep Habitat: Impacts to Desert Bighorn Sheep
- AIB-13 Grasslands and Pronghorn Habitat: Impacts to Grasslands and Pronghorn
- AIB-16 Sandhill Crane Habitat
- AID-3 Avian Collisions: Collision risk for avian species.
- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species.
- AID-6 New Mexico Meadow Jumping Mouse: Impacts to New Mexico Meadow Jumping Mouse
- AID-7 BLM Sensitive Wildlife Species: Impacts to BLM sensitive wildlife species
- AID-8 Federally Listed Plant Species: Impacts to federally listed plant species

The impacts analysis for the sensitive time periods and habitat fragmentation assumes application of the design features and environmental protection measures contained in Table 3-35. Full design features and EPMs are provided in Appendix C.

Table 3-35. Design Features and Environmental Protection Measures Applicable to Sensitive Time Periods and Habitat Fragmentation

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 7, 8, 12, 18, 19, 21, 25, 26	1, 2, 3, 4, 5, 8, 12, 13, 14, 15

3.3.28.2 Impacts Common to All Components

Specific to the proposed project components, impact-causing elements from project Components 1, 2, and 3 include vegetation removal and ground surface disturbance, excavation and grading, overland travel of construction and operating equipment, increased vehicle traffic along access roads, use of ground-based and aerial construction equipment, presence of personnel, generation of noise during construction and operation, blasting, and vegetation maintenance within the right-of way. Disturbance within wildlife habitat has the potential to cause behavioral changes in wildlife including avoidance of or displacement from areas with increased noise, vibrations/ground disturbance, visual impacts, as well as additional edge effects (POWER Engineers, Inc. 2021g). Such avoidance or displacement has the potential to result in nest or den abandonment or general movement out of previously established territories. If behavioral changes occur during sensitive time periods, proposed activities may result in reduced reproduction success and/or avoidance of suitable foraging areas. Additionally, habitat fragmentation has the potential to introduce additional impacts related to edge effects including but not limited to variation in interspecific species interactions, breaks in habitat continuity, and changes to rate of genetic exchange and reproductive success (POWER Engineers, Inc. 2021g). For plant species, primary growth and flowering periods are also vulnerable as surface-disturbing activities can result in direct mortality, reduction of seed banks, and loss of seed-producing individuals (see Table 3-34). As depicted in Table 3-34 above, each month of the year includes a sensitive time period for at least one of the representative species or species groups. However, the majority of sensitive time periods occur between July and August when many species are breeding and rearing young (see AIB-14). With respect to the species analyzed, construction during any time of year has the potential to impact wildlife during a sensitive time period. However, if construction were to occur over the winter months (November–January), it is likely that fewer species would be subject to impacts during known critical time periods.

The proposed project components would also result in increased habitat fragmentation, especially within areas which contain little to no existing anthropogenic surface disturbance. In these areas, various wildlife species may avoid new visual, sound, and activity-related disturbances associated with the impact-causing elements described above. Project disturbance would result in decreased patch size of areas which meet species requirements, changes to movement within territories or other behavioral patterns, as well as changes in inter-species relationships and competitive community structures (Rybicki et al. 2020).

Project Components 1 and 3 would result in short-term impacts of noise and increased activity during the construction phase as well as intermittent impacts during operational activities. Following construction, the transmission line structures would generally allow for large mammal and general wildlife passage underneath the route between otherwise suitable patches of habitat distributed across the analysis area.

3.3.28.3 Impacts of Localized Route Modifications

Localized route modifications are expected to result in short-term adverse impacts to habitat connectivity due to noise and increased activity during the construction phase as well as intermittent impacts during operational activities.

3.3.28.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs are expected to result in increased long-term surface disturbance for the construction and maintenance of access roads. Access road routes are expected to result in increased fragmentation of habitat for small mammal and insect species and other species with limited or small territory size. Long-term increased habitat fragmentation and reduced patch size of suitable grazing areas for big game species would occur as a result of access roads and locations of project infrastructure where interim revegetation does not occur. These effects may also result in successional impacts to availability and distribution of prey for both mammal and avian predatory species, dependent on the present ecosystem dynamics across the project area. Avian species may be affected by increased collision risk (see AID-3) and avoidance of fringe habitat for nesting purposes; however the proposed project is not expected to impede general movement and flight patterns.

3.3.28.5 Impacts of Segment 4 Reroute Alternatives

Segment 4 Reroute Alternatives have the potential to increase habitat fragmentation, especially within areas which contain little to no existing anthropogenic surface disturbance, which may result in wildlife avoiding these areas.

3.3.28.6 Impacts of SunZia West Substation

Due to the level of existing surface disturbance and urban environment of the SunZia West Substation, this component is unlikely to contribute to additional habitat fragmentation or impacts to species during sensitive time periods.

3.3.28.7 No Action Alternative

Under the no action alternative, the project would also result in impacts to species during sensitive time periods, dependent on the time of construction and maintenance activities. Additionally, the route of the no action alternative would also result in increased habitat fragmentation proportional to the amount of surface disturbance proposed. The proposed project components are expected to result in similar impacts, compared with the no action alternative.

3.3.28.8 Summary of Impacts

Project design features and EPMs as well as the Avian Protection Plan (APP) would be applied to the selected alternative to reduce impacts to present wildlife and vegetation species. Project design features and EPMs which reduce surface disturbance and avoid sensitive time periods would reduce the severity of impacts related to behavioral changes and increased fragmentation resulting from habitat loss. The established APP also includes procedures for nest management, operations and maintenance procedures during avian breeding seasons, mortality reduction measures, a suite of adaptive measures (such as the use of line marking devices) that may be implemented if problem areas of the line are identified, as well as procedures for monitoring and reporting avian incidents.

Incremental impacts from the proposed project activities could adversely impact species within time periods of increased sensitivity as well as contribute to landscape-level fragmentation. Impacts to wildlife during sensitive time periods and habitat fragmentation from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to wildlife and increased fragmentation may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines and maintenance of existing transportation infrastructure within the analysis area. The cumulative impacts to wildlife and increased habitat fragmentation would be long term and adverse.

AIB-15 Wildlife Corridors

Would the disturbance associated with the proposed project components reduce access or create non-physical barriers to known wildlife corridors that would result in reduction of habitat utilization?

3.3.29 Affected Environment

Wildlife routinely use wildlife corridors to travel through their habitat, and include corridors used by migrating wildlife (NMSA Chapter 97 Section 2(A)). Specific to the proposed project, three potential wildlife corridors in New Mexico would be crossed by project Components 2 and 3, as identified by the BLM and USFWS: Abó Canyon in Socorro, Valencia, and Torrance Counties; the Sevilleta NWR in Socorro County; and the Desert Bighorn Sheep travel corridor in Socorro County. Together, these areas comprise the analysis area for this issue statement. These wildlife corridors provide travel routes for several wildlife species, including but not limited to, American pronghorn, bighorn sheep, mule deer, mountain lion, and black bear.

Abó Canyon forms a pass between the Manzano Mountains to the north and Los Pinos Mountains to the south in central New Mexico. The canyon provides wildlife connectivity from the mountains on the east side of the Rio Grande to the Sevilleta NWR and the Ladron Mountain-Devil's Backbone Complex ACEC on the west side of the Rio Grande. Abo Canyon Arroyo is an incised ephemeral drainage, dominated by saltcedar (*Tamarix* sp.) in the arroyo, and one-seed juniper (*Juniperus monosperma*) in the upland areas (Hall et al. 2009).

Sevilleta NWR offers a diverse assortment of wildlife species habitat due to its unique intersection of the Colorado Plateau Shrub Steppe, Great Plains Short Grass Prairie, the Chihuahuan Desert, and the Pinyon-Juniper Woodland biomes (USFWS 2000a). The various habitats on the Refuge are known to support 89 species of mammals, 225 species of birds, 58 species of reptiles, and 15 species of amphibians. Resident wildlife, many of which are commonly seen on the Refuge, includes desert bighorn sheep, pronghorn, mule deer, mountain lion, and black bear (USFWS 2000a). Per the Sevilleta NWR CCP, one of the USFWS's management objectives for the Refuge is to protect, restore, and maintain upland terrestrial communities at the landscape level within the upper/Middle Rio Grande ecosystem to avoid fragmentation, degradation, and loss of terrestrial habitats (USFWS 2000a:36).

The BLM Socorro Field Office RMP established the Desert Bighorn Sheep travel corridor between Ladron Mountain (north end of the corridor) and the Devil's Backbone Mountains (on the south end of the corridor) to reduce impacts to bighorn habitat resulting from access and surface disturbance (BLM 2010:48). The travel corridor encompasses portions of the north, west, and southwest boundaries of the Sevilleta NWR on the west side of the Rio Grande. The Desert Bighorn Sheep travel corridor is designated as an avoidance area for rights-of-way and leases (BLM 2010:53).

3.3.29.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Existing transportation and transmission infrastructure within Abo Canyon includes the double-tracked BNSF Railroad, New Mexico State Highway 60, distribution power lines, and the constructed Western Spirit 345-kV Transmission Line Project (SWCA 2021).

3.3.30 Environmental Consequences

3.3.30.1 Methods and Assumptions

The following assumptions were used to analyze impacts to wildlife corridors:

- Abó Canyon in Socorro, Valencia, and Torrance Counties, the Sevilleta NWR in Socorro County, and the Desert Bighorn Sheep travel corridor in Socorro County comprise the wildlife corridors crossed by the proposed project.
- Although there is existing linear infrastructure within the wildlife corridors crossed by the proposed project, this analysis focuses on the incremental impacts to these wildlife corridors by the proposed project.

The impact indicator used for this analysis is:

- Miles of transmission line route and associated infrastructure and related surface disturbance (vegetation/forage removal).

The following analyses are incorporated by reference as they relate to the analysis used to inform impacts to wildlife corridors:

- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species
- AIB-8 Native Vegetation
- AIB-12 Desert Bighorn Sheep: Impacts to desert bighorn sheep
- AIB-13 Grasslands and Pronghorn Habitat: Impacts to Pronghorn
- AIB-14 Sensitive Time Periods and Habitat Fragmentation

The impacts analysis for wildlife corridors assumes application of the design features and environmental protection measures contained in Table 3-36. Full design features and EPMs are provided in Appendix C.

Table 3-36. Design Features and Environmental Protection Measures Applicable to Wildlife Corridors

Relevant Design Features	Applicable EPMs
2, 3, 5, 6, 7, 9, 23, 29	1, 2, 3, 4, 5, 6, 12, 14, 15

3.3.30.2 Impacts of Localized Route Modifications

There would be no impacts to wildlife corridors from the proposed localized route modifications.

3.3.30.3 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Impact-causing elements from proposed project Component 2 include vegetation removal and ground surface disturbance, excavation and grading, overland travel for construction and operation, use of ground-based and aerial construction equipment, presence of personnel, generation of noise during construction and operation, blasting, and routine vegetation maintenance within the right-of-way. Construction-related adverse impacts to wildlife corridors would include:

- incremental loss of vegetation, reduction of forage, and other habitat components within the wildlife corridors associated with the temporary and permanent project components footprints;
- incremental increase of noxious and invasive weeds caused by vegetation removal over the long term (Gelbard and Belknap 2003);
- wildlife avoidance and displacement from otherwise suitable wildlife corridor habitat during project construction (short term) and operation (long term and infrequent) (Manitoba Hydro 2010); and
- potential for increased wildlife mortalities resulting from vehicle collisions with construction vehicles or equipment (long term and infrequent).

Proposed project Component 2 would overlap with 34 acres of the Desert Bighorn Sheep travel corridor, thereby resulting in adverse impacts to wildlife migration in this location.

3.3.30.4 Impacts of Segment 4 Reroute Alternatives

The impacts from proposed project Component 3, the Segment 4 reroutes, would result in the same impacts as described above for proposed project Component 2. Alternative Route 3 subroutes would overlap with approximately 26 acres of the Desert Bighorn Sheep travel corridor, and Alternative Routes 1, 2, and 3 would all overlap with approximately 100 acres of the Abo Canyon area. Therefore, proposed project Component 3 would overlap with up to 126 acres of wildlife corridors, resulting in an adverse effect on wildlife migration in these areas.

3.3.30.5 Impacts of SunZia West Substation

There would be no impacts to wildlife corridors from the proposed SunZia West Substation because no wildlife corridors have been identified the vicinity of the substation.

3.3.30.6 No Action Alternative

Under the no action alternative, the project would cross the southern portion of the Desert Bighorn Sheep travel corridor between Polvadera Mountain and Socorro Peak (BLM 2013:4-101). In this area, the impacts to desert bighorn sheep populations would be similar to the project Components 2 and 3 discussed above, including loss of foraging habitat and disturbance during sensitive seasons (BLM 2013:4-355).

3.3.30.7 Summary of Impacts

Proposed project Components 2 and 3 (combined) would result in approximately 134 acres of new, permanent access roads and transmission line infrastructure within the wildlife corridor analysis area. The no action alternative would also cross the Desert Bighorn Sheep travel corridor (see also AIB-12 Desert Bighorn Sheep Habitat).

Incremental impacts from the proposed project components could adversely impact up to 134 acres of wildlife corridors. Impacts to wildlife corridors from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to wildlife corridors may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines and maintenance of existing transportation infrastructure within the analysis area. The cumulative impacts to migrating wildlife using these corridors would be long term and adverse.

AIB-16 Sandhill Crane Habitat

Would the proposed project components reduce the quantity or quality of sandhill crane (*Grus canadensis*) roosting and foraging areas in the Sulphur Springs Valley, Lordsburg Playa, and along the Rio Grande?

3.3.31 Affected Environment

Sandhill cranes are not considered a special-status species by the USFWS nor the BLM, but the Rocky Mountain population of sandhill cranes is considered a Bird of Conservation Concern by the USFWS (2011). This species winters in the southern United States, including in southeastern Arizona and southern New Mexico (Audubon 2022). Roosting and feeding usually occur in open areas. Sandhill cranes typically roost while standing in shallow water; river sandbars or open, dry playas may also be used.

Sandhill cranes rely heavily on agricultural grain crops for feeding; however, open desert and fallow fields are also used (AZGFD 2021c).

In Arizona, most sandhill cranes (more than 20,000) winter within the Sulphur Springs Valley of Cochise County (AZGFD 2021c). Aside from agriculture, existing disturbances within this portion of the analysis area include an interstate highway, a U.S. highway, other roads, residential and commercial development (including an airport), and associated infrastructure.

The Middle Rio Grande Valley, in New Mexico, provides wintering habitat for approximately 80% of the Rocky Mountain sandhill crane population (Pacific Flyway Council and Central Flyway Council 2016, as cited in POWER Engineers, Inc. 2021g). Within this portion of the analysis area, existing disturbances include highways, roads, bridges, power lines/transmission lines, and residential and commercial development.

The analysis area includes locations where the proposed project would be within proximity to sandhill crane foraging or roosting habitat. An 8-mile-wide corridor around the proposed project components was used to define the outer boundaries of the analysis area (POWER Engineers, Inc. 2021g). Specifically related to this issue statement, the following locations within the analysis area were identified as relevant to sandhill crane roosting and foraging:

1. Component 2 (Access Roads and Temporary Work Areas):
    - Sulphur Springs Valley
    - Rio Grande Corridor
    - Lordsburg Playa
2. Component 3 (Segment 4 Reroute Alternatives): Rio Grande Corridor

3.3.31.1 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for sandhill crane. These include approved and planned transmission line projects including the constructed Western Spirit 345-kV transmission line and the Southline Transmission Line project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trends could reduce the quality and quantity of habitat for this species through the varying annual precipitation and potential reduction of suitable habitat.

3.3.32 Environmental Consequences

3.3.32.1 Methods and Assumptions

The following impact indicators are considered factors which may contribute to loss or degradation of sandhill crane habitat:

- Amount of permanent and temporary project activities resulting in surface disturbance within sandhill crane suitable habitat in proximity to the Sulphur Springs Valley, Lordsburg Playa, and Rio Grande.
- Degradation of terrestrial habitat due to increased vehicular traffic and human activity.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to the sandhill crane:

- AID-3 Avian Collisions: Collision risk for avian species.

The impacts analysis for the sandhill crane assumes application of the design features and environmental protection measures contained in Table 3-37. Full design features and EPMs are provided in Appendix C.

Table 3-37. Design Features and Environmental Protection Measures Applicable to Sandhill Crane Habitat

Relevant Design Features	Applicable EPMs
15	2, 3, 4, 5, 6, 7, 8, 12, 13, 16

3.3.32.2 Impacts Common to All Components

The quality and quantity of sandhill crane roosting and foraging habitat would be impacted by the proposed project components during construction and operation phases within areas of both permanent and temporary project activities. These effects would include long-term, direct habitat destruction and alteration, as well as disturbances associated with human presence and noise/vibration (POWER Engineers, Inc. 2021g). Table 3-38 quantifies the impacts to sandhill crane habitat from the proposed project components.

Although Lordsburg Playa does fall within the analysis area, all features associated with the proposed project would be located at least 2 miles from the playa. No impacts are expected to sandhill crane habitat within this portion of the analysis area.

Table 3-38. Sandhill Crane Foraging and Roosting Habitat within the Analysis Area per Project Component

Project Component	Linear Passage (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Total Disturbance (acres)
Component 1: Localized Route Modifications					
1. Mavericks Area	0.0	0.0	0.0	0.0	**0.0**
2. SunZia South Area	0.0	0.0	0.0	0.0	**0.0**
3. Macho Springs Area	0.0	0.0	0.0	0.0	**0.0**
4. Las Palomas Area	0.0	0.0	0.0	0.0	**0.0**
5. Highlands Area	0.0	0.0	0.0	0.0	**0.0**
6a. Pinal Central Area-North Route	0.0	0.0	0.0	0.0	**0.0**
6b. Pinal Central Area-Steele Route	0.0	0.0	0.0	0.0	**0.0**
6c. Pinal Central Area-Earley Route	0.0	0.0	0.0	0.0	**0.0**
Local Alternative East Tie-In	0.0	0.0	0.0	0.0	**0.0**

Project Component	Linear Passage (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Total Disturbance (acres)
Local Alternative Central Tie-In	0.0	0.0	0.0	0.0	**0.0**
Local Alternative West Tie-In	0.0	0.0	0.0	0.0	**0.0**
Component 2a. Access Roads	1.0	0.0	0.0	6,484.0	**0.0**
Component 2b. Temporary Work Areas			0.0	5,263.1	**0.0**
Component 3. Segment 4 Reroute Alternatives					
Alt Route 1 with Subroute 1A-1	1.1	4.3	4.8	5,884.0	**9.2**
Alt Route 1 with Subroute 1A-2	1.0	4.4	4.6	6,220.7	**8.9**
Alt Route 1 with Subroute 1A-3	1.0	4.3	4.5	5646.0	**8.9**
Alt Route 1 with Subroute 1A-4	1.1	4.3	4.8	5,884.0	**9.2**
Local Alternative 1A-6	0.0	0.0	0.0	--	**0.0**
Local Alternative 1A-7	0.0	0.0	0.0	--	**0.0**
Alt Route 2 with Subroute 2A-1	1.1	4.1	4.8	10,122.6	**8.9**
Alt Route 2 with Subroute 2A-2	1.0	4.1	4.6	8,437.0	**8.7**
Alt Route 2 with Subroute 2A-3	1.0	4.1	4.5	5,646.0	**8.6**
Alt Route 2 with Subroute 2A-4	1.1	4.1	4.8	10,122.6	**8.9**
Alt Route 3 with Subroute 3A-1	1.1	4.2	4.8	25,782.5	**9.0**
Alt Route 3 with Subroute 3A-2	1.0	4.2	4.6	24,096.9	**8.8**
Alt Route 3 with Subroute 3A-3	1.0	4.2	4.5	21,095.1	**8.7**
Alt Route 3 with Subroute 3A-4	1.1	4.2	4.8	25,782.5	**9.0**
Local Alternative 3B-1	0.0	0.0	0.0	--	**0.0**
Local Alternative 3B-2	0.0	0.0	0.0	--	**0.0**
Component 4. SunZia West Substation	1.0	4.4	4.6	6,220.7	**8.9**

Note: Local Alternatives are exchangeable within their associated alternative route. Totals may not sum exactly due to rounding.

3.3.32.3 Impacts of Localized Route Modifications

No impacts are expected to sandhill crane habitat within Component 1 localized route modifications as these areas are outside of suitable habitat for the species.

3.3.32.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Within the Sulphur Springs Valley, approximately 0.7 mile of existing roads (in the vicinity of the Cochise County Airport) would be used as part of Component 2 of the proposed project. During the construction phase of the project, impacts within the Sulphur Springs Valley would include increased noise disturbances and potentially fugitive dust resulting from increased vehicle traffic. After construction, vehicle traffic associated with intermittent maintenance activities would occur throughout the life of the project. EPM 12 (modification or discontinuation of right-of-way activities during sensitive periods for sensitive wildlife species) could potentially be used to mitigate impacts to sandhill cranes.

Within the Rio Grande Corridor portion of the analysis area, approximately 0.3 mile of existing road would be used as part of Component 2. Construction and operations impacts and mitigation would be similar to that described for Component 2 within the Sulphur Springs Valley.

3.3.32.5 Impacts of Segment 4 Reroute Alternatives

Features associated with Component 3 (Segment 4 transmission line reroute) would travel through 1.0 to 1.1 mile of sandhill crane foraging and roosting habitat within the Rio Grande Corridor (exact length is dependent upon alternative; see Table 3-38 for details). Construction impacts would include habitat removal associated with the development of the transmission line and associated roads, structures, and facilities; approximately 1.0 to 1.1 acres (dependent upon alternative) would be disturbed during construction. This surface disturbance would impact less than 1% of available habitat. Additional construction impacts would include vegetation disturbance from overland travel; noise disturbances and vibrations resulting from construction equipment, vehicle traffic, and blasting; and fugitive dust associated with construction equipment, vehicle traffic, blading/excavation, blasting, and concrete batch activities.

After construction, the presence of permanent structures, roads, and facilities would result in permanent habitat removal (4.1 to 4.4 acres, dependent upon alternative). Periodic maintenance and inspection activities would result in vegetation disturbances as vehicles travel overland. Noise and vibration disturbances would result from operation equipment and repair/maintenance activities. Fugitive dust would be generated by intermittent operation and maintenance activities (including use of access roads, grading/excavation, and use of other operation equipment).

Where the transmission line crosses the Rio Grande, Segment 4 would pose an ongoing collision hazard for sandhill cranes (see AID-3 Avian Collisions).

Environmental protection measures that would mitigate impacts include EPM 2 (placement of new access roads), EPM 3 (use of overland access), EPM 4 (closure of access roads not needed for ongoing maintenance), EPM 5 (project reclamation plan), EPM 6 (blocking of access roads in sensitive areas), EPM 7 (modified tower design or alternate tower type), EPM 8 (spanning of sensitive features), EPM 12 (modification or discontinuation of right-of-way activities during sensitive periods for sensitive wildlife species), EPM 13 (helicopter placement of structures), and EPM 16 (separation between transmission line and existing infrastructure).

IMPACTS OF ALTERNATIVE ROUTE 1

Within the Rio Grande Corridor, Alternative Route 1 route(s) would result in up to 4.8 acres of permanent and up to 4.4 acres of temporary project activities within sandhill crane habitat (see Table 3-38). Both local alternatives (1A-6 and 1A-7) within Alternative Route 1 are outside of suitable habitat for this species.

IMPACTS OF ALTERNATIVE ROUTE 2

Within the Rio Grande Corridor, Alternative Route 2 would result in up to 4.8 acres of permanent and up to 4.1 acres of temporary project activities within sandhill crane habitat (see Table 3-38).

IMPACTS OF ALTERNATIVE ROUTE 3

Within the Rio Grande Corridor, Alternative Route 3 subroutes would result in up to 4.8 acres of permanent and up to 4.2 acres of temporary project activities within sandhill crane habitat (see Table 3-38). Both local alternatives (3B-1 and 3B-2) within Alternative Route 3 are outside of suitable habitat for this species.

3.3.32.6 Impacts of SunZia West Substation

There would be no impacts to sandhill crane habitat associated with the SunZia West Substation within Sulphur Springs Valley, Lordsburg Playa, or Rio Grande Corridor.

3.3.32.7 No Action Alternative

Under the no action alternative, there would be no impacts to sandhill crane habitat within the Sulphur Springs Valley or Lordsburg Playa (BLM 2013). The 2015 Selected Route would travel through potential sandhill crane habitat within the Rio Grande Corridor. In this portion of the analysis area, the no action alternative would result in direct habitat disturbances similar to that described for the proposed project.

3.3.32.8 Summary of Impacts

Project Design Feature 15, and EPMs 2, 3, 4, 5, 6, 7, 8, 12, 13, and 16 as well as the APP, would be applied to the selected alternative to reduce impacts to present wildlife and vegetation species.
The established APP also includes procedures for nest management, operations and maintenance procedures during avian breeding seasons, mortality reduction measures, and a suite of adaptive measures (such as the use of line marking devices) that may be implemented if problem areas of the line are identified, as well as procedures for monitoring and reporting avian incidents.

Cumulative impacts to biological resources, including sandhill crane habitat, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components include the loss or alteration of up to 18.1 acres of foraging and roosting habitat for sandhill cranes due to surface disturbance. Habitat loss and alteration would be similar to that resulting from the implementation of other planning and approved transmission lines, such as the Western Spirit 345-kV transmission line and the Southline Transmission Line project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trends could reduce the quality and quantity of habitat for this species through varying annual precipitation and potential reduction of suitable habitat. Impacts from the proposed project and other transmission lines include loss of habitat, habitat alteration, increased noise disturbance and fugitive dust from increased vehicle traffic during construction, and an increase in potential collision hazards.

AIB-17 Sonoran Desert Tortoise Habitat

Would the roads and power lines associated with the proposed project components reduce the quantity or quality of Sonoran desert tortoise (*Gopherus morafkai*) BLM Category 3 habitat areas, compared with the no action alternative?

3.3.33 Affected Environment

The analysis area for the Sonoran desert tortoise (*Gopherus morafkai*) is a 4-mile buffer around the project components (8-mile-wide analysis area). This species is present in the Arizona portion of the analysis area, specifically around Segment 1; the New Mexico portion is outside of this species' range.

The Sonoran desert tortoise is found in the rocky foothills of the Sonoran Desert in desert scrub and semidesert grassland habitats. The Sonoran desert tortoise was placed on the list of candidate for ESA protection in 2010 (USFWS 2010a), and though listing was found to be not warranted, the species was placed back on the candidate list in 2020 as a result of a settlement to a legal challenge (USFWS 2022).

On February 8, 2022, the USFWS issued a 12-month finding on a petition to list the Sonoran desert tortoise under the ESA where the USFWS determined that listing of the tortoise was not warranted (USFWS 2022). The Sonoran desert tortoise is listed as a BLM-AZ sensitive species.

As described in the Biological Resources Report (POWER Engineers, Inc. 2021g), the BLM categorizes Sonoran desert tortoise habitat into three management categories in order to maintain viable populations. There is no Category 1 habitat within the analysis area. The only Category 2 habitat in the analysis area is in the northern Picacho Mountains, approximately 1 mile south of Segment 1. Category 3 habitat is present throughout the analysis area west of Benson, Arizona. Category 3 habitats are areas not essential to maintenance of viable populations, with stable or decreasing populations (BLM 1988).

3.3.33.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable future trends and planned actions in the project vicinity that impact Sonoran desert tortoise and its habitat include development associated with area population growth, including increased roads and traffic, residential development, and additional transmission lines (SWCA 2021).

3.3.34 Environmental Consequences

3.3.34.1 Methods and Assumptions

The following assumptions were used to analyze impacts to Sonoran desert tortoise Category 3 habitat:

- Surface-disturbing activities would reduce the quantity or quality of Sonoran desert tortoise habitat and negatively affect individual tortoises in those areas, depending on the amount of area disturbed.

The impact indicator used for this analysis is:

- Miles of permanent ground disturbance in Category 3 habitat.
- Acres of ground disturbance from permanent and temporary project activities in Category 3 habitat, compared with available habitat within the analysis area.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to Sonoran desert tortoise Category 3 habitat:

- AIB-8 Native Vegetation: Impacts to native vegetation communities.
- AIB-11 Invasive Species (Noxious Weeds): Impacts to native habitats from the spread and establishment of weeds.

The impacts analysis for the Sonoran desert tortoise Category 3 habitat assumes application of the design features and environmental protection measures contained in Table 3-39. Full design features and EPMs are provided in Appendix C.

Table 3-39. Design Features and Environmental Protection Measures Applicable to Sonoran Desert Tortoise Category 3 Habitat

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 26	2, 3, 4, 5, 6, 7, 8, 12, 13, 16

3.3.34.2 Impacts Common to All Components

Both the proposed action and no action alternative would lead to a decline in the quality and quantity of Sonoran desert tortoise Category 3 habitat due to permanent removal of habitat, temporary disturbance within habitat, and degraded habitat due to the introduction of invasive and noxious weeds. New roads and increased traffic during construction and operation may also decrease the suitability of habitat by increasing collision risk.

The no action alternative (2015 Selected Route) does not cross Category 1 or 2 desert tortoise habitat. The 2015 Selected Route crosses approximately 91.9 miles of Category 3 habitat. The proposed action also does not cross Category 1 or 2 desert tortoise habitat. Additionally, due to the distance from project components, the proposed action is not anticipated to reduce the quantity or quality of Category 2 habitat within the analysis area. Overall, less than 0.5% of Category 3 habitat available within the analysis area would be impacted temporarily or permanently. Since Category 3 habitats are not essential to maintenance of viable populations, the proposed action would not affect the Sonoran desert tortoise population.

Without mitigation, reasonably foreseeable effects on Sonoran desert tortoise could include direct mortality during ground-disturbing activities, and habitat loss. However, these impacts are anticipated to be largely avoided through application of project design features and EPMs (POWER Engineers, Inc. 2021g). Project design features would reduce the extent of habitat disturbance (Design Features 2, 3, 4, 5, and 6) and reduce the risk of the spread and establishment of noxious weeds (Design Features 1 and 26). EPMs 2, 3, 5, 7, 8, 13, and 16 also aim to minimize surface disturbance and EPMs 4 and 6 aim to reduce traffic, which could decrease collision risk.

The potential for direct mortality would also be reduced by restricting construction to periods when the Sonoran desert tortoise is typically underground (November 1 through March 1; EPM 12). Additionally, an environmental monitor would ensure the application of the *Recommended Standard Mitigation Measures for Projects in Sonoran Desert Tortoise Habitat* (Arizona Interagency Desert Tortoise Team 2008). If avoidance is not possible, Sonoran desert tortoises would be relocated in accordance with *Guidelines for Handling Sonoran Desert Tortoises Encountered on Development Projects* (AZGFD 2014). The design features and EPMs would minimize the extent and degree of residual impacts in Category 3 habitat by restoring habitat quality and restricting road access during operations.

3.3.34.3 Impacts of Localized Route Modifications

Localized route modifications would have no impacts to Category 3 habitat.

3.3.34.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Component 2 access roads cross 46.8 miles (67.7 acres permanent; 2.7 acres temporary project activities) of Category 3 habitat, and temporary work areas contain 66.0 acres of Category 3 habitat. This is less than 0.1% of available Category 3 habitat in the analysis area. Long-term impacts in these areas would reduce the quantity and quality of Sonoran desert tortoise habitat. Impacts would be similar, compared with the existing POD.

3.3.34.5 Impacts of Segment 4 Reroute Alternatives

Segment 4 reroutes would have no impacts to Category 3 habitat.

3.3.34.6 Impacts of SunZia West Substation

The SunZia West Substation would permanently impact 80.3 acres of Category 3 habitat (26.0 acres permanent and 54.3 acres temporary project activities).

3.3.34.7 Summary of Impacts

Impacts to Sonoran desert tortoise Category 3 habitat would occur due to Component 2 access roads (permanent project activities) and temporary work areas (temporary project activities) in the Arizona portion of the project area. The other project components would not impact Category 3 habitat. Overall, less than 0.1% of habitat within the analysis area would be affected, and tortoises could be relocated to nearby habitat if needed. Since Category 3 habitats are not essential to the maintenance of viable populations, the proposed action is not expected to affect the Sonoran desert tortoise population. Design features and EPMs (see Table 3-39) would minimize impacts to individual tortoise and their habitat by decreasing surface disturbance, reducing traffic, and controlling weeds in Sonoran desert tortoise habitat. Construction in occupied habitat would be restricted to periods when the Sonoran desert tortoise is typically underground (November 1 through March 1) to reduce the potential for direct mortality.

Cumulative impacts to biological resources are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact 216.7 acres of Sonoran desert tortoise Category 3 habitat (93.7 permanent; 123.0 temporary). Impacts to Sonoran desert tortoise habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative habitat impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. A portion of the BLM Category 3 Sonoran desert tortoise habitat impacts would be temporary and cease following construction of proposed infrastructure (e.g., increased noise from construction equipment). Operation and maintenance of the transmission lines and renewable energy projects would result in long-term loss of Category 3 Sonoran desert tortoise habitat. However, these impacts represent only a small portion of the available BLM Category 3 habitat that would be permanently lost or reduced in quality.

AIB-18 Monarch Butterfly Breeding Habitat

Would the surface disturbance and fugitive dust associated with the proposed project components reduce the quantity or quality of flowering plant foraging habitat and milkweed (*Asclepias* spp.) breeding habitat of the monarch butterfly (*Danaus plexippus plexippus*) within the Rio Grande Corridor north of Elephant Butte Reservoir?

3.3.35 Affected Environment

The monarch butterfly (*Danaus plexippus plexippus*; monarchs) is a Candidate species under the ESA (see AID-5 Federally Listed Wildlife Species for additional information). The analysis area for impacts to the monarch butterfly and its habitat are riparian and wet vegetation community types identified as likely supporting suitable breeding and roosting habitat as well as nectar forage for monarchs within the 8-mile-wide study corridor surrounding the project components. This is consistent with the Biological Resources study corridor used in the 2013 FEIS to analyze impacts to invertebrates (BLM 2013:3-2). More specifically, this analysis area is the intersection of an 8-mile-wide study corridor of the four project components with the Riparian Woodland and Shrubland as well as the Marsh, Wet Meadow, and Playa vegetation communities from the SWReGAP.

Within the analysis area for Component 1 there are currently between 195 acres and 1,525 acres of suitable breeding and foraging habitat for monarchs within the Riparian Woodland Shrubland land cover type, and between 2 and 24 acres within the Marsh, Wet Meadow, and Playa land cover type depending on the localized route modification (with potential for overlap between the two analysis areas). Within the analysis area for Component 2a, access roads, there are currently 31,253 acres of suitable breeding and foraging habitat for monarchs within the Riparian Woodland Shrubland land cover type, and 1,210 acres within the Marsh, Wet Meadow, and Playa land cover type (with potential for overlap between the two analysis areas). For Component 2b, TWAs, there are 31,679 acres of suitable foraging and breeding habitat for monarch associated with the Riparian Woodland Shrubland land cover type, and 1,210 acres within the Marsh, Wet Meadow, and Playa land cover type (with potential for overlap between the two analysis areas). Within the analysis areas for Component 3, acres of suitable breeding and foraging habitat for monarchs within the Riparian Woodland Shrubland land cover type range from 8,501 acres to 16,489 acres depending on alternative and 687 acres to 1,040 acres for the Marsh, Wet Meadow, and Playa land cover type, also dependent on alternative. Like the aforementioned components, there is potential for overlap between the two analysis areas for each land cover type within Component 3. Within the analysis area for Component 4, there are 2 acres of suitable breeding and foraging habitat for monarchs within the Riparian Woodland Shrubland land cover type.

Monarchs occur in North, Central, and South America; Australia; islands of the Pacific and Caribbean, and elsewhere (USFWS 2020b). Individual monarchs in western North America undergo long-distance migration. Regionally, those in New Mexico tend to have a migration pattern south to Mexico where they spend the winter months, and those in Arizona have known migration patterns to both Mexico and California. In the southwestern states, migrating monarchs tend to occur more frequently near water sources such as rivers, creeks, roadside ditches, and irrigated gardens (USFWS 2020b). During the breeding season, generally throughout the summer in warmer climates, monarchs lay their eggs on their obligate milkweed host plant (primarily *Asclepias* spp.) and require blooming nectar resources for forage; nectar and milkweed resources are often associated with riparian corridors, and milkweed may function as the principal nectar source for monarchs in more arid regions (USFWS 2020b). Breeding and foraging habitat for monarchs near the proposed action is found in belts of riparian vegetation along the Rio Grande Corridor near Elephant Butte Reservoir in New Mexico and other mapped riparian corridors and wet vegetation communities with the potential for flowering nectar resources in the analysis area (POWER Engineers, Inc. 2021g:94, 115). See AIB-10 Riparian Habitat for further discussion on impacts to riparian vegetation and associated habitat areas from the project including a map of riparian areas relative to the project (see Appendix A, Maps 2–11, 13, 15, 18–40, 43–48, 50, 53–73, 75, 76, 90–98, 100, 101, 103, 104, 106, 107, 109–111, 113–116, 123–179, 185, 186). Monarchs are known to use the Rio Grande Corridor as a migratory corridor through central New Mexico, and the San Pedro River of Arizona also serves as a migratory corridor; the project crosses both of these (Cary and DeLay 2016; Kline 2007; POWER Engineers, Inc. 2021g: 91, 115). Data collected by the BLM in New Mexico during vegetation monitoring efforts over the past decade—using a combination of survey protocols including the line-point intercept method, the pace transect method, as well as various survey methods for assessing species richness at survey plots—demonstrated that milkweed species were less than 1% foliar cover at surveyed plots (BLM 2021c). Some of these surveyed plots fall within the analysis area for monarchs. This indicates that while flowering plants and riparian habitat is present in the analysis area, milkweed species are known to have sporadic occurrence and not be a dominant species in the area. Monarchs are particularly susceptible to activities which result in the loss of available flowering plant foraging habitat and milkweed breeding habitat, increased risk of mortality via vehicle strike, and increased production of fugitive dust. Fugitive dust is generally associated with reduction of plant productivity and an indirect reduction in habitat suitability for monarchs.

3.3.35.1 Reasonably Foreseeable Trends and Planned Actions

The analysis area is expected to be affected by reasonably foreseeable trends and future actions in both the short and long term. These include variations in global and regional environmental conditions related to climate change in line with global trends which could reduce the quality and quantity of habitat for use by monarch butterflies. In addition, there are reasonably foreseeable future actions within the analysis area that may result in loss of available habitat and forage as well as increased risk for mortality for monarchs, including the plat-approved 50,000-acre Willow Springs Residential subdivision (SWCA 2021).

3.3.36 Environmental Consequences

3.3.36.1 Methods and Assumptions

The following assumptions were used to analyze impacts to monarchs:

- Suitable breeding and foraging habitat for monarchs is assumed to be found within the Riparian Woodland and Shrubland vegetation community and the Marsh, Wet Meadow, and Playa vegetation community from land cover data provided by the SWReGAP. The following quantitative analysis utilizes these data to delineate suitable habitat for monarch butterfly relative to the project considering the lack of publicly available, refined range data for the species.
- For the purposes of this analysis, disturbance and removal of riparian and wet vegetation community types, and their associated composition of suitable flowering plants, is a direct impact to monarch habitat and equates to reduction in available habitat and forage for this species.
- For Component 2a, miles of vegetation crossed equates to miles of access road through suitable breeding and foraging habitat for monarchs. Miles of access roads through these vegetation communities represent the greatest potential for mortality from collisions as well as fugitive dust from project-related activities, which are considered indirect impacts to the suitability or quality of monarch butterfly habitat from the project.
- When comparing the proposed action to the no action alternative, it is assumed that the Floodplains vegetation community analyzed in the 2013 FEIS represents suitable breeding and foraging habitat for monarchs (BLM 2013:4-70).

- Reductions in impact potential based on application of design features and applicant-committed environmental protection measures assumes project-related personnel compliance as well as successful reclamation of disturbed areas (Table 3-40).

The impact indicators used for this analysis are:

- Acres of surface disturbance resulting from permanent or temporary project activities within suitable breeding and foraging habitat for monarchs
- Miles of access roads within suitable breeding and foraging habitat for monarchs

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to monarchs:

- AIB-8 Native Vegetation: Impacts to native vegetation communities.
- AIB-10 Riparian Habitat: Impacts to the riparian vegetation community.
- AIB-14 Sensitive Time Periods and Habitat Fragmentation
- AID-5 Federally Listed Wildlife Species

The impacts analysis for monarchs assumes application of design features and environmental protection measures contained in Table 3-40.

Table 3-40. Design Features and Environmental Protection Measures Applicable to Monarchs

Relevant Design Features	Applicable EPMs
2, 3, 4, 5, 6, 8, 18, 20	1, 2, 3, 4, 5, 6, 8, 13, 14, 16

Appendix C lists design features and EPMs intended to minimize impacts from the project; Design Features 2, 3, and 6 as well as EPMs 1, 2, 4, and 6 are intended to restrict vehicle traffic and construction activity to designated areas and minimize said activity to the extent practicable in order to reduce the amount of ground disturbance, and thus loss of available habitat and forage, as well as traffic, and thus fugitive dust and potential for vehicle collisions, from the project. Design Features 4 and 18 and EPMs 3, 8, 13, 14, and 16 prescribe best practices during construction activities and siting to reduce ground disturbance and the impacts of ground disturbance. Design Features 5 and 8 and EPMs 5 and 14 would limit ground disturbance where practicable and restore affected areas to their baseline conditions, which would reduce impacts to vegetation from project-related activities, and resultantly impacts to available forage and habitat for monarchs. Design Feature 20 would support the development of a dust control plan that would also minimize impacts to monarchs from fugitive dust. Reductions in impact potential based on application of design features and EPMs is dependent on project-related personnel compliance as well as successful reclamation of disturbed areas.

Due to decline in North American populations as a result of habitat reduction and fragmentation, in December 2020, the USFWS announced that listing the monarch butterfly as endangered or threatened under the ESA is warranted but precluded by higher-priority listing actions; the monarch butterfly remains a candidate for listing under the ESA at the time publication of this document (USFWS 2020c, 2021a).

3.3.36.2 Impacts Common to All Components

Loss of breeding and foraging habitat for monarchs and resultant reductions in populations is the main causal factor for listing the species under the ESA, as described above. Habitat loss reduces resource availability and can affect habitat connectivity, which may lead to population declines of a species locally, regionally, or across the entire range dependent on the scale of habitat loss and status of the population. Construction activities that remove vegetation within the Riparian Woodland and Shrubland and the Marsh, Wet Meadow, and Playa vegetation communities would resultantly remove available habitat for monarchs. Use of access roads and increased vehicle and construction equipment traffic could result in mortalities caused by collisions and create fugitive dust, especially during construction activities when use of access roads is anticipated to be highest. Fugitive dust arises from the mechanical disturbance of granular material exposed to the air and typically comes about from unpaved roads, agricultural tilling operations, aggregate storage piles, and heavy construction operations. Fugitive dust has the potential to affect photosynthetic rates and decrease plant productivity which may result in reductions to the quantity or quality of milkweed and other nectar plants available to monarchs (POWER Engineers, Inc. 2021g:115). The overall impact to vegetation from fugitive dust would be localized along access roads and areas of ground disturbance and would be reduced once construction activities were completed, occurring only occasionally during maintenance activities. Since monarchs would likely be concentrated in the areas that support a greater abundance of milkweed and nectar sources, the effects of increased vehicle traffic would decrease as distance from access roads increases within habitat for monarchs. Tables 3-19 through 3-22 in AIB-8 Native Vegetation summarize the potential impacts to monarch butterfly breeding and foraging habitat from the proposed project components.

3.3.36.3 Impacts of Localized Route Modifications

There would be no impact to suitable breeding and foraging habitat for monarchs from the localized route modifications.

3.3.36.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Within the analysis area, surface disturbance as a result of the improvement or installation of access roads and TWAs would occur within suitable breeding and foraging habitat for monarchs. As described above, fugitive dust is anticipated to be highest when access roads are used and during construction activities and would be a short-term impact. Overall, acreages of temporary and permanent project activities from the modification and use of access roads and TWAs are less than 1% of suitable breeding and foraging habitat for monarchs in the respective analysis areas for Components 2a and 2b across both land cover types that represent monarch butterfly breeding and foraging habitat. Less than 6 miles of access roads would cross suitable breeding and foraging habitat for monarchs.

3.3.36.5 Impacts of Segment 4 Reroute Alternatives

For the Segment 4 reroute alternatives, surface disturbance from temporary and permanent project activities would impact suitable breeding and foraging habitat for monarchs, as disclosed by alternative in Table 3-22. Each alternative would require crossing the Rio Grande where suitable breeding and foraging habitat as well as migratory corridors for monarchs are anticipated to be concentrated along the river's edge.

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1, specifically Subroutes 1A-1 and 1A-2, would have the greatest long-term impact of loss of habitat in terms of acreages of disturbance as compared to all alternatives and subroutes. Alternative Route 1 surface disturbance acreages are less than 1% of suitable breeding and foraging habitat for each subroute in their respective analysis areas across both land cover types that represent monarch butterfly breeding and foraging habitat.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 is the only alternative where there are impacts across both land cover types (Riparian Woodland and Shrubland as well as Marsh, Wet Meadow, and Playa). Surface disturbance resulting from permanent and temporary project activities are less than 1% of suitable breeding and foraging habitat for each subroute in their respective analysis areas across both land cover types that represent monarch butterfly breeding and foraging habitat. Of the four subroutes within Alternative Route 2, Subroute 2A-1 had the largest area of disturbance and Subroute 2A-3 would create the least disturbance within monarch habitat.

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3, specifically Subroutes 3A-3 and 3A-4, would have the least impact to suitable breeding and foraging habitat for monarchs. Alternative Route 3 disturbance acreages resulting from permanent and temporary project activities are less than 1% of suitable breeding and foraging habitat for each subroute in their respective analysis areas across both land cover types that represent monarch butterfly breeding and foraging habitat.

3.3.36.6 Impacts of SunZia West Substation

There would be no impact to suitable breeding and foraging habitat for monarchs from the SunZia West Substation.

3.3.36.7 No Action Alternative

The no action alternative would likely result in direct mortality of invertebrates, including monarchs, from project-related activities as well as reductions in available forage and habitat for invertebrates (BLM 2013:4-67). Additionally, there is potential for increased predation risk due to loss of vegetative cover (BLM 2013:4-67). The no action alternative has proposed crossing sites of the Rio Grande that may disturb riparian vegetation, and thus potential breeding and foraging habitat for monarchs, during construction and maintenance activities as well as crossings at the San Pedro River (BLM 2013:4-87, 4-116).

3.3.36.8 Summary of Impacts

As a result of the proposed action, monarch butterfly habitat availability and quality would be reduced. There would be no impacts to the species associated with project Components 1 or 4, and low-severity impacts associated with project Components 2a, access roads, including those related to fugitive dust. Specifically, approximately 6 acres of permanent project activities would occur across less than 6 miles of access roads under Component 2a. This is less than 1% of the mapped monarch butterfly habitat in the respective analysis areas for Component 2a across both land cover types that represent monarch butterfly breeding and foraging habitat. Fugitive dust is likely to be greatest near access roads during construction and maintenance activities, but the minimal length of access roads through breeding and foraging habitat for monarchs (less than 6 miles) would equate to minimal disturbance from fugitive dust. Additionally, fugitive dust is a short-term, indirect impact to habitat that would occur intermittently over the life of the project. Component 2b would have the largest amount of surface disturbance across all components and alternatives. Two subroutes associated with Alternative Route 1 of Component 3 would create the largest area of disturbance for the Segment 4 reroute alternatives, and if one of these routes were to be selected, total surface disturbance from permanent project activities in suitable breeding and foraging habitat for monarchs would be under 25 acres. Impacts to monarchs would be concentrated near the San Pedro River, relative to Components 2a and 2b, and at the Rio Grande, relative to Component 3 as both rivers contain known breeding and foraging habitat for monarchs and also serve as migratory corridors; see AIB-10 Riparian Habitat for a discussion of impacts to riparian habitat associated with these major waterways (Cary and DeLay 2016; Kline 2007). More specifically, all of the Component 3 alternatives cross the Rio Grande. Impacts to monarchs from the no action alternative would be similar to those described for the proposed action. Both the no action alternative as well as the proposed action cross the Rio Grande and San Pedro River as well as other suitable monarch butterfly breeding and foraging habitat. However, impacts from the proposed action are anticipated to be less than the no action alternative, as there would be fewer river crossings and less total acreage of monarch butterfly breeding and foraging habitat removed overall.

Cumulative impacts to biological resources, including invertebrates, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could adversely impact monarchs by increasing the potential for direct mortality, removing available flowering plant foraging habitat and milkweed breeding habitat from the landscape, and reducing the quality of existing habitat due to fugitive dust. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to monarchs may result from construction of the proposed project components, in addition to other planned infrastructure projects, including the creation of residential subdivisions. Impacts other than surface disturbance related to construction activities would be short term and would cease upon completion of project construction. Permanent project activities including infrastructure site locations as well as areas of vegetation removal resulting from temporary project activities would result in long-term reduction in available plant forage and breeding habitat. Residential subdivisions would generate traffic that could cause fugitive dust and increase risk of collision for monarchs; however, these impacts would dissipate with increasing distance from the project boundary and would be stochastic in nature. Therefore, any adverse impacts from construction and operations activities disturbances likely would be infrequent and of short duration, while impacts from the removal of available forage and breeding habitat from infrastructure siting would be long term and adverse.

AIB-19 Nectar Bats

Would the removal of agave (*Agave palmeri*) associated with the proposed project components reduce the quantity and quality of forage for the lesser long-nosed bat (*Leptonycteris yerbabuenae*), Mexican long-tongued bat (*Choeronycteris mexicana*), and Mexican long-nosed bat (*Leptonycteris nivalis*)?

3.3.37 Affected Environment

The analysis area for special-status bats is the 4-mile buffer around the project components (8-mile-wide analysis area). Three sensitive nectar bat species may occur in the Arizona portion of the analysis area. The lesser long-nosed bat (*Leptonycteris yerbabuenae*) was delisted in 2018 due to recovery (USFWS 2018a) but remains a BLM sensitive species. The endangered Mexican long-nosed bat (*Leptonycteris nivalis*), also called greater long-nosed bat, and BLM sensitive Mexican long-tongued bat

(*Choeronycteris mexicana*) also have a low potential to occur in the Arizona portion of the analysis area (POWER Engineers, Inc. 2021g).

Within the analysis area, suitable foraging habitat for nectar bats is primarily present in the Arizona Upland subdivision of Sonoran Desert Scrub in southeastern Pinal County, particularly east of the Picacho Mountains, and east through the Tucson valley (project Segment 1). Mexican long-nosed bats roost in caves and mines in the pine-oak belt and Mexican long-tongued bats use canyons with mixed oak conifer forests or semidesert grassland (POWER Engineers, Inc. 2021g). No roost sites are known to occur near the project. For all three species, the most important predictors of distribution are presence of agave, columnar cacti, and species richness of food plants (Burke et al. 2019).

The analysis area throughout much of Segment 1 (the west end of the analysis area) contains suitable foraging habitat for the three bat species. Forage plants known to occur in the analysis area include *Agave palmeri*, *Agave chrysantha*, *Agave parryi*, and saguaro (*Carnegiea gigantea*) (POD Appendix B1). Saguaro and agave occur from approximately 9 miles east of the Pinal Central Substation (i.e., the beginning of Segment 1) to approximately 2 miles west of the Willow 500-kV Substation (i.e., the end of Segment 1) (POWER Engineers, Inc. 2021g:89–90). Sonoran Desert Scrub is the primary foraging habitat with dominant agave and saguaro species composition; however, bats may also forage in Chihuahuan Desert Scrub and Semi-Desert Scrub and Grassland habitats.

3.3.37.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable future trends and planned actions in the project vicinity that would impact these bat foraging habitats include linear transportation (e.g., new roads) and population/economic growth (e.g., new subdivisions) (SWCA 2021).

3.3.38 Environmental Consequences

3.3.38.1 Methods and Assumptions

The following assumptions were used to analyze impacts to sensitive bat foraging habitat:

- Suitable habitat in the analysis area contains saguaro and/or agave plants used by sensitive bat species for foraging.
- Salvaging and replanting saguaro and agave plants will successfully reestablish foraging habitat.

The impact indicator used for this analysis is:

- Qualitative discussion of impacts to suitable habitat from ground-disturbing activities.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to sensitive bat foraging habitat:

- AIB-8 Native Vegetation: Impacts to native vegetation communities.
- AIB-11 Invasive Species (Noxious Weeds): Impacts to native habitats from the spread and establishment of weeds.

The impacts analysis for the sensitive bat foraging habitat assumes application of the design features and environmental protection measures contained in Table 3-41. Full design features and EPMs are provided in Appendix C.

Table 3-41. Design Features and Environmental Protection Measures Applicable to Sensitive Bat Foraging Habitat

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 26, 28	1, 2, 3, 5, 12

3.3.38.2 Impacts Common to All Components

Both the proposed project components and no action alternative would lead to a decline in the quality and quantity of bat foraging habitat due to long-term removal of foraging plants and additional indirect impacts in desert scrubland habitats, primarily in the Arizona portion of the project where agave and saguaro occur. In addition to the removal of foraging plants by surface-disturbing activities, construction activities such as blasting, drilling, and the use of heavy equipment may transmit ground vibrations that could disturb roosting bats if any occupied roosts are near the project. Currently there are no known roosts in the analysis area (POWER Engineers, Inc. 2021g). No part of the project is near enough to any known roost site to result in disturbance of roost sites.

Vegetation clearing for construction of new roads, improvement to existing roads, and temporary work areas would result in the loss of forage plants which could result in a long-term impacts and a local reduction in forage availability for the nectar bats due to removal of saguaro and agave. However, paniculate agaves and saguaros would be avoided or salvaged for replanting within the right-of-way or suitable adjacent habitat (Design Feature 28). The plan for plant salvage is detailed in the project Biological Opinion (USFWS 2013) and POD Appendix B1 (POWER Engineers, Inc. 2021b).

Successful plant salvage would decrease the level of long-term impacts by retaining foraging opportunities for the bats. Agave and saguaro salvage would be augmented, as necessary, to achieve a goal of no net loss of mature flowering plants. Stocks from local sources or approved nursery-grown plants would be used. Salvaged plants would be monitored following reclamation for a period of 3 years. Supplementary water would be provided if monitoring indicates that rainfall is insufficient to achieve the goal of no net loss of forage plants. Plant survival through the monitoring period would be reported annually to the BLM and USFWS.

Other project design features aimed at reducing project disturbance (Design Features 2, 3, 4, 5, and 6) and preventing the spread and establishment of noxious weeds (Design Features 1 and 26) would also limit impacts on lesser long-nosed bat, Mexican long-nosed bat, and Mexican long-tongued bat foraging habitat (see Appendix C). Surface disturbance in foraging habitat may also be reduced with implementation of EPMs 1, 2, 3, and 5. If any occupied roosts are found, blasting and drilling within 0.25 mile of roosts would occur between November and April, when lesser long-nosed bats are not typically present in Arizona or New Mexico (EPM 12; see Appendix C).

3.3.38.3 Impacts of Localized Route Modifications

There is no habitat for lesser long-nosed bat, Mexican long-nosed bat, or Mexican long-tongued bat where localized route modifications would occur. Saguaro and agave are known to occur along project Segment 1 except for the portion within 9 miles east of the Pinal Central substation; this portion of the project area does not include any localized route modifications.

3.3.38.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Short-term and long-term impacts within suitable habitat for sensitive bats would occur in Component 2 access roads and temporary work areas in Arizona. Vegetation communities that may be used by the bats include Sonoran Desert Scrub, Chihuahuan Desert Scrub, Semi-Desert Scrub, and Grassland habitats. See AIB-8 Native Vegetation for more details on these habitats. Saguaro and agave are known to occur along project Segment 1, and access roads and TWAs in this area would require salvage of these plants.

3.3.38.5 Impacts of Segment 4 Reroute Alternatives

There is no habitat for lesser long-nosed bat, Mexican long-nosed bat, or Mexican long-tongued bat in the Segment 4 reroute analysis area.

3.3.38.6 Impacts of SunZia West Substation

Habitat in the substation footprint is Sonoran Desert Scrub (80 acres) which may contain suitable forage plant species for lesser long-nosed bat, Mexican long-nosed bat, or Mexican long-tongued bat. Saguaro and agave are known to occur along project Segment 1, and salvage would be required if these plants are present within areas of proposed disturbance.

3.3.38.7 No Action Alternative

The no action alternative (2015 Selected Route) ground disturbance would occur in Sonoran Desert Scrub, Chihuahuan Desert Scrub, and Semi-Desert Scrub and Grassland habitats that may be used for bat foraging. Impacts to the lesser long-nosed bat, Mexican long-tongued bat, and Mexican long-nosed bat foraging habitat under the no action alternative would be similar to those impacts described above for the proposed project components in Segment 1.

3.3.38.8 Summary of Impacts

Short-term and long-term impacts to lesser long-nosed bat, Mexican long-nosed bat, and Mexican long-tongued bat foraging habitat would occur as a result of Component 2 access roads and temporary work areas and the Component 4 substation. These impacts are similar to those described under the no action alternative. The other project components would not impact foraging habitat for nectar bat species. Suitable bat foraging habitat in the analysis area would be reduced as a result of surface disturbance; however food sources are likely to be available in nearby habitat. There are no known roosts in the analysis area that would be affected by the project and therefore no impact to roosting or breeding activities is expected. Design features and EPMs (see Appendix C) would minimize impacts to bat foraging habitat, including plant salvage of saguaro and agave, and overall reduction of available forage habitat would be minimal.

Cumulative impacts to nectar bats are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-327). Proposed project Components 2 and 4 in Arizona could contribute to incremental adverse impacts to nectar bat foraging habitat. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions in desert scrubland habitats. Construction impacts are expected to be temporary and would end upon completion of project construction. Operations and maintenance of the transmission lines and renewable energy projects could have minor impacts on nectar bats. Therefore, any related adverse impacts likely would be minor and of short-term duration.

AIB-20 Traditional Cultural Properties and Resources with Tribal Importance

Would the proposed project components impact, reduce the quality, or impair access to Traditional Cultural Properties (TCPs) and resources important to Native American communities, such as resource gathering areas, sacred sites, and archaeological sites?

3.3.39 Affected Environment

Resources of concern to Native Americans include prehistoric archaeological sites, traditional cultural properties (TCPs), resource gathering areas, and sacred sites. This project has the potential to impacts these resources directly and indirectly. Prehistoric archaeological sites are discussed in issue statement AID-10 Cultural Resources in this Draft EIS. Traditional cultural properties are a type of historic property which is "eligible for the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). Resource gathering areas and sacred sites are locations where Native Americans gather resources such as plants, animals, or minerals or landscape features that are held sacred as integral parts of Native American culture.

The analysis area for TCPs and resources important to Native Americans is based on the analysis areas developed for cultural resources and visual resources which consists of a 3-mile (4.8-km) buffer on either side of the centerline of the proposed project and alternatives (totaling a 6-mile-wide corridor) and is in keeping with the visual resources analysis area from the 2013 FEIS (BLM 2013:Section 3.9); however, because the area of potential effects for visual effects is 5 miles (8 km) on either side (see above), some data were collected for a 10-mile-wide corridor. Prehistoric archaeological site data were collected within a 400-meter (m) (0.25-mile) buffer (analysis area) and are found in issue statement AID-10 Cultural Resources. As visual impacts are not anticipated from Components 1, 2, and 4, visual effects will be confined to the route alternatives presented in Component 3.

The analysis incorporates by reference data and analysis for the no action alternative presented in Sections 3.8 and 4.8 of the 2013 FEIS (BLM 2013:3-146 through 3-199, 4-122 through 4-148). For a list of laws and regulations regarding cultural resources see Table 3-35 in Section 3.8.1.3 Regulatory Framework of the 2013 FEIS (BLM 2013:3-150 through 3-152).

Data from the 2013 FEIS (BLM 2013:3-182 through 3-195) are used when applicable. Other data have been and will be collected through tribal consultation. BLM has and is consulting with the Ak-Chin Indian Community, Comanche Nation, Fort Sill Apache Tribe of Oklahoma, Gila River Indian Community, The Hopi Tribe, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Sandia, Pueblo of Ysleta dela Sur, San Carlos Apache Tribe, Salt River Pima-Maricopa Indian Community, Tohono O'odham Nation, and White Mountain Apache Tribe. Please note that an inventory for TCPs has not been completed at this time.

3.3.39.1 Known Resources

Full discussion of archaeological sites can be found in AID-10 Cultural Resources in this Draft EIS. A brief summary by project component is presented here.

For project Component 1, five sites with a prehistoric component are found with the analysis area for the SunZia South Modification Area localized route modification, three in the analysis area for the North Route localized route modification, one in the analysis area for the Steele Route, four in the analysis area for the Earley Route localized route modification, and none in the Macho Springs Area, Palomas Creek Area, or Highlands Area localized route modifications. For Component 2, there are 119 prehistoric sites within the analysis area for New Mexico and 117 in Arizona. For Component 3, there are 61 prehistoric sites within the analysis area for Alternative Route 1, 55 within the analysis area for Alternative Route 2, and 65 within the analysis area for Alternative Route 3. The one site within the analysis area for Component 4 is of unknown temporal affiliation.

For visual effects for Component 3, two prehistoric sites eligible under Criterion A and/or C are located within 0.25 mile of the alternatives. No National Register of Historic Places–listed prehistoric resources are found within 5 miles of the Component 3 alternatives.

The 2013 FEIS identified over 500 prehistoric sites or archaeological districts within the analysis area and the Salinas Pueblo Missions National Monument – Gran Quivira as a cultural landscape, and the McClellan Wash Archaeological District within the visual analysis area for the no action alternative (BLM 2013:3-178 through 3-180, 3-189 through 3-194).

During the previously conducted tribal consultation, several places or resources of concern were identified along the project route which may still affected by the route modifications and access roads along the granted right-of-way (Components 1 and 2). The San Carlos and White Mountain Apache Tribes expressed concerns about plant-gathering areas near Deming, New Mexico, which may be of concern for Components 1 and 2 (BLM 2013:3-189). A concern about the effects of electrical fields on spiritual communication between sacred sites was raised by the Gila River Indian Community Tribal Historic Preservation Officer as well (BLM 2013:3-184, 3-195).

No TCPs or sacred sites were identified within the analysis area during the previous consultation for the 2013 FEIS (BLM 2013:3-184, 3-195). No new data are available for this Draft EIS.

3.3.39.2 Reasonably Foreseeable Environmental Trends and Planned Actions

Four planned high-voltage transmission lines or energy generating facilities with associated transmission lines are within the spatial boundary for the reasonably foreseeable environmental trends and planned action, which is an 8-mile-wide corridor buffered around the proposed SunZia project components: Southline Transmission Line, High Plains Express Transmission Line Project, Southwest Transmission Co-op Inc., and Western Spirit Wind. These projects may impact the same resources or may affect resources avoided by the SunZia project in the same corridor. Other projects planned within the 8-mile-wide corridor which may impact TCPs and resources important to Native Americans include the Great Divide Wind facility, Bowie Power Station, Storey Solar facility, and several residential subdivisions.

3.3.40 Environmental Consequences

3.3.40.1 Methods and Assumptions

The following assumptions were used to analyze impacts:

- Ground disturbance to Native American resources within the right-of-way and/or project footprint is permanent.
- Construction of project component may restrict access to Native American resources.

- Visual impacts to Native American resources beyond 0.25 mile of the project footprint will be minimal.

The impact indicator used for this analysis is:

- Numbers and types of Native American resources within the right-of-way and/or project component footprint.
- Numbers and types of Native American resources for which setting is important within 0.25 mile of the project footprint.
- Number and types of resources that may be affected identified during tribal consultation.

The following analyses are incorporated by reference as they relate to analysis used to inform the impact analysis:

- AID-10 Cultural Resources: Impacts to cultural resources from ground disturbance.

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-42. Full design features and EPMs are provided in Appendix C.

Table 3-42. Design Features and Environmental Protection Measures Applicable to Traditional Cultural Properties and Resources with Tribal Importance

Relevant Design Features	Applicable EPMs
1, 3, 11, 14, 15	1, 2, 4, 6, 7, 8, 14, 16

3.3.40.2 Mitigation

TCPs may be considered historic properties under Section 106 of the NHPA, and thus fall under the requirements of Section 106 of NHPA. Mitigation measures will be developed in consultation with the Arizona and New Mexico State Historic Preservation Officers, affected land mangers or owners, Tribes, and other consulting parties per the project's programmatic agreement signed in December 2014 (see Standard Mitigation Measure [ST] 15 in the 2015 ROD [BLM 2015a:Appendix E, Table 2-1]). The programmatic agreement will be amended to account for current changes to the project's description analyzed in this EIS. For all other resources which are not considered historic properties, mitigation measures will be developed in consultation with the affected Tribes through NEPA and government-to-government consultation.

3.3.40.3 Impacts Common to All Components

Construction and operation of the project has the potential to impact resources important to Native American communities through ground disturbance, visual impacts, and access restrictions. Following the above-mentioned mitigation measures could avoid or lesson impacts. Ground disturbance from construction would be a permanent disturbance to these resources. Auditory and visual impacts would occurring during construction and visual impacts would occur through operation of the transmission line. Access issues could occur during construction or throughout operation.

See Section 3.4.20 Environmental Consequences of AID-10 Cultural Resources for a discussion of what prehistoric archaeological sites are found in each project component footprint.

3.3.40.4 Impacts of Localized Route Modifications

Two prehistoric archaeological sites are located within the project footprint for the SunZia South Area localized route modification; two prehistoric archaeological sites are within the project footprint for the Las Palomas Area localized route modification (see AID-10, Cultural Resources). The Macho Springs Area and SunZia South Area localized route modifications are near Deming and may impact plant-gathering areas or access to those areas. One prehistoric archaeological site is located within the project footprint for the Earley Route localized route modification. One prehistoric archaeological site is found within the Local Alternative West Tie-in project footprint; none are found within the project footprints of the Local Alternative Central Tie-in or Local Alternative East Tie-in.

3.3.40.5 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

In New Mexico, 20 prehistoric archaeological sites are found within the project footprint of the access roads and seven within the TWAs (see AID-10, Cultural Resources). In Arizona, 10 prehistoric archaeological sites are found within the access road project footprint and four within TWAs. These sites include habitations and artifact scatters with and without features.

Access roads outside of the granted right-of-way which are near Deming may impact plant-gathering areas.

3.3.40.6 Impacts of Segment 4 Reroute Alternatives

No Native American resources of concern other than prehistoric archaeological sites have been identified within the Segment 4 Reroute Alternatives project footprints. See AID-10, Cultural Resources for the number of habitations and total prehistoric archaeological sites by alternative route.

Visual impacts may occur to two prehistoric archaeological sites within 0.25 mile of Subroute 3A-1.

3.3.40.7 Impacts of SunZia West Substation

No known prehistoric archaeological sites are found in the footprint of the SunZia West Substation; however, the majority of the footprint has not been surveyed. No known visually sensitive resources are within the visual analysis area.

3.3.40.8 No Action Alternative

The no action alternative consists of the previously permitted transmission line route which was the BLM preferred alternative (Routes 1A2-3A2-4C2c) in the 2013 FEIS (BLM 2013, 2015a). For the no action alternative route, the 2013 FEIS identified the following potential impacts (BLM 2013:4-147, 4-148). The no action alternative could physically impact five previously recorded Native American habitation sites and visual impacts from the no action alternative could occur to the Gran Quivira Cultural Landscape and McClellan Wash Archaeological District.

3.3.40.9 Summary of Impacts

The no action alternative could physically impact five habitation sites and visually impact the Gran Quivira Cultural Landscape and McClellan Wash Archaeological District. For Component 1, prehistoric archaeological sites which may be impacted by project construction are found along the centerline for the SunZia South Area (n=2) and Las Palomas Area (n=1); plant-gathering sites may be located near the

Macho Springs and SunZia South Areas. Access to these resources could be impacted during construction and operation of the proposed project. For Component 2, 39 prehistoric archaeological sites which may be physically impacted by project construction are found within the access road and TWA footprints and access roads near Deming may impact access to plant-gathering areas. For Component 3, 19 to 21 prehistoric archaeological sites are found along each of the route alternatives; potential physical impacts or access restrictions are similar for each route. No known prehistoric archaeological sites are found within the Local Alternatives 1A-6, 1A-7, 3B-1, and 3B-2. Visual impacts may occur to one resource near Subroute 3A-1. For Component 4, no physical impacts to known resources are expected. As stated above, adverse effects on historic properties will be resolved per the programmatic agreement. The programmatic agreement also stipulates that any unsurveyed portion of the selected alternative will be inventoried for cultural resources. Adverse impacts to all other resources which are not historic properties will be mitigated under NEPA.

Cumulative impacts to TCPs and resources important to Native Americans are discussed in the cumulative impacts section for cultural resources are discussed Section 4.17.4.8 of the 2013 FEIS (BLM 2013:4-330 through 4-335). Incremental impacts from the proposed components could adversely impact TCPs and resources important to Native Americans. Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to TCPs and resources important to Native Americans may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 74,000 acres and 2,890 miles within the analysis area). Impacts from disturbance to TCPS and resources important to Native Americans associated with construction are permanent and long term; access restrictions during construction are temporary and short term. In addition, cumulative impacts may occur from visual impacts or access restrictions to TCPs and resources important to Native Americans during the operation and maintenance of the transmission lines and generating facilities.

AIB-21 Recreation

Would construction and operation of the proposed project components impact any recreational uses, including special recreation management areas, hiking trails, existing campground sites, off-highway (OHV) vehicle areas, and tourism?

3.3.41 Affected Environment

The analysis area for recreation resources for this Draft EIS consists of the following elements:

- Project Component 1 – Localized Route Modifications: A 6-mile-wide area centered on the reference centerline of the five proposed localized route modifications
- Project Component 2 – Access Roads and Temporary Work Areas Outside of Granted Right-of-Way: 150-foot-wide study corridor centered on access-road centerline of proposed access road alignments outside 400-foot right-of-way; boundary of temporary work areas
- Project Component 3 – Segment 4 Reroute Alternatives: A 6-mile-wide study corridor (centered on the 400-foot right-of-way) for Segment 4 alternative routes
- Project Component 4 – SunZia West Substation: 80-acre substation siting area (including the 40 acres of the substation siting area in the existing right-of-way)

The analysis area for recreation consists of primarily rural and undeveloped federal, state, and private land that allows for limited dispersed recreation opportunities such as hiking, biking, horseback riding, hunting, fishing, picnicking, camping, rock climbing and bouldering, and wildlife viewing. A variety of federal, state, and local land management agencies provide and manage recreational opportunities on their lands within the analysis area, including BLM, USFS, USFWS, various state agencies, local and county governments, and private landowners.

3.3.41.1 Bureau of Land Management

BLM-administered public lands that attract intensive recreational use may be designated as Special Recreation Management Areas (SRMAs), which are managed for structured recreation activities, experiences, and benefits along with visitor health and safety, user conflict, and resource protection (BLM 2010:29). There are four SRMAs within the analysis areas for Component 2 and/or Component 3: The Box, Johnson (Gordy's) Hill, Quebradas Backcountry Byway, and Socorro Nature Area, which are all in BLM's Socorro District and managed in accordance with the Socorro RMP. As stated in the 2013 FEIS (BLM 2013:3-288), The Box is managed for rock climbing and bouldering, scenic quality, and protection for cultural sites and listed species habitat. Johnson (Gordy's) Hill is managed for recreation uses that include OHV races and group events. Quebradas Backcountry Byway is managed for a variety of recreation opportunities and experiences, including driving for pleasure, high scenic quality, geological sightseeing, interpretation and environmental education, mountain biking, and access to hiking areas such as the Presilla and Sierra de Las Canas Wilderness Study Areas (WSAs; see AID-16 BLM Special Designations). Socorro Nature Area is managed for recreational use and to provide environmental education and interpretation opportunities. Available experiences are primarily picnicking, hiking, sightseeing in Bosque Habitat, access to the Rio Grande, camping, and mountain biking (POWER Engineers, Inc. 2021i).

3.3.41.2 U.S. Forest Service

The Component 3 analysis area intersects with the Bear Mountains region within the Magdalena District of Cibola National Forest. The forest is managed by the USFS and offers a variety of developed and dispersed recreational opportunities including hiking, hunting, fishing, horseback riding, biking, picnicking, camping, and OHV use. The Coronado National Forest is also within the analysis area for Component 2. Dispersed motorized and nonmotorized recreation is permitted in these areas. USFS uses the recreation opportunity spectrum (ROS) within national forests to define classes of outdoor recreation environments, activities, and experience opportunities based on the social, managerial, and physical characteristics of the area. ROS classes range from primitive (i.e., extremely isolated from the sights and sounds of humans, offering a high degree of challenge and risk, and managed to be essentially free from evidence of human modifications) to urban (i.e., urbanized environment with dominant structures, traffic lights and paved streets) (USFS 2021a:199–200). The ROS classes present within the portions of Cibola National Forest and Coronado National Forest that are within the analysis area include the following:

- Roaded Natural (RN), in which users have the opportunity to affiliate with other users in developed sites. These areas are predominantly natural with some site modifications that harmonize with the natural environment (USFS 2021a:200).
- Semi-Primitive Motorized (SPM), in which users have a moderate probability of experiencing solitude. High degree of self-reliance and challenge in using motorized equipment. These areas are predominantly natural, lacking some human modification, except when necessary for site protection (USFS 2021a:200).
- Semi-Primitive Non-Motorized (SPNM), in which users have a high probability of experiencing isolation from the sights and sounds of humans. Access and travel is nonmotorized. These areas are predominantly natural, lacking much human modification, except when necessary for site protection (USFS 2021a:200).

- Roaded Modified (RM), in which users have a moderate probability of experiencing solitude, closeness to nature, self-reliance, and risk in a predominantly natural or natural appearing environment with minimal onsite controls or restrictions. Roads are well maintained and provide easy access (USFS 2018:187).

Roads, trails, and areas available for open or limited OHV use or dispersed camping are present on USFS lands within the analysis area. A portion of Cibola National Forest within the analysis area includes several roads classified as open to all vehicles. Big-game retrieval and dispersed camping is allowed along some of these roads (up to 300 feet from each side of the road) (USFS 2020). In addition to USFS areas that allow dispersed or backcountry camping, one developed USFS campground, the New Canyon Campground, is located within the analysis area for Component 3 in Torrance County. No other USFS designated campgrounds or trailheads are within the analysis area.

3.3.41.3 U.S. Fish and Wildlife Service

The Sevilleta NWR, which is within the analysis area for Component 3, provides recreational opportunities including wildlife watching and photography, nature trails, wildlife viewing, limited hiking, and hunting (USFWS 2021b). Along the southern border of the NWR within the analysis area is San Lorenzo Canyon, a hiking and primitive camping area jointly managed by USFWS and BLM (BLM 2021d).

3.3.41.4 State, Local, and Private Resources

Formal or developed recreation opportunities in the analysis area include, but are not limited to, state and local parks, multi-use trails, and private campgrounds or RV parks. Major hiking trails within the analysis area include the Arizona National Scenic Trail (see AID-11 National Scenic and Historic Trails) and the Central Arizona Project National Recreation Trail (Pinal County 2020), which are in the analysis area for Component 2, and the planned Rio Grande Trail, which is within the analysis area for Component 3 and within approximately 300 feet of the analysis area for Component 2. State and local parks within the analysis area include: Oracle State Park northeast of Tucson, Arizona, which offers day-use picnic areas, hiking, mountain biking, and horseback riding and is designated as an International Dark Sky Park (POWER Engineers, Inc. 2021i); New Mexico Tech Golf Course and Sedillo Park in Socorro, New Mexico, which offers a golf course, athletic fields, tennis and basketball courts, playgrounds, an Olympic-size swimming pool, and outdoor grills (POWER Engineers, Inc. 2021i); and Caballo Lake State Park (Component 2) south of Williamsburg, New Mexico, which offers boating, kayaking, sailing, designated and dispersed campsites, and trails for hiking and horseback riding (New Mexico Energy, Minerals and Natural Resources Department 2021). Pima County's A7 Ranch natural resource park, which consists of state, county, and private open space lands, offers dispersed recreational opportunities such as biking, horseback riding, hiking, limited hunting, and wildlife viewing.

Roads, trails, and areas available for open or limited OHV use or dispersed camping are present on state lands within the analysis area. However, no areas specifically designated for OHV use on state lands were identified within the analysis area. No state, local, or other publicly owned designated campgrounds or trailheads are within the analysis area. Approximately 15 private campgrounds or RV parks are within the analysis area for Component 2.

3.3.41.5 Tourism and Film

Other relevant factors influencing recreation within the analysis area include tourism and the film industry. Both New Mexico and Arizona are recreational tourist destination locations, and almost all counties within the analysis area have National Forests, National and State Parks, recreational and wilderness areas, or other natural attractions within their borders, or are in close proximity to these attractions. Tourism is frequently high in counties that have specific areas of interest, such as Grant County (Gila National Forest and Gila Cliff Dwellings National Monument); Graham County (Cibola National Forest, Tombstone); and Pima County (Saguaro National Monuments, Cibola National Forest, and destination resorts) (BLM 2013:3-322). In addition to tourism, New Mexico also incentivizes filmmaking; the unique and varied terrain throughout the state combined with tax incentives, a film liaison network, filmmaker training opportunities, and other services and amenities has attracted an average of over 80 productions per year since 2019 (New Mexico Film Office 2021a). The New Mexico Tourism Department has also developed an initiative to promote film tourism throughout the state, encouraging tourists to visit filming locations and other movie-themed events and attractions (New Mexico Film Office 2021b).

3.3.41.6 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable future trends and planned actions that may contribute to recreation impacts include any projects taking place on or within the viewsheds of BLM, USFS, or State-owned recreation lands within the analysis area, including maintenance projects; right-of-way authorizations; construction of new transmission lines, substations and wind projects, and transmission line updates; vegetation management treatment; recreation disposal; forest restoration and fuels reduction; mining activities and issuance of mining leases and permits; ongoing military training; and transportation projects.

3.3.42 Environmental Consequences

3.3.42.1 Methods and Assumptions

The following assumptions were used to analyze impacts to recreation resources:

- All temporary impact areas would be restored to pre-construction conditions following the design features and EPMs provided in Appendix C and the draft POD (POWER Engineers, Inc. 2021b).
- Current recreation activities would be allowed to continue within the project right-of-way after construction is complete, provided that the activities do not interfere with operation of transmission lines as long as the activity does not interfere with operation of transmission lines.
- Project components proposed to be co-located within existing transmission line rights-of-way may result in minor visual changes if existing structures and transmission lines are replaced with larger or visually different structures; however, these visual changes would have a negligible impact on visitor experience within recreation areas.

The impact indicators used for this analysis are:

- Acres of recreation areas crossed;
- Acres of ROS areas crossed;
- Distance (miles) of project components from recreation resources within the analysis area;
- Miles of overlap with USFS motorized access routes; and
- Acres of temporary ground disturbance for access roads and TWAs within recreation areas.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to recreation resources:

- AID-11 National Scenic and Historic Trails
- AID-12 Visual Resources
- AID-16 BLM Special Designations
- AID-17 USFS Inventoried Roadless Area
- AID-18 Sevilleta National Wildlife Refuge

This impact analysis assumes application of the design features and EPMs in Table 3-43. Full design features and EPMs are provided in Appendix C.

Table 3-43. Design Features and Environmental Protection Measures Applicable to Recreation

Relevant Design Features	Applicable EPMs
2, 3, 4, 5, 6, 8, 20, 21	1, 2, 4, 6, 7, 8, 10

3.3.42.2 Impacts Common to All Components

Similar to the 2013 FEIS (BLM 2013:4-225 through 4-226), direct, permanent impacts to recreation activities and designated areas are defined as the presence of structures or right-of-way within the boundaries of or other direct physical conflicts with recreation areas. Indirect impacts would include the presence of transmission lines or structures adjacent to the boundaries of a recreation area or within the viewshed of recreation areas that adversely affect the user experience and/or deter users (see AID-12 Visual Resources). Temporary impacts would include temporary ground disturbance for access roads and TWAs and increased traffic, dust, noise, and emissions from construction vehicles. No direct impacts to Johnson (Gordy's) Hill SRMA, Quebradas Backcountry Byway SRMA, Socorro Nature Area SRMA, Coronado National Forest, state or local parks, or public or private campgrounds or trailheads are anticipated.

The following design features have been incorporated into the proposed action and Segment 4 alternatives to avoid and minimize recreation impacts. Vehicle movement outside the right-of-way would be limited to designated areas or public roads (Design Feature 2) and construction activities would be restricted to and confined within predetermined limits (Design Feature 3), which would reduce recreational conflicts in adjacent areas. New access roads and overland routes would be aligned to follow the area's landform contours where possible to minimize ground disturbance and visual contrast (Design Feature 4). Use of existing roads has been proposed to the extent possible to minimize new disturbance (Design Feature 6). All existing roads would be left in a condition equal to or better than their pre-construction condition, as determined by the appropriate land-managing agency (Design Feature 5), ensuring that OHV and other recreational use can continue in the area following construction. All temporarily disturbed areas would be restored in accordance with the POD and as required by the landowner or BLM Authorized Officer (Design Features 1 and 8). All requirements of those entities having jurisdiction over air quality matters would be adhered to and any necessary dust control plans would be developed (Design Feature 20) to minimize emissions and fugitive dust near recreation areas. Fences and gates would be repaired or replaced to their original, pre-construction condition, as required by the landowner or the BLM Authorized Officer if they are damaged or destroyed by construction activities. New temporary and/or permanent gates would be installed only with the permission of the landowner or the BLM. Temporary gates not required for postconstruction access control would be removed following construction completion (Design Feature 21) unless BLM specifically requests that access should be restricted.

In addition to these design features, the following EPMs would be applied in recreation areas to further minimize impacts. No widening or upgrading of existing access roads would occur in parks and recreation areas, except for repairs necessary to make roads passable, to avoid disturbance (EPM 1). Existing road crossings would be used at designated recreational trails to limit conflicts with trails and visual impacts. Off-road or cross-country access routes would be used for construction and maintenance in select areas, subject to BLM or landowner approval, to minimize ground disturbance impacts. These access routes would be flagged with an easily seen marker (EPM 2). All new temporary access roads would be permanently closed with concurrence of the landowner or appropriate land management agency (EPM 4). Permanent access roads required for operations and maintenance would be gated or otherwise blocked from public access to protect sensitive areas, unless BLM indicates that the road can be made available for recreation use. Fences would meet BLM or other applicable agency/owner specifications (EPM 6). In recreation areas, structures would be placed at the maximum distance practicable to avoid or span sensitive features such as roads and trails within limits of standard tower design (EPMs 8 and 10). Through the incorporation of these design features and EPMs, the proposed project components would not substantially change the use of recreation areas or trails or the number and type of recreation users and tourists; therefore, long- and short-term impacts to recreation are anticipated to be minor.

3.3.42.3 Impacts of Localized Route Modifications

The Earley and Steele Routes under Route Modification 6 pass within 0.25 mile north of the Sunscape RV resort. Any impacts to the RV resort would be temporary and indirect and may include increased traffic, dust, noise, and emissions from construction vehicles. No other formal designated federal, state, or local parks, recreation areas, or OHV trails would be impacted under Component 1. No route modifications are proposed in the vicinity of Oracle State Park; thus, any visual impacts to stargazing activities within the park due to the presence of transmission line structures would be the same as under the no action alternative. Visual impacts are discussed in further detail in Section 3.4 (AID-12).

3.3.42.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Under Component 2, one existing paved road proposed for access (Box Canyon Road) would cross the northwest corner of The Box SRMA for approximately 200 feet (less than 0.2 acre). Because no improvements to this road are proposed, no direct impacts to The Box are anticipated. Furthermore, use of the existing road for access to the project area would not require an amendment to the Socorro RMP. Indirect, temporary impacts may occur during construction as a result of additional construction traffic and the associated noise, fugitive dust, and emissions. The use of existing roads not requiring improvement is proposed along 0.6 mile of USFS motorized access routes within Coronado National Forest and adjacent to several other recreation areas, including the Central Arizona Project National Recreation Trail, Oracle State Park, Caballo Lake State Park, the A7 Ranch, and the 15 private campgrounds and RV parks identified within the analysis area. However, because no improvements to these roads are proposed, no ground disturbance would occur inside the boundaries of these resources. Therefore, no direct impacts to these resources are anticipated under Component 2. Indirect, temporary impacts to these recreation resources may occur during construction as a result of additional construction traffic and the associated noise, fugitive dust, and emissions. Two access roads not requiring improvements (Route 152 and Percha Road) are within approximately 300 to 600 feet from planned segments of the Rio Grande Trail near the town of Oasis, New Mexico. Use of these access roads would be temporary and would not preclude the future construction of the trail. A total of 230 miles of access roads are proposed on BLM land. After construction, new or improved permanent roads could provide additional or improved OHV and general recreation opportunities and access.

3.3.42.5 Impacts of Segment 4 Reroute Alternatives

IMPACTS OF ALTERNATIVE ROUTE 1

All subroutes under Alternative Route 1 are over 2 miles from the Johnson (Gordy's) Hill, Quebradas Backcountry Byway, and Socorro Nature Area SRMAs. Therefore, no impacts to SRMAs would occur if Alternative Route 1 is implemented. The USFS New Canyon Campground is over 2 miles north of all subroutes under Alternative Route 1; no impacts are anticipated due to distance. No other BLM, USFS, or private campgrounds would be impacted. All subroutes under Alternative Route 1 would cross approximately 41 acres of ROS areas within Cibola National Forest, including ROS classifications Roaded Natural, Semi-Primitive Motorized, and Semi-Primitive Non-Motorized. Local Alternative 1A-7 would avoid 0.2 acre of ROS classification Semi-Primitive Non-Motorized. Alternative 1 with all subroutes would cross one designated motor vehicle use trail within Cibola National Forest and pass within 2,000 feet of several others. The presence of transmission lines, structures, and potential access roads may impact user experiences in the affected areas and make the areas less attractive to users seeking more primitive recreation opportunities.

IMPACTS OF ALTERNATIVE ROUTE 2

All subroutes under Alternative Route 2 are over 2 miles from the Johnson (Gordy's) Hill, Quebradas Backcountry Byway, and Socorro Nature Area SRMAs. Therefore, no impacts to SRMAs would occur if Alternative Route 2 is implemented. The USFS New Canyon Campground is over 2 miles north of all subroutes under Alternative Route 2; no impacts are anticipated due to distance.

All subroutes of Alternative Route 2 would cross the Sevilleta NWR for approximately 14 miles (see AID-18 Sevilleta National Wildlife Refuge). All Alternative Route 2 subroutes would also be within 1.4 miles of the San Lorenzo Canyon recreation area, from which transmission lines and structures may be visible. Within the Sevilleta NWR, the Alternative Route 2 alternatives would be co-located in the existing transmission line footprint. SunZia would replace the existing transmission line infrastructure in the existing EPE transmission line footprint with one set of structures that would accommodate both the existing and new transmission lines. The change in structure type and/or size would result in visual changes within the NWR and San Lorenzo Canyon (see AID-12 Visual Resources) (POWER Engineers, Inc. 2021i:82). Temporary impacts would include presence of construction equipment and personnel and increased traffic, dust, noise, and emissions from construction vehicles, which would adversely impact recreation opportunities. The presence of larger transmission structures may impact user experiences over the long term and make the areas less attractive to users seeking more primitive recreation opportunities.

IMPACTS OF ALTERNATIVE ROUTE 3

All subroutes under Alternative Route 3 are over 2 miles from the Johnson (Gordy's) Hill, Quebradas Backcountry Byway, and Socorro Nature Area SRMAs. Therefore, no impacts to SRMAs would occur if Alternative Route 3 is implemented. The USFS New Canyon Campground is over 2 miles north of all subroutes under Alternative Route 3; no impacts are anticipated due to distance. Similar to Alternative Route 2, all subroutes of Alternative Route 3 would cross the Sevilleta NWR for approximately 14 miles, within the existing Tri-State transmission line footprint. The impacts to recreation activities due to replacement of existing transmission structures would be similar to those discussed under Alternative Route 2.

3.3.42.6 Impacts of SunZia West Substation

The SunZia West Substation footprint consists entirely of vacant, non-developed Arizona State Trust lands directly adjacent to two existing high-voltage transmission lines (POWER Engineers, Inc. 2021i:57). Therefore, no impacts to recreation resources are anticipated.

3.3.42.7 No Action Alternative

Impacts to recreation resources under the no action alternative would be as described in the 2013 FEIS (BLM 2013:4-209 through 4-221 and 4-226 through 4-227). The no action alternative crosses two areas of the Johnston (Gordy's) Hill SRMA, which is used for OHV recreation. The no action alternative avoids Cibola National Forest and the Sevilleta NWR.

3.3.42.8 Summary of Impacts

Long-term impacts to recreation resources would occur as a result of the presence of structures and transmission lines within the boundaries and/or viewsheds of recreation areas, which may adversely affect the user experience of these recreation areas and/or deter potential users. New or improved permanent roads on BLM lands would result in long-term, beneficial impacts to recreation because they would provide additional or improved OHV and general recreation opportunities and access. Short-term impacts would occur as a result of temporary presence of construction equipment and personnel as well as increased traffic, dust, noise, and emissions from construction vehicles during construction. Through the incorporation of the design features and EPMs referenced above, both long- and short-term impacts to recreation resources would be minimized to the extent practicable. Ultimately, the proposed project components would not substantially change the use of recreation areas or trails or the number and type of recreation users and tourists within these areas; therefore, long- and short-term impacts to recreation are anticipated to be minor.

Cumulative impacts to recreation are discussed in Sections 4.17.4.10 and 4.17.4.11 (BLM 2013:4-339 through 4-345) of the 2013 FEIS. Incremental impacts from the proposed project components would include long-term adverse impacts to up to 41 acres of ROS areas within Cibola National Forest and up to 60 acres of the Sevilleta NWR and short-term adverse impacts to several recreation areas related to construction traffic and the associated noise, fugitive dust, and emissions. Recreation impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components. Adverse cumulative impacts to recreation may result from construction of the proposed project components, in addition to other planned projects taking place on or within the viewsheds of BLM, USFS, or State-owned recreation lands, including maintenance projects; right-of-way authorizations; construction of new transmission lines, substations and wind projects, and transmission line updates; vegetation management treatment; recreation disposal; forest restoration and fuels reduction; mining activities and issuance of mining leases and permits; ongoing military training; and transportation projects (planned actions are estimated to total at least 1.5 million acres and/or 2,740 miles within the analysis area). Construction related impacts would be temporary and would end upon completion of project construction. Operation and maintenance of the transmission lines in combination with other infrastructure projects, renewable energy projects, and ongoing military training within the viewsheds of recreation resources may result in long-term visual impacts, which may adversely affect the user experience and/or deter potential users. Planned actions affecting federally owned lands would be carried out in accordance with NEPA and applicable RMPs, which would include avoidance and minimization measures.

AIB-22 Hunting Access

Would construction and operation of the proposed project components change hunting access, compared with the no action alternative?

3.3.43 Affected Environment

Hunting of big-game species can occur on federal, state, and private lands in New Mexico and Arizona. The NMDGF and AZGFD are responsible for regulating hunting activities in the analysis area, which is defined as federal and state hunting areas that overlap with the proposed project components. Hunting is also allowed within the Sevilleta NWR September to mid-February (USFWS 2019). The Rio Puerco Game Management Unit consists of 590 acres located adjacent to the Rio Puerco, approximately 4 miles north of the NWR Visitor Center.

The analysis area contains populations of big-game species, including mule deer, pronghorn, and desert bighorn sheep. Game species associated with Sevilleta NWR include dove, quail, American coots, ducks, and goose (USFWS 2019). Disturbance from the proposed project components could result in direct loss of vegetation, as described in AIB-8 Native Vegetation.

3.3.43.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable future trends and planned actions that may contribute to additional hunting include construction of new transmission lines, substations and wind projects, and transmission line updates; vegetation management treatment, recreation disposal, forest restoration and fuels reduction projects, and military operations (SWCA 2021).

3.3.44 Environmental Consequences

3.3.44.1 Methods and Assumptions

The following assumption was used to analyze impacts to hunting areas:

- The impacts analysis assumes application design features and EPMs provided in Appendix C.

The impact indicator used for this analysis is:

- Acres of surface disturbance within BLM, USFS, USFWS, and state hunting areas

3.3.44.2 Impacts Common to All Components

The proposed project components would result in up to 2,490 acres of surface disturbance within the BLM, USFS, and state hunting areas and proposed project Component 3, Alternative Route 3 would cross approximately 2 acres of the USFWS Rio Puerco Game Management Unit (Table 3-44). The surface disturbance would result in adverse impacts to hunting. Species of interest for hunting may avoid the project area during short-term construction (estimated construction duration is 3 years) and during infrequent, long-term operational activities. Species avoidance of the area could result in lower hunting success by permitted, recreational hunters. Hunting access may have the potential to be adversely affected by the proposed project components during project construction, when portions of the right-of-way and temporary work areas may be restricted for safety purposes. Per EPM 6, access roads required for operations purposes would be gated or otherwise blocked from public access to minimize disturbance to sensitive habitats or resources. Fences would meet BLM or other applicable agency/owner specifications. In the cases where permanent access roads are gated for resource protection, hunters would not be able to use those access roads for recreational hunting purposes.

Table 3-44. Hunting Areas Crossed by the Proposed Project Components

Project Component	Surface Disturbance in BLM and State Hunting Areas (acres)	Surface Disturbance in USFS Hunting Areas (acres)	Surface Disturbance in USFWS Hunting Areas (acres)
Component 1: Localized Route Modifications			
1. Mavericks Area	3	0	0
2. SunZia South Area	4	0	0
3. Macho Springs Area	9	0	0
4. Las Palomas Area	3	0	0
5. Highlands Area	6	0	0
6a. Pinal Central Area- North Route	0.8	0	0
6b. Pinal Central Area- Steele Route	0.03	0	0
6b. Pinal Central Area- Earley Route	0.5	0	0
Local Alternative West Tie-in	0	0	0
Local Alternative Central Tie-in	0	0	0
Local alternative East Tie-in	0	0	0
Component 2a. Access Roads	768	0	0
Component 2b. Temporary Work Areas	1,049	0	0
Component 3. Segment 4 Reroute Alternatives			
Alt Route 1 with Subroute 1A-1	510	31	0
Alt Route 1 with Subroute 1A-2	508	32	0
Alt Route 1 with Subroute 1A-3	536	31	0
Alt Route 1 with Subroute 1A-4	510	31	0
Local Alternative 1A-6	0.3	0	0
Local Alternative 1A-7	0.5	0	0
Alt Route 2 with Subroute 2A-1	259	0	0
Alt Route 2 with Subroute 2A-2	259	0	0
Alt Route 2 with Subroute 2A-3	258	0	0
Alt Route 2 with Subroute 2A-4	258	0	0
Alt Route 3 with Subroute 3A-1	257	0	2
Alt Route 3 with Subroute 3A-2	257	0	2
Alt Route 3 with Subroute 3A-3	257	0	2
Alt Route 3 with Subroute 3A-4	257	0	2
Local Alternative 3B-1	4	0	0
Local Alternative 3B-2	5	0	0
Component 4. SunZia West Substation	80	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.44.3 No Action Alternative

The no action alternative would result in impacts to hunting, similar to those disclosed for the proposed project components above. Impacts to recreation resources, including hunting, under the no action alternative would be as described in the 2013 FEIS (BLM 2013:3-255 through 3-272 and 4-209 through 4-227). No direct impacts to hunting are disclosed for no action alternative in the 2013 FEIS (BLM 2013). The no action alternative avoids USFS (Cibola National Forest) lands and the Sevilleta NWR.

3.3.44.4 Summary of Impacts

The proposed project components would result in up to 2,490 acres of surface disturbance within the BLM, USFS, and state hunting areas, and proposed project Component 3, Alternative Route 3 would cross approximately 2 acres of the USFWS Rio Puerco Game Management Unit. The surface disturbance would result in adverse impacts to hunting. The no action alternative would result in impacts to hunting similar to those disclosed for the proposed project components, although no impacts would occur to the USFS or USFWS hunting areas under the no action alternative.

Cumulative impacts to hunting are discussed in Section 4.17.4.13 of the 2013 FEIS (BLM 2013:4-350). Incremental impacts from the proposed project components could adversely impact up to 2,490 acres of surface disturbance within the BLM, USFS, USFWS, and state hunting areas. Impacts to hunting access from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to hunting may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations and wind projects, vegetation management treatment, forest restoration and fuels reduction, and military operations. The cumulative impacts to hunting access would include avoidance of the project area by game animals during short-term construction and during infrequent, long-term operational activities. Species avoidance of the area could result in lower hunting success by permitted, recreational hunters.

AIB-23 Livestock Grazing

Would construction and operation of the proposed project components impact livestock grazing by reducing available acreage or limiting access, compared with the no action alternative?

3.3.45 Affected Environment

For the purposes of this EIS, the analysis area for livestock grazing consists of the total acreage of all BLM grazing allotments that intersect with the proposed project components (Components 1–4 as described in Chapter 2).

The BLM, USFS, NMSLO, ASLD, and some local governments lease lands for livestock grazing within designated grazing allotments. The quantitative analysis in this section focuses on BLM grazing allotments; however, the impacts disclosed below would apply to any grazing activities occurring in the analysis area. Grazing also includes associated infrastructure and range improvements, including but not limited to fences, gates, wells, water pipelines, reservoirs, feed storage facilities, water troughs, corrals, and similar structural improvements, that enhance or improve livestock grazing management, forage production, soil and water quality, and wildlife habitat (BLM 2001). Grazing allotments managed by the BLM Field and District Offices within the analysis area in Arizona and New Mexico were identified in the 2013 FEIS (BLM 2013:3-254). The analysis area for the proposed project components includes a total of 85 allotments totaling 1,820,589 acres. Table H-1 in Appendix H includes a list of all grazing allotments within the analysis area.

3.3.45.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Other reasonably foreseeable trends and planned actions listed in the Reasonably Foreseeable Future Environmental Trends and Planned Actions Technical Report (SWCA 2021) may result in cumulative impacts to livestock grazing within the analysis area. Planned projects would result in future temporary and/or permanent surface disturbance within grazing allotments, resulting in temporary and/or permanent removal of forage within grazing allotments that would be similar to the proposed project. The BLM, USFS, and other federal agencies would continue to issue new grazing permits, manage existing grazing allotments, construct and maintain range improvements, and conduct vegetation management on federally owned lands as indicated in their respective RMPs and planning documents.

3.3.46 Environmental Consequences

3.3.46.1 Methods and Assumptions

The following assumptions were used to analyze impacts to livestock grazing:

- Temporary impact areas would be restored to preconstruction conditions.
- Grazing activities would be allowed to continue within the right-of-way and in temporary impact areas after construction is complete.
- With the exception of permanent impact areas, all existing access to grazing lands would be maintained after construction; permanent fences or gates would only be installed with permission of the of the BLM and coordination with the grazing permittee(s) (POWER Engineers, Inc. 2021i:4).
- All impacts to existing range improvements would be temporary, as any damaged range improvements would be repaired following construction.
- Lessees of affected grazing allotments would have the opportunity to discuss the potential loss of forage and animal unit month (AUM) reduction within their respective allotment with the authorized BLM Field/District Office Manager.

The impact indicators used for this analysis are:

- Acres of grazing allotments temporarily impacted
- Acres of grazing allotments permanently impacted

The impacts analysis for grazing assumes application of the design features and EPMs contained in Table 3-45 below. Full design features and EPMs are provided in Appendix C.

Table 3-45. Design Features and Environmental Protection Measures Applicable to Livestock Grazing

Relevant Design Features	Applicable EPMs
1, 5, 7, 8, 9, 21	3, 5

3.3.46.2 Impacts Common to All Components

For the purposes of this EIS, a permanent impact to available livestock grazing lands is defined as permanent removal of available grazing acreage, specifically to forage or foraging access due to transmission structures and substations (Components 1 and 4), new or improved permanent access roads (Component 2), fencing, or other permanent features. Long-term impacts to grazing include loss of vegetation/forage from the permanent project components, potential introduction of noxious weeds into grazing allotments, and potential restricted access to grazing allotments due to new fences erected along the transmission line right-of-way. A temporary impact to available livestock grazing lands is defined as a reduction in available grazing acreage during construction that would occur from ground-disturbing impact to forage or grazing allotments that would be restored to preconstruction conditions and in which grazing would be allowed to continue after construction is complete. All impacts to existing range improvements would also be temporary, as any damaged range improvements would be repaired following construction (Design Features 9 and 21).

A series of design features and EPMs would be implemented to reduce impacts to livestock grazing. After construction, all temporary impact areas would be restored as is practicable to their original contour, natural drainage patterns, and vegetation in accordance with the POD (Design Features 1 and 8). In addition to standard reseeding and recontouring practices, a detailed project reclamation plan would be developed to mitigate site-specific resource impacts (EPM 5). In construction areas where grading is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for regrowth (Design Feature 5). Overland access (i.e., drive-and-crush or cut-and-clear) would be used to the greatest extent possible in areas where no grading would be needed to access work areas. All vegetation would be removed using above-ground cutting methods that leave the root crown intact (EPM 3). Unless requested by the landowner, SunZia would not erect fencing along the right-of-way (POWER Engineers, Inc. 2021i:4). New temporary and/or permanent gates would be installed only with the permission of the landowner or the BLM. Temporary gates would be removed following construction activities (Design Feature 21). Construction excavations would be fenced or covered to prevent wildlife or livestock from becoming trapped or injured (Design Feature 7). Existing range improvements such as watering facilities (e.g., tanks, developed springs, water lines, wells, etc.), fences, and gates that are damaged or destroyed by construction activities would be repaired or replaced to their original pre-construction condition as required by the landowner or BLM Authorized Officer or designee (Design Features 9 and 21). Temporary watering facilities would be provided for wildlife and livestock until permanent repair or replacement is complete (Design Feature 9). Thus, impacts to range improvements would be temporary. As noted in Section 4.10.5 of the 2013 FEIS (BLM 2013:4-208), individual grazing lessees/permittees of record on public lands would have the opportunity to discuss the potential loss of forage and AUM reduction within their respective allotment with the authorized BLM Field/District Office Manager.

Table 3-46 shows the acreages of temporary and permanent impacts to grazing allotments anticipated under the proposed action. Table H-1 in Appendix H includes a detailed analysis of the temporary and permanent impacts by allotment.

Table 3-46. Impacts to Livestock Grazing (Reduction of Available Acreage) from the Proposed Project Components

Project Component	Temporary Reduction of Available Grazing (acres)	Permanent Reduction of Available Grazing (acres)
Component 1. Localized Route Modifications		
1. Mavericks Area	0	0.8

Project Component	Temporary Reduction of Available Grazing (acres)	Permanent Reduction of Available Grazing (acres)
2. SunZia South Area	0	0.6
3. Macho Springs Area	0	2.9
4. Las Palomas Area	0	1.6
5. Highlands Area	0	1.8
6a. Pinal Central Area- North Route	0	0
6b. Pinal Central Area- Steele Route	0	0
6c. Pinal Central Area- Earley Route	0	0.2
Local Alternative West Tie-in	0	0
Local Alternative Central Tie-in	0	0
Local Alternative East Tie-in	0	0
Component 2a. Access Roads	47.8	429.4
Component 2b. Temporary Work Areas	779.1	0
Component 3. Segment 4 Reroute Alternatives		
Alternative Route 1 with Subroute 1A-1	202.8	199.0
Alternative Route 1 with Subroute 1A-2	201.4	198.0
Alternative Route 1 with Subroute 1A-3	215.7	211.6
Alternative Route 1 with Subroute 1A-4	202.8	198.7
Local Alternative 1A-6	1.1	1.6
Local Alternative 1A-7	2.1	2.7
Alternative Route 2 with Subroute 2A-1	70.3	65.1
Alternative Route 2 with Subroute 2A-2	70.3	65.2
Alternative Route 2 with Subroute 2A-3	70.3	65.0
Alternative Route 2 with Subroute 2A-4	70.3	65.0
Alternative Route 3 with Subroute 3A-1	92.6	87.9
Alternative Route 3 with Subroute 3A-2	92.6	88.0
Alternative Route 3 with Subroute 3A-3	92.6	87.9
Alternative Route 3 with Subroute 3A-4	92.6	87.8
Local Alternative 3B-1	18.8	15.8
Local Alternative 3B-2	24.2	21.5
Component 4. SunZia West Substation	0	80.3

Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.46.3 Impacts of Localized Route Modifications

The localized route modifications would result in a total of 7.9 acres of permanent removal of grazing lands.

3.3.46.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Under Component 2, a total of 827 acres within grazing allotments would be temporarily impacted, primarily as a result of TWAs (779 acres).

3.3.46.5 Impacts of Segment 4 Reroute Alternatives

Under Component 3, the Segment 4 alternative routes and subroutes intersect between seven and 17 BLM grazing allotments. Segment 4 Alternative Route 1 with Subroute 1A-3 would result in the highest acreage of permanent impacts to grazing at 212 acres; Alternative Route 2 with Subroutes 2A-3 or 2A-4 would result in the lowest acreage of permanent impacts at 65 acres. Segment 4 Alternative Route 1 with Subroute 1A-3 would result in the highest acreage of temporary impacts to grazing at 216 acres; Alternative Route 2 with any subroute would result in the lowest acreage of temporary impacts at 70 acres.

3.3.46.6 Impacts of SunZia West Substation

The SunZia West Substation would result in the permanent removal of approximately 80 acres of available grazing land within the Owl Head grazing allotment, representing less than 0.2% of the available grazing land within the 58,000-acre allotment. Therefore, the impact to grazing under Component 4 would be negligible given the availability of other grazing areas within the allotment.

3.3.46.7 No Action Alternative

Impacts to grazing under the no action alternative would be as described in Sections 3.10.3.2 and 4.10.5 of the 2013 FEIS (BLM 2013:3-254, 3-267 through 3-268, 4-210 through 4-216). Under the no action alternative, approximately 276 acres of BLM land used for grazing within the Las Cruces District Field Office (BLM 2013:4-210, 4-212), approximately 151 acres within the Socorro Field Office (BLM 2013:4-210), approximately 124 acres within the Safford Field Office (BLM 2013:4-212), and approximately 50 acres within the Tucson Field Office (BLM 2013:4-216) would be permanently impacted, which is less than 0.01% of available grazing land in those Field Offices. No BLM land would be removed within the Rio Puerco Field Office.

3.3.46.8 Summary of Impacts

Overall, the proposed action and alternatives would result in a total of 583 to 729 acres of permanent removal of forage, representing approximately 0.04% of the total grazing allotment acres within the analysis area. By incorporating the design features and EPMs described above, the proposed action and Segment 4 reroute alternatives would minimize the extent of surface disturbance and vegetation removal in grazing areas. Therefore, the long-term impact to livestock grazing under the proposed action and alternatives would be minor.

Cumulative impacts to grazing are discussed concurrently with land use in Section 4.17.4.10 of the 2013 FEIS (BLM 2013:4-339 through 4-344). Incremental impacts from the proposed project components would result in a total of up to 729 acres of permanent removal of forage. Reasonably foreseeable environmental trends and planned actions would result in future temporary and/or permanent surface disturbance and removal or forage within grazing allotments, similar in nature to the proposed project components. Adverse cumulative impacts to grazing may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, solar developments, military activities, and residential subdivisions (planned actions are estimated to total approximately 76,600 acres and/or 2,890 miles within the analysis area). However, the amount of permanent removal of forage associated with these projects would not be significant in the context of the region. The planned actions proposed by BLM, USFS, and other federal agencies would involve issuing new grazing permits, managing and renewing existing grazing allotments, constructing and maintaining range improvements, and conducting vegetation management on federally owned lands as indicated in their respective RMPs and planning documents, all of which would have beneficial impacts on grazing. Existing and future grazing allotments, conservation areas, open space designations, and other conservation initiatives would limit development to certain areas. Similar to the proposed action, proponents of planned actions would be expected to resolve land use conflicts, including any compensation for economic impacts through landowner agreements and permissions. Therefore, cumulative adverse impacts to grazing in the region would be minor.

AIB-24 Transportation

Would traffic generated by construction and operation of the proposed project components lead to increased congestion or increased potential for accidents on existing roads, compared with the no action alternative?

3.3.47 Affected Environment

The analysis area for ground transportation for this Draft EIS consists of the following elements:

- Project Component 1 – Localized Route Modifications: A 6-mile-wide area centered on the reference centerline of the six proposed localized route modifications
- Project Component 2 – Access Roads and Temporary Work Areas Outside of Granted Right-of-Way: 150-foot-wide study corridor centered on access-road centerline of proposed access road alignments outside 400-foot right-of-way; boundary of temporary work areas
- Project Component 3 – Segment 4 Reroute Alternatives: A 6-mile-wide study corridor (centered on the 400-foot right-of-way) for Segment 4 alternative routes
- Project Component 4 – SunZia West Substation: 80-acre substation siting area (including the 40 acres of the substation siting area in the existing right-of-way)

A variety of federal, state, and local agencies administer and regulate roadways. The Federal Highway Administration (FHWA) is responsible for interstate and U.S. highways and projects affecting them. The Arizona Department of Transportation (ADOT) and New Mexico Department of Transportation (NMDOT) manage state highways and routes, whereas county and local roads are controlled by the presiding municipality. Other roads on federal lands are managed by the applicable federal agencies (BLM, USFS, etc.). These various entities are responsible for ensuring the safety, functionality, and economic efficiency of the public roadway network.

Two interstate highways are present in the analysis area: Interstate 10 and Interstate 25. I-10 is oriented east–west and is located south of the 2015 Selected Route from the western terminus at Pinal Central Substation in Arizona to Deming, New Mexico. I-25 is oriented north–south and generally parallels the Rio Grande. Numerous other state highways, including State Highways 1, 26, 27, 42, 47, 90, 107, and 464, are also present within the analysis area.

3.3.47.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable trends and planned actions within the analysis area for ground transportation may result in cumulative impacts to congestion or safety concerns when combined with the proposed project components or the no action alternative. Anticipated population growth within the 12 counties crossed by the project is expected to result in additional development, corresponding roadway congestion, and the need for additional transportation improvements in the region (SWCA 2021). Six ADOT projects and 14 NMDOT projects were identified within or near the analysis area (POWER Engineers, Inc. 2021i:9–11). The proposed action would not preclude these projects from proceeding as planned. Construction activities associated with ongoing and planned actions of any kind are likely to add unusually high levels of traffic to the roadway network at a local and/or regional level. These activities typically increase travel on the road network during finite construction periods and/or for extended periods associated with facility operations. This traffic, in combination with baseline traffic levels, can create congestion, safety, and/or road maintenance issues during the overlapping timeframes. While these traffic impacts may be temporary at the level of an individual project, the cumulative impact of projects constructed consecutively may prolong these adverse effects on a larger scale.

3.3.48 Environmental Consequences

3.3.48.1 Methods and Assumptions

The following assumptions were used to analyze impacts to ground transportation:

- No long-term changes in traffic patterns are anticipated.
- Project-related construction traffic would represent a negligible portion of total traffic on public roads.
- SunZia would coordinate with NMDOT to ensure all crossing permit requirements are met prior to construction.

The impact indicator used for this analysis is the miles of linear transportation routes crossed by the proposed project components.

The impacts analysis for transportation assumes application of the design features and EPMs contained in Table 3-47 below. Full design features and EPMs are provided in Appendix C.

Table 3-47. Design Features and Environmental Protection Measures Applicable to Transportation

Relevant Design Features	Applicable EPMs
1, 2, 5, 6	2, 3, 4, 6, 8, 9, 10

3.3.48.2 Impacts Common to All Components

Under all components of the proposed action, additional traffic would occur during construction and decommissioning. Construction and decommissioning activities would introduce construction vehicles and personal worker vehicles onto existing roadway networks. Project-related construction traffic would represent a negligible portion of total traffic on public roads. To minimize traffic impacts during construction, all vehicle movement outside the right-of-way would typically be restricted to designated access, contractor acquired access, or public roads (Design Feature 2). The POD (Design Feature 1) would include a Transportation Management Plan that includes measures to reduce impacts on transportation and to protect public safety on roads during construction. Strict adherence to the Transportation Management Plan included in the POD would minimize traffic impacts along the Lake Valley Backcountry Byway. No permanent impacts to traffic along the Byway would occur. Operations and maintenance activities would be infrequent (bi-annually and emergency response) and require only a minimal number of vehicles using public roadways, resulting in a negligible long-term impact to traffic.

During operations and maintenance, the placement of transmission lines and structures along or over existing roadways may result in an increased risk of operational conflicts and safety hazards (e.g., vehicle collisions with structures, reduced driver visibility). To minimize these risks, structures would be placed at the maximum distance possible from roadway crossings to avoid or span roadways (EPMs 8 and 10) and/or to correspond with spacing of existing transmission line structures where feasible (EPM 9). SunZia would coordinate with NMDOT to ensure all crossing permit requirements are met prior to construction (POWER Engineers, Inc. 2021i:77).

Table 3-48 shows the miles of linear transportation facilities crossed by each of the project components.

Table 3-48. Miles of Linear Transportation Facilities Crossed

Project Component	Linear Transportation Crossed (miles)
Component 1: Localized Route Modifications	
1. Mavericks Area	0.1
2. SunZia South Area	0.3
3. Macho Springs Area	0.4
4. Las Palomas Area	0.4
5. Highlands Area	0.2
6a. Pinal Central Area- North Route	0.7
6b. Pinal Central Area- Steele Route	3.4
6c. Pinal Central Area- Earley Route	3.4
Local Alternative West Tie-in	0
Local Alternative Central Tie-in	0
Local Alternative East Tie-in	0
Component 2a. Access Roads	980.7
Component 2b. Temporary Work Areas	3.3
Component 3. Segment 4 Reroute Alternatives	
Alternative Route 1 with Subroute 1A-1	9.0
Alternative Route 1 with Subroute 1A-2	8.5
Alternative Route 1 with Subroute 1A-3	8.5
Alternative Route 1 with Subroute 1A-4	9.3
Local Alternative 1A-6	0.2
Local Alternative 1A-7	0.1
Alternative Route 2 with Subroute 2A-1	8.9
Alternative Route 2 with Subroute 2A-2	8.8
Alternative Route 2 with Subroute 2A-3	8.6

Project Component	Linear Transportation Crossed (miles)
Alternative Route 2 with Subroute 2A-4	9.2
Alternative Route 3 with Subroute 3A-1	9.1
Alternative Route 3 with Subroute 3A-2	8.9
Alternative Route 3 with Subroute 3A-3	8.7
Alternative Route 3 with Subroute 3A-4	9.3
Local Alternative 3B-1	1.1
Local Alternative 3B-2	0.4
Component 4. SunZia West Substation	0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.48.3 Impacts of Localized Route Modifications

Localized Route Modifications 1 through 5 cross a total of 1.4 miles of local roads. Route Modification 2 (SunZia South) would pass within 1,300 feet of State Highway 26 (Hatch Highway). Route Modification 5 would span State Highway 107. Route Modification 6a, the North Route, crosses 0.7 mile of roads, including State Highway 287, and parallels State Highway 87 for 0.4 mile. Route Modification 6b, the Steele Route, parallels State Highway 87 for 1 mile and then parallels Steele Road for 3 miles. Route Modification 6c, the Earley Route, parallels Earley Road for approximately 1.5 miles and crosses State Highway 87. The remaining proposed route modifications would cross generally the same roads as proposed under the no action alternative, but in different locations.

3.3.48.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Under Component 2, approximately 709 miles of permanent access roads and 52 miles of temporary access roads are proposed outside the granted right-of-way along Segments 1, 2, and 3. Of these, approximately 549 miles of permanent roads and 7 miles of temporary roads are proposed along existing roads (POWER Engineers, Inc. 2021i:29–30). Proposed access roads along Segment 3 include the existing New Mexico State Roads 27 and 152. All proposed temporary work areas are typically located adjacent to or near existing roads; no roadway crossings or direct impacts to roads are anticipated.

Access road types proposed outside the granted right-of-way under Component 2 include existing roads with no improvement required, existing roads with improvement required, and new roads. Use of existing roads has been proposed to the extent possible (Design Feature 6), which would minimize ground disturbance and new access points to existing road networks. Because access roads must be sufficient to bear the weight and endure heavy construction vehicle use, existing roads may need to be upgraded to meet construction requirements and/or to meet BLM (or other agencies') standards for road construction. Road improvements and construction would be in accordance with agency requirements and applicable mitigation measures (POWER Engineers, Inc. 2021a:20–21). New roads may be built as either temporary (required for construction only) or permanent roads (required for long-term operation and maintenance) (POWER Engineers, Inc. 2021a:25). During construction of temporary access roads, overland access (i.e., drive-and-crush or cut-and-clear) would be used to the greatest extent possible in areas where no grading would be needed to access work areas (EPMs 2 and 3), which would minimize public access and increases to vehicular traffic (POWER Engineers, Inc. 2021a:21). On completion of construction, all new temporary access roads not required for maintenance would be permanently closed, with concurrence of the landowner or appropriate land management agency. This would limit new or improved accessibility into the area (EPM 4). Existing and new permanent access roads that are used for construction will be used for operation and maintenance purposes only for the term of the right-of-way grant. These roads would be gated or otherwise blocked from public access (EPM 6) and therefore would not result in any long-term changes to traffic patterns. All existing roads will be left in a condition equal to or better than the condition prior to construction, in accordance with BLM, state, and/or local road standards or private landowner agreements (Design Feature 5) (POWER Engineers, Inc. 2021a:21). SunZia would maintain the road rights-of-way in a safe, useable condition and maintenance agreements will be executed with applicable land-management agencies, counties, local agencies, and private landowners (POWER Engineers, Inc. 2021a:25).

3.3.48.5 Impacts of Segment 4 Reroute Alternatives

All Segment 4 alternatives under Component 3 run parallel to State Highway 42 for approximately 20 miles and cross the highway south of Cedarvale, New Mexico. All Segment 4 alternatives also cross I-25; U.S. Highway 60; State Highways 47, 116, 304, and 55; and multiple local roads. Alternative Route 2 with Subroutes 2A-1, 2A-2, and 2A-4 and Alternative Route 3 with Subroutes 3A-1, 3A-2, and 3A-4 all run parallel to I-25 to the west for 2 to 7 miles between U.S. Highway 60 and the Valencia County line. The alternative routes would cross between 8.5 and 10 miles of linear transportation facilities. Alternative Route 3 with Subroute 3A-4 would cross the greatest amount of linear transportation facilities at 10 linear miles crossed; Alternative Route 1 with either Subroute 1A-2 or 1A-3 would cross 8.5 miles.

3.3.48.6 Impacts of SunZia West Substation

The proposed SunZia West Substation (Component 4) is adjacent to South Owl Head Ranch Road. No improvements to the road are proposed; therefore, the implementation of Component 4 would have no impacts to transportation.

3.3.48.7 No Action Alternative

Impacts to ground transportation under the no action alternative would be as described in the 2013 FEIS (BLM 2013:4-247 through 4-256). Under the no action alternative, access roads would not be optimized for efficiency, constructability, and safety, resulting in a greater impact to traffic congestion and safety and potentially requiring time-consuming variances during construction to comply with local and state regulations.

3.3.48.8 Summary of Impacts

Overall, the implementation of the proposed action and alternatives with the design features and EPMs incorporated would result in negligible impacts to traffic patterns and safety during construction. No permanent impacts to traffic patterns are anticipated. Implementation of Component 2 would result in increased use of existing roads, increased efficiencies during construction, improved constructability and safety, and minimal potential time-consuming variances needed during construction, compared with the no action alternative (POWER Engineers, Inc. 2021a:20).

Cumulative impacts to transportation are discussed in Sections 4.17.4.2 and 4.17.4.10 of the 2013 FEIS (BLM 2013:4-306, 4-340 through 4-343). Incremental impacts to transportation from the proposed project components include negligible short-term impacts to traffic patterns and safety. Transportation impacts from reasonably foreseeable trends and planned actions would be similar in nature to the proposed project components (described above). Construction of the proposed project components, when combined with baseline traffic levels and construction activities of planned actions of any kind, may result in adverse cumulative impacts to congestion, safety, and/or road maintenance issues. While these traffic impacts may be temporary at the level of an individual project, the cumulative impact of projects constructed consecutively may prolong these adverse effects.

AIB-25 Civilian Airports and Flight Paths

Would construction and operation of towers and power lines associated with the proposed project components interfere with any civilian airports and flight paths, compared with the no action alternative?

3.3.49 Affected Environment

This analysis focuses on project components with features such as transmission structures and lines that have the potential to interfere with flight paths (i.e., Components 1 and 3). The analysis area for civilian airports and flight paths consists of a 6-mile-wide area centered on the reference centerline of the proposed localized route modifications (Component 1) and a 6-mile-wide corridor centered on the 400-foot right-of-way for each Segment 4 alternative route (Component 3). Components 2 and 4 do not include features that would interfere with flight paths and therefore have been dismissed from this issue statement.

Per Federal Aviation Administration (FAA) regulations at 14 CFR 77, airports are required to maintain three-dimensional clear zones around runway approaches to ensure that flight paths remain unobstructed. FAA must be notified and an obstruction evaluation/airport airspace analysis must be prepared if a proposed project would involve construction of structures such as guy wires, towers, transmission lines, tall buildings, temporary construction equipment such as cranes, or other possible aviation hazards that encroach upon these clear zones or exceed 200 feet above ground level regardless of location. In these cases, the project proponent is required to file a Notice of Proposed Construction or Alteration (Form 7460-1) with the FAA at least 45 days prior to construction (FAA 2020a). The FAA may issue a Determination of No Hazard to Air Navigation if the proposed construction exceeds these obstruction standards but would not have a substantial impact to air navigation; additional provisions, limitations, and recommendations may apply in these cases (14 CFR 77.31). Private-use airstrips are not subject to notification requirements listed in 14 CFR 77.9; however, for the purposes of this analysis, the FAA criteria for clear zones have been applied to private airstrips for consistency in determining impacts.

Six air facilities exist within or near the Component 1 and 3 analysis areas. The Coolidge Municipal Airport is a public-use airport located approximately 3.4 miles northeast of Route Modification 6a, the North Route. Coolidge Municipal Airport has two runways, both of which exceed 3,200 feet in length. The privately owned Sarita Airport is located within the Component 1 analysis area approximately 2 miles north of Route Modification 6a and has one 2,800-foot-long runway. The Belen Regional Airport is an FAA-registered, public-use airport located approximately 3 miles north of the Component 3 analysis area and approximately 6 miles north of the project footprint for the nearest Segment 4 reroute alternative (Alternative 1). Belen Regional Airport has two runways, both of which exceed 3,200 feet in length (FAA 2021). The remaining three facilities are privately owned airstrips (i.e., Burris Ranch NR 1, Flying H, and Skywagon Farm) with runway lengths ranging from 1,100 to 5,000 feet (FAA 2021), used for agricultural purposes and to access private land (Table 3-49).

Table 3-49. Air Facilities within or near the Civilian Airports and Flight Paths Analysis Area and Distances from Project Footprint

Project Component	**Sarita Airport Type: Private Use Location: 32-56-8.224N, 111-29-4.44W Runway Length: 2,800 feet Clear Zone: 10,000 feet, 1:50 slope**	**Coolidge Municipal Airport (FAA-regulated) Type: Public Use Location: 32-56-9.684N, 111-25-35.3041W Runway Length: 5,564 feet Clear Zone: 20,000 feet, 1:100 slope**	**Belen Regional Airport (FAA-regulated) Type: Public Use Location: 34-38-45.1019N, 106-50-10.8243W Runway Length: 6,601 feet Clear Zone: 20,000 feet, 1:100 slope**	**Burris Ranch NR 1 Airstrip Type: Private Location: 34-29-00.2300N, 106-36-47.0770W Runway Length: 5,000 feet Clear Zone: 20,000 feet, 1:100 slope**	**Flying H Airstrip Type: Private Location: 34-32-24.6200N, 106-46-40.4400W Runway Length: 1,120 feet Clear Zone: 10,000 feet, 1:50 slope**	**Skywagon Farm Airstrip Type: Private Location: 34-32-35.7000N, 106-45-35.6000W Runway Length: 1,100 feet Clear Zone: 10,000 feet, 1:50 slope**
	Distance to project footprint (feet)	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**
Component 1: Localized Route Modifications						
6a. Pinal Central Area – North Route[1]	Outside of clear zone	Outside of clear zone				
Component 3: Segment 4 Reroute Alternatives						
Alternative Route 1 with Subroute 1A-1			Outside of clear zone	4,000 feet NNE	300 feet N*	3,300 feet NNE
Alternative Route 1 with Subroute 1A-2			Outside of clear zone	4,000 feet NNE	Outside of clear zone	Outside of clear zone
Alternative Route 1 with Subroute 1A-3			Outside of clear zone	13,500 feet N	Outside of clear zone	Outside of clear zone
Alternative Route 1 with Subroute 1A-4			Outside of clear zone	1,600 feet S*	300 feet N*	3,300 feet NNE
Local Alternative 1A-6			Outside of clear zone	Outside of clear zone	Outside of clear zone	Outside of clear zone
Local Alternative 1A-7			Outside of clear zone	Outside of clear zone	Outside of clear zone	Outside of clear zone
Alternative Route 2 with Subroute 2A-1			Outside of clear zone	4,000 feet NNE	300 feet N*	3,300 feet NNE
Alternative Route 2 with Subroute 2A-2			Outside of clear zone	4,000 feet NNE	Outside of clear zone	Outside of clear zone
Alternative Route 2 with Subroute 2A-3			Outside of clear zone	13,500 feet N	Outside of clear zone	Outside of clear zone

Project Component	Sarita Airport Type: Private Use Location: 32-56-8.224N, 111-29-4.44W Runway Length: 2,800 feet Clear Zone: 10,000 feet, 1:50 slope	Coolidge Municipal Airport (FAA-regulated) Type: Public Use Location: 32-56-9.684N, 111-25-35.3041W Runway Length: 5,564 feet Clear Zone: 20,000 feet, 1:100 slope	Belen Regional Airport (FAA-regulated) Type: Public Use Location: 34-38-45.1019N, 106-50-10.8243W Runway Length: 6,601 feet Clear Zone: 20,000 feet, 1:100 slope	Burris Ranch NR 1 Airstrip Type: Private Location: 34-29-00.2300N, 106-36-47.0770W Runway Length: 5,000 feet Clear Zone: 20,000 feet, 1:100 slope	Flying H Airstrip Type: Private Location: 34-32-24.6200N, 106-46-40.4400W Runway Length: 1,120 feet Clear Zone: 10,000 feet, 1:50 slope	Skywagon Farm Airstrip Type: Private Location: 34-32-35.7000N, 106-45-35.6000W Runway Length: 1,100 feet Clear Zone: 10,000 feet, 1:50 slope
	Distance to project footprint (feet)	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**	**Distance to project footprint (feet)**
Alternative Route 2 with Subroute 2A-4			Outside of clear zone	1,600 feet S*	300 feet N*	3,300 feet NNE
Alternative Route 3 with Subroute 3A-1			Outside of clear zone	4,000 feet NNE	300 feet N*	3,300 feet NNE
Alternative Route 3 with Subroute 3A-2			Outside of clear zone	4,000 feet NNE	Outside of clear zone	Outside of clear zone
Alternative Route 3 with Subroute 3A-3			Outside of clear zone	13,500 feet N	Outside of clear zone	Outside of clear zone
Alternative Route 3 with Subroute 3A-4			Outside of clear zone	1,600 feet S*	300 feet N*	3,300 feet NNE
Local Alternative 3B-1			Outside of clear zone	Outside of clear zone	Outside of clear zone	Outside of clear zone
Local Alternative 3B-2			Outside of clear zone	Outside of clear zone	Outside of clear zone	Outside of clear zone

Sources: FAA (2021); POWER Engineers, Inc. (2021i).

* Co-located with constructed Western Spirit 345-kV transmission line

1. Only localized Route Modification 6a would occur near an airport.

Note: Local Alternatives are exchangeable within their associated alternative route.

3.3.49.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Planned transmission line projects (e.g., the constructed Western Spirit 345-kV Line Project, and proposed Southline Transmission Line project, High Plains Express Transmission Line Project, and others), wind energy projects, ongoing and future military testing and airspace restrictions, and other projects involving structures may impact civilian airports and flight paths (SWCA 2021). These projects would also have to comply with FAA regulations cited above.

3.3.50 Environmental Consequences

3.3.50.1 Methods and Assumptions

The following assumptions were used to analyze impacts to civilian airports:

- All project elements would be designed and constructed in accordance with FAA regulations.
- Private airstrips may require coordination with individual landowners in lieu of or in addition to coordination with FAA.
- No construction equipment would exceed 200 feet in height.

The impact indicator used for this analysis is the proposed location of structures within the FAA-designated clear zone of any public or private airport or airstrip that would require coordination with FAA. The size and elevation of clear zones are calculated according to the length of the runway and the airport type. For public-use, federally owned or operated, and FAA-permitted airports, the clear zone consists of an imaginary surface extending outward and upward at a slope of: 1) 100 to 1 for a horizontal distance of 20,000 feet (approximately 4 miles) from any point on the nearest runway for each airport with at least one runway 3,200 feet or more in length, or 2) 50 to 1 for a horizontal distance of 10,000 feet (approximately 2 miles) from any point on the nearest runway for airports with runways up to 3,200 feet in length (14 CFR 77.9).

The impacts analysis for existing and future land uses assumes application of the design features and EPMs contained in Table 3-50 below. Full design features and EPMs are provided in Appendix C.

Table 3-50. Design Features and Environmental Protection Measures Applicable to Existing and Planned Land Uses

Relevant Design Features	Applicable EPMs
12	7, 8

3.3.50.2 Impacts Common to All Components

Table 3-49 shows the location and characteristics of each civilian air facility within the analysis area and the distance to the nearest runway of each proposed project component that is within the clear zone of these facilities.

A permanent impact to flight paths is defined as any structure that encroaches upon the clear zone of any public or private air facility, which could require adjustments to flight paths and potentially result in a Determination of Hazard to Air Navigation from the FAA. Temporary impacts to flight paths are defined as any construction equipment such as cranes that would temporarily encroach upon clear zones during construction and decommissioning. Construction equipment is not anticipated to exceed 200 feet in height. Any construction equipment that would encroach within a clear zone or that would exceed 200 feet in height in any location would require notification to FAA and/or coordination with owners and users of private airstrips.

The project would be designed in accordance with FAA regulations and appropriate design features and EPMs to avoid or minimize potential safety issues associated with these airstrips. Structures and/or groundwire would be marked with high-visibility devices where required by FAA (Design Feature 12). Modified tower design or alternate tower types would be used to minimize operational conflicts in designated areas such as airstrip clear zones (EPM 7). To the extent practicable, structures could be placed so as to avoid or span sensitive features such as runway approaches within the limits of the selected tower design in those areas (EPM 8). The incorporation of these design features and EPMs would minimize the impact to runway approaches and flight paths.

3.3.50.3 Impacts of Localized Route Modifications

The analysis area for Component 1 is outside the FAA-designated clear zones for the Belen Regional Airport and Sarita Airport. Therefore, no impacts to flight patterns at these facilities are anticipated and no notification to FAA would be required. Route Modification 6a, the North Route, is within the clear zone of the Coolidge Municipal Airport; however, the height of the proposed transmission structures is not likely to exceed the runway approach surface elevation for this facility. Notification to FAA may be required to initiate a Determination of No Hazard.

3.3.50.4 Impacts of Segment 4 Reroute Alternatives

The analysis area for Component 3 is outside the FAA-designated clear zones for the Belen Regional Airport and Sarita Airport. Therefore, no impacts to flight patterns at these facilities are anticipated and no notification to FAA would be required. The project footprints for all Segment 4 alternative routes are within the clear zone of the Burris Ranch NR 1 airstrip. Eight of these alternative routes are also within the clear zones for the Flying H and Skywagon Farm airstrips. Four alternatives (i.e., Alternative Route 1 with Subroute 1A-4, Alternative Route 2 with Subroute 2A-4, Alternative Route 3 with Subroute 3A-4, and Alternative Route 3 with Subroute 3A-4) would have the highest potential impact to private airstrip flight paths; these alternatives are the closest to the Burris Ranch NR 1 airstrip and would also affect the Flying H and Skywagon Farm airstrips. Alternative Route 1 with Subroute 1A-1, Alternative Route 2 with Subroute 2A-1, and Alternative Route 3 with Subroute 3A-1 would also encroach upon the clear zones of all three private airstrips; however, these alternatives are farther from the Burris Ranch airstrip, and thus the overall impact to airstrips would be to a lesser extent. The remaining alternatives would encroach upon the Burris Ranch airstrip only and would therefore have the least overall impact to private airstrip flight paths.

Given the locations of the Segment 4 reroute alternatives, the height of the proposed transmission structures (100 to 170 feet [BLM 2013:2-51 through 2-59]) would potentially be above the runway approach surface elevations for all private airstrips within the analysis area for this issue statement. The heights of certain structure types may exceed the 100:1 or 50:1 slope criteria. Because these airstrips are privately owned, encroachments into the flight paths may not require submission of a Notice of Proposed Construction or Alteration to the FAA for an obstruction evaluation, unless requested by FAA (FAA 2020a).

3.3.50.5 No Action Alternative

For the no action alternative, 15 public and military air facilities were identified within the 2013 FEIS study area (BLM 2013:3-256). One airport, the San Manuel Airport, is located within 1 mile of the granted right-of-way east of Segment 1 (BLM 2013:3-274). Since the 2015 ROD was issued, the FAA determined that the San Manuel Airport Layout Plan must be modified to accommodate the 2015 Selected Route within the granted right-of-way. As of September 2021, the FAA is currently reviewing the modified San Manuel Airport Layout Plan. Upon FAA approval of the plan, SunZia will apply to the FAA for a Determination of No Hazard (SunZia 2021b). No other airports or airstrips were identified within 20,000 feet of the granted right-of-way. As stated above, all structures under the no action alternative would be constructed in accordance with FAA regulations. Therefore, no impacts to civilian airports or flight paths would occur.

3.3.50.6 Summary of Impacts

Under Components 1 and 3, transmission structures are proposed within the FAA-designated clear zones (or equivalent) of one public airport and three private airstrips, which may require coordination with FAA to obtain a Determination of No Hazard to Air Navigation. The incorporation of the design features and EPMs described above would minimize impacts to runway approaches and flight paths. Therefore, changes in flight patterns or altitudes at airports within the analysis areas would not be anticipated as a result of implementation of Component 1 or any of the Segment 4 reroute alternatives under Component 3.

Cumulative impacts to civilian airports and flight paths are discussed concurrently with land use in Section 4.17.4.10 of the 2013 FEIS (BLM 2013:4-339 through 4-344). Incremental impacts to civilian airports and flight paths include potential impacts to four FAA-designated clear zones. Impacts to airports and flight paths from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts may result from construction of the proposed project components, in addition to other planned transmission lines, wind energy projects, ongoing and future military testing and airspace restrictions, and other projects involving structures. All planned projects would be required to comply with FAA regulations cited above. Therefore, any adverse impacts to civilian airports and airstrips would be minimized.

AIB-26 Hazardous Materials

Would construction, operation, and maintenance of the proposed project components generate contaminants or hazardous wastes that would pose a threat to human health and safety or the environment?

3.3.51 Affected Environment

The regulatory framework for hazardous materials is described in the 2013 FEIS, Section 3.15.1.3 (Federal and State Laws) (BLM 2013:3-341 and 3-342). The analysis area for this issue statement is a 1-mile buffer around the proposed project components.

Petroleum products such as gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents would be present on-site during construction (BLM 2013:4-261). These products would be used to fuel, lubricate, and clean vehicles and equipment, and would be contained within fuel trucks or in approved containers. When not in use, such materials would be stored properly to prevent drainage or accidents.

Sulfur hexafluoride (SF_6) is an inorganic compound that is colorless, odorless, nontoxic, and nonflammable (under standard conditions). It is generally transported as a liquefied compressed gas. SF_6 is used in a number of applications, including as a gaseous dielectric medium in the electrical industry for insulation and current interruption in electric transmission and distribution equipment; it is a gaseous dielectric medium for high-voltage (345-kV and greater) circuit breakers, switchgear, and other electrical equipment.

3.3.51.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Currently there is existing disturbance and other ongoing actions contributing to environmental impacts from hazardous materials within and adjacent to the project. Existing disturbance includes other transmission lines, solar arrays, and wind turbines. Reasonably foreseeable future trends and planned actions that may contribute to additional water quality impacts within the analysis area include construction of new transmission lines, substations and wind projects, and transmission line updates; and military operations (SWCA 2021).

A search of publicly available databases was conducted to determine whether there were any National Priority List sites or Superfund sites and underground storage tanks (USTs) within the analysis area. EPA databases were used to identify Superfund sites and the number of USTs (Table 3-51). Superfund Enterprise Management System (SEMS) sites—previously referred to as Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites—are presented in Table 3-52. These projects would contribute to similar surface disturbance and water resource impacts as the proposed project components.

Table 3-51. Underground Storage Tanks within the Analysis Area

State	Number Non-Release	Number Release	Total
Arizona	14	11	**25**
New Mexico	13	5	**18**

Source: POWER Engineers, Inc. (2021k)

Table 3-52. Superfund Enterprise Management System Sites within the Analysis Area

Project Segment	State	SEMS ID	Site Name	Location
1	Pima County, AZ	AZ0000309146	Oracle Ridge Mine	22 M South-Southeast, Oracle, AZ 85623
4	Socorro County, NM	NMD09796027	ARCA Engineering	W. Frontage Road Lemitar, NM 87823

Source: POWER Engineers, Inc. (2021k)

Neither of the sites identified in Table 3-52 fall within the project area for the proposed project components.

3.3.52 Environmental Consequences

3.3.52.1 Methods and Assumptions

The following assumptions were used to analyze impacts to hazardous materials:

- The impacts analysis for this issue statement assumes application of the design features and EPMs provided in Appendix C.
- Potential hazardous material impacts from the proposed project components include:
    - the use, storage, or disposal of petroleum products or hazardous materials in such a way that results in a release in an amount equal to or greater than the acceptable quantity for that material to the aquatic or terrestrial environment or that creates a substantial risk to human health;
    - mobilization of contaminants currently existing in the soil, groundwater, or USTs, creating potential exposure of humans or wildlife to contaminants at levels that could be harmful; and
    - exposure of workers to contaminated or hazardous materials at levels in excess of those permitted by the Occupational Safety and Health Administration (OSHA), or exposure of the public to direct or indirect contact with hazardous materials from the construction or operation phases of the project.

The impact indicators used for this analysis are:

- Types of hazardous materials stored, transported, and handled for the project and proposed disposal methods
- Number of SEMS sites and USTs that would be crossed by the proposed right-of-way

3.3.52.2 Impacts Common to All Components

All applicable federal, state, and local regulations regarding the use of hazardous substances would be complied with during construction, operation, and decommissioning of the proposed project components. Hazardous material would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste (trash, litter, garbage, other solid waste, petroleum products, and other potential hazardous materials) would be removed and transported to a disposal facility authorized to accept such materials. Petroleum products (gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents) would be stored properly to prevent drainage or accidents when not in use.

The circuit breakers at the SunZia West and SunZia East Substations would be filled with SF_6. There would be a small amount of ongoing leakage of SF_6 over time, resulting in emissions of this pollutant. Leak detection monitoring that would alert when a circuit breaker loses 10% of its SF_6 is proposed to mitigate unplanned releases of SF_6 and greenhouse gas emissions from the substations (POWER Engineers, Inc. 2021k).

Design features (see Appendix C) would minimize the potential impacts from hazardous materials on the human and natural environment. Prior to construction, a detailed POD would be developed to further describe project features, EPMs, and procedures. At a minimum, the POD would address hazardous materials management (Design Feature 1). All vehicle movement outside the right-of-way would typically be restricted to designated access, contractor acquired access, or public roads (Design Feature 2). The boundary of construction activities would typically be predetermined, with activity restricted to and confined within those limits (Design Feature 3). To the extent practicable, structures would be sited with a minimum distance of 200 feet from stream banks (Design Feature 19).

3.3.52.3 No Action Alternative

Impacts and mitigation measures specific to hazardous materials under the no action alternative are the same as described above for the proposed project components (BLM 2013:4-261, 4-262).

3.3.52.4 Summary of Impacts

All applicable federal, state, and local regulations regarding the use of hazardous substance would be complied with during construction, operation, and decommissioning of the proposed project components. Further, the project owner and construction team would coordinate with land management agencies to incorporate health and safety requirements in response to accidental release of hazardous materials (BLM 2013:4-261). Health and safety procedures to respond to accidental release of hazardous materials would be developed as part of the final POD. SunZia would coordinate with the land-management agencies to incorporate specific agency requirements into the final POD for construction (POWER Engineers, Inc. 2021k:15). Cumulative impacts associated with hazardous materials are discussed in Section 4.17.4.15 of the 2013 FEIS (BLM 2013:4-351 through 4-352).

3.4 ISSUES ANALYZED IN DETAIL

The issues identified for detailed analysis in this EIS were developed in accordance with CEQ regulations using input from internal and external scoping. Issues were retained for detailed analysis if that analysis is necessary to make a reasoned choice between alternatives; to determine significance; if there is disagreement about the best way to use a resource; or if there is conflict between resource impacts or uses.

AID-1 Climate Change

Would the proposed project increase or reduce greenhouse gas (GHG) emissions over the short and/or long term, and what effect would this have on climate change at the regional, national, and worldwide scales?

3.4.1 Affected Environment

For this issue, the analysis area is the regional climate of the southwestern United States with a focus on Arizona and New Mexico, where the proposed project components would be built. National and global trends with respect to climate change impacts are also important to consider since emissions of GHGs from any location may impact climate over large geographical and temporal scales. This issue statement addresses changes to the affected environment since publication of the 2013 FEIS (BLM 2013), a general discussion of climate change, a summary of current global trends and the state of climate science, and a description of reasonably foreseeable trends that may affect climate change.

Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. Climate averages, known as “climate normal” as defined by the World Meteorological Organization, are 30-year averages of temperature and precipitation for the previous 3 decades. Since publication of the 2013 FEIS, climate normal data from the period of 1991–2020 have been published. The comparison of average monthly maximum daily temperature, average monthly daily minimum temperatures, and average total precipitation from the 1981–2010 (which was the period presented in the 2013 FEIS) to the 1991–2020 30-year averages are presented on page 5 of the Climate and Air Quality Resource Report (POWER Engineers, Inc. 2021c), which is hereby incorporated by reference. A comparison of the updated climate normal data shows that relative to the period from 1981–2010, there has been a change in average monthly daily maximum temperature ranging from a slight decrease of 0.3 degrees Fahrenheit (°F) to an increase of 1.9°F within the project area. Average monthly daily minimum temperature data comparisons show a slight decrease of 0.1°F to an increase of 1.5°F relative to the 1981–2010 period. For precipitation, there was a decrease in total annual precipitation at all monitoring sites, ranging from 0.05 to 2.07 inches of rainfall per year (POWER Engineers, Inc. 2021c).

Climate change is a global process that is affected by the concentration of GHGs in the Earth's atmosphere, which is in turn affected by total cumulative GHG emissions. The Intergovernmental Panel on Climate Change (IPCC) recently published its Sixth Assessment Report: *Climate Change 2021: The Physical Science Basis*" (IPCC 2021). The IPCC report states that "it is unequivocal that human influence has warmed the atmosphere, ocean, and land" and that "widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred" (IPCC 2021:SPM-5). Since the IPCC's previous iteration of the report (i.e., Fifth Assessment Report [AR5]) in 2011, concentrations of GHGs have continued increasing in the atmosphere. GHGs would be emitted by the construction and operation of the proposed project components. Pollutants that would be emitted by mobile source equipment operation include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which reached an annual average concentration of 410 parts per million (ppm), 1,866 parts per billion (ppb), and 332 ppb, respectively, in 2019 (IPCC 2021). Additionally, sulfur hexafluoride (SF_6), which would be used in gas-insulated switchgear and circuit breaker equipment associated with the substation for proposed project Component 4, has increased to an annual average concentration of 10 parts per trillion in 2019 (IPCC 2021). This is due mainly to the global expansion of the electric power sector and associated fugitive emissions from banks of SF_6 gas-containing equipment (IPCC 2021).

The greenhouse effect refers to the process by which GHGs in the atmosphere absorb heat energy radiated by Earth's surface. Water vapor is the most abundant GHG, followed by CO_2, CH_4, N_2O, and several other trace gases. Each of these GHGs exhibit a particular "heat trapping" effect which causes additional heat retention in the atmosphere that would otherwise be radiated into space. The greenhouse effect is responsible for Earth's warm atmosphere and temperatures suitable for life on Earth. Different GHGs can have different effects on the Earth's warming due to their ability to absorb energy ("radiative efficiency"), and how long they stay in the atmosphere ("lifetime"). The Global Warming Potential (GWP) was developed to allow comparisons of the global warming effects of different gases relative to CO_2 (expressed as CO_2 equivalent or CO_2e) (EPA 2020b). Several different time horizons can express GWPs to fully account for the gases' ability to absorb infrared radiation (heat) over their atmospheric lifetime. A summary of the atmospheric lifetimes of each GHG emitted by the project as well as their GWPs for the 20- and 100-year time horizons are presented in Table 3-53 (Forster et al. 2007; Myhre et al. 2013).

Table 3-53. Lifetimes and Global Warming Potentials relative to CO_2 based on IPCC's AR4 and AR5 Reports

GHG	AR4 - Lifetime in Years	AR4 GWP (20-yr)	AR4 GWP (100-yr)	AR5 - Lifetime in Years	AR5 GWP (20-yr)	AR5 GWP (100-yr)
CO_2	See note 1	1	1	See note 1	1	1
CH_4	12	72	25	12.4	84	28
N_2O	114	289	298	121	264	265
SF_6	3,200	16,300	22,800	3,200	17,500	23,500

Sources: Forster et al. (2007); Myhre et al. (2013).

[1] No single lifetime can be given, as the lifetime is dependent on multiple factors.

For the purposes of this analysis, the 100-year time horizon is used both to maintain consistency with the 2013 FEIS (BLM 2013:Appendix F) and because most of the climate change effects derived from climate models are expressed toward the end of the century. Also, in accordance with international GHG reporting standards under the United Nations Framework Convention on Climate Change and in order to maintain consistent comparisons over the years, official GHG emission estimates for the United States are reported based on the 100-year GWP values given in the Fourth Assessment Report (AR4) of the IPCC (Forster et al. 2007).

3.4.1.1 Reasonably Foreseeable Future Environmental Trends and Planned Actions

Reasonably foreseeable planned actions within the states of Arizona and New Mexico include population growth in the counties within Arizona and population decline in the counties within New Mexico. This trend is expected to impact overall mobile-source GHG emissions in the analysis area (SWCA 2021). There are several planned wind and solar energy development projects and transmission line projects located in various counties within the analysis area (SWCA 2021). Notably, the High Plains Express Transmission Line Project, Southline Transmission Line, and the constructed Western Spirit Transmission Line may run in proximity to the SunZia project in portions of New Mexico and/or Arizona (SWCA 2021). These planned actions and trends, along with the proposed project components and no action alternative, are expected to reduce the “net short” transfer capacity for renewable energy disclosed in Table 1-1 of the 2013 FEIS (BLM 2013:1–7). The needed capacity disclosed in the 2013 FEIS was based on Southwestern State renewable portfolio standard goals, many of which have since been updated to increase the renewable portfolio standard percentages for renewable energy (National Conference of State Legislatures 2021). There is also a proposed 1,000-MW natural gas-fired power station located 2 miles north of Bowie, Arizona, which would use natural gas-fired electric generating units (SWCA 2021). The Bowie Power Station would comply with applicable state and federal air permitting regulations and mandatory GHG reporting requirements. In addition, Pattern Energy has a formal agreement with SunZia to use the SunZia project as the primary transmission system for the electricity generated at Pattern Energy’s wind-generation projects in eastern New Mexico, including the Corona area (Lincoln, Torrance, and Guadalupe Counties) (POWER Engineers, Inc. 2021a).

There is uncertainty related to reasonably foreseeable climate change trends within the analysis area since there is uncertainty related to future emission trends, ambient GHG concentrations, and the effect of increasing GHG concentrations on the Earth system. To further inform the analysis, regional climate change projections based on the most recent available data are included in this discussion of reasonably foreseeable planned actions. Global and regional climate predictions are based on a hierarchy of climate models that range from simple to complex, coupled with comprehensive Earth System Models. For the Fifth Assessment Report (AR5), scientists estimated future climate impacts based on a range of Representative Concentration Pathways (RCPs) for well-mixed GHGs in model simulations (IPCC 2013). The RCPs represent a range of mitigation scenarios that are dependent upon socioeconomic and geopolitical factors and have different targets for radiative forcing (RF) in 2100 (2.6, 4.5, 6.0, and 8.5 watts per meter squared [W/m^2]). The scenarios are considered to be illustrative and do not have probabilities assigned to them (IPCC 2013).

To illustrate the potential differences in impacts between the various RCP scenarios, climate model results of mean temperature increase from baseline data (1981–2010) under the RCP 4.5 and RCP 8.5 scenarios are presented below for both Arizona (Figure 3-1) and New Mexico (Figure 3-2) for the period of 2075–2099 (Alder and Hostetler 2013). Regardless of the degree of climate change impacts, some general trends within Arizona and New Mexico are projected:

- The potential for more frequent and extreme droughts in the future as well as a decrease in predicted snowpack accumulation would pose a major challenge to environmental, agricultural, and human systems (Frankson and Kunkel 2022a, 2022b).
- The frequency of wildfire occurrence and severity is projected to increase (Frankson and Kunkel 2022a, 2022b).
- The annual average temperature, which has increased about 2°F since the early twentieth century, is projected to continue to increase in the future along with incidences of extreme heat events (Frankson and Kunkel 2022a, 2022b).

To mitigate damaging impacts from climate change, deep reductions in CO_2 and other GHG emissions need to occur over the coming decades (IPCC 2021). The importance of limiting warming to less than 1.5 degrees Celsius (°C) is detailed in the 2018 IPCC *Special Report: Global Warming of 1.5°C* (IPCC 2018). For context, climate modeling predicts (with medium confidence) that limiting global warming to 1.5°C, compared with 2°C, may reduce the proportion of the world population exposed to a climate change-induced increase in water stress by up to 50%, although there is considerable variability between regions (IPCC 2018). Further benefits of limiting warming to 1.5°C vs. 2°C are available in the IPCC 2018 Special Report (IPCC 2018:7-11). Without deep reductions in GHG emissions, global warming of 1.5°C and 2°C are predicted to be exceeded during the twenty-first century (IPCC 2021).

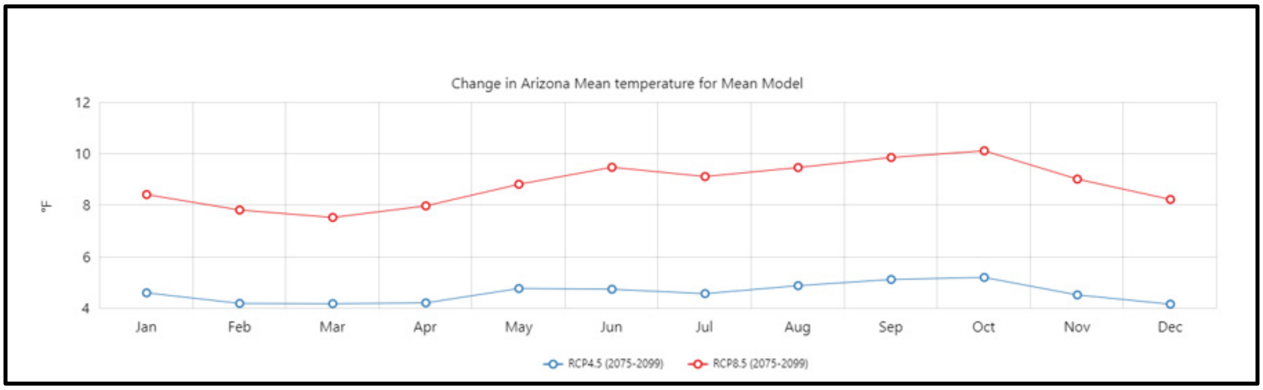

Figure 3-1. Change in Arizona mean surface temperature from 1981–2010 to 2075–2099, based on RCP 4.5 and RCP 8.5 projections.

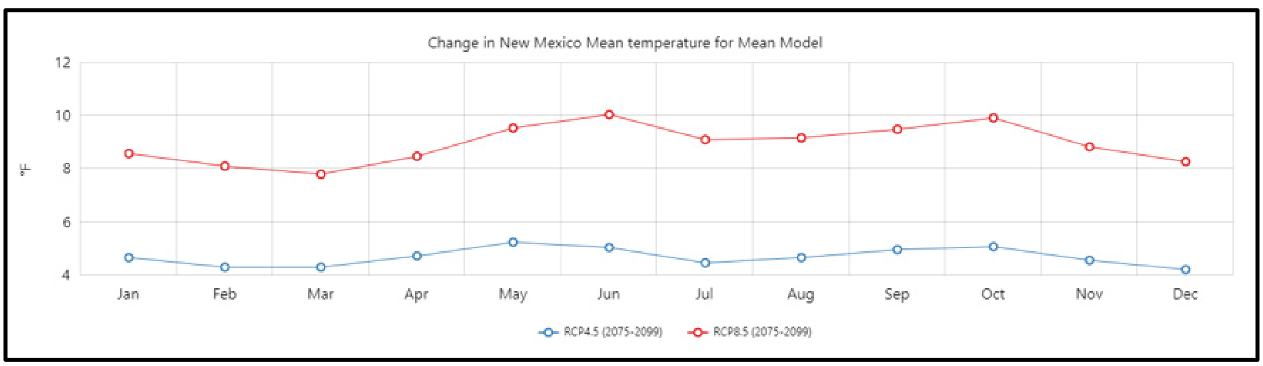

Figure 3-2. Change in New Mexico mean surface temperature from 1981–2010 to 2075–2099, based on RCP 4.5 and RCP 8.5 projections.

3.4.2 Environmental Consequences

3.4.2.1 Methods and Assumptions

The following assumptions were used to analyze impacts to climate change:

- The quantity and character of emissions from project Components 1, 2, and 4 would be similar to those previously analyzed for transmission line route construction in the 2013 FEIS (BLM 2013:Appendix F).
- The quantity and character of emissions from project Component 3 would be similar to those previously analyzed for substation construction in the 2013 FEIS (BLM 2013:Appendix F).
- A summarized disclosure of the no action alternative emissions derived from the 2013 FEIS Appendix F, as well as estimated impacts from the proposed action components, are shown in Appendix D, which specified additional assumptions in detail.

The impact indicator used for this analysis is:

- Metric tons (MT) of CO_2e from annualized construction and operational emissions from the project components were compared against state, national, and global GHG emissions for context.

The following analyses are incorporated by reference, as they relate to analysis used to inform impacts to ambient air quality:

- The 2013 Final Environmental Impact Statement for the SunZia Southwest Transmission Project, Appendix F: Climate and Air Quality Report (BLM 2013:Appendix F)
- The SunZia Southwest Transmission Project Amendment of Federal Right-of-Way Climate and Air Quality Report (POWER Engineers, Inc. 2021c)

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-54. Full design features and EPMs are provided in Appendix C.

Table 3-54. Design Features and Environmental Protection Measures Applicable to Climate Change

Relevant Design Features	Applicable EPMs
6, 20	1, 2, 5

3.4.2.2 Impacts Common to All Components

Equipment associated with construction, operation, maintenance, and decommissioning would contribute incrementally to GHG emissions within the analysis area and indirectly to global climate change as a result of the proposed action. Additionally, during the operational phase, SF_6 could potentially be released as fugitive emissions from the proposed SunZia West Substation.

The additional potential GHG emissions from construction of the proposed project components are estimated to result in approximately 34,430 MT CO_2e over the 4-year construction period and an additional 58.5 MT CO_2e per year during operation. These calculations are presented in detail in Appendix D. Combined construction and operational emissions would equate to roughly 8, 666 MT CO_2e on an annualized basis over the 75-year life of the project, which is less than the EPA's mandatory reporting threshold for large stationary sources codified in 40 CFR 98. The emissions from the proposed action are compared against the GHG emission totals from the States of Arizona, New Mexico, and nationally, based on EPA's 2019 Facility Level Information on GreenHouse gases Tool (FLIGHT) emissions which represent approximately 50% of total U.S. emissions (Table 3-55) (EPA 2021c).

Table 3-55. Annualized Additional Proposed Action Emissions Compared with State and Federal GHG Emissions

Geographic Area	Annual GHG Emissions (MT CO_2e)	Proposed Action %
Proposed project components	8,666	–
Arizona	51,632,525	0.0168%
New Mexico	29,733,151	0.0291%
United States	2,850,000,000	0.0003%

Note: The FLIGHT data include emissions from facilities subject to the requirements of the Greenhouse Gas Reporting Program Requirements in 40 CFR 98, which requires facilities that emit above 25,000 MT of CO_2e to report their emissions (EPA 2021c).

The total additional GHG emissions from the four proposed project components over the maximum useful project life of 75 years is equal to 38,818 MT CO_2e, which is the total construction plus the sum of annual operational emissions over the life of the project. The beneficial impacts to climate change as a result of the proposed project components would be substantively similar to the no action alternative (discussed below).

Design features and EPMs to reduce air quality and climate impacts are presented in Appendix C. Design features would limit operation of construction equipment and associated GHG emissions, and they include use of existing access roads where feasible (Design Feature 6). Additionally, open burning would not be allowed unless permitted by the appropriate authorities (Design Feature 20). EPMs would include reduction of widening or upgrading existing access roads unless necessary (EPM 1), no blading of new access roads in select areas (EPM 2), and a detailed project reclamation plan to restore vegetation (EPM 5). These EPMs would result in less mobile-source equipment operation and associated GHG emissions, and would also limit impacts to carbon sequestration of vegetation. Additionally, leak detection monitoring that would alert when a circuit breaker loses 10% of its SF_6 is proposed to mitigate GHG emissions from the substation (POWER Engineers, Inc. 2021c).

3.4.2.3 Impacts of Localized Route Modifications

The localized route modifications are changing minimally, compared with the previously selected route. Tables F-2 and F-3 of the 2013 FEIS Appendix F, disclose the estimated per-mile transmission line construction and concrete batch plant GHG emissions, in tons of CO_2e per mile (BLM 2013:F-3 through F-5). The localized route modifications would result in up to an additional 7.0 miles of transmission line (POWER Engineers, Inc. 2021a). Based on the per-mile CO_2e emissions from transmission line construction and concrete batch plant emissions (171 MT CO_2e per mile of transmission line), the additional GHG emissions from Component 1 would be 1,196.6 MT CO_2e over the duration of construction. Component 1 operational emissions estimates would be unchanged from those originally disclosed in the 2013 FEIS (BLM 2013:4-20, 4-21).

3.4.2.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Additional access roads construction activities (both improvement of existing roads and newly proposed roads) and temporary work areas would be required outside the previously authorized right-of-way. The access roads and work areas would be similar to those previously analyzed in the 2013 FEIS. Emissions of GHG are calculated for the entire transmission line for the purposes of the 2013 FEIS in Appendix F (BLM 2013:F-3). Specific mileages of access roads and temporary work areas were not presented in the 2013 FEIS, but a conservative estimate of these types of activities were included in the per-transmission line mileage emission estimates (BLM 2013:4-8). Therefore, GHG emissions from proposed project Component 2 are expected to be substantively similar to the no action alternative GHG emissions. Proposed project Component 2 operational emissions estimates are unchanged from those originally disclosed in the 2013 FEIS (BLM 2013:4-20, 4-21).

3.4.2.5 Impacts of Segment 4 Reroute Alternatives

The relocation of the SunZia East Substation would not change the calculated GHG emission estimates during construction and operation of the SunZia East Substation from those originally disclosed in the 2013 FEIS (BLM 2013:Appendix F, p. F-7; POWER Engineers, Inc. 2021c). The Segment 4 route modifications would result in a change in the Segment 4 transmission line mileages and GHG emissions, as shown in Table 3-56 below (POWER Engineers, Inc. 2021a).

Table 3-56. Route 4 Alternatives

Alternative Route	Length (miles)	Additional Transmission Line Mileage	Additional CO2e Emissions (MT)
2015 Selected Route	91.7	0	0
Alternative Route 1 with Subroute 1A-1	146.5	54.8	9,374.4
Alternative Route 1 with Subroute 1A-2	145.2	53.5	9,152.0
Alternative Route 1 with Subroute 1A-3	146.4	54.7	9,350.2
Alternative Route 1 with Subroute 1A-4	146.3	54.6	9,336.5
Alternative Route 2 with Subroute 2A-1	123.1	31.4	5,364.7
Alternative Route 2 with Subroute 2A-2	119.5	27.8	4,748.5
Alternative Route 2 with Subroute 2A-3	115.2	23.5	4,026.4
Alternative Route 2 with Subroute 2A-4	122.8	31.1	5,310.4
Alternative Route 3 with Subroute 3A-1	126.6	34.9	5,965.8
Alternative Route 3 with Subroute 3A-2	123.1	31.4	5,366.0
Alternative Route 3 with Subroute 3A-3	118.9	27.2	4,643.8
Alternative Route 3 with Subroute 3A-4	126.4	34.7	5,927.9
Maximum additional CO2e	**–**	**54.8**	**9,374.4**

Source: POWER Engineers (2021a).

Notes: Note that each route alternative incorporates the longest mileage local alternative, as applicable. Alternative Route 1 includes Local Alternative 1A-7 and Alternative Route 3 includes Local Alternative 3B-2.

Tables F-2 and F-3 of the 2013 FEIS Appendix F, disclose the per-mile transmission line construction and concrete batch plant GHG emissions, in CO_2e (171 MT CO_2e per mile of transmission line) (BLM 2013:Appendix F, pp. F-3 through F-5). The maximum potential increase in GHG emissions from proposed project Component 3 is 9,374.4 MT CO_2e, which is associated with Alternative Route 1 with Subroute 1A-1 and Local Alternative 1A-7.

Based on the recent development of proposed wind-generation facilities, SunZia determined that relocating the SunZia East Substation to the north near Corona in Torrance County would optimize the potential interconnection of future renewable resources (POWER Engineers, Inc. 2021a). The project would be open to all interconnection requests, however, the project would provide needed infrastructure to increase transfer capability in areas of potential renewable energy generation. The need to increase transfer capability in order to meet Renewable Portfolio Standard Goals is described in Section 1.4 of the 2013 FEIS (BLM 2013:1-6). Beneficial impacts with respect to climate change from providing needed transfer capability in the analysis area is discussed in more detail in the no action alternative section below.

3.4.2.6 Impacts of SunZia West Substation

Construction of the SunZia West Substation would result in additional GHG emissions. The worst-case substation emission estimates disclosed in Appendix F, Tables F-5, F-8, F-11, F-14, and F-17 of the 2013 FEIS are assumed to be representative of the potential CO_2e emissions from the SunZia West Substation construction (BLM 2013:Appendix F, pp. F-7 through F-15). It is estimated that emissions from the SunZia West Substation construction would be approximately 23,859 MT CO_2e. Operation of the SunZia West Substation would result in fugitive leaks of SF_6 which are conservatively estimated to be equal to the worst-case substation emission estimates disclosed in Appendix F of the 2013 FEIS (BLM 2013:Appendix F, p. F-16). It is estimated that emissions from the SunZia West Substation operations would be equal to 58.5 MT/year of CO_2e.

3.4.2.7 No Action Alternative

Appendix F of the 2013 FEIS discloses the potential GHG emissions from the project, which is evaluated as the no action alternative for this analysis (BLM 2013:Appendix F). The 2013 FEIS emissions are 266,737 MT of CO_2e during construction based on the worst-case GHG emission scenarios for the project (BLM 2013:Appendix F). See Appendix D for supporting documentation and emission scenarios used to derive these estimates. The estimated total annual operational emissions from SF_6 leakage from circuit breakers and gas-insulated switchgear equipment is 241.9 MT CO_2e/year. Combined construction and operational emissions would equate to roughly 66,926 MT CO_2e on an annualized basis. The emissions from the no action alternative are compared against the GHG emission totals from the States of Arizona, New Mexico, and nationally based on EPA's 2019 FLIGHT emissions, which represent approximately 50% of total U.S. emissions (Table 3-57) (EPA 2021c).

Table 3-57. Annualized No Action Alternative Emissions Compared with State and Federal GHG Emissions

Geographic Area	Annual GHG Emissions (MT CO_2e)	No Action %
No action alternative	66,926	–
Arizona	51,632,525	0.13%
New Mexico	29,733,151	0.23%
United States	2,850,000,000	0.002%

Source: BLM 2013: Appendix F emissions are summarized and presented on an annual basis in Appendix D; State and National emissions data from large stationary sources are shown for comparison based on EPA (2021b) source.

Notes: The FLIGHT data include emissions from facilities subject to the requirements of the Greenhouse Gas Reporting Program Requirements in 40 CFR 98, which requires facilities that emit above 25,000 MT of CO_2e to report their emissions (EPA 2021c).

The total GHG emissions from the no action alternative over the maximum useful project life of 75 years would be equal to 284,876 MT CO_2e, which is the total construction plus the sum of annual operational emissions over the life of the project. These estimates are derived in Appendix D based on the 2013 FEIS, Appendix F calculations for the worst-case emission scenario (BLM 2013:Appendix F).

Although the project would be open to all interconnection requests, the project would provide needed infrastructure to increase transfer capability in areas of potential renewable energy generation. The need to increase transfer capability in order to meet Renewable Portfolio Standard Goals is described in Section 1.4 of the 2013 FEIS (BLM 2013:1-6). The project would supply up to 4,500 MW of renewable energy (POWER Engineers, Inc. 2021a). Table 1-1 of the 2013 FEIS provides a forecast of renewable energy and transfer capability needed to meet southwestern state RPS (BLM 2013:1-7). As noted in the 2013 FEIS, the Department of Energy characterizes the need to resolve current transmission congestion as “urgent” as demonstrated by the large number of both wind and solar projects that have applied for interconnection to the transmission grid (BLM 2013:1-8). The project would support efforts to supply interconnection for projects that could otherwise not be built due to insufficient transfer capacity (BLM 2013:1-8). Therefore, the project (both no action and proposed action alternatives) would result in an environmental benefit with respect to climate change.

For context, additional generation of 100 MW of renewable-energy electricity generation in the Southwest region was estimated using EPA’s AVERT web-based tool, which is a simplified regional model which estimates displaced fossil-fuel electric generating unit emissions by renewable energy development. It is estimated that the annual emission reduction from potential displacement of fossil fuel–fired electric generating units would be approximately 137,600 MT of CO_2 based on 2019 electric generating unit and grid data (EPA 2020c). It must be recognized that this is just a general upper-boundary estimate of the potential avoided annual GHG emissions and the AVERT model is unable to provide any type of certainty for the long-term avoided emissions associated with wind and solar development. However, these estimates are presented in this EIS to provide context and to demonstrate that even if only a fraction of the transmission capacity for the project is used to convey renewable energy, the benefits to climate change easily outweigh the additional GHG emissions from construction and operation of the project over the 75-year projected useful life of the project.

The additional transmission capacity would in turn support national goals to transition to carbon-free electricity generation by 2035 and carbon neutrality for the economy as a whole by 2050 (United States of America 2021). These national goals were submitted by the United States to the United Nations Framework Convention on Climate Change (UNFCCC) in order specify national GHG emission targets. These efforts are part of the larger goals of the United Nations to limit global temperature increase this century to 2°C and pursuing the means to limit increases to 1.5°C (UNFCCC 2021).

3.4.2.8 Summary of Impacts

Emissions increases from construction and operation of the project components over the 75-year life of the project are summarized in Table 3-58 below.

Table 3-58. Total GHG Emissions in terms of Metric Tons CO_2e over the 75-Year Life of Project

Project Component	Description	Total GHG Emissions (MT CO_2e)
Component 1 and 2	Construction of Localized Route Modifications and Access Roads/Temporary Work Areas outside of the Right-of-Way	1,196.6
Component 3	Construction of Segment 4 Reroute	9,374.4

Project Component	Description	Total GHG Emissions ($MT\ CO_2e$)
Component 4	Construction of SunZia West Substation	23,859
Component 4	Operation of SunZia West Substation over the 75-year life of the project	4,388.5
Total proposed action	**Sum of construction and operational emissions**	**38,818**

Source: BLM (2013:Appendix F) emissions are summarized and presented on an annual basis in Appendix D.

Although it is uncertain to what degree the project would offset fossil fuel–fired electricity generation with renewable energy generation, the project is an important incremental step towards meeting state and national climate change goals. Therefore, despite short-term increases in GHG emissions during construction and minor levels of ongoing operational emissions, it is anticipated that the proposed project components would result in beneficial effects with respect to climate change through offsetting of fossil fuel–fired electric generating unit emissions over the life of the project.

Without deep reductions in GHG emissions, warming of 2°C is predicted to be exceeded during the twenty-first century, which is projected to increase climate change risk and have adverse consequences for human and ecological systems (IPCC 2021). Progress toward state and national climate change goals is critical to avoid potentially catastrophic climate change damages.

Cumulative impacts to climate are discussed in Section 4.17.4.2 of the 2013 FEIS (BLM 2013:4-308 through 4-311). Incremental impacts from the proposed project components would contribute a relatively small amount of GHG emissions over the 75-year life of the project as disclosed above. Air quality impacts from reasonably foreseeable transmission line, wind energy, solar energy, and residential subdivision development would mainly occur during construction, similar to the proposed project components (described above). The impacts from such projects would result in temporary construction emissions and long-term, ongoing operational emissions which are low in magnitude. Overall, it is not likely that emissions from such projects would result in cumulatively significant increases in GHG emissions.

The proposed 1,000-MW Bowie Power Station was identified as a reasonably foreseeable future planned action and is therefore incorporated into the EIS analysis. This site originally submitted an air permit application to the ADEQ for a 525-MW natural gas–fired, combined-cycle power plant (BLM 2013:4-307). However, the full buildout of the site is anticipated to be 1,000 MW. As noted in the 2013 FEIS, natural gas combined-cycle power plants are estimated to emit approximately 3,542 to 5,142 tons CO_2 per MW. Therefore, should the Bowie Power Station project occur, this would represent an annual increase of up to 5,142,000 tons CO_2e per year (or 4,664,745 MT per year) (BLM 2013:4-311). It is anticipated that the broader trend of increasing renewable development will help to offset reasonably foreseeable fossil fuel–fired projects within the Southwest region.

AID-2 Paleontological Resources

Would ground-disturbing activities associated with construction and operation of the proposed project components damage or destroy any paleontological resources?

3.4.3 Affected Environment

The 2013 FEIS analysis area consisted of 0.5 mile on either side of the centerline (1-mile-wide corridor) of the proposed transmission line alternatives (BLM 2013:3-45). For this Draft EIS, the analysis area for paleontological resources for Components 1, 2, and 3 is 0.5 mile on either side of the centerline and/or road for geological resources search (1-mile-wide corridor) and 1.0 mile (2-mile-wide corridor) for the previously recorded fossil locality record search (POWER Engineers, Inc. 2021e:14). The analysis area for Component 4 is a 1.0-mile buffer around the proposed substation for the geological resources search and 2.0-mile buffer for the previously recorded fossil locality records search.

As defined in the Paleontological Preservation Act of 2009, paleontological resources are any fossilized remains, traces, or imprints of organisms preserved in Earth's crust, which provide information about the history of life on Earth (BLM 2013:3-44 through 3-45). Several federal and state laws and regulations govern the protection and treatment of paleontological resources. See the 2013 FEIS Section 3.4.1.3 Regulatory Framework for a discussion of laws, regulations, and ordinances regarding paleontological resources (BLM 2013:3-47 through 3-48).

For the 2013 FEIS and this Draft EIS, data were collected through geological map reviews, a literature search to evaluate paleontological potential of geological deposits, and a records search for previously recorded fossil localities. Sources used can be found in the 2013 FEIS Section 3.4.1.2 Methods of the Paleontological Resources (BLM 2013:3-45).

See Section 5.3 of the paleontological report for a list of sources for this Draft EIS (POWER Engineers, Inc. 2021e:14). In addition, BLM potential fossil yield classifications (PFYC) of geological units (BLM 2008b, 2016b) were consulted. The PFYC is a tiered classification of geological units "based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts" (BLM 2016b:1). There are eight ranks from Class 1 (very low potential) to Class 5 (very high potential), plus a rank for Ice, Water, and Unknown. See the 2013 FEIS, Section 3.4.1.2 Methods (BLM 2013:3-46, 3-47) for full discussion of the PFYC tiers.

Several geologic units of concern are within the analysis area. Data for the no action alternative can be found in Sections 3.4.2 through 3.4.5 of the 2013 FEIS (BLM 2013:3-49 through 3-57). Table 3-59 presents geological units with known paleontological resources, PFYC, and sensitivity for Components 1–4 as described in this Draft EIS.

Table 3-59. Geological Units with Paleontological Resources and PFYC in the Analysis Area

Geological Age	Geological Unit	Fossils Found in the Project Analysis Area	PFYC	Paleontological Sensitivity
Latest Pleistocene to Holocene	Quaternary and Tertiary Sedimentary Deposits	Camel, mammoth, bison, birds, lions, llama, among other taxa; potentially other mammals	U	Unknown
Eocene and Miocene	Rubio Peak Formation	Mammals and possible plants	U	Unknown
Miocene	San Manuel Formation	Camel and bear tracks	U	Unknown
Latest Oligocene to Middle Pleistocene	Gila Group (or Conglomerate), Santa Fe Group: Sierra Ladrones, Palomas, Rincon Valley and Ceja formations	Diverse mammals including mastodon, rabbit, horse, rats, deer, and reptiles and birds	4	High
Paleogene	Paleogene Sedimentary units	Artiodactyls, turtles, rodents, lizards, primates, and plants	4	High
Tertiary and Quaternary	Tertiary and Quaternary Volcaniclastic Units	None known	2	Low

Geological Age	Geological Unit	Fossils Found in the Project Analysis Area	PFYC	Paleontological Sensitivity
Cretaceous	Mancos Shale, McRae Formation, Bisbee Group, Mesa Verde Group, Dakota Sandstone	Invertebrates, dinosaurs, hadrosaurid dinosaurs, small mammal tracks, reptiles, fish, and silicified wood	3–4	Low to High
Late Triassic	Chinle Group	Plants, invertebrates, fish, sharks, amphibians, reptiles, dinosaurs, and trackways	4	Very High
Paleozoic	San Andres Formation, Artesia Group, Yeso Formation, Glorieta Sandstone, Abo Formation, Naco Group, Bursum Formation, Pennsylvanian rocks, undivided, Madera Group, Caballero Formation, Martin Formation, Paleozoic Sedimentary Rocks, Abrigo Formation, Bolsa Quartzite	Marine invertebrates, foraminifera plants, invertebrate trace fossils, less common rare tetrapod trackways, amphibian and reptile trackways, plants, invertebrates, and sharks, fish, and amphibians, Insects, crustaceans, eurypterids, palynomorphs, and conodonts	2–4	Low to High

Source: Condensed from Table R4-B1 (POWER Engineers, Inc. 2021e:Appendix B)

The 2013 FEIS records search within 0.5 mile of the centerline reported 27 localities (BLM 2013:3-46). The records search of known fossil localities within 1 mile of either side of the centerline for the Draft EIS resulted in 46 localities (Table 3-60) (POWER Engineers, Inc. 2021e:47). Please note that localities may be within 1 mile of more than one project component. See Table R-4-B3 in the paleontological report for a description of the fossil localities within 1 mile (POWER Engineers, Inc. 2021e:Appendix R4-B).

Table 3-60. Known Localities within 1 Mile of the Centerline for Components 1–4

	Total Previously Recorded Localities within 1 Mile
Component 1 – Localized Route Modifications	
1. Mavericks Area	1
2. SunZia South Area	0
3. Macho Springs Area	0
4. Las Palomas Area	1
5. Highlands Area	0
6a. Pinal Central Area- North Route	0
6b. Pinal Central Area- Steele Route	0
6c. Pinal Central Area- Earley Route	0
Local Alternative West Tie-in	0
Local Alternative Central Tie-in	0
Local Alternative East Tie-in	0
Component 2 – Access Roads and Temporary Work Areas	
Component 2a. Access Roads	7
Component 2b. Temporary Work Areas	6
Component 3 – Segment 4 Reroute Alternatives	
Alternative Route 1 with Subroute 1A-1	4
Alternative Route 1 with Subroute 1A-2	4

	Total Previously Recorded Localities within 1 Mile
Alternative Route 1 with Subroute 1A-3	4
Alternative Route 1 with Subroute 1A-4	4
Local Alternative 1A-6	0
Local Alternative 1A-7	0
Alternative Route 2 with Subroute 2A-1	1
Alternative Route 2 with Subroute 2A-2	1
Alternative Route 2 with Subroute 2A-3	1
Alternative Route 2 with Subroute 2A-4	1
Alternative Route 3 with Subroute 3A-1	3
Alternative Route 3 with Subroute 3A-2	3
Alternative Route 3 with Subroute 3A-3	3
Alternative Route 3 with Subroute 3A-4	3
Local Alternative 3B-1	0
Local Alternative 3B-2	0
Component 4 – SunZia West Substation	**0**

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.3.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Four planned high-voltage transmission lines or energy generating facilities with associated transmission lines are within the spatial boundary for the reasonably foreseeable environmental trends and planned action, which is an 8-mile-wide corridor buffered around the proposed SunZia project components: Southline Transmission Line, High Plains Express Transmission Line Project, Southwest Transmission Co-op Inc., and Western Spirit Wind (SWCA 2021). Ground disturbance from these projects may affect the same paleontological resources or may affect resources avoided by the SunZia project in the same corridor. Other projects planned within the 8-mile-wide corridor which may impact paleontological resources include the Great Divide Wind facility, Bowie Power Station, Storey Solar facility, and several residential subdivisions.

3.4.4 Environmental Consequences

Sensitive geological units and their PFYC were identified within the right-of-way and/or footprint for each project component. The sensitivity assessment for paleontological resources is the potential for the proposed project component to impact significant resources and is based on the PFYC of geological components. The sensitivity assessment of resources follows the analysis methods presented in the 2013 FEIS (BLM 2013:4-48 through 4-50).

3.4.4.1 Methods and Assumptions

The following assumptions were used to analyze impacts:

- Project ground disturbance is confined to the right-of-way and/or footprint.

- Ground disturbance can unearth paleontological resources within sensitive geological deposits and, because paleontological resources are finite and nonrenewable, all ground disturbance is permanent for paleontological resources.

The impact indicator used for this analysis is:

- Miles or acres of sensitive geological units and their PFYC within the right-of-way and/or footprint for each project component.
- Known paleontological resources within geologic formations crossed by project components.

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-61. Full design features and EPMs are provided in Appendix C.

Table 3-61. Design Features and Environmental Protection Measures Applicable to Paleontological Resources

Relevant Design Features	Applicable EPMs
1, 4, 6, 24	1, 2, 8

3.4.4.2 Impacts Common to All Components

For all proposed project components, ground disturbance associated with construction has the potential to impact paleontological resources. Any disturbance to paleontological resources is considered a permanent impact; however, if the standard mitigation measure as described above is implemented, impacts from construction ground disturbance to significant resources can be lessened. For operation activities, ground disturbance is not expected to be a significant impact; however, work must comply with the project's paleontological resources treatment plan. Table 3-62 shows miles of PFYC per project component.

As described in the 2013 FEIS Section 4.4.2.3 Mitigation of Impacts, loss of paleontological resources from ground disturbance during construction would be the primary potential adverse impact (BLM 2013:4-50). In order to reduce potential impacts, Design Feature 24 would be implemented based on sensitivity level and specific planned project activities (see Appendix C).

Table 3-62. Miles of PFYC within Project Components

Project Component	Class I Very Low (miles)	Class 2 Low (miles)	Class 3 Moderate (miles)	Class 4 High (miles)	Class U Unknown (miles)
Component 1: Localized Route Modifications					
1. Mavericks Area	0.0	1.1	0.0	0.0	1.0
2. SunZia South Area	0.0	0.0	0.0	0.0	4.6
3. Macho Springs Area	0.0	0.0	0.0	0.0	9.3
4. Las Palomas Area	0.0	0.6	0.0	3.5	1.2
5. Highlands Area	0.0	0.0	0.0	5.6	0.7
6a. Pinal Central Area- North Route	0.0	0.0	0.0	7.7	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	0.0	4.1	0.0

Project Component	Class I Very Low (miles)	Class 2 Low (miles)	Class 3 Moderate (miles)	Class 4 High (miles)	Class U Unknown (miles)
6c. Pinal Central Area- Earley Route	0.0	0.0	0.0	6.4	0.0
Local Alternative West Tie-in	0.0	0.0	0.0	0.8	0.0
Local Alternative Central Tie-in	0.0	0.0	0.0	0.8	0.0
Local Alternative East Tie-in	0.0	0.0	0.0	1.2	0.0
Component 2a. Access Roads	157.3	80.0	10.8	310.8	314.5
Component 2b. Temporary Work Areas (acres)	113.9	161.8	2.1	349.2	499.3
Component 3. Segment 4 Reroute Alternatives					
Alt Route 1 with Subroute 1A-1	0.5	29.6	22.5	35.6	58.2
Alt Route 1 with Subroute 1A-2	0.5	30.1	22.5	32.4	59.6
Alt Route 1 with Subroute 1A-3	0.5	31.0	22.5	36.0	56.3
Alt Route 1 with Subroute 1A-4	0.5	28.2	22.5	37.4	57.6
Local Alternative 1A-6	0.0	0.0	0.4	0.0	0.0
Local Alternative 1A-7	0.0	0.0	0.5	0.0	0.0
Alt Route 2 with Subroute 2A-1	1.7	31.6	7.5	20.3	60.9
Alt Route 2 with Subroute 2A-2	1.7	32.1	7.5	16.9	60.3
Alt Route 2 with Subroute 2A-3	1.7	32.0	7.5	18.7	54.2
Alt Route 2 with Subroute 2A-4	1.7	30.2	7.5	22.1	60.3
Alt Route 3 with Subroute 3A-1	0.8	29.6	7.5	15.6	0.8
Alt Route 3 with Subroute 3A-2	0.8	30.1	7.5	12.2	0.8
Alt Route 3 with Subroute 3A-3	0.8	30.0	7.5	14.0	0.8
Alt Route 3 with Subroute 3A-4	0.8	28.1	7.5	17.4	0.8
Local Alternative 3B-1	0.0	0.0	0.0	0.6	5.0
Local Alternative 3B-2	0.0	0.0	0.0	1.3	4.0
Component 4. SunZia West Substation (acres)	0.0	21.0	0.0	0.0	59.2

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.4.3 Impacts of Localized Route Modifications

No known fossil localities are within the localized route modifications right-of-way. All four localized route modifications pass through Quaternary and Tertiary Sedimentary Deposits with an unknown PFYC; these deposits have preserved mammal and bird fossils. The Upper Santa Fe Group which has a sensitivity level of high is crossed by the Las Palomas Area localized route modification. The Highlands Area localized route modification crosses the Santa Fe Group which has a sensitivity level of high.
The North Route, the Steele Route, and the Earley Route, as well as the Local Alternative Tie-ins, are on Holocene to Middle Miocene deposits with high sensitivity. Table 3-62 presents miles of PFYC class crossed by each localized route modification.

3.4.4.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

For project Component 2, the access roads and TWAs outside the granted right-of-way may impact Quaternary and Tertiary Sedimentary Deposits (unknown sensitivity) in Arizona and New Mexico, San Manuel Formation (unknown sensitivity) in Arizona, and the Rubio Peak Formation in New Mexico. Access roads and TWAs may impact the Bisbee Group (high sensitivity) in Arizona, Gila Group (high sensitivity) in Arizona and New Mexico, and the Santa Fe Group (high sensitivity) in New Mexico. Geological units with moderate sensitivity which may be impacted by access roads and TWAs outside the granted right-of-way include the Naco Group, Martin Formation, and Paleozoic Sedimentary Rocks in Arizona, the Caballero Formation in New Mexico, and the Yeso Formation along Segment 4. Table 3-62 presents miles per PFYC class for access roads and TWAs.

Two fossil localities, a *Megalonyx* claw and a large bivalve, are within the access road footprints outside the granted right-of-way.

3.4.4.5 Impacts of Segment 4 Reroute Alternatives

No known fossil localities are within any of the Segment 4 reroute alternatives rights-of-way. All alternatives and subroutes cross Quaternary and Tertiary Sedimentary Deposits (unknown sensitivity), as well as the Santa Fe Group (high sensitivity). Geologic units with moderate sensitivity (PFYC 3) crossed by Alternative 1 with Subroute 1A-1, Alternative Route 2 with Subroute 2A-1, and Alternative Route 3 with Subroute 3A-1 and Local Alternative 3B-1 include Mancos Shale and Dakota Sandstone, Yeso Formation, Bursum Formation, Pennsylvanian Rocks, undivided, and Madera Group. All three also cross the Chinle Group and Abo Formation (high sensitivity). The three versions of Alternative 1 are the most paleontologically sensitive with all having about the same number of miles crossed of PFYC 3, 4, and U. Local Alternative 1A-6 and Local Alternative 1A-7 both cross about the same miles of deposits with moderate sensitivity. Local Alternative 3B-1 crosses 0.8 less mile of moderately sensitive deposits and 0.5 mile of deposits with unknown sensitivity than Local Alternative 3B-2. Table 3-62 and Appendix A, Maps 130–133, 135–167, 169–182, and 184–192 present miles of PFYC by alternative route.

3.4.4.6 Impacts of SunZia West Substation

The SunZia West Substation may impact Quaternary and Tertiary Sedimentary Deposits which have an unknown sensitivity level (59.2 acres). The remaining acreage for the substation (21.0 acres) is PFYC 2 (low sensitivity). No known fossil localities are within the proposed SunZia West Substation footprint.

3.4.4.7 No Action Alternative

The no action alternative consists of the previously permitted transmission line route which was the BLM preferred alternative (Routes 1A2-3A2-4C2c) in the 2013 FEIS (BLM 2013, 2015a). According to the 2013 FEIS, Route 1A2 crosses the sensitive Abo, Blancan Sierra Ladrones, and Blancan Palomas formations, Route 3A2 crosses the sensitive 111 Ranch Beds and Gila Group, and Route 4C2c crosses the Quiburis and St. David formations (BLM 2013:4-54). However, the applicant-committed EPMs are expected to reduce the impacts to paleontological resources along these routes from a high to a low level.

3.4.4.8 Summary of Impacts

Ground disturbance from construction of the no action alternative may impact formations with high sensitivity including the Abo, Blancan Sierra Ladrones, and Palomas formations, 111 Ranch Beds,

Gila group, and the Quiburis and St. David formations. For Component 1, ground-disturbing activities associated with the construction of all localized route modifications have the potential to disturb significant paleontological resources with unknown or high sensitivity. The Mavericks, SunZia South, Macho Springs, Las Palomas, and the Highlands localized route modifications cross Quaternary and Tertiary Sedimentary Deposits with unknown sensitivity, the Las Palomas Area localized route modification could impact the Upper Santa Fe Group (high sensitivity), and the Highlands Area localized route modifications could impact the Santa Fe Group (high sensitivity). All of the Pinal Area localized route modifications are on Holocene to Middle Miocene deposits which are high sensitivity.
For Component 2, ground disturbance associated with construction for the access roads and TWAs outside the granted right-of-way may disturb deposits with unknown sensitivity (Quaternary and Tertiary Sedimentary Deposits), and high sensitivity (San Manuel Formation, Rubio Peak Formation, Bisbee Group, Gila Group, and the Santa Fe Group). For Component 3, ground construction associated with the construction of all alternatives may impact geologic units with high and unknown paleontological sensitivity; the routes for Alternative 1 cross the most miles of high and unknown sensitivity. Ground disturbance associated with Local Alternative 3B-1 and Subroute 3A-2 could impact deposits with unknown sensitivity. For Component 4, the ground disturbance associated with the construction of the substation may impact Quaternary and Tertiary Sedimentary Deposits which have unknown sensitivity. In order to reduce potential impacts, Design Feature 24 would be implemented based on sensitivity level and specific planned project activities.

Cumulative impacts to paleontological resources are discussed Section 4.17.4.4 of the 2013 FEIS (BLM 2013:4-316 through 4-318). Incremental impacts from the proposed components could adversely impact sensitive paleontological deposits. Impacts to paleontological resources from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to paleontological resources may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 74,000 acres and 2,890 miles within the analysis area). Impacts to paleontological resources from construction are permanent and long-term. Cumulative impacts from operation and maintenance of the transmission lines and generating facilities are not expected.

AID-3 Avian Collisions

Would the power lines and towers associated with the proposed project result in increased potential for avian collision with groundwires, conductors, and structures (for waterfowl and/or raptor species with the potential to occur within the area of disturbance), compared with the no action alternative?

3.4.5 Affected Environment

This analysis focuses only on Components 1 and 3, as there are no transmission structures or associated groundwires or structures associated with Components 2 or 4. Component 1 and Component 3 introduce aerial infrastructure that has the potential to impact birds within Desert Scrub, Grasslands, and Juniper Woodlands vegetation communities (see AIB-8, Native Vegetation). In addition, Component 1 and Component 3 are adjacent to flyways that include riparian and wetland habitats used by waterfowl and raptors, including Elephant Butte, Rio Grande, Rio Salado, Rio Puerco, and Abo Canyon. The analysis area for impacts to birds includes an approximately 4,000-square-mile area encompassing Components 1 and 3, with the southern boundary of the analysis areas at Elephant Butte, northeastern boundary at Abo Canyon, and northwestern boundary at the western portion of Component 3. The analysis area includes the Sevilleta National Wildlife Refuge, Rio Grande, Rio Salado, and the Rio Puerco confluence with the

Rio Grande. In addition, suitable habitat for golden and bald eagles within the analysis area will be further defined in coordination with the USFWS.

The analysis area includes the Sevilleta National Wildlife Refuge, which encompasses 229,674 acres in central New Mexico along the Rio Grande (USFWS 2015a). The Sevilleta NWR is located within the Southern Rockies/Colorado Plateau Bird Conservation Region and the Chihuahuan Desert Bird Conservation Region. The Sevilleta NWR, which is used for waterfowl management, is also located within the Central Flyway. Waterfowl and shorebirds use the Rio Grande, the Refuge wetlands, and riparian areas. Waterfowl are primarily winter residents. In addition, a variety of raptors use the Sevilleta NWR, such as red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), peregrine falcon (*Falco peregrinus anatum*), golden eagle (*Aquila chrysaetos*), and bald eagle (*Haliaeetus leucocephalus*). The analysis area also contains the Middle Rio Grande, which is a stopover site for migrating and wintering cranes and waterfowl. Large flocks of wintering birds, including sandhill cranes, white geese (snow goose [*Chen caerulescens*] and Ross's goose [*Chen rossii*]), and other waterfowl, disperse daily from Bosque del Apache NWR and the Ladd S. Gordon Waterfowl Area to forage on agricultural lands along the river (POWER Engineers, Inc. 2021g:105). Terrestrial riparian habitats along the Rio Grande provide diverse stopover sites for migratory landbirds that use the Great Plains-Rocky Mountain flight route. Approximately 241 species use the Middle Rio Grande Valley and include local and migrant bird species (Finch and Yong 2000). Raptors and waterfowl may use the habitats within the analysis area to move between migration corridors and foraging and nesting habitats. Waterfowl and raptor collisions are of particular concern due to their larger size (in comparison to passerine birds) and the need for perches for hunting, feeding, resting, roosting, or nesting (Avian Power Line Interaction Committee [APLIC] 2006, 2012). Abo Canyon is located within a bird migration corridor between the southern end of the Manzano Mountains and the northern end of the Los Pinos Mountains in central New Mexico. In addition, Rio Puerco and Rio Salado are within the analysis area and provide potentially suitable riparian and foraging habitat along the rivers. The southernmost part of the analysis area contains Elephant Butte Reservoir, the largest lake in New Mexico and an area identified by the Audubon as an important bird area for wintering waterfowl (Audubon 2021a).

3.4.5.1 Reasonably Foreseeable Trends and Future Actions

Within the analysis area, there are existing or approved transmission lines that present collision risks to birds, specifically raptors and waterfowl, that may result in mortality or injury. These existing or approved transmission lines include the constructed Western Spirit 345-kV transmission line, located north of the 2015 Selected Route, and approximately 12 miles of Tri-State's 115-kV transmission line and approximately 14 miles of EPE's 345-kV transmission line that pass through portions of the Sevilleta NWR (POWER Engineers, Inc. 2021a:3, 2021g:105).

3.4.6 Environmental Consequences

3.4.6.1 Methods and Assumptions

The following assumptions were used to analyze impacts to risk of avian collision with transmission line infrastructure:

- Flight patterns and poor maneuverability of larger avian species, especially flocking species, leads to a higher risk of collision, compared with smaller passerines and other migratory species.
- Risk of collision increases the closer aerial transmission line infrastructure is to areas of preferred use (occupied habitat), and is related to habitat use and behavior patterns.

- Risk of collision increases proportionately with increased length of transmission lines within occupied habitats.
- Reductions in the introduction of additional risk as a result of co-location of transmission lines assumes the infrastructure would be of similar height.

The impact indicator used for this analysis is:

- Miles of proposed transmission line infrastructure per alternative for Components 1 and 3.
- Proximity of each alternative to suitable waterfowl and raptor habitat.

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-63. Full design features and EPMs are provided in Appendix C.

Table 3-63. Design Features and Environmental Protection Measures Applicable to Avian Collisions

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 8, 14, 18, 19, 21, 29	1, 2, 3, 5, 8, 12, 13, 14, 15

Note: See also Migratory Bird Conservation Plan and Avian Protection Plan (Environmental Planning Group, LLC [EPG] 2018:Appendix B3).

3.4.6.2 Impacts of Localized Route Modifications

The Component 1 route modifications would introduce approximately 27.7 miles of aerial transmission line within proximity to Elephant Butte Reservoir and the Rio Grande, instead of the route authorized in the 2015 ROD. Route Modifications 1 and 2 are in desert grasslands 89 miles and 36 miles, respectively, southwest of the Rio Grande and would therefore likely have the least amount of impact to waterfowl. Route Modification 3 and 4 are in desert grasslands and scrub within 26 and 14 miles, respectively, of the southern portion of Elephant Butte. Route Modification 5 is located in desert grassland and scrub within 6 miles of the Rio Grande. Route Modification 6 is in agricultural and disturbed/developed lands and is not near the Rio Grande or Elephant Butte Reservoir.

The proposed localized route modifications would include groundwires, conductors, and structures that would present a long-term collision hazard for birds, particularly raptors that use grassland and scrub habitats. Waterfowl are unlikely to be present along the modifications due to lack of habitat, although they may occasionally fly through Route Modification 5 to access the Rio Grande. Although the route modifications are different locations than the 2015 Selected Route, the impacts would be similar to those disclosed by the 2013 FEIS, including collision hazards during aerial pursuit of prey and electrocution during perching (BLM 2013:4-65). As described in the 2013 FEIS, structures would be engineered so that energy sources would be beyond the wingspan of even the largest birds, effectively eliminating risk of electrocution from the line itself (BLM 2013:4-65). The risk of electrocution can be reduced with design measures that prevent birds from perching on structures at locations where there are energized lines with a short, near-vertical path to grounded components.

3.4.6.3 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Component 2 would not result in avian collisions with transmission lines or electrocutions.

3.4.6.4 Impacts of Segment 4 Reroute Alternatives

Different species of birds have various susceptibility levels to electrocution from transmission lines. Risk of electrocution is present for all avian species and is highly dependent on temporal, spatial, biological, and engineering factors, but typically species with wider wing spans and larger body size, that occupy habitats lacking naturally occurring perch sites, tend to be at higher risk (APLIC 2006). Raptors will generally prefer to perch in trees rather than on the exposed perches provided by electrical transmission and distribution lines (APLIC 2006). However, raptors may still perch on or collide with transmission lines, resulting in electrocution or mortality. The North American accipiters accounted for <1% of raptor mortality in Arizona (APLIC 2006). Buteos comprise the largest non-eagle group of raptors that are electrocuted on power lines. The electrocution of red-tailed (*Buteo jamaicensis*), ferruginous (*B. regalis*), Swainson's (*B. swainsoni*), and rough-legged (*B. lagopu*s) hawks occurs in open habitats where these species commonly perch on transmission poles and towers (APLIC 2006). The mortality rate due to electrocution is low, compared with other causes of death and has ranged from 3% to 13% in the western United States (APLIC 2006). Other diurnal raptors with wingspans less than 102 centimeters are likely more at risk of electrocution on poles with transformers because of the small spacing between energized and grounded parts. Electrocution records for kestrels (*Falco sparverius*) and merlins (*Falco columbarius*) were <5% in the western United States (APLIC 2006). Electrocution of large falcons (*Falco peregrinus*), northern harriers (*Circus hudsonius*), and osprey (*Pandion haliaetus*) are rare and mortality comprises <5% of the total mortality in the western United States. Based on extrapolation of data collected from 1997 to 2013 for satellite-tagged golden eagles, electrocution is estimated to account for approximately 8% of golden eagle death in the United States, making it the sixth most common cause of death for the species (USFWS 2006). Bald eagle electrocutions are less common than golden eagle electrocutions and comprise approximately 1% to 6% of electrocutions in the western United States. Great horned and barn owls (*Tyto alba*) account for approximately 7% to 15% of electrocutions and forest owls (*Athene blewitti*) account for <1% of electrocutions throughout the western United States. Electrocutions of condors (*Gymnogyps californianus*) and vultures (*Cathartes aura*) are not common and generally account for 2% to 6% of electrocutions. Electrocutions of waterfowl may occur where poles and perches do not offer adequate spacing to accommodate heights or wingspans. Electrocutions of waterfowl generally ranged from 4% to 13% depending on location (APLIC 2006). The electrocution rates above do not distinguish between transmission and distribution lines. Distribution lines have less separation between conductors than transmission lines and therefore avian electrocution risk is greater on distribution lines (APLIC 2006). No distribution lines are proposed as part of the Segment 4 Reroute or other components.

The Rio Grande crossing avian impact assessment study included in the 2013 FEIS (BLM 2013) showed that white geese regularly flew at heights well above the proposed transmission line at all surveyed crossing sites during both migratory and foraging flights (BLM 2013:Appendix B2). Sandhill cranes and other waterfowl, however, were quite variable in flight-heights at different crossing points, with some being within the height range of conductors or groundwires. For many bird species, although long-distance flights often take place well above the typical height of conductors or groundwires, collision risk can increase when taking off or landing, and during low-elevation daily flights near feeding areas. The avian impact assessment study estimated that, while collisions would occur, effects at the population level are not expected (BLM 2013:Appendix B2).

Mitigation measures to improve visibility of groundwires (EPM 15), such as the use of bird diverters on groundwires and guywires, and the use of 1-inch fiber-optic groundwire (OPGW) rather than ½-inch overhead groundwire where practicable, would reduce the collision risk for sandhill cranes and other large birds, and those design specifications are detailed in the project's Avian Protection Plan (APP) (POWER Engineers, Inc. 2021g:113). Co-locating the project with the Western Spirit Project and the installation of bird flight diverters on the project's conductors would increase the visibility of both projects to avian species and reduce the risk of collision. Furthermore, an Avian Collision Avoidance System (ACAS) consisting of ultra-violet lighting of the transmission lines would be installed on the Rio Grande crossing, with the intent of significantly reducing nighttime avian collisions (POWER Engineers, Inc. 2021g:105). Although ACAS has not been tested in this ecosystem, it is extremely likely to reduce collision risk (Dwyer et al. 2019). Potentially significant impacts could occur but would likely be restricted to short-duration events such as poor visibility conditions that prevent birds from detecting the lines or bird diverters in time to avoid collision.

In accordance with EPM 12, the APP, and the project's Biological and Aquatic Resources Survey Plan (POWER Engineers, Inc. 2021m), preconstruction nest clearance surveys for all migratory birds would be required within the right-of-way (including new or improved access roads) if construction occurs during the nesting season (mid-February through July). Any active nests found would be avoided by a specified buffer until no longer active, thus disturbance during the breeding season would be minimized (POWER Engineers, Inc. 2021g:20). If an active nest is present, the APP Program Coordinator will identify spatial buffers to avoid disturbance near the nest that may cause the adults to flush (EPG 2018:B3-11).
In addition, if the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) is listed as proposed threatened, then pre-construction surveys in suitable habitat within the analysis area would be required per the USFWS survey protocol.

In addition to the EPMs, SunZia worked closely with the USFWS and BLM to prepare a Migratory Bird Conservation Plan and Avian Protection Plan, both of which have been reviewed and approved by the USFWS (POWER Engineers, Inc. 2021g:13). The plans include design features, mitigation measures, and standard operating procedures to avoid disturbance of eagles and other migratory birds that could result in "take" under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA) (POWER Engineers, Inc. 2021g:13). The Migratory Bird Conservation Plan includes measures to offset the loss of or unavoidable impacts to migratory bird habitat. Such measures include acquisition of conservation lands or easements, additional research and monitoring, and other means of compensation to replace migratory bird habitat service losses (POWER Engineers, Inc. 2021g:6–13). The APP will be updated following an additional avian risk assessment that will inform structure design modifications that will go above and beyond the APLIC engineering design guidance. The risk assessment will review additional data (ongoing telemetry studies, etc.) to inform the locations of bird flight diverters, ACAS installation locations, structure design, and other measures to further minimize collision risk. The adjusted design of the river crossing transmission structures would be developed to match the risk space height over and above the APLIC recommendations. Additional mitigation measures, including ACAS, will be described in detail in the Migratory Bird Conservation Plan and APP (POWER Engineers, Inc. 2021g:105–106).

Implementation of the Migratory Bird Conservation Plan and the APP will be required as a stipulation of the amended federal right-of-way grant, if approved. These plans fulfill requirement in EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and the *Memorandum of Understanding Between the Bureau of Land Management and the U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds* (BLM and USFWS 2010).

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 would result in approximately 0.1 mile of transmission line crossing the Middle Rio Grande, less than 0.1 mile of transmission line across the Rio Salado, and approximately 0.1 mile of transmission line across the Rio Puerco (Table 3-64). In addition, Alternative Route 1 is approximately 1.7 miles away from the Sevilleta NWR in the south and 0.6 mile from the northeastern boundary adjacent to Abo Canyon. Alternative Route 1 intersects with and is in close proximity to suitable waterfowl and raptor habitat, introducing aerial collision hazards. The groundwires, conductors, and structures associated with the transmission line would present a collision hazard for birds, particularly large species such as waterfowl and cranes, which cannot make abrupt course corrections when obstacles are encountered in their flight path.

The risk of collision at the Rio Grande crossing would not increase where co-locating the transmission line along approximately 14 miles of the constructed Western Spirit 345-kV transmission line, compared with siting the two transmission lines at a greater distance apart, as this would result in two barriers to flight patterns and an increased risk of collision. However, if the lines are co-located but constructed with a substantial difference in height, then a greater level of flight path obstruction may occur due to the presence of multiple horizontal barriers.

Waterfowl and sandhill cranes move between the Casa Colorada and Belen waterfowl management areas north of the Western Spirit line to the Bernardo Waterfowl Management Area south of the line, creating a collision risk. A 2019–2020 non-breeding season study at the Western Spirit Rio Grande crossing found that the sandhill crane exposure to potential collisions with transmission lines varied in part by proximity to roosting or foraging areas (POWER Engineers, Inc. 2021g:105). The Western Spirit crossing location had lower estimated rates of collision-induced fatalities than other study sites located between Belen and Escondida, New Mexico, along the Middle Rio Grande (POWER Engineers, Inc. 2021g:105). Due to the co-location of the proposed transmission line route at the point of crossing of the Rio Grande, impacts are expected to be similar in nature to those disclosed in the Western Spirit Rio Grande crossing study (Witt 2020).

Table 3-64. Avian Collision Risk within Project Component 3 Alternative

Project Component	Miles of Transmission Line across Middle Rio Grande	Miles of Transmission Line across Rio Puerco	Miles of Transmission Line across Rio Salado	Miles of Transmission Line within or adjacent to Suitable Waterfowl and Raptor Habitat within Analysis Area
Alternative Route 1 with Subroute 1A-1				
Subroute 1A-1	0.12	0.12	0.03	98
Subroute 1A-2	0.07	0.06	0.03	107
Subroute 1A-3	0.11	0.06	0.03	5
Subroute 1A-4	0.12	0.12	0.03	99

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 would cross approximately 14 miles of the Sevilleta NWR (Table 3-65). Alternative Route 2 would be constructed on approximately 14 miles of El Paso Electric's structures, which would be modified and rebuilt, through the Sevilleta NWR. Although co-located, the combined lines in this location require taller poles and conductors (up to 200 feet in height) which could increase collision risk.
In addition, Subroute 2A-1 crosses approximately 0.5 mile of the Rio Salado. All Alternative Route 2 subroutes cross approximately 0.1 mile of the Rio Grande. In addition, all Alternative Route 2 subroutes cross through Abo Canyon (see Table 3-65).

Alternative Route 2 intersection with and close proximity to suitable waterfowl and raptor habitat introduces aerial collision hazards. The collision hazard risks would be similar to Alternative 1 where the groundwires, conductors, and structures associated with the transmission line would present a collision hazard for birds, particularly large species such as waterfowl and cranes, which cannot make abrupt course corrections when obstacles are encountered in their flight path. However, by co-locating the transmission lines on one set of structures, the wires on the transmission structures would be confined to a smaller area, which increases the visibility of the transmission lines and allows birds to make one ascent and descent to cross the lines (APLIC 2012:70).

Table 3-65. Avian Collision Risk within Project Component 3 Alternative Route 2 Subroutes

Project Component	Miles of Transmission Line across Sevilleta NWR	Miles of Transmission Line across the Rio Grande	Miles of Transmission Line across the Rio Salado	Miles of Transmission Line within or adjacent to Suitable Waterfowl and Raptor Habitat within Analysis Area
Alternative Route 2 with Subroute 2A-1				
Subroute 2A-1	14	0.11	0.5	67
Subroute 2A-2	14	0.05	0.5	65
Subroute 2A-3	14	0.09	0.5	62
Subroute 2A-4	14	0.11	0.5	68

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 would cross approximately 12 miles of the Sevilleta NWR (Table 3-66). Alternative Route 3 would be co-located along approximately 12 miles of Tri-State's structures, which would be modified and rebuilt, through the Sevilleta NWR. Although co-located, the combined lines in this location require taller poles and conductors (increasing the existing structure height from approximately 50 feet to structures up to 200 feet in height) which could increase collision risk. Approximately 0.1 mile of the Rio Grande and Rio Puerco would be crossed by all Alternative Route 3 subroutes (see Table 3-66). In addition, all Alternative Route 3 subroutes cross through Abo Canyon. The collision hazard risks would be similar to Alternative Route 1 where the groundwires, conductors, and structures associated with the transmission line would present a collision hazard for birds, particularly large species such as waterfowl and cranes, which cannot make abrupt course corrections when obstacles are encountered in their flight path. However, by co-locating the transmission lines on one set of structures, the wires on the transmission structures would be confined to a smaller area, which increases the visibility of the transmission lines and allows birds to make one ascent and descent to cross the lines (APLIC 2012:70).

Table 3-66. Avian Collision Risk within Project Component 3 Alternative Route 3 Subroutes

Project Component	Miles of Transmission Line across Sevilleta NWR	Miles of Transmission Line across the Rio Grande	Miles of Transmission Line across the Rio Puerco	Miles of Transmission Line within or adjacent to Suitable Waterfowl and Raptor Habitat within Analysis Area
Subroute 3A-1	12	0.13	0.13	72
Subroute 3A-2	12	0.08	0.08	69
Subroute 3A-3	12	0.11	0.11	65
Subroute 3A-4	12	0.13	0.13	72

3.4.6.5 Impacts of SunZia West Substation

No avian collisions with structures within the substation are expected for proposed project Component 4. Based on the APP, there are no features at the substation that would contribute to electrocution risk.

3.4.6.6 No Action Alternative

Under the no action alternative, the groundwires, conductors, and structures would still present collision hazards for birds, particularly large-bodied species such as cranes, geese, and raptors, which cannot make abrupt course corrections when obstacles are encountered in their flight path (BLM 2013). Design measures would prevent birds from perching on structures at locations where electrocution is a risk. The substations would be engineered with spacing similar to transmission lines, with similarly low electrocution risk. When the risk of electrocution is minimized, beneficial effects for raptors include introduction of perches and nesting sites on structures and the clearing of vegetation that could improve their ability to see prey (BLM 2013). Passerine birds may be at risk for injury from collision, especially when flying lower, such as in poor weather conditions or where structures are placed on elevated terrain. An Avian Protection Plan and associated avian conservation strategy has been developed through collaboration among the BLM, the USFWS, and the Applicant, to mitigate the collision risk and loss of productivity for all birds. The mitigation measures proposed for identified areas of high collision risk would follow the recommendations of the APLIC, including the application of bird diverters (APLIC 2012). Potentially significant impacts could occur, but would likely be restricted to short-duration events such as poor-visibility conditions that prevent birds from detecting the lines or bird diverters in time to avoid collision (BLM 2013:4-74).

3.4.6.7 Summary of Impacts

Component 3, Segment 4 alternatives would have similar potential for raptor and waterfowl collision impacts between the different alternatives (Table 3-67). Alternative Route 1 would introduce the greatest linear mileage (98 miles) in waterfowl and raptor habitat in comparison to Alternative Routes 2 and 3 (67 miles and 72 miles, respectively). Therefore, Alternative Route 1 has the potential to contribute to more avian collisions. Alternative Routes 2 and 3 would co-locate the proposed routes with existing transmission infrastructure, which would reduce the likelihood of collision by increasing the visibility of the transmission lines to provide time for birds to avoid the transmission lines. However, in Sevilleta NWR, the combined lines require taller poles and lines (up to 200 feet in height), which could increase collision risk. Implementing EPM 15 would increase the visibility of groundwires to reduce the risk of collision. Furthermore, an Avian Collision Avoidance System (ACAS) consisting of ultra-violet lighting of the transmission lines would be installed on the Rio Grande crossing, and is likely to significantly reduce nighttime avian collisions. Potentially significant impacts could occur but would likely be restricted to short-duration events such as poor visibility conditions that prevent birds from detecting the lines or bird diverters in time to avoid collision (POWER Engineers, Inc. 2021g:105).

Cumulative impacts to avian species from collisions are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-323). Incremental impacts from the proposed project components could result in increased avian collision and electrocution risks along 342 miles of transmission line (see Table 3-67). Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to birds may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, and wind farms. Adverse impacts to birds from collisions or electrocutions likely would be infrequent but long term.

Table 3-67. Summary of Impacts

Project Component	Miles of Transmission Line across Sevilleta NWR	Miles of Transmission Line within or adjacent to Suitable Waterfowl and Raptor Habitat within Analysis Area
Component 1: Localized Route Modifications	0	105
Component 3: Segment 4 Reroute		
Alternative Route 1	0	98
Alternative Route 2	14.4	67
Alternative Route 3	14.4	72

AID-4 Migratory Bird Corridors

Would the power lines associated with the proposed project reduce the viability of migratory bird corridors and habitat areas of Lordsburg Playa and the Rio Grande and San Pedro River valleys, compared with the no action alternative?

3.4.7 Affected Environment

River corridors and playa lakes are important to numerous species of wintering, breeding, and migrating waterfowl, shorebirds, and songbirds. Birds that travel for long distances over arid deserts and plains frequently follow the rivers and streams, stopping in riparian habitats that provide water, food, and cover (Finch and Yong 2000). Migrating birds may also follow mountain ranges and other landscape-level features. Extensive semidesert grasslands in southwestern New Mexico provide wintering habitat for a number of prairie-nesting species (BLM 2013:3-86).

The analysis area is the 8-mile-wide analysis area, which includes portions of Bird Habitat Conservation Areas (BHCAs) designated by Intermountain West Joint Venture, Important Bird Areas (IBAs) designated by Audubon, and the BLM's Lordsburg Playa Research Natural Area (RNA) as well as migratory bird habitat within 0.5 mile of the Rio Grande and San Pedro River (i.e., the river valleys). A new IBA north of the Lordsburg Playa is proposed for conservation of the Bendire's thrasher (*Toxostoma bendirei*). See AID-7 for discussion of this species.

3.4.7.1 Rio Grande River Valley

The Middle Rio Grande BHCA is located on the Rio Grande from near Los Alamos, New Mexico, south to the headwaters of Elephant Butte Reservoir. This BHCA contains extensive areas of middle-elevation riparian and wetland habitats and is an important avian migratory corridor (BLM 2013:3-118). The Middle Rio Grande BHCA is considered a New Mexico IBA. Nearly 300 bird species have been regularly recorded in the region, the majority associated with the riparian corridor. The area is important for wintering waterfowl, as well as migrant and resident waterbirds and shorebirds. The BHCA provides habitat for special-status bird species, including the southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus*). The Middle Rio Grande Valley is the most important overwintering area for the Rocky Mountain sandhill crane population (POWER Engineers, Inc. 2021g).

Growing human populations and rapid ecological changes threaten the sustainability of the Middle Rio Grande corridor by modifying riparian woodland habitat (Finch and Yong 2000). Existing habitat modification includes irrigation canals at the Rio Grande crossing.

Other IBAs in the vicinity of the Rio Grande Valley are the Luna County Grasslands BHCA (known locally as the Nutt Grasslands) and San Mateo and Magdalena Mountains BHCA. A portion of the Luna County Grasslands BHCA is within the Sierra County portion of the analysis area. This BHCA contains important grassland habitats for wintering grassland birds and agricultural areas for sandhill cranes and geese (POWER Engineers, Inc. 2021g).

3.4.7.2 San Pedro River Valley

The Lower San Pedro River IBA consists of 6,938 acres of riparian habitat along nearly 59 miles of the river from the "Narrows" north of Cascabel, Arizona, north to the junction with the Gila River at Hayden, Arizona. This reach of the river contains significant segments of cottonwood-willow gallery forest interspersed among old-growth mesquite (*Prosopis juliflora*) bosques (BLM 2013:3-118). Important special-status bird species that use the river area include the southwestern willow flycatcher and western yellow-billed cuckoo, and the largest populations of nesting gray hawks (*Buteo nitidus*) and Mississippi kites (*Ictinia mississippiensis*) in Arizona. The entire San Pedro River corridor in Arizona is an important movement corridor for avian and other wildlife species. Over 300 bird species have been recorded in the area including migrant and permanent breeding species (Krueper et al. 2003).

Groundwater extraction, improper livestock grazing in riparian corridors, fire, off-highway vehicles, suburban development, and wood cutting are the greatest threats to this IBA (Arizona Important Bird Areas Program 2021; Audubon 2021b). Recent threats include a proposed interstate highway and a large subdivision near San Manuel, Arizona.

3.4.7.3 Lordsburg Playa

The Lordsburg Playa RNA near Highway 10 and the town of Lordsburg, New Mexico, is approximately 4,500 acres of land managed by the BLM to protect biological and research values. The dry lakebeds provide an important stop-off or wintering site for migrating shorebirds and waterfowl in some wet years.

Playas contain fragile soils and vegetation is sparse. The land is managed by the BLM for grazing, and cattle cause disturbance on the playa surface. The proposed Bendire's thrasher IBA includes portions of the Lordsburg Playa. See AID-7 for discussion of this species.

3.4.7.4 Reasonably Foreseeable Trends and Future Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for migratory birds. These include transmission line projects including the constructed Western Spirit 345-kV transmission line and the approved and planned Southline Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change could reduce the quality and quantity of habitat for species analyzed by varying annual precipitation and reducing suitable vegetation.

3.4.8 Environmental Consequences

3.4.8.1 Methods and Assumptions

The impact indicators used for this analysis are:

- Miles of permanent project activities (transmission line infrastructure) in BHCAs, IBAs, RNAs, and riparian habitat within 0.5 mile of rivers.

- Acres of temporary and permanent project activities in BHCAs, IBAs, RNAs, and riparian habitat within 0.5 mile of rivers, compared with acres available in the analysis area.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to migratory bird corridors:

- AID-3 Avian Collisions: Potential for avian collision with groundwires, conductors, and structures.
- AID-5 Federally Listed Wildlife Species: Impacts to southwestern willow flycatcher, yellow-billed cuckoo, and bald eagle habitat.
- AID-7 BLM Sensitive Wildlife Species: Impacts to Bendire's thrasher and pinyon jay (*Gymnorhinus cyanocephalus*).
- AIB-16 Sandhill Crane Habitat: Impacts to sandhill crane habitat.

The impacts analysis for the migratory bird corridors assumes application of the design features and environmental protection measures contained in Table 3-68. Full design features and EPMs are provided in Appendix C.

Table 3-68. Design Features and Environmental Protection Measures Applicable to Migratory Bird Corridors

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 8, 18, 19, 26, 28	2, 3, 4, 5, 6, 7, 8, 10, 13, 14, 16

3.4.8.2 Impacts Common to All Components

Impacts to migratory bird corridors from project development could potentially include minor habitat alteration or loss. Ground-disturbing activities, primarily vegetation removal, may cause erosion that could result in sediment input to the rivers; and ground disturbance may provide habitat suitable for colonization by invasive plant species. An Avian Protection Plan and associated avian conservation strategy has been developed through collaboration among the BLM, the USFWS, and the Applicant, to mitigate the collision risk and loss of productivity for all birds (EPG 2018).

Surface disturbance resulting from permanent and temporary project activities would occur in the San Pedro River valley (within 0.5 mile of river crossing) including the Lower San Pedro River IBA (Table 3-69). Surface-disturbing activities would also occur within the Rio Grande and San Pedro River valleys (within 0.5 mile of river crossing), and Lower San Pedro River IBA from project development. There would be no impacts within the Lordsburg Playa RNA from any component.

Table 3-69. Migratory Bird Areas within the Analysis Area per Project Component

Project Component	Rio Grande River Valley (miles/acres)	Middle Rio Grande BHCA (miles/acres)	Luna County Grasslands BHCA (miles/acres)	SMMM* BHCA (miles/acres)	San Pedro River Valley (miles/acres)	Lower San Pedro River IBA (miles/acres)
Component 1. Localized Route Modifications						
1. Mavericks Area	0.0	0.0	0.0	0.0	0.0	0.0
2. SunZia South Area	0.0	0.0	0.0	0.0	0.0	0.0

Project Component	Rio Grande River Valley (miles/acres)	Middle Rio Grande BHCA (miles/acres)	Luna County Grasslands BHCA (miles/acres)	SMMM* BHCA (miles/acres)	San Pedro River Valley (miles/acres)	Lower San Pedro River IBA (miles/acres)
3. Macho Springs Area	0.0	0.0	9.4 miles 2.9 acres	0.0	0.0	0.0
4. Las Palomas Area	0.0	0.0	0.0	0.0	0.0	0.0
5. Highlands Area	0.0	0.0	0.0	0.0	0.0	0.0
6a. Pinal Central Area- North Route	0.0	0.0	0.0	0.0	0.0	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	0.0	0.0	0.0	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative West Tie-in	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative Central Tie-in	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative East Tied-in	0.0	0.0	0.0	0.0	0.0	0.0
Component 2a. Access Roads	0.3 mile 0.1 acre	0.0 miles 0.0 acre	15.7 miles 35.7 acres	12.3 miles 25.0 acres	36.0 miles 3.5 acres	14.5 miles 0.7 acre
Component 2b. Temporary Work Areas	0.0 acre	0.0 acre	94.8 acres	36.5 acres	35.7 acres	28.0 acres
Component 3. Segment 4 Reroute Alternatives						
Alt Route 1 with Subroute 1A-1	1.1 miles (9.6 acres)	6.0 miles (52.4 acres)	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-2	1.0 mile (9.0 acres)	5.7 miles (49.9 acres)	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-3	1.0 mile (9.0 acres)	4.0 miles (35.3 acres)	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-4	1.1 miles (9.6 acres)	6.0 miles (52.4 acres)	0.0	0.0	0.0	0.0
Local Alternative 1A-6	0	0	0	0	0	0
Local Alternative 1A-7	0	0	0	0	0	0
Alt Route 2 with Subroute 2A-1	1.1 miles (9.3 acres)	11.3 miles (96.6 acres)	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-2	1.0 mile (8.8 acres)	8.0 miles (68.7 acres)	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-3	1.0 mile (8.7 acres)	4.0 miles (34.3 acres)	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-4	1.1 miles (9.3 acres)	11.3 miles (96.1 acres)	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-1	1.1 miles (9.5 acres)	11.9 miles (103.3 acres)	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-2	1.0 mile (8.9 acres)	8.7 miles (75.5 acres)	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-3	1.0 mile (8.8 acres)	4.7 miles (40.7 acres)	0.0	0.0	0.0	0.0

Project Component	Rio Grande River Valley (miles/acres)	Middle Rio Grande BHCA (miles/acres)	Luna County Grasslands BHCA (miles/acres)	SMMM* BHCA (miles/acres)	San Pedro River Valley (miles/acres)	Lower San Pedro River IBA (miles/acres)
Alt Route 3 with Subroute 3A-4	1.1 miles (9.4 acres)	11.9 miles (103.2 acres)	0.0	0.0	0.0	0.0
Local Alternative 3B-1	0	0	0	0	0	0
Local Alternative 3B-2	0	0	0	0	0	0
Component 4. SunZia West Substation	0.0	0.0	0.0	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

* SMMM = San Mateo and Magdalena Mountains

CONSTRUCTION

During construction, the project would disturb land and remove vegetation associated with the permanent structures, ancillary facilities, access roads, and footings as well as temporary use areas. Surface disturbance would remove suitable nesting and foraging habitat for bird species that use the area and could result in a direct take of bird nests if done during the nesting season and is therefore expected to result in long-term adverse impacts to migratory birds. The project would require overland travel along the project right-of-way, along the access roads, and within the ancillary facilities, substations, construction yards, concrete plants, work areas, and wire pulling/tensioning sites. Overland travel could impact ground-nesting and roosting birds, while tree trimming could affect nesting and roosting birds if present in those trees.

The project construction equipment, traffic, and blasting would also generate noise and vibrations. This short-term increase in noise and vibration could disturb nesting or wintering birds during construction, thus degrading the quality of suitable habitat. The noise and/or vibration could deter migrating birds from using suitable habitat in the nearby area.

OPERATION AND MAINTENANCE

During operation and maintenance, impacts would be similar to those described for construction. The project would include the presence of permanent structures, ancillary facilities, access roads, substations, and footings. The project would include trimming trees and woody vegetation within the transmission line wire zone including riparian and woodland areas. Trimming trees would continue to open the canopy and allow for invasive species such as saltcedar to establish. The project would require occasional overland travel along the project right-of-way, along the access roads, and within the ancillary facilities, substations, and footings associated with periodic maintenance and inspection. The project operation equipment and traffic would generate intermittent noise.

DECOMMISSIONING

Decommissioning would remove the structures, ancillary facilities, access roads, substations, and footings. This would require overland travel along the project right-of-way, along the access roads. There would be a short-term increase in equipment and traffic that would generate noise.

3.4.8.3 Impacts of Localized Route Modifications

The Luna County Grasslands BHCA is located within the analysis area of the Component 1 localized route modifications. Only the Macho Springs modification would cross the Luna County Grasslands

BHCA and less than 0.1% of the BHCA within the analysis area would be affected. Component 1 does not cross any other important migratory bird areas or river valley migration corridors. Component 1 modifications cross desert scrub and grassland habitats with no nearby water resources that would attract migrating birds. Therefore, Component 1 would not reduce the viability of migratory bird corridors and habitat areas.

3.4.8.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Component 2 access roads and temporary work areas would occur in the Rio Grande Valley, including the Middle Rio Grande, Luna County Grasslands, and San Mateo and Magdalena Mountains BHCAs, and the San Pedro River valley including the Lower San Pedro River IBA (see Table 3-69). Impacts to migratory bird habitats from Component 2 would primarily occur along Segment 1 and Segment 4 access roads and TWAs within the San Pedro and Rio Grande Valleys, respectively. Segment 2 access roads head north of the Lordsburg Playa through Chihuahuan Desert Scrub and Chihuahuan Semi-Desert Grassland to the SunZia South Substation, avoiding playas used by migratory birds. Overall, there would be 195 acres of impacts associated with TWAs, and 64.9 acres of disturbance and associated impacts resulting from the construction of access roads. However, less than 0.1% of each bird area would be impacted and the viability of migratory bird corridors and habitat areas would not be reduced.

3.4.8.5 Impacts of Segment 4 Reroute Alternatives

Segment 4 reroute alternatives all cross the Rio Grande valley and the Middle Rio Grande BHCA (see Table 3-69). Depending on alternative, the miles of Middle Rio Grande BHCA crossed range from 4.0 to 11.9 miles, compared with 8.9 miles for the 2015 Selected Route. Approximately 0.2% of the BHCA within the analysis area would be impacted (0.1% by temporary project activities, 0.1% permanent project activities), regardless of subroute alternative.

Birds in the Rio Grande Valley and the Middle Rio Grande BHCA including waterfowl, waterbirds, and shorebirds could be affected by the construction phase of the project. Although the entire riparian corridor is designated critical habitat for southwestern willow flycatcher and yellow-billed cuckoo at all three alternative route crossings, habitat suitability varies (POWER Engineers, Inc. 2021g). Approximately half of the Component 3 acres of impacts would be temporary within the river crossing. The reroutes would not reduce the viability of migratory bird corridors and habitat areas with implementation of design features and EPMs.

IMPACTS OF ALTERNATIVE ROUTE 1

The Alternative Route 1 reroute crosses the Rio Grande Corridor where there are riparian and other habitats used by migratory birds. Depending on subroute, Alternative Route 1 crosses 4.0 to 6.0 miles within the Middle Rio Grande BHCA but avoids Sevilleta NWR. This route contains southwestern willow flycatcher and western yellow-billed cuckoo critical habitat at river crossing (see AID-5 Federally Listed Wildlife Species).

IMPACTS OF ALTERNATIVE ROUTE 2

The Alternative Route 2 reroute crosses the Rio Grande Corridor where there are riparian and other habitats used by migratory birds. Depending on subroute, Alternative Route 2 would cross 4.0 to 11.3 miles within the Middle Rio Grande BHCA and crosses uplands within the Sevilleta NWR over 5 miles west of the Rio Grande. This route contains southwestern willow flycatcher and western yellow-billed cuckoo critical habitat at river crossing; these species have been documented in this area (see AID-5 Federally Listed Wildlife Species).

IMPACTS OF ALTERNATIVE ROUTE 3

The Alternative Route 3 reroute crosses the Rio Grande Corridor where there are riparian and other habitats used by migratory birds. Depending on subroute, Alternative Route 3 would cross 4.7 to 11.9 miles within the Middle Rio Grande BHCA and crosses uplands within Sevilleta NWR, paralleling the Rio Grande 1 to 2 miles west of its banks. This route contains southwestern willow flycatcher and western yellow-billed cuckoo critical habitat at river crossing, but only a portion of the crossing contains potentially suitable habitat (see AID-5 Federally Listed Wildlife Species). The riparian habitat at this crossing is not as dense as at the other alternatives, so although up to 11.9 miles could be affected, the impacts to migratory birds that rely on dense riparian habitat would be less at this location.

3.4.8.6 Impacts of SunZia West Substation

The substation is not near the Rio Grande and San Pedro River valleys, or Lordsburg Playa. The area is Sonoran Desert Scrub habitat with no nearby water resources that would attract migrating birds. Therefore, Component 4 would not reduce the viability of migratory bird corridors and habitat areas.

3.4.8.7 No Action Alternative

The 2015 Selected Route crossed 8.9 miles of the Middle Rio Grande BHCA and crossed 0.4 mile of yellow-billed cuckoo and 0.5 mile of southwestern willow flycatcher critical habitat at Rio Grande crossing. Impacts to the Rio Grande and San Pedro River valleys, and Lordsburg Playa from the no action alternative are similar to impacts from the proposed project components and include minor habitat alteration or loss; increased erosion that could result in sediment input to the rivers; and colonization by invasive plant species. The no action alternative would increase avian collision hazards at river crossings presented by conductors, groundwires, and structure guywires. See AID-3 for analysis of avian collisions.

3.4.8.8 Summary of Impacts

Impacts to bird migratory areas from the proposed project include surface disturbance in riparian habitats along river corridors, three BHCAs, and one existing and one proposed IBA. These impacts are similar to the no action alternative. Impacts from surface disturbance would be minimized by EPMs 2, 3, 5, 7, 8, 10, 13, and 16. EPM 14 would minimize impacts to riparian habitat/trees. Traffic and overland travel could impact birds, including direct impacts to ground-dwelling and ground-nesting birds. Traffic, noise, and vibrations could deter migrating birds from using areas with these activities. EPMs 4 and 6 would reduce traffic/overland travel through habitat. Design Features 2, 3, 4, 5, and 6 could reduce the extent of disturbance. Design Features 1 and 26 could preventing the spread and establishment of noxious weeds in important bird habitats. Design Features 18 and 19 would help reduce disturbance to drainages and stream banks and Design Feature 8 would restore disturbed areas with desirable native vegetation.

SunZia worked with the USFWS and BLM to prepare a Migratory Bird Conservation Plan and Avian Protection Plan (EPG 2018), both of which have been reviewed and approved by the USFWS.
As described in the APP, preconstruction nest clearance surveys for all migratory birds would be required within the right-of-way and access roads if construction occurs during the nesting season. Any active nests found would be avoided by a specified buffer until no longer active, thus disturbance during the breeding season would be minimized. Preconstruction surveys for yellow-billed cuckoo and southwestern willow flycatchers were conducted in 2021; protective measures for confirmed locations of these species are provided in the Biological Assessment (SWCA 2022a).

Cumulative impacts to migratory birds are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could result in the disturbance of migratory habitats in river corridors and other important bird areas. Impacts to migratory birds from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to birds that use the two river corridors, three BHCAs, and one existing and one proposed IBA may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbing migratory bird habitats.

AID-5 Federally Listed Wildlife Species

Would the proposed project reduce populations of special-status wildlife that occur along the Rio Grande or San Pedro River, including the Bald (*Haliaeetus leucocephalus*) and Golden (*Aquila chrysaetos*) eagles, southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-billed cuckoo (*Coccyzus americanus*), cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), Rio Grande silvery minnow (*Hybognathus amarus*), Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*) and Northern Mexican gartersnake (*Thamnophis eques megalops*)?

3.4.9 Affected Environment

The Rio Grande and the San Pedro River, within the analysis area, provide habitat for multiple federally protected species including those listed, proposed to be listed, or candidates under the ESA and BGEPA. These rivers, as well as the surrounding riparian corridors, provide habitat for species of concern which are known or likely to occur, including southwestern willow flycatcher, yellow-billed cuckoo, Rio Grande silvery minnow, Rio Grande cutthroat trout, Northern Mexican gartersnake, as well as bald and golden eagles. An additional species, the cactus ferruginous pygmy-owl is found in upland areas and xeroriparian washes in the western portion of the analysis area. A brief description of present habitat within the analysis area(s) and species habitat requirements are included in Table 3-70 and in the species-specific subsections below. Additional habitat information and documentation of the full evaluation process for ESA-listed species is further detailed in the 2013 FEIS (BLM 2013:3-73 through 3-136 and 4-63 through 4-116), SunZia Draft Biological Assessment (SWCA 2022a), and SunZia Biological Resource Report (POWER Engineers, Inc. 2021g), and are considered incorporated by reference in the following analysis. See EIS Section 5.4 for more information about compliance with ESA Section 7.

3.4.9.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact suitable and critical habitat for species of concern. These include transmission line projects including the constructed Western Spirit 345-kV transmission line and planned High Plains Express Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trends could reduce the quality and quantity of habitat for species of concern, including southwestern willow flycatcher, yellow-billed cuckoo, Rio Grande silvery minnow, Rio Grande cutthroat trout, Northern Mexican gartersnake, as well as bald and golden eagles, through the varying annual precipitation and potential reduction of riparian habitat. Influences of climate change that would impact federally listed species habitat include, but are not limited to, continued lowering of groundwater levels and loss of aging cottonwood gallery forests within riparian areas.

Table 3-70. Federally Protected Species with Potential to Occur and the Associated Analysis Areas for Each Species

Species Common Name (Scientific Name)	Status	Analysis Area
Southwestern willow flycatcher (*Empidonax traillii extimus*)	USFWS Endangered	8-mile-wide corridor; extent of critical habitat
Yellow-billed cuckoo (*Coccyzus americanus*)	USFWS Threatened	8-mile-wide corridor; extent of critical habitat
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	USFWS Proposed Threatened	8-mile-wide corridor
Northern Mexican gartersnake (*Thamnophis eques megalops*)	USFWS Threatened	8-mile-wide corridor; extent of critical habitat
Rio Grande silvery minnow (*Hybognathus amarus*)	USFWS Endangered	8-mile-wide corridor
Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*)	USFWS Candidate	8-mile-wide corridor
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA	4-mile-wide corridor
Golden eagle (*Aquila chrysaetos*)	BGEPA	4-mile-wide corridor
Monarch butterfly (*Danaus plexippus plexippus*)	USFWS Candidate	See AIB-18 for species-specific analysis

3.4.9.2 Yellow-billed cuckoo (Coccyzus americanus)

STATUS AND LIFE HISTORY

The USFWS listed the western distinct population segment (DPS) of the yellow-billed cuckoo (*Coccyzus americanus*) as threatened on October 3, 2014 (USFWS 2014a). The western DPS is a neotropical migrant, arriving from its winter grounds in South America in mid- to late May (Hughes 1999), and breeding in 12 states west of the Rockies. Western yellow-billed cuckoos breed in large blocks of riparian habitats, at least 50 acres or greater, particularly woodlands with cottonwoods and willows (Ehrlich et al. 1988). The USFWS considers habitat patches on the Rio Grande that are wider than 100 feet and larger than 12 acres to be suitable habitat for yellow-billed cuckoo breeding.

OCCURRENCE IN ANALYSIS AREA

The yellow-billed cuckoo is known to occur within the analysis area along the Middle Rio Grande Corridor with additional suitable habitat occurring within riparian vegetation areas (see AIB-10 Riparian Habitat). Approximately 44,161 to 71,145 acres of suitable habitat occurs within the analysis area (Table 3-71).

The USFWS considers species location (occupied habitat) data confidential for protection of the species, and those locations are therefore not spatially mapped within the EIS. The following analysis assumes occupancy of all present suitable habitat within the analysis area.

CRITICAL HABITAT

The USFWS designated critical habitat for the western DPS of yellow-billed cuckoo in May 2021 within the states of Arizona, California, Colorado, Idaho, New Mexico, Texas, and Utah. Critical habitat for this species occurs within 8,254 to 15,902 acres of the analysis area at project crossings at both the San Pedro River and Rio Grande (USFWS 2021c) (see Appendix A, Maps 24, 27, 31, 34–36, 39, 40, 138, 141, 156, 158, 164–167).

3.4.9.3 Southwestern willow flycatcher (Empidonax traillii extimus)

STATUS AND LIFE HISTORY

The USFWS listed the southwestern willow flycatcher as endangered on February 27, 1995 (USFWS 1995). The southwestern willow flycatcher breeds in riparian forests in Arizona, New Mexico, and southern California, as well as portions of southern Nevada and Utah, and southwestern Colorado in late May and early June (USFWS 2013b). Breeding southwestern willow flycatchers are riparian obligates, typically nesting in relatively dense riparian vegetation where surface water is present (Sogge et al. 2010). The species winters in the rain forests of Mexico, Central America, and northern South America (USFWS 2013b).

OCCURRENCE IN ANALYSIS AREA

Southwestern willow flycatcher is known to occur and breed within the analysis area along the Middle Rio Grande, San Pedro River, and Cienega Creek where suitable riparian vegetation exists (BLM 2013). Project-specific survey results are on file with the BLM and USFWS (POWER Engineers, Inc. 2021g). Species location (occupied habitat) data are considered confidential for the protection of the species, and are therefore not spatially mapped within the EIS. The following analysis assumes occupancy of all present suitable habitat within the analysis area.

CRITICAL HABITAT

Designated critical habitat for southwestern willow flycatcher is present within the analysis area (Table 3-72) and intersected by Component 2 and Component 3 of the proposed project per the USFWS revised Critical Habitat publication (USFWS 2013b, 2021d) (see Appendix A, Maps 24, 27, 31–36, 39, 40, 138, 141, 156, 158, 160, 164–167).

3.4.9.4 Cactus Ferruginous Pygmy-owl (Glaucidium brasilianum cactorum)

STATUS AND LIFE HISTORY

On December 22, 2021, the USFWS proposed to list the cactus ferruginous pygmy-owl as a threatened species under the ESA (USFWS 2021l). A final rule is expected in 2023.

The cactus ferruginous pygmy-owl first received federal protection in 1997, but was delisted in 2006 (USFWS 2021l). In 2011, the USFWS determined that a petition to relist the cactus ferruginous pygmy-owl was not warranted (USFWS 2021l). A court decision in 2017 directed the USFWS to reconsider that finding. The current distribution of the cactus ferruginous pygmy-owl is from southern Arizona extending south into western Mexico and in southern Texas extending south into Mexico (USFWS 2021m).
In Arizona, cactus ferruginous pygmy-owl is found in Sonoran Desert Scrub and Semidesert Grassland biotic communities below 1,200 m (4,000 feet) (USFWS 2021m). Suitable habitat for cactus ferruginous pygmy-owl includes areas with fairly dense vegetation with the presence of trees, saguaros (*Carnegiea gigantea*), organ pipe cactus (*Stenocereus thurberi*), or other columnar cacti large enough to support nesting cavities (USFWS 2021m). The cactus ferruginous pygmy-owl is a primarily diurnal or crepuscular species that is nonmigratory and typically begins nesting in April or May (USFWS 2021m).

OCCURRENCE IN ANALYSIS AREA

The cactus ferruginous pygmy-owl was addressed in the 2013 FEIS (BLM 2013) as a special-status species that is known to or has potential to occur within the analysis area based on range and habitat.

In 1990, the BLM conducted cactus ferruginous pygmy-owl surveys and habitat assessment within BLM lands that overlap with project components and analysis area for Components 2 and 4. Results indicated that 250 plots overlapped with the analysis area, some of which had relatively high scores for habitat value (e.g., habitat criteria receiving higher scores include: saguaro density, vegetation ground cover, and abundance of xeric riparian tree species), though it is unknown if cactus ferruginous pygmy-owl were observed within these plots (Hughes 2022).

Formal monitoring and surveys for this species within its historical distribution area have not occurred after it was delisted in 2006 (USFWS 20201b). To address that data gap, and to develop the species status assessment report for cactus ferruginous pygmy-owl, the AZGFD, USFWS, and Audubon Society volunteers conducted cactus ferruginous pygmy-owl surveys in 17 geographic locations in Arizona during spring of 2020 (USFWS 2021m:Figure 4.5). While the locations are not precisely known, two of those sites likely overlapped with the project analysis area: 15 (Park Link/Florence) and 16 (Mammoth). Site 15 consisted of 106 call points with no cactus ferruginous pygmy-owl detections. Site 16 consisted of 30 call points with no cactus ferruginous pygmy-owl detections (USFWS 2021m).

However, the cactus ferruginous pygmy-owl has the potential to occur in the analysis area where suitable habitat occurs. Suitable habitat within the analysis area was modeled as that which meets all of the following criteria: 1) located within the cactus ferruginous pygmy-owl Distribution 1990-Current (digitized by SWCA from Figure 4.6 in USFWS 2021m with approximately 0.5-mile accuracy); 2) below elevations of 1,200 m (4,000 feet) above mean sea level (amsl); and 3) within Sonoran Desert Scrub or Semidesert Grassland biotic communities. Approximately 94,121.3 acres of modeled suitable habitat occurs within the analysis area (Table 3-73 and see Appendix A, Maps 12–15). This model overestimates the suitable habitat because only the portions of the analysis area that contain fairly dense vegetation with trees or columnar cacti large enough to support nesting cavities would be suitable for this species.

3.4.9.5 Rio Grande silvery minnow (Hybognathus amarus)

STATUS AND LIFE HISTORY

In 1994, the USFWS listed the Rio Grande silvery minnow (minnow) as endangered (59 Federal Register 36988) with an experimental non-essential population in the Rio Grande and Pecos River in Texas added in 2008 (USFWS 2010b, 2021e). The minnow's current extent is within the Rio Grande between Cochiti Dam to the headwaters of Elephant Butte Reservoir and is represented by the species designated critical habitat (USFWS 2021e). Minnow habitat is restricted to a small portion of available aquatic habitat and is characterized by silt substrates in areas of "low or moderate water velocity (e.g., eddies formed by debris piles, pools, and backwaters)" (USFWS 2010b:11).

OCCURRENCE IN ANALYSIS AREA

Habitat for the minnow is known to occur within the analysis area for Component 3 at each of the proposed Alterative crossings of the Rio Grande.

CRITICAL HABITAT

Critical habitat for the species is designated within the analysis area for Component 3 at each of the proposed crossings of the Rio Grande (Table 3-75; see Appendix A, Maps 141, 156, 158, 164–167).

3.4.9.6 Rio Grande cutthroat trout (Oncorhynchus clarkia virginalis)

STATUS AND LIFE HISTORY

The Rio Grande cutthroat trout (*Oncorhynchus clarkia virginalis*) is a subspecies of cutthroat trout which exists within the Rio Grande, Canadian River, and Pecos River basins within New Mexico and Colorado (USFWS 2021f). The species is a candidate for listing under the ESA and has been found to be warranted for listing, but precluded by other higher-priority listings (USFWS 2012a). Rio Grande cutthroat trout prefers high-elevation headwater streams and lakes which exhibit lower temperatures and low water turbidity (NMDGF 2016b).

OCCURRENCE IN ANALYSIS AREA

The Rio Grande cutthroat trout is known to exist within upstream tributaries of the Rio Grande within the analysis area and may occur within the main Rio Grande channel at times.

CRITICAL HABITAT

As this species is a candidate for listing under ESA, no critical habitat has been designated.

3.4.9.7 Northern Mexican gartersnake (Thamnophis eques megalops)

STATUS AND LIFE HISTORY

The USFWS listed the Northern Mexican gartersnake (gartersnake; *Thamnophis eques megalops*) as threatened in 2014 (USFWS 2014b; 79 Federal Register 38677), with designated critical habitat established April 28, 2021 (USFWS 2021g; 86 Federal Register 22518). Northern Mexican gartersnake is a riparian obligate species which inhabits both lotic and lentic habitats that include cienegas and stock tanks (earthen impoundments) and rivers containing pools and backwaters (USFWS 2014b). This species uses adjacent terrestrial habitat for foraging, thermoregulation, gestation, shelter, immigration, emigration, and brumation purposes (USFWS 2014b). Generally, this species is found in areas of high concentrations of native prey. Preferential prey species include leopard frog species (*Lithobates* spp.) and native fish species, and secondarily, nonnative larval and juvenile bullfrogs as well as soft-rayed fish.

OCCURRENCE IN ANALYSIS AREA

The species is known to occur within the analysis area in proximity to the San Pedro River and has a potential to occur near other suitable water bodies.

CRITICAL HABITAT

Critical habitat for Northern Mexican gartersnake was designated across 20,326 acres in La Paz, Mohave, Yavapai, Gila, Cochise, Santa Cruz, and Pima Counties, Arizona, as well as Grant County, New Mexico. Critical habitat exists within the analysis area in proximity of the San Pedro River (Table 3-17).

3.4.9.8 Bald Eagle (*Haliaeetus leucocephalus*) and Golden Eagle (*Aquila chrysaetos*)

STATUS AND LIFE HISTORY

Bald eagles and golden eagles are protected under the MBTA and the BGEPA. Bald eagles are found typically in association with water and nest and breed from October to July throughout the Southwest. Golden eagles nest primarily on rock ledges or cliffs and occasionally in large trees at elevations ranging from 4,000 to 10,000 feet amsl. Golden eagles are typically found in mountainous regions of open country, prairies, grasslands, dessert, open wooded areas, and barren areas. Bald eagles prey primarily on fish, but also waterfowl, small mammals, and carrion. Golden eagles feed mainly on small mammals, especially prairie dogs (*Cynomys* sp.), as well as carrion, jackrabbits, ground squirrels, and other wildlife (Stahlecker and Walker 2010).

OCCURRENCE IN ANALYSIS AREA

Both bald and golden eagle habitat are known to exist within the analysis area as supported by a species-specific habitat evaluation included in Appendix G. Approximately 149,378 acres (8% of analysis area) overlap modeled bald eagle nesting habitat, 153,954 acres (8%) overlap modeled bald eagle foraging habitat, 51,177 acres (3%) overlap modeled golden eagle nesting habitat, and 1,746,298 acres (93%) overlap modeled golden eagle foraging habitat within the analysis area. Table 3-76 and Table 3-77 summarize habitat within the analysis area per project component for bald eagle and golden eagle, respectively.

Table 3-71. Yellow-Billed Cuckoo Habitat within the Analysis Area per Project Component

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications								
1. Mavericks Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0	0.4	0.1	--	2,629.7
5. Highlands Area	0.0	0.0	--	0.0	0.0	0.0	--	201.3
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Local Alternative Central Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Component 2a. Access Roads	10.4	0.0	0.002	12,142.7	16.5	4.4	0.9	22,896.3
Component 2b. Temporary Work Areas	--	--	2.6	9,312.3	--	--	10.8	19,975.4
Component 3. Segment 4 Reroute Alternatives								
Alt Route 1 with Subroute 1A-1	0.4	1.6	1.6	2,417.4	2.6	11.3	11.5	17,263.2
Alt Route 1 with Subroute 1A-2	0.5	2.3	2.3	2,818.7	2.8	12.1	12.3	16,895.4
Alt Route 1 with Subroute 1A-3	0.5	2.0	2.1	3,106.4	3.3	14.3	14.6	17,592.9
Alt Route 1 with Subroute 1A-4	0.4	1.6	1.6	2,417.4	2.6	11.3	11.5	17,263.2
Local Alternative 1A-6	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 1A-7	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	0.4	1.5	1.6	4,796.3	2.7	10.9	11.8	24,831.6
Alt Route 2 with Subroute 2A-2	0.5	2.2	2.3	4,214.8	2.9	11.9	12.8	20,311.3
Alt Route 2 with Subroute 2A-3	0.5	1.9	2.1	3,117.0	3.3	13.5	14.6	15,695.8
Alt Route 2 with Subroute 2A-4	0.4	1.5	1.6	4,796.3	2.7	10.9	11.8	24,831.6
Alt Route 3 with Subroute 3A-1	0.4	1.5	1.6	13,393.8	2.9	12.2	12.9	47,119.6
Alt Route 3 with Subroute 3A-2	0.5	2.2	2.3	12,812.4	3.1	13.2	13.9	42,599.4
Alt Route 3 with Subroute 3A-3	0.5	2.0	2.1	11,606.4	3.5	14.9	15.7	37,732.8
Alt Route 3 with Subroute 3A-4	0.4	1.5	1.6	13,393.8	2.9	12.2	12.9	47,119.6
Local Alternative 3B-1	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	--	0.0	0.0	0.0	--

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 4. SunZia West Substation		0.0	0.0	0.0	--	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-72. Southwestern Willow Flycatcher Habitat within the Analysis Area per Project Component

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications								
1. Mavericks Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0	0.3	1.8	--	2,629.7
5. Highlands Area	0.0	0.0	--	216.4	0.0	0.0	--	201.3
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Component 2a. Access Roads	8.8	0.0	0.0	10,792.5	16.5	4.4	0.9	22,896.3
Component 2b. Temporary Work Areas	--	--	1.8	5,538.3	--	--	10.8	19,975.4
Component 3. Segment 4 Reroute Alternatives								
Alt Route 1 with Subroute 1A-1	0.4	1.5	1.6	2,344.9	2.6	11.3	11.5	17,263.2

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Alt Route 1 with Subroute 1A-2	0.6	2.6	2.6	2,850.6	2.8	12.1	12.3	16,895.4
Alt Route 1 with Subroute 1A-3	0.5	2.0	2.1	4,843.6	3.3	14.3	14.6	17,592.9
Alt Route 1 with Subroute 1A-4	0.4	1.5	1.6	2,344.9	2.6	11.3	11.5	17,263.2
Local Alternative 1A-6	0.0	0.0	0.0	--	0.0	0.0	0.0	
Local Alternative 1A-7	0.0	0.0	0.0	--	0.0	0.0	0.0	
Alt Route 2 with Subroute 2A-1	0.4	1.4	1.6	6,680.4	2.7	10.9	11.8	24,831.6
Alt Route 2 with Subroute 2A-2	0.6	2.5	2.6	6,130.1	2.9	11.9	12.8	20,311.3
Alt Route 2 with Subroute 2A-3	0.5	1.9	2.1	5,229.2	3.3	13.5	14.6	15,695.8
Alt Route 2 with Subroute 2A-4	0.4	1.4	1.6	6,680.4	2.7	10.9	11.8	24,831.6
Alt Route 3 with Subroute 3A-1	0.4	1.5	1.6	15,390.7	3.1	13.2	13.9	42,599.4
Alt Route 3 with Subroute 3A-2	0.6	2.5	2.6	14,286.2	3.5	14.9	15.7	37,732.8
Alt Route 3 with Subroute 3A-3	0.5	2.0	2.1	15,940.9	2.9	12.2	12.9	47,119.6
Alt Route 3 with Subroute 3A-4	0.4	1.5	1.6	--	0.0	0.0	0.0	--
Local Alternative 3B-1	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	2,344.9	2.6	11.3	11.5	17,263.2
Component 4. SunZia West Substation	--	0.0	0.0	0.0	--	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-73. Cactus Ferruginous Pygmy-Owl Modeled Habitat within the Analysis Area per Project Component

Project Component	Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	--	0.0

Project Component	Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
2. SunZia South Area	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0
Component 2a. Access Roads	7.9	7.3	1.7	37,277.1
Component 2b. Temporary Work Areas	--	--	7.9	36,948.3
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-2	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-3	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-4	0.0	0.0	0.0	0.0
Local Alternative 1A-6	0.0	0.0	0.0	0.0
Local Alternative 1A-7	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-1	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-2	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-3	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-4	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-1	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-2	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-3	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-4	0.0	0.0	0.0	0.0
Local Alternative 3B-1	0.0	0.0	0.0	0.0
Local Alternative 3B-2	0.0	0.0	0.0	0.0
Component 4. SunZia West Substation	--	26.0	54.3	19,895.8

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-74. Northern Mexican Gartersnake Habitat within the Analysis Area per Project Component

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications								
1. Mavericks Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Component 2a. Access Roads	--	--	0.0	0.0	4.6	0.1	0.0	7,283.3
Component 2b. Temporary Work Areas	--	--	0.0	0.0	--	--	13.6	6,058.4
Component 3. Segment 4 Reroute Alternatives								
Alt Route 1 with Subroute 1A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 1A-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 1A-7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Alt Route 2 with Subroute 2A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 3B-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 3B-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Component 4. SunZia West Substation	--	0.0	0.0	0.0	--	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-75. Rio Grande Silvery Minnow Habitat within the Analysis Area per Project Component

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications	0.0	0.0	--	0.0	0.0	0.0	--	0.0
1. Mavericks Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0	0.0	0.0	0.0	0.0
Component 2a. Access Roads	0.0	0.0	0.0	35.7	0.3	0.0	0.0	6,484.0
Component 2b. Temporary Work Areas	--	--	0.0	37.1	--	--	0.0	5,263.1
Component 3. Segment 4 Reroute Alternatives								
Alt Route 1 with Subroute 1A-1	0.2	0.9	0.9	1,114.8	1.1	4.7	4.8	5,884.0
Alt Route 1 with Subroute 1A-2	0.2	0.7	0.7	1,087.9	1.0	4.5	4.6	6,220.7
Alt Route 1 with Subroute 1A-3	0.2	0.7	0.7	885.9	1.0	4.4	4.5	5,646.0
Alt Route 1 with Subroute 1A-4	0.2	0.9	0.9	1,114.8	1.1	4.7	4.8	5,884.0
Local Alternative 1A-6	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 1A-7	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	0.2	0.8	0.9	1,782.6	1.1	4.5	4.8	10,122.6
Alt Route 2 with Subroute 2A-2	0.2	0.7	0.7	1,448.9	1.0	4.2	4.6	8,437.0
Alt Route 2 with Subroute 2A-3	0.2	0.6	0.7	885.9	1.0	4.2	4.5	5,646.0
Alt Route 2 with Subroute 2A-4	0.2	0.8	0.9	1,782.6	1.1	4.5	4.8	10,122.6
Alt Route 3 with Subroute 3A-1	0.2	0.8	0.9	4,140.0	1.1	4.6	4.8	25,782.5
Alt Route 3 with Subroute 3A-2	0.2	0.7	0.7	3,806.3	1.0	4.3	4.6	24,096.9
Alt Route 3 with Subroute 3A-3	0.2	0.6	0.7	3,209.5	1.0	4.3	4.5	21,095.1
Alt Route 3 with Subroute 3A-4	0.2	0.8	0.9	4,140.0	1.1	4.6	4.8	25,782.5

Project Component	Critical Habitat				Suitable/Occupied			
	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Local Alternative 3B-1	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Component 4. SunZia West Substation	--	0.0	0.0	0.0	--	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-76. Bald Eagle Habitat within the Analysis Area per Project Component

Project Component	Nesting		Foraging	
	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Permanent Project Activities (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	--	0.1	--	0.1
2. SunZia South Area	--	0.0	--	0.0
3. Macho Springs Area	--	0.1	--	0.1
4. Las Palomas Area	--	0.2	--	0.2
5. Highlands Area	--	0.1	--	0.1
6a. Pinal Central Area- North Route	--	0.1	--	0.2
6b. Pinal Central Area- Steele Route	--	0.0	--	0.0
6c. Pinal Central Area- Earley Route	--	0.1	--	0.1
Local Alternative East Tie-In	--	0.0	--	0.0
Local Alternative Central Tie-In	--	0.0	--	0.0
Local Alternative West Tie-In	--	0.0	--	0.0
Component 2a. Access Roads	5.0	63.3	5.1	64.9
Component 2b. Temporary Work Areas	87.3		90.7	
Component 3. Segment 4 Reroute Alternatives				
Alternative Route 1 with Subroute 1A-1	49.3	48.4	49.6	48.7
Alternative Route 1 with Subroute 1A-2	44.5	43.8	44.9	44.2
Alternative Route 1 with Subroute 1A-3	41.2	40.4	41.6	40.8
Alternative Route 1 with Subroute 1A-4	41.9	41.1	42.1	41.3
Local Alternative 1A-6	0.1	0.1	--	--
Local Alternative 1A-7	0.1	0.1	--	--
Alternative Route 2 with Subroute 2A-1	43.7	40.5	44.5	41.2
Alternative Route 2 with Subroute 2A-2	38.8	35.9	39.5	36.6

Project Component	Nesting		Foraging	
	Temporary Project Activities (acres)	**Permanent Project Activities (acres)**	**Temporary Project Activities (acres)**	**Permanent Project Activities (acres)**
Alternative Route 2 with Subroute 2A-3	32.0	29.6	32.7	30.3
Alternative Route 2 with Subroute 2A-4	36.3	33.6	37.0	34.2
Alternative Route 3 with Subroute 3A-1	44.6	42.3	45.5	43.1
Alternative Route 3 with Subroute 3A-2	39.7	37.7	40.5	38.5
Alternative Route 3 with Subroute 3A-3	32.9	31.2	33.7	31.9
Alternative Route 3 with Subroute 3A-4	37.2	35.3	37.9	36.0
Local Alternative 3B-1	1.4	1.2	1.6	1.3
Local Alternative 3B-2	1.3	1.1	1.4	1.3
Component 4. SunZia West Substation	--	0.4	--	0.4

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-77. Golden Eagle Habitat within the Analysis Area per Project Component

Project Component	Nesting		Foraging	
	Temporary Project Activities (acres)	**Permanent Project Activities (acres)**	**Temporary Project Activities (acres)**	**Permanent Project Activities (acres)**
Component 1: Localized Route Modifications				
1. Mavericks Area	--	0.0	--	0.8
2. SunZia South Area	--	0.0	--	1.4
3. Macho Springs Area	--	0.0	--	2.9
4. Las Palomas Area	--	0.1	--	1.6
5. Highlands Area	--	0.3	--	1.7
6a. Pinal Central Area- North Route	--	0.0	--	1.3
6b. Pinal Central Area- Steele Route	--	0.0	--	0.5
6c. Pinal Central Area- Earley Route	--	0.0	--	1.1
Local Alternative East Tie-In	--	0.0	--	0.0
Local Alternative Central Tie-In	--	0.0	--	0.0
Local Alternative West Tie-In	--	0.0	--	0.0
Component 2a. Access Roads	2.8	12.9	77.6	762.9
Component 2b. Temporary Work Areas	31.1	--	1,219.3	
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	12.3	12.0	566.4	555.7
Alt Route 1 with Subroute 1A-2	13.0	12.8	565.9	556.6
Alt Route 1 with Subroute 1A-3	15.1	14.9	575.6	564.7

Project Component	Nesting		Foraging	
	Temporary Project Activities (acres)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Permanent Project Activities (acres)
Alt Route 1 with Subroute 1A-4	12.3	12.0	570.6	559.2
Local Alternative 1A-6	0.0	0.0	1.4	1.9
Local Alternative 1A-7	0.0	0.0	2.0	2.5
Alt Route 2 with Subroute 2A-1	14.4	13.3	467.3	432.8
Alt Route 2 with Subroute 2A-2	15.4	14.3	456.2	422.9
Alt Route 2 with Subroute 2A-3	17.0	15.7	443.0	409.9
Alt Route 2 with Subroute 2A-4	14.4	13.3	471.3	436.0
Alt Route 3 with Subroute 3A-1	13.0	12.4	495.7	470.0
Alt Route 3 with Subroute 3A-2	14.1	13.4	484.5	460.4
Alt Route 3 with Subroute 3A-3	15.6	14.8	471.2	446.7
Alt Route 3 with Subroute 3A-4	13.0	12.4	499.9	473.9
Local Alternative 3B-1	0.0	0.0	24.4	20.4
Local Alternative 3B-2	0.0	0.0	25.4	22.6
Component 4. SunZia West Substation	--	--	--	80.2

Note: Local Alternatives are exchangeable within their associated alternative route.

REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for federally protected species. These include the constructed Western Spirit 345-kV transmission line and the planned High Plains Express Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trend which could reduce the quality and quantity of habitat for species analyzed through the varying annual precipitation and potential reduction of riparian habitat.

3.4.10 Environmental Consequences

3.4.10.1 Methods and Assumptions

The following assumptions apply to this analysis:

- All species within this section with the exception of Rio Grande cutthroat trout were previously analyzed in the 2013 FEIS Section 4.6.4.5 (BLM 2013). Impacts previously disclosed are incorporated by reference as similar impacts, at varying degrees, are expected to occur under the proposed project and alternatives.
- Species-specific analysis for monarch butterfly is included as AIB-18 and incorporated by reference.
- The USFS screened the portions of the project area that would cross the Cibola National Forest and determined Mexican spotted owl (*Strix occidentalis lucida*) does not have the potential to occur within the vicinity of the project.

The following impact indicators are considered factors which may contribute to species population decline:

- Loss or degradation of terrestrial riparian or aquatic habitat
- Loss or degradation of habitat from clearing of vegetation during construction
- Decreased forage availability and foraging habitat quality due to removal of or disturbance within habitat (e.g., noise, vibrations, aerial activity)
- Degradation of terrestrial habitat due to increased vehicular traffic and human activity
- Degradation of habitat from increased soil erosion and/or chemical contamination
- Displacement or decrease in fitness due to noise and human activity associated with all aspects of construction, operation, and maintenance
- Decreased forage availability and foraging habitat quality due to the spread of invasive and noxious weed species and the removal of habitat.

The analysis assumes application of design features and environmental protection measures on a species-specific basis as shown in Table 3-78. Full design features and EPMs are provided in Appendix C.

Table 3-78. Design Features and Environmental Protection Measures Applicable to Species-Specific Impacts

Species Common Name (Scientific Name)	Relevant Design Features	Applicable EPMs
Southwestern willow flycatcher (*Empidonax traillii extimus*)	1, 2, 3, 4, 5, 6, 8, 12, 14, 18, 19, 21, 25, 26, 29	1, 2, 3, 5, 8, 12, 13, 14, 15
Yellow-billed cuckoo (*Coccyzus americanus*)	1, 2, 3, 4, 5, 6, 8, 12, 14, 18, 19, 21, 25, 26, 29	1, 2, 3, 5, 8, 12, 13, 14, 15
Cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	1, 2, 3, 4, 5, 6, 8, 12, 14, 18, 19, 21, 25, 26, 28, 29	1, 2, 3, 4, 5, 6, 8, 12, 13, 14, 15
Northern Mexican gartersnake (*Thamnophis eques megalops*)	1, 2, 3, 4, 5, 6, 7, 8, 14, 18, 19, 21, 25, 26	1, 2, 3, 5, 8, 12, 13, 14
Rio Grande silvery minnow (*Hybognathus amarus*)	1, 2, 3, 4, 5, 6, 8, 14, 18, 19, 21	1, 2, 3 4, 5, 8, 13, 14
Rio Grande cutthroat trout (*Oncorhynchus clarki virginalis*)	1, 2, 3, 4, 5, 6, 8, 14, 18, 19, 21	1, 2, 3, 4, 5, 8, 13, 14
Bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*)	See Migratory Bird Conservation Plan and Avian Protection Plan (EPG 2018: Appendix B3)	

3.4.10.2 Impacts Common to All Components

Potential construction-related impacts from the proposed project components common to all species analyzed would include the following:

- loss, degradation, and/or fragmentation of breeding, rearing, foraging, and dispersal habitats;
- collisions with and crushing by construction vehicles;
- loss of burrowing animals in burrows where grading would occur;
- increased invasive and noxious weed establishment and spread;
- increased fragmentation of habitat;

- avoidance of otherwise suitable habitat or behavioral changes due to increased activity; and
- increased noise/vibration levels.

Potential impacts from operation and maintenance activities would be similar in nature to those previously described above for construction activities but would be lower in magnitude. Impacts from ongoing maintenance activities would be intermittent over the life of the project. It is estimated that maintenance activities would occur once or twice a year under normal circumstances, but may result in long-term adverse impacts to species, as described in the sections below.

YELLOW-BILLED CUCKOO

The yellow-billed cuckoo is known to occur within the analysis area and its habitat is intersected by Components 1, 2 and 3 (POWER Engineers, Inc. 2021g; SWCA 2022a; USFWS 2021h).

Because project components would occur within the areas of occupied riparian habitat suitable for foraging, stopover, and breeding activities, including the crossing locations of the Rio Grande and San Pedro River, long-term, adverse impacts related to vegetation removal and general disturbance are expected to occur (Table 3-79). Expected impacts to yellow-billed cuckoo within the Rio Grande and San Pedro River corridors include loss of known occupied habitat, loss and degradation of highly suitable habitat, reduction or changes in habitat use from construction and maintenance related noise, and collision with power lines (see AID-3 for additional analysis of collision risk).

The amount of vegetation removed, and the proportional loss of habitat, is both component and alternative specific, and is therefore discussed under AIB-8 Native Vegetation and AIB-10 Riparian Habitat. Removal of vegetation would include large suitable nesting trees and supporting foraging vegetation which would reduce the availability of highly suitable and occupied habitat for the species. Specifically, suitable nesting trees for yellow-billed cuckoo are anticipated to be trimmed or removed entirely in riparian areas occurring underneath sections of the transmission line itself to satisfy conductor clearance requirements.[6] Proposed vegetation removal activities associated with conductor clearance are detailed in Appendix B.5 of the POD (see Table B-5-1 in Plan of Development Appendix B.5 [SunZia 2018]). Ongoing reduction in height or removal of suitable nesting trees would result in a long-term reduction in available habitat and may adversely affect breeding efforts of present yellow-billed cuckoo populations.

Revegetation and reclamation of areas of disturbance as well as design features and EPMs outlined in Table 3-78 would reduce overall effects of vegetation removal. Due to the time period for regeneration of suitable large nesting trees, habitat loss impacts are expected to be long term and extend past the life of the project. Primary EPMs applicable to all alternatives which would reduce effects of habitat loss include EPMs 1, 2, and 3 which minimize disturbance of access roads; EPM 8 which outlines the spanning of habitat within the limits of standard structure design; and EPM 14 which minimizes the clearing of trees in and adjacent to the right-of-way to the greatest extent practicable to satisfy conductor-clearance requirements (POWER Engineers, Inc. 2021g). However, residual impacts and direct loss of habitat are anticipated.

During the construction phase of the project, it is expected that yellow-billed cuckoo behavioral changes would include avoidance of otherwise suitable habitat due to noise and human activity as well as vegetation removal. Maintenance activities also have the potential to cause long-term avoidance and displacement from suitable, occupied, and critical habitat for the life of the project. Therefore, adverse

[6] An exception to this statement is the proposed segment of the transmission crossing of the Rio Grande under Alternative A of Component 3 which would be co-located with the Western Spirit Transmission Line and not result in additional removal of riparian vegetation.

impacts of species behavioral changes and degradation of habitat suitability are anticipated to be long-term and occur during the life of the project and beyond. The construction phase of the proposed activities and related avoidance of nesting habitat is assumed to occur outside of migratory bird breeding season (May–August) and therefore is not anticipated to lead to the abandonment or removal of active nests. However, proposed activities are likely to prevent the use of habitat for breeding activities into the future.

Migratory songbirds are vulnerable to collision during takeoff and landing (Loss et al. 2014) and the Rio Grande is a migratory corridor. However, due to their body weight, wing size, flight speed, visual acuity, and generally diurnal activity, yellow-billed cuckoo are less susceptible to collisions with transmission lines and are expected to avoid the Rio Grande and San Pedro crossings, resulting in minor potential impacts from collision (APLIC 2012).

SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher is known to occur within the analysis area and its habitat is intersected by Components 1, 2, and 3 (POWER Engineers, Inc. 2021g; SWCA 2022a; USFWS 2021i). Potential impacts to southwestern willow flycatcher would include loss of known occupied habitat, loss and degradation of suitable habitat, changes to habitat use from maintenance-related noise, and collision with power lines that cross the Rio Grande (see Table 3-79).

The amount of riparian vegetation removed, and proportional loss of habitat, is both component and alternative specific, and is therefore discussed under AIB-8 Native Vegetation and AIB-10 Riparian Habitat. The removal of riparian vegetation, especially willow species that are preferred nesting locations for the species, and increases to level of disturbance and activity, would reduce the availability of both nesting and foraging habitat for the species. Additionally, suitable nesting trees and willow habitat for southwestern willow flycatcher are anticipated to be trimmed or removed entirely in riparian areas occurring underneath the transmission line itself to satisfy conductor clearance requirements.[7] Proposed vegetation removal activities associated with conductor clearance are detailed in Appendix B.5 of the POD (see Table B-5-1 in Plan of Development Appendix B.5 [SunZia 2018]). Ongoing reduction in height or removal of suitable nesting sites would result in a long-term reduction in available habitat and may adversely affect breeding efforts of present southwestern willow flycatcher populations.

Revegetation and reclamation of areas of disturbance as well as design features and EPMs outlined in Table 3-78 would reduce overall effects of vegetation removal. Primary EPMs applicable to all alternatives that would reduce effects of habitat loss include EPMs 1, 2, and 3 which minimize disturbance of access roads; EPM 8 which outlines the spanning of habitat within the limits of standard structure design, and EPM 14 which minimizes the clearing of trees in and adjacent to the right-of-way to the greatest extent practicable to satisfy conductor-clearance requirements (POWER Engineers, Inc. 2021g). However, adverse impacts including direct loss of habitat are anticipated and expected to be long term.

Additionally, both construction and maintenance actions of the proposed project components are expected to degrade the suitability of occupied and critical habitat for southwestern willow flycatcher. The noise, increased vehicular traffic, and general activity related to these actions is likely to lead to southwestern willow flycatcher behavioral changes including avoidance of habitat as described above for yellow-billed cuckoo. Indirect adverse impacts to southwestern willow flycatcher related to construction and its critical habitat are expected to be adverse and long term. Maintenance activities, causing noise, vibrations, and

[7] An exception to this statement is the proposed segment of the transmission crossing of the Rio Grande under Alternative A of Component 3 which would be co-located with the Western Spirit Transmission Line and not result in additional removal of riparian vegetation.

human presence, would occur intermittently for the life of the project and cause species to change their movement patterns or abandon habitat in surrounding areas. As southwestern willow flycatchers are small birds they have a lower susceptibility to collisions with power lines, compared with larger waterfowl species (see AID-3 Avian Collisions). Transmission lines pose a risk to migratory birds during the migratory period, including the southwestern willow flycatcher. However, this species would be expected to avoid the power lines that cross the Rio Grande and San Pedro River, resulting in minor potential impacts from collision (APLIC 2012).

CACTUS FERRUGINOUS PYGMY-OWL

The cactus ferruginous pygmy-owl has the potential to occur within the analysis area. Its suitable habitat modeled using its current distribution, elevational range, and preferred biotic communities in Arizona is intersected by Components 2 and 4 (POWER Engineers, Inc. 2021g; USFWS 2021m). On-the-ground surveys would be required to determine the amount of suitable dense vegetation and nesting substrate (e.g., columnar cacti or trees large enough for cavities) available for this species within the areas of modeled habitat.

Potential impacts to cactus ferruginous pygmy-owl would include habitat loss, degradation, and fragmentation (see Table 3-79); loss of potential nest sites; disturbance during the nesting season; and changes in behavior from construction and maintenance-related noise. The removal of Sonoran Desert Scrub and Semidesert Grassland (discussed under AIB-8 Native Vegetation), in particular, areas that contain saguaros or thick xeroriparian drainage vegetation, and increased level of human activity and disturbance would reduce the availability of both nesting, foraging, and dispersal habitat for cactus ferruginous pygmy-owl. Habitat fragmentation resulting from project construction could also cause adverse impacts to cactus ferruginous pygmy-owl.

Revegetation and reclamation of areas of disturbance as well as design features and EPMs outlined in Table 3-78 would reduce overall effects of vegetation removal. Design Features 1–6 would serve to minimize disturbance from access roads and thus reduce habitat loss, and the adverse impacts from establishment or spread of noxious weeds would be reduced through Design Features 1 and 26 (POWER Engineers, Inc. 2021g). Design Feature 28 would reduce the number of saguaros (i.e., suitable nesting substrate for cactus ferruginous pygmy-owl) removed from this species' range by either avoiding or salvaging these plants to replant in the right-of-way or adjacent habitat. In addition, if this species is listed, Design Feature 25 calls for preconstruction surveys for species listed under the ESA or specified by the land management agency as being a species of concern, which could result in reduced impacts to cactus ferruginous pygmy-owl.

During the construction phase of the project, the increased noise, increased vehicular traffic, and increased human activity are expected to lead to cactus ferruginous pygmy-owl behavioral changes including avoidance of the habitat, which could impact life-history activities. Indirect adverse impacts to cactus ferruginous pygmy-owl related to construction are expected to be temporary and short term, with impact ceasing at completion. Maintenance activities, causing noise, vibrations, and human presence, would occur intermittently for the life of the project and cause species to change their movement patterns or abandon habitat in surrounding areas. Preconstruction nest surveys would be completed in accordance with EPM 12 and the project's Biological and Aquatic Resources Survey Plan, if construction occurs during nesting season (mid-February through late July). With guidance from the USFWS if this species is listed, active nests would be avoided by a buffer identified by the APP Program Coordinator until no longer active, minimizing disturbance during the breeding season (EPG 2018:B3-11).

RIO GRANDE SILVERY MINNOW AND RIO GRANDE CUTTHROAT TROUT

The Rio Grande silvery minnow is known to occur throughout its designated critical habitat within the Middle Rio Grande Corridor and the Rio Grande cutthroat trout has potential to occur within the tributaries of the Rio Grande which are crossed by proposed project components. The analysis area for these species is intersected by Components 2 and 3 of the proposed project. Due to the similar nature of impacts to each of these species' habitats, they are grouped together in the subsequent analyses.

Aquatic habitat for each of these fish species has the potential to be impacted by increased erosion in areas of surface disturbance proximal to habitat. Increased erosion is related to areas of vegetation removal where increased sedimentation and thereby increased turbidity may affect fish populations. Additional adverse impacts that have the potential to negatively affect the survivability and fecundity of fish include changes in water quality such as temperature, pH, dissolved oxygen, hardness, alkalinity, or salinity outside of species-specific parameters for survival. The contribution to increased erosion and associated impacts is directly correlated to the distance of surface disturbance from aquatic habitat. Design features and EPMs would reduce surface disturbance and mitigate erosional concern, which would reduce the likelihood of impacts, including those indicated in Table 3-80. Further analysis of impacts to surface water can be found in AIB-6 Water Quality.

NORTHERN MEXICAN GARTERSNAKE

The amount of riparian vegetation removed, and the proportional loss of habitat, is both component and alternative specific, and is therefore discussed under AIB-8 Native Vegetation and AIB-10 Riparian Habitat. Impacts common to the proposed action are similar to the avian and aquatic species previously analyzed. Northern Mexican gartersnake inhabits riparian areas in close proximity to surface waters. Impacts to gartersnake have the potential to occur as a result of surface disturbance within suitable and critical habitat and also include those which affect preferred prey species. Said impacts are correlated to the removal of riparian vegetation and any impacts to aquatic habitat which would decrease the availability of prey species. Other adverse impacts include the potential for direct mortality during construction and maintenance phases related to crushing and ground-disturbing activities as well as increased vehicular traffic. Additionally, construction and maintenance activities occurring within riparian areas, particularly river crossings, have the potential to spread amphibian chytrid fungus (*Batrachochytrium dendrobatidis*) which infects and is fatal to amphibian species and is known to occur within New Mexico since 2001 (NMDGF 2018). Introduction of amphibian chytrid fungus and subsequent increase in mortality rates of native frog species, a primary food source of the gartersnake, could reduce forage opportunities and cause a decrease in present populations (NMDGF 2018).

BALD AND GOLDEN EAGLES

Bald and golden eagle habitat is known to occur within the analysis area and eagle habitat is intersected by Components 1, 2 and 3. Potential impacts to these species include a reduction in available forage and nesting habitat (Table 3-81). Surface disturbance would remove native vegetation and therefore disrupt habitat conditions of prey species, including small mammals such as prairie dog species. Removal of large nesting trees along riparian corridors or in proximity to larger water bodies would also constitute a reduction of suitable nesting habitat. Pre-construction nest surveys (2013 FEIS:Appendix B.3) would be conducted to prevent removal of active nests and avoid disturbing breeding activities for both bald and golden eagles. Disturbance during construction and operation project phases in close proximity to cliff habitat would also reduce availability of additional nesting habitat for golden eagles which use these areas. In addition to habitat removal, additional contributions to the reduction of suitability of habitat would include noise impacts during construction phases which may contribute to behavioral changes and avoidance of areas for the duration of increased noise and presence of heavy equipment.

3.4.10.3 Impacts of Localized Route Modifications

Component 1 would result in no surface disturbance within southwestern willow flycatcher, yellow-billed cuckoo, Northern Mexican gartersnake, or Rio Grande silvery minnow critical habitats. Additionally, there would be no surface disturbance within cactus ferruginous pygmy-owl, Northern Mexican gartersnake, and Rio Grande silvery minnow suitable habitats.

This component would result in impacts to approximately 1.8 acres (<1% of the habitat within the analysis area) of suitable southwestern willow flycatcher habitat and 0.1 acre (<1% of the habitat within the analysis area) of yellow-billed cuckoo suitable habitat as a result of permanent project activities.

Component 1 would result in up to 0.2 acre (<1% of the habitat within the analysis area) of surface disturbance within bald eagle nesting and foraging habitat as a result of permanent project activities.

Component 1 would result in up to 0.3 acre (<1% of the habitat within the analysis area) and up to 2.9 acres (<1% of the habitat within the analysis area) of surface disturbance within golden eagle foraging habitat as a result of permanent and temporary project activities. However, all localized route modifications except for Las Palomas and Highlands would have no impact on golden eagle nesting habitat.

3.4.10.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Component 2 would result in approximately 1.8 acres (<1% of the habitat within the analysis area) of surface disturbance from permanent project activities within southwestern willow flycatcher critical habitat, as well as 4.4 acres (<1% of the habitat within the analysis area) and 11.7 acres (<1% of the habitat within the analysis area) of surface disturbance within southwestern willow flycatcher suitable habitat as a result of permanent and temporary project activities, respectively.

Component 2 would result in approximately 2.6 acres (<1% of the habitat within the analysis area) of surface disturbance within yellow-billed cuckoo critical habitat from temporary project activities; as well as 4.4 acres (<1% of the habitat within the analysis area) and 11.7 acres (<1% of the habitat within the analysis area) of surface disturbance within yellow-billed cuckoo suitable habitat as a result of permanent and temporary project activities, respectively.

Component 2 would result in up to 7.3 acres (<1% of the modeled habitat within the analysis area) and up to 9.6 acres (<1% of the modeled habitat within the analysis area) of surface disturbance within cactus ferruginous pygmy-owl suitable habitat as a result of permanent and temporary project activities, respectively. These acreages likely overestimate the suitable habitat because not all of the habitat modeled as suitable for the cactus ferruginous pygmy-owl will contain all of the habitat components necessary to support this species (e.g., saguaros or dense vegetation).

Component 2 would result in no surface-disturbing activities within Northern Mexican gartersnake critical habitat and approximately 0.1 acre (<1% of the habitat within the analysis area) and 13.6 acres (<1% of the habitat within the analysis area) of disturbance within Northern Mexican gartersnake suitable habitat as a result of permanent and temporary project activities, respectively.

Component 2 would not result in surface disturbance within Rio Grande silvery minnow critical or suitable habitat.

Component 2 would result in approximately 63.3 acres (<1% of the habitat within the analysis area) and 92.3 acres (<1% of the habitat within the analysis area) of surface disturbance within bald eagle nesting habitat as a result of permanent and temporary project activities, respectively (SWCA 2022a). Additionally, there would be approximately 64.9 acres (<1% of the habitat within the analysis area) and 95.8 acres (<1% of the habitat within the analysis area) of surface disturbance as a result of permanent and temporary project activities, respectively, within bald eagle foraging habitat (SWCA 2022a).

Component 2 would result in approximately 12.9 acres (<1% of the habitat within the analysis area) and 33.9 acres (<1% of the habitat within the analysis area) of surface disturbance as a result of permanent and temporary project activities within golden eagle nesting habitat, respectively. Additionally, there would be approximately 762.9 acres (<1% of the habitat within the analysis area) and 1,296.9 acres (<1% of the habitat within the analysis area) of surface disturbance as a result of permanent and temporary project activities, respectively, within golden eagle foraging habitat.

3.4.10.5 Impacts of Segment 4 Reroute Alternatives

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 would result in up to 2.6 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 2.6 acres (<1% of the habitat within the analysis area) of temporary project activities (Subroute 1A-2) within southwestern willow flycatcher critical habitat. This route would also result in up to 14.3 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.6 acres (<1% of the habitat within the analysis area) of project activities as a result of Subroute 1A-3 within southwestern willow flycatcher suitable habitat. Both local alternatives (1A-6 and 1A-7) within Alternative Route 1 are outside of critical and suitable habitat for this species.

Alternative Route 1 would result in up to 2.3 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 2.3 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 1A-2 within yellow-billed cuckoo critical habitat. This route would also result in up to 14.3 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 1A-3 within yellow-billed cuckoo suitable habitat. Both local alternatives (1A-6 and 1A-7) within Alternative Route 1 are outside of critical and suitable habitat for this species.

Alternative Route 1 would result in no permanent or temporary project activities within Northern Mexican gartersnake critical and suitable habitat.

Alternative Route 1 would result in up to 0.9 acre (<1% of the habitat within the analysis area) of permanent project activities and 0.9 acre (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 1A-1 and 1A-4 within Rio Grande silvery minnow critical habitat. This route would also result in up to 4.8 acres (<1% of the habitat within the analysis area) of permanent project activities with Subroute 1A-1 and 4.8 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 1A-1 and 1A-4 within Rio Grande silvery minnow suitable habitat. Both local alternatives (1A-6 and 1A-7) within Alternative Route 1 are outside of critical and suitable habitat for this species.

Alternative Route 1 would result in up to 48.4 acres (<1% of the habitat within the analysis area) of permanent project activities and 49.3 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 1A-1 within bald eagle nesting habitat. This route would also result in up to 48.7 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 49.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute

1A-1 within bald eagle foraging habitat. Both local alternatives within Alternative Route 1 (1A-6 and 1A-7) each intersect 0.1 acre of nesting habitat but do not intersect foraging habitat, and are expected to have similar effects on bald eagle species habitat conditions.

Alternative Route 1 would result in up to 15.1 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.9 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 1A-3 within golden eagle nesting habitat. This route would also result in up to 575.6 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 564.7 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 1A-3 within golden eagle foraging habitat. There are two local alternatives within Alternative Route 1: Local Alternative 1A-6 intersects 1.4 acres and Local Alternative 1A-7 intersects 2.0 acres of foraging habitat, but no nesting habitat is intersected by these local alternatives.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 would result in up to 2.5 acres (<1% of the habitat within the analysis area) of permanent project activities and 2.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-2 within southwestern willow flycatcher critical habitat. This route would also result in up to 13.5 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-3 within southwestern willow flycatcher suitable habitat.

Alternative Route 2 would result in up to 2.2 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 2.3 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-2 within yellow-billed cuckoo critical habitat. This route would also result in up to 13.5 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-3 within yellow-billed cuckoo suitable habitat.

Alternative Route 2 would result in no permanent and temporary project activities within Northern Mexican gartersnake critical and suitable habitat.

Alternative Route 2 would result in up to 0.8 acre (<1% of the habitat within the analysis area) of permanent project activities and up to 0.9 acre (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 2A-1 and 2A-4 within Rio Grande silvery minnow critical habitat. This route would also result in up to 4.5 acres (<1% of the habitat within the analysis area) of permanent project activities and 4.5 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-1 and 2A-4 within Rio Grande silvery minnow suitable habitat.

Alternative Route 2 would result in up to 43.7 acres (<1% of the habitat within the analysis area) of permanent project activities and 40.5 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-1 within bald eagle nesting habitat. This route would also result in up to 44.5 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 41.2 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-1 within bald eagle foraging habitat.

Alternative Route 2 would result in up to 17.0 acres (<1% of the habitat within the analysis area) of permanent project activities and 15.7 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-3 within golden eagle nesting habitat. This route would also result in up to 471.3 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 436.0 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 2A-4 within golden eagle foraging habitat.

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 would result in up to 2.5 acres (<1% of the habitat within the analysis area) of permanent project activities and 2.6 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-2 within southwestern willow flycatcher critical habitat. This route would also result in up to 14.9 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 15.7 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-3 within southwestern willow flycatcher suitable habitat. Both local alternatives (3B-1 and 3B-2) within Alternative Route 3 are outside of critical habitat for this species. However, Local Alternative 3B-2 would intersect 22.8 acres within southwestern willow flycatcher suitable habitat, but Local Alternative 3B-1 does not intersect suitable habitat for this species.

Alternative Route 3 would result in up to 2.2 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 2.3 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-2 within yellow-billed cuckoo critical habitat. This route would also result in up to 14.9 acres (<1% of the habitat within the analysis area) of permanent project activities and 15.7 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-3 within yellow-billed cuckoo suitable habitat. Both local alternatives (3B-1 and 3B-2) within Alternative Route 3 are outside of suitable habitat for this species.

Alternative Route 3 would result in no permanent or temporary project activities within Northern Mexican gartersnake suitable habitat.

Alternative Route 3 would result in up to 0.8 acre (<1% of the habitat within the analysis area) of permanent project activities and up to 0.9 acre (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-1 and 3A-4 within Rio Grande silvery minnow critical habitat. This route would also result in up to 4.6 acres (<1% of the habitat within the analysis area) of permanent project activities and 4.8 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroutes 3A-1 and 3A-4 within Rio Grande silvery minnow suitable habitat. Both local alternatives (3B-1 and 3B-2) within Alternative Route 3 are outside of suitable habitat for this species.

Alternative Route 3 would result in up to 44.6 acres (<1% of the habitat within the analysis area) of permanent project activities and 42.4 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 3A-1 within bald eagle nesting habitat. This route would also result in up to 45.3 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 43.0 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 3A-1 within bald eagle foraging habitat. There are two local alternatives within Alternative Route 3: Local Alternative 3B-1 intersects 2.6 acres and Local Alternative 3B-2 intersects 2.4 acres of bald eagle nesting habitat, and Local Alternative 3B-1 intersects 2.9 acres and Local Alternative 3B-2 intersects 2.7 acres of bald eagle foraging habitat. The two local alternatives (3B-1 and 3B-2) are expected to have similar effects on bald eagle habitat conditions.

Alternative Route 3 would result in up to 15.6 acres (<1% of the habitat within the analysis area) of permanent project activities and 14.8 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 3A-3 within golden eagle nesting habitat. This route would also result in up to 499.9 acres (<1% of the habitat within the analysis area) of permanent project activities and up to 473.9 acres (<1% of the habitat within the analysis area) of temporary project activities with Subroute 3A-4 within golden eagle foraging habitat. Both local alternatives (3B-1 and 3B-2) within Alternative Route 3 are outside of nesting habitat for this species. However, Local Alternative 3B-1 intersects 44.8 acres and Local Alternative 3B-2 intersects 48.0 acres of golden eagle foraging habitat.

3.4.10.6 Impacts of SunZia West Substation

The SunZia West Substation would result in no permanent or temporary project activities within critical or suitable habitat for southwestern willow flycatcher, yellow-billed cuckoo, Northern Mexican gartersnake, and Rio Grande silvery minnow.

The SunZia West Substation would result in approximately 26.0 acres (<1% of the modeled habitat within the analysis area) of permanent surface disturbance and approximately 54.3 acres (<1% of the modeled habitat within the analysis area) of temporary surface disturbance within cactus ferruginous pygmy-owl suitable habitat. These acreages likely overestimate the suitable habitat because not all of the habitat modeled as suitable for the cactus ferruginous pygmy-owl will contain all of the habitat components necessary to support this species (e.g., saguaros or dense vegetation). The SunZia West Substation would result in approximately 0.4 acre (<1% of the habitat within the analysis area) of permanent project activities within bald eagle nesting habitat and approximately 0.4 acre (<1% of the habitat within the analysis area) of permanent surface disturbance within bald eagle foraging habitat.

The SunZia West Substation would result in approximately 80.2 acres (<1% of the habitat within the analysis area) of permanent project activities within golden eagle foraging habitat.

3.4.10.7 No Action Alternative

The no action alternative consists of the previously permitted transmission line route which was the 2015 Selected Route (BLM 2013, 2015a). Compared with the action alternatives, the no action alternative would still involve crossings of the San Pedro River and Rio Grande with associated impacts as disclosed in the 2013 FEIS. These effects are comparable to the action alternatives in that similar amounts of occupied or critical habitat for southwestern willow flycatcher, yellow-billed cuckoo, cactus ferruginous pygmy-owl, Rio Grande silvery minnow, Rio Grande cutthroat trout, Northern Mexican gartersnake, and bald and golden eagles would be impacted. However, it should also be noted that the point of crossing of the Rio Grande under the no action alternative would impact lower-quality habitat for southwestern willow flycatcher and yellow-billed cuckoo due to riparian habitat density and known occupancy (POWER Engineers, Inc. 2021n, 2021o; SWCA 2022a). It should be noted, that at the time of development of the 2013 FEIS, Rio Grande cutthroat trout and Northern Mexican gartersnake were not analyzed in detail as neither were listed under the ESA nor were candidate species at the time of analysis. The cactus ferruginous pygmy-owl was addressed in the 2013 FEIS as it was under review for ESA listing at the time of development for that document (BLM 2013).

3.4.10.8 Summary of Impacts

Analyses have shown that project construction and operation would disturb species habitat for the long term, which may result in reduced populations. Component 1 localized route modifications would have no adverse impacts to designated critical habitat for federally listed species. However, Component 1 permanent project activities would result in impacts to suitable habitat for yellow-billed cuckoo and northern Mexican gartersnake outside of designated critical habitat.

Localized route modifications would reduce bald and golden eagle foraging and nesting habitat, with golden eagle foraging habitat being most impacted. Access roads would impact riparian habitats suitable for the yellow-billed cuckoo and the Northern Mexican gartersnake but would have no direct impact on southwestern willow flycatcher and Rio Grande silvery minnow habitat. Temporary work areas would potentially intersect habitat for all species except the Rio Grande silvery minnow and Rio Grande cutthroat trout. Each of the Component 3 Segment 4 reroute alternatives cross the Rio Grande and would have direct impacts on all species except for the cactus ferruginous pygmy-owl and Northern Mexican gartersnake. Impacts to the Rio Grande cutthroat trout are expected to be similar to those described for the Rio Grande silvery minnow as it occurs in tributary streams of the Rio Grande which are intersected by access roads and Component 3. Potential impacts to aquatic habitat include increased sedimentation from vegetation removal and construction activities, reduced water quality, and altered drainage systems (AIB-6 Water Quality; AIB-7 Sedimentation to Surface Water Resources). Design features such as spanning all river crossings and avoiding the riverbank by 200 feet would be implemented to avoid surface disturbance impacts to suitable habitat, water quality, and populations. Other design features would be implemented to avoid impacts to vegetation during construction (Appendix C; see Appendix B.5 of the POD [SunZia 2018]). The SunZia West Substation would disturb and permanently remove cactus ferruginous pygmy-owl suitable habitat.

Cumulative impacts to biological resources are discussed in the 2013 FEIS (BLM 2013:4-321 through 4-328). Additionally, incremental contribution to impacts from the proposed project components could result in the disturbance of up to 32 acres of riparian habitat and up to 5 acres of aquatic habitat at river crossings. Impacts to federally listed wildlife habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to aquatic, desert vegetation, grassland, and riparian habitat may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Riparian vegetation removal would be mitigated by replanting and avoidance to the greatest extent possible, but impacts to the vegetation communities and federally listed wildlife species habitat would be long term. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbing riparian and aquatic habitat; however, these effects would dissipate with distance from the project boundary. Therefore, any adverse impacts likely would be infrequent but potentially long term.

Table 3-79. Summary of Impacts for Southwestern Willow Flycatcher, Yellow-Billed Cuckoo, Cactus Ferruginous Pygmy-Owl, and Northern Mexican Gartersnake

Project Component	Southwestern Willow Flycatcher Habitat	Yellow-Billed Cuckoo Habitat	Cactus Ferruginous Pygmy-Owl Habitat	Northern Mexican Gartersnake Habitat
Component 1: Localized Route Modifications				
1. Mavericks Area	No effect.	No effect.	No effect.	No effect.
2. SunZia South Area	No effect	No effect.	No effect.	No effect
3. Macho Springs Area		No effect.	No effect.	
4. Las Palomas Area		Route modification would result in a 0.1-acre reduction of suitable riparian habitat as a result of permanent project activities and as indirect impacts to surrounding habitat. No effect on critical habitat.	No effect.	
5. Highlands Area		No effect.	No effect.	
6a. Pinal Central Area-North Route		No effect.	No effect.	
6b. Pinal Central Area-Steele Route		No effect.	No effect.	
6c. Pinal Central Area-Earley Route		No effect.	No effect.	

Project Component	Southwestern Willow Flycatcher Habitat	Yellow-Billed Cuckoo Habitat	Cactus Ferruginous Pygmy-Owl Habitat	Northern Mexican Gartersnake Habitat
Local Alternative East Tie-In		No effect.	No effect.	
Local Alternative Central Tie-In		No effect.	No effect.	
Local Alternative West Tie-In		No effect.	No effect.	
Component 2a: Access Roads	No effect	Access roads would result in a 5.3-acre reduction of suitable habitat and a 12.5-acre reduction in critical habitat as a result of permanent and temporary project activities and as indirect impacts to surrounding habitat.	Access roads would result in a 9.0-acre reduction of suitable habitat as a result of permanent and temporary project activities and as indirect impacts to surrounding habitat. Access roads would also increase habitat fragmentation.	Access roads would result in a 0.1-acre reduction of suitable habitat as a result of permanent and temporary project activities and as indirect impacts to surrounding habitat. No effect on critical habitat.
Component 2b: Temporary Work Areas	TWAs would result in a 1.8-acre reduction of suitable riparian habitat as a result of temporary project activities. No effect on critical habitat.	TWAs would result in a 10.8-acre reduction of suitable riparian habitat and a 2.6-acre reduction in critical habitat as a result of temporary project activities.	TWAs would result in a 7.9-acre reduction of suitable habitat as a result of temporary project activities.	TWAs would result in a 13.6-acre reduction of suitable riparian habitat as a result of temporary project activities. No effect on critical habitat.
Component 3: Segment 4 Reroute Alternatives	Each route modification has the potential to reduce suitable (11.5 to 27.0 acres) and critical (1.6 to 2.6 acres) riparian habitat as a result of permanent and temporary project activities.	Each route modification has the potential to reduce suitable (11.5 to 15.7 acres) and critical (1.6 to 2.6 acres) riparian habitat as a result of permanent and temporary project activities.		
Alternative Route 1 with Subroute 1A-1			No effect.	No effect.
Alternative Route 1 with Subroute 1A-2			No effect.	
Alternative Route 1 with Subroute 1A-3			No effect.	
Alternative Route 1 with Subroute 1A-4			No effect.	
Local Alternative 1A-6			No effect.	
Local Alternative 1A-7			No effect.	
Alternative Route 2 with Subroute 2A-1			No effect.	
Alternative Route 2 with Subroute 2A-2			No effect.	
Alternative Route 2 with Subroute 2A-3			No effect.	
Alternative Route 2 with Subroute 2A-4			No effect.	
Alternative Route 3 with Subroute 3A-1			No effect.	
Alternative Route 3 with Subroute 3A-2			No effect.	

Project Component	Southwestern Willow Flycatcher Habitat	Yellow-Billed Cuckoo Habitat	Cactus Ferruginous Pygmy-Owl Habitat	Northern Mexican Gartersnake Habitat
Alternative Route 3 with Subroute 3A-3			No effect.	
Alternative Route 3 with Subroute 3A-4			No effect.	
Local Alternative 3B-1			No effect.	
Local Alternative 3B-2			No effect.	
Component 4. SunZia West Substation	No effect.	No effect.	The SunZia West Substation would result in an 80.3-acre reduction of suitable habitat as a result of permanent and temporary project activities and as indirect impacts to surrounding habitat.	No effect.

Table 3-80. Summary of Impacts for Rio Grande Silvery Minnow and Rio Grande Cutthroat Trout

Project Component	Rio Grande Silvery Minnow Habitat	Rio Grande Cutthroat Trout Habitat
Component 1: Localized Route Modifications		
1. Mavericks Area	No effect.	No effect.
2. SunZia South Area		
3. Macho Springs Area		
4. Las Palomas Area		
5. Highlands Area		
6a. Pinal Central Area- North Route		
6b. Pinal Central Area- Steele Route		
6c. Pinal Central Area- Earley Route		
Local Alternative East Tie-In		
Local Alternative Central Tie-In		
Local Alternative West Tie-In		
Component 2a. Access Roads	Access roads would result in a 0.3-acre reduction of suitable habitat. No effect on critical habitat.	Access roads have the potential to reduce suitable habitat within Rio Grande tributary streams due to disturbance resulting in reduced water quality, increased sedimentation, and modified drainage systems. Quantitative impacts are expected to be similar to those listed under Rio Grande silvery minnow.
Component 2b. Temporary Work Areas	No effect.	No effect.

Project Component	Rio Grande Silvery Minnow Habitat	Rio Grande Cutthroat Trout Habitat
Component 3. Segment 4 Reroute Alternatives	Each route alternative has the potential to reduce suitable (4.5 to 4.8 acres) and critical (0.7 to 0.9 acre) habitat as a result of crossings of multiple tributaries of the Rio Grande.	Potential impacts include a reduction in suitable habitat as a result of surface water disturbance, including decreased water quality and impacts to drainage within tributary streams of the Rio Grande. Quantitative impacts are expected to be similar to those listed under Rio Grande silvery minnow.
Alternative Route 1 with Subroute 1A-1		
Alternative Route 1 with Subroute 1A-2		
Alternative Route 1 with Subroute 1A-3		
Alternative Route 1 with Subroute 1A-4		
Local Alternative 1A-6		
Local Alternative 1A-7		
Alternative Route 2 with Subroute 2A-1		
Alternative Route 2 with Subroute 2A-2		
Alternative Route 2 with Subroute 2A-3		
Alternative Route 2 with Subroute 2A-4		
Alternative Route 3 with Subroute 3A-1		
Alternative Route 3 with Subroute 3A-2		
Alternative Route 3 with Subroute 3A-3		
Alternative Route 3 with Subroute 3A-4		
Local Alternative 3B-1		
Local Alternative 3B-2		
Component 4. SunZia West Substation	No effect.	No effect.

Table 3-81. Summary of Impacts for Bald and Golden Eagles

Project Component	Bald Eagle Habitat	Golden Eagle Habitat
Component 1: Localized Route Modifications		
1. Mavericks Area	Route modification would reduce foraging habitat (0.1 acre) and suitable nesting tree availability (0.1 acre).	Route modification would reduce foraging habitat (0.8 acre). No effect on nesting tree habitat availability.
2. SunZia South Area	No effect.	Route modification would reduce foraging habitat (1.4 acre). No effect on nesting tree habitat availability.
3. Macho Springs Area	Route modification would reduce foraging habitat (0.1 acre) and suitable nesting tree availability (0.1 acre).	Route modification would reduce foraging habitat (2.9 acre). No effect on nesting tree habitat availability.
4. Las Palomas Area	Route modification would reduce of foraging habitat (0.2 acre) and suitable nesting tree availability (0.2 acre).	Route modification would reduce foraging habitat (1.6 acre) and suitable nesting tree availability (0.1 acre).
5. Highlands Area	Route modification would reduce foraging habitat (0.1 acre) and suitable nesting tree availability (0.1 acre).	Route modification would reduce foraging habitat (1.7 acre) and suitable nesting tree availability (0.3 acre).
6a. Pinal Central Area- North Route	Route modification would reduce foraging habitat (0.1 to 0.2 acre) and suitable nesting tree availability (0.1 acre).	Route modification would reduce foraging habitat (0.5 to 1.3 acre). No effect on suitable nesting tree availability.
6b. Pinal Central Area- Steele Route		
6c. Pinal Central Area- Earley Route		
Local Alternative East Tie-In		

Project Component	Bald Eagle Habitat	Golden Eagle Habitat
Local Alternative Central Tie-In		
Local Alternative West Tie-In		
Component 2a. Access Roads	Access roads would remove nesting (64.7 acres) and foraging (65.8 acres) habitat within the analysis area for the species.	Access roads would remove nesting (15.7 acres) and foraging (816.9 acres) habitat within the analysis area for the species.
Component 2b. Temporary Work Areas	TWAs would result in reduced nesting (76.9 acres) and foraging (78.1 acres) habitat as a result of temporary project activities.	TWAs would result in reduced nesting (31.1 acres) and foraging (1,109.1 acres) habitat as a result of temporary project activities.
Component 3. Segment 4 Reroute Alternatives	Each route modification would contribute to reducing permanent foraging habitat (30.3 to 48.7 acres) and suitable nesting tree availability (29.6 to 48.4 acres).	Each route modification would contribute to reducing foraging habitat (409.9 to 567.5 acres) and suitable nesting tree availability (12.0 to 15.7 acres).
Alternative Route 1 with Subroute 1A-1		
Alternative Route 1 with Subroute 1A-2		
Alternative Route 1 with Subroute 1A-3		
Alternative Route 1 with Subroute 1A-4		
Alternative Route 2 with Subroute 2A-1		
Alternative Route 2 with Subroute 2A-2		
Alternative Route 2 with Subroute 2A-3		
Alternative Route 2 with Subroute 2A-4		
Alternative Route 3 with Subroute 3A-1		
Alternative Route 3 with Subroute 3A-2		
Alternative Route 3 with Subroute 3A-3		
Alternative Route 3 with Subroute 3A-4		
Local Alternative 3B-1		
Local Alternative 3B-2		
Component 4. SunZia West Substation	The SunZia West Substation would remove nesting (0.4 acre) and foraging (0.4 acre) habitat.	The SunZia West Substation would remove foraging habitat (80.2 acres)

AID-6 New Mexico Meadow Jumping Mouse

How much would the roads and power lines associated with the proposed project reduce the quantity or quality of the New Mexico meadow jumping mouse (*Zapus hudsonius luteus*) riparian habitat proximal to known populations within the Sevilleta National Wildlife Refuge and along the Rio Grande Corridor in New Mexico?

3.4.11 Affected Environment

The analysis area for impacts to the New Mexico meadow jumping mouse (NMMJM; *Zapus hudsonius luteus*) is the species' known habitat range as mapped by the USFWS (USFWS 2014c, 2021j). Within the analysis area, suitable riparian habitat was identified using portions of the NMRipMap (Muldavin et al. 2020). Within the 7,117,521 acres of the analysis area, approximately 3,970,168 acres of mapped riparian vegetation is considered potentially suitable habitat for this species (see AIB-10 Riparian Vegetation for detailed analysis). This riparian vegetation is concentrated near the Rio Grande and Rio Salado as well as within wetland and marsh areas within the Sevilleta NWR. However, there are no known populations of NMMJM within the analysis area.

The USFWS listed the NMMJM as endangered on July 10, 2014 (USFWS 2014c). Critical habitat was designated in 2016 and includes sections of Arizona, Colorado, and New Mexico (USFWS 2016). The jumping mouse has exceptionally specialized habitat requirements characterized by dense riparian and tall (average stubble height of at least 61 cm [24 inches]) herbaceous vegetation (USFWS 2014c). Suitable habitat for this species should also contain sufficient seasonally available or perennial flowing waters to support the growth of tall, dense, riparian herbaceous plants and maintain moist soils (USFWS 2014c). Riparian areas that could provide suitable habitat within the species' known range are present within multiple areas of the project area including areas along the Sevilleta NWR and the Rio Grande riparian corridor in New Mexico. An additional area of known occupied habitat within the White Mountains was considered and dismissed from analysis due to being over 50 miles outside the analysis area.

At the request of USFWS, an NMMJM habitat assessment was conducted within proximity of the intersections of the Component 3 Alternatives with the Rio Grande River (GeoSystems Analysis, Inc. 2022). Evaluation of data collected in the field and at the desktop level determined that suitable habitat, defined as containing all preferred ecological conditions for the species, was not present (GeoSystems Analysis, Inc. 2022). However, further coordination with the USFWS, including a qualitative review of habitat photographs, resulted in a request for additional presence/absence surveys within marginally suitable habitat within the analysis area for Component 3 Alternative 1. Additional information and analysis regarding proximity to known populations and suitability of habitat within the Rio Grande portion of the analysis area is included in the SunZia Biological Assessment (SWCA 2022a) and NMMJM habitat assessment (GeoSystems Analysis, Inc. 2022). See EIS Section 5.4 for more information about compliance with ESA Section 7.

3.4.11.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact suitable NMMJM habitat. These include the constructed Western Spirit 345-kV transmission line and planned High Plains Express Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change could reduce the quality and quantity of NMMJM habitat via varying annual precipitation and potential reduction of suitable vegetation.

3.4.12 Environmental Consequences

3.4.12.1 Methods and Assumptions

The following impact indicators are considered factors which may contribute to species population decline:

- Loss or degradation of terrestrial riparian or aquatic habitat:
    - Loss or degradation of habitat from clearing of vegetation during construction.
    - Decreased forage availability and foraging habitat quality due to removal of or disturbance within habitat (e.g., noise, vibrations, aerial activity)
    - Degradation of terrestrial habitat due to increased vehicular traffic and human activity.
- Displacement or decrease in fitness due to noise and human activity associated with all aspects of construction, operation, and maintenance.
- Decreased forage availability and foraging habitat quality due to the spread of invasive and noxious weed species and the removal of habitat.

The following analyses are incorporated by reference as they relate to habitat suitability and potential degradation of habitat quality:

- AIB-10 Riparian Vegetation: Quality and availability of riparian habitat within the analysis area.
- AIB-11 Invasive Species (Noxious Weeds): Risk of spread of noxious and invasive weeds as a factor of habitat degradation.

Due to ongoing species-specific surveys and habitat evaluation, the analysis assumes all riparian vegetation within the species range to be potentially suitable and acknowledges due to specific habitat requirements this likely results in an over-estimation of suitable habitat and potential impacts to the species. As noted above, the forthcoming Biological Assessment (SWCA 2022a) will address proximity to known populations and suitability of habitat within the Rio Grande portion of the analysis area.

The analysis assumes application of the following design features and environmental protection measures on a species-specific basis as shown in Table 3-82.

Table 3-82. Design Features and Environmental Protection Measures Applicable to New Mexico Meadow Jumping Mouse

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 7, 8, 14, 18, 19, 26	1, 2, 3, 4, 5, 8, 13, 14

3.4.12.2 Impacts Common to All Components

Two components of the proposed action, Component 2 and Component 3, intersect NMMJM species range (and therefore the analysis area) and have the potential to impact suitable riparian habitat for the species. The proposed action components do not intersect with NMMJM critical riparian habitat.

CONSTRUCTION

Potential construction-related impacts from the proposed project common to all analyzed components would include the following:

- loss, degradation, and/or fragmentation of habitat suitable for breeding, rearing, foraging, and dispersal habitats;
- crushing by construction vehicles;
- increased invasive and noxious weed establishment and spread;
- increased fragmentation of habitat;
- avoidance of otherwise suitable habitat or behavioral changes due to increased activity; and
- increased noise/vibration levels.

OPERATION AND MAINTENANCE

Potential impacts from operation and maintenance activities would be similar in nature to those previously described above for construction activities but would be lower in magnitude. Impacts from ongoing maintenance activities would be temporary and would occur intermittently over the life of the project. It is estimated that maintenance activities would occur once or twice a year under normal circumstances. Given the temporary and limited nature of maintenance activities, impacts to federally protected wildlife would be minor/negligible and short term.

3.4.12.3 Impacts of Localized Route Modifications

No disturbance to New Mexico meadow jumping mouse habitat is expected as a result of Component 1 localized route modifications.

3.4.12.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs do not intersect with NMMJM critical habitat. However, access roads would result in impacts to approximately 55.3 acres (<1% of the habitat within the analysis area) and 9.9 acres (<1% of habitat within the analysis area) as a result of permanent and temporary project activities, respectively, within NMMJM suitable habitat (Table 3-83). TWAs would result in impacts to approximately 50.1 acres (<1% of habitat within the analysis area) as a result of temporary project activities within species suitable habitat but no permanent disturbance (see Table 3-83). Therefore, adverse impacts as a result of construction or operation of these components would be minimal.

Table 3-83. New Mexico Meadow Jumping Mouse Permanent and Temporary Disturbance within Suitable Habitat

Project Component	Permanent Project Activities (acres)	Percentage of Analysis Area	Temporary Project Activities (acres)	Percentage of Analysis Area
Access Roads	55.3	<1%	9.9	<1%
TWAs	--	0	50.1	<1%

3.4.12.5 Impacts of Segment 4 Reroute Alternatives

Each of the three alternatives of the Segment 4 Reroute (Component 3) intersect potentially suitable riparian habitat within the NMMJM analysis area (Table 3-84 and Table 3-85). Without application of mitigation, effects on NMMJM and its habitat could include individual mortality during ground-disturbing activities or vehicle use, habitat loss and degradation of suitability of adjacent habitat, and increased habitat fragmentation. Additional indirect impacts to the species and habitat include the introduction of noxious and invasive weeds and reduced quality of habitat related to increased noise and vibration which could lead to behavioral changes and avoidance of otherwise suitable habitat. These effects would be offset by project design features and EPMs as shown in Table 3-82. Such reductions would include a decrease in the likelihood for removal of riparian vegetation due to Applicant commitment to span sensitive habitat within the limits of structure design (EPM 8) as well as multiple measures aimed to minimize surface-disturbing activities (POWER Engineers, Inc. 2021g). Additionally, due to the high suitability of habitat and likelihood of adverse impacts to multiple riparian obligate species, un-guyed (self-supporting) structures would be used to reduce the width of the right-of-way and associated fragmentation of riparian woodland at the Rio Grande crossing under each alternative (POWER Engineers, Inc. 2021g). Helicopters would also be used to string conductors to avoid the need to clear the right-of-way of vegetation during construction (EPM 13) (POWER Engineers, Inc. 2021g).

The impacts to NMMJM habitat would therefore be long term and primarily associated with vegetation removal, which would lessen over the life of the project until successful revegetation is achieved. As this species is dependent on tall herbaceous vegetation that has the ability to regenerate in one to six growing seasons following reclamation activities, the duration of this impact is expected to be short term (SWCA 2022b). If surveyed suitable habitat is occupied, then effects related to direct mortality or reduction in foraging habitat may occur within the present population(s).

Residual reduction of quality of suitable NMMJM habitat is anticipated to occur as a result of construction phase noise, vibrations building structure foundations, and surface-disturbing activities as well as during intermittent maintenance and operation activities within or proximal to habitat. These impacts are expected to be short term as they would cease upon completion of the activity.

Table 3-84. New Mexico Meadow Jumping Mouse Suitable Habitat within the Analysis Area per Project Component

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	5,900.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	0.0	0.0
Local Alternative Central Tie-In	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	0.0	0.0
Component 2a. Access Roads	74.0	55.3	9.9	169,727.9
Component 2b. Temporary Work Areas	--	--	50.1	143,709.7
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	45.0	195.5	199.3	240,104.4
Alt Route 1 with Subroute 1A-2	43.8	190.9	194.1	235,418.1
Alt Route 1 with Subroute 1A-3	41.9	181.9	185.4	226,995.7
Alt Route 1 with Subroute 1A-4	44.8	194.3	198.3	239,052.4
Local Alternative 1A-6	0.0	0.0	0.0	--
Local Alternative 1A-7	0.0	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	54.8	224.7	242.6	275,715.3
Alt Route 2 with Subroute 2A-2	51.2	210.2	226.8	263,238.8
Alt Route 2 with Subroute 2A-3	47.0	192.5	208.1	247,552.4
Alt Route 2 with Subroute 2A-4	54.5	223.3	241.4	274,679.2
Alt Route 3 with Subroute 3A-1	65.1	273.7	288.5	328,282.5
Alt Route 3 with Subroute 3A-2	61.6	259.3	273.0	315,806.0
Alt Route 3 with Subroute 3A-3	57.4	241.2	254.3	299,904.8
Alt Route 3 with Subroute 3A-4	64.9	272.4	287.5	327,246.4

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Local Alternative 3B-1	6.0	22.3	26.6	--
Local Alternative 3B-2	6.0	23.6	26.6	--
Component 4. SunZia West Substation	--	0.0	0.0	0.0

Table 3-85. New Mexico Meadow Jumping Mouse Suitable Habitat Disturbance within the Analysis Area for Segment 4 Reroute Alternatives

Project Component	Permanent Project Activities (acres)	Percentage of Analysis Area	Temporary Project Activities (acres)	Percentage of Analysis Area	Miles of ROW
Alternative Route 1	181.9 – 195.5	<1%	185.4 – 199.3	<1%	41.9 – 45.0
Alternative Route 2	192.5 – 224.7	<1%	208.1 – 242.6	<1%	47.0 – 54.8
Alternative Route 3	240.8 – 274.8	<1%	253.3 – 288.5	<1%	57.2 – 65.1

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 would result in impacts to up to 195.5 acres (<1% of the habitat within the analysis area) and up to 199.3 acres (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively, within NMMJM potentially suitable riparian habitat (see Table 3-85). This route avoids intersection with the Sevilleta NWR and thereby does not impact this area of concentrated habitat which includes areas of suitable riparian, wetland, and marsh vegetation communities. Compared with Alternative Routes 2 and 3, Alternative Route 1 has 6% to 14%, and 28% to 34% less impacts to potentially suitable habitat for NMMJM, compared with Alternative Route 2 and Alternative Route 3, respectively. However, Alternative Route 1 includes a crossing of the Rio Grande and associated riparian habitat which has impacts of similar extent to those of the other action alternatives. Both local alternatives within Alternative Route 1 are outside of suitable habitat for NMMJM.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 would result in impacts to up to 224.7 acres (<1% of the habitat within the analysis area) and up to 242.6 acres (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively, within NMMJM suitable riparian habitat (see Table 3-85). Alternative Route 2 includes approximately 14 miles of transmission line corridor within the Sevilleta NWR which contains a concentrated area of potentially suitable habitat and proximity to known populations along the Rio Grande Corridor. Additionally, this route would require additional TWAs and access roads outside of the right-of-way corridor that may further fragment or reduce suitable habitat (POWER Engineers, Inc. 2021g; SWCA 2022b).

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 would result in impacts to up to 274.8 acres (<1% of the habitat within the analysis area) and up to 288.5 acres (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively, within NMMJM potentially suitable riparian habitat (see Table 3-85). There are two local alternatives within Alternative Route 3: Local Alternative 3B-1 intersects

22.3 acres and Local Alternative 3B-2 intersects 23.6 acres of suitable habitat. Local Alternative 3B-1 and 3B-2 are expected to have similar effects on NMMJM habitat conditions.

Alternative Route 3 would also cross the 12 miles of the Sevilleta NWR, with impacts of similar nature as Alternative Route 2. However this route more closely parallels I-25 and is further co-located with existing disturbance. Alternative Route 3 would be co-located within approximately 12 miles of the existing Tri-State 115-kV transmission line. In similar nature to Alternative Route 2, Alternative Route 3 would also require additional access road and TWA infrastructure locations outside of the existing transmission line facilities footprint (POWER Engineers, Inc. 2021g).

3.4.12.6 Impacts of SunZia West Substation

No disturbance to New Mexico meadow jumping mouse habitat is expected as a result of Component 4, SunZia West Substation.

3.4.12.7 No Action Alternative

Under the no action alternative, the SunZia transmission line would be routed outside of the Sevilleta NWR and would cross the Rio Grande within the documented species' range with present riparian habitat (BLM 2013). However, no known populations or element occurrences of NMMJM are within the no action alternative route and therefore no take of individuals or impacts to known occupied habitat is anticipated.

3.4.12.8 Summary of Impacts

With consideration that analyzed potentially suitable habitat within the analysis area does not contain known populations (occupied habitat) or designated critical habitat for the species, direct impacts to populations are unlikely to occur. However, each action alternative could have a long-term adverse effect on the availability of suitable habitat for the species proportional to the amount of riparian habitat removed. The Component 3 Alternative Route 1 subroutes represent a lesser impact to NMMJM habitat, compared with Alternative Routes 2 and 3 in terms of acres of habitat impacted by disturbance, as this alternative avoids habitat within the Sevilleta NWR. Component 3 Alternative Route 1 is anticipated to result in similar effects on NMMJM as the no action alternative. Components 3 Alternative Routes 2 and 3 are expected to result in additional impacts due to the intersection with habitat located on the Sevilleta NWR. However, the no action alternative and each of the proposed action alternatives would reduce suitable habitat at their respective crossing of the Rio Grande.

Cumulative impacts to biological resources are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could result in the disturbance of up to approximately 300 acres of riparian habitat within Sevilleta NWR and at river crossings. Impacts to riparian habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to riparian habitat may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Riparian vegetation removal would be mitigated by replanting and avoidance, but impacts to the vegetation communities and to suitable NMMJM habitat could be long term. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbance of riparian and aquatic habitat; however, this would dissipate with distance from the project boundary. Therefore, any adverse impacts likely would be infrequent but potentially long term.

Table 3-86. Summary of Impacts for New Mexico Meadow Jumping Mouse

Project Component	New Mexico Meadow Jumping Mouse Habitat
Component 1: Localized Route Modifications	No effect.
Component 2a. Access Roads	Access roads would result in a 65.2-acre reduction of suitable habitat as a result of permanent and temporary project activities and as indirect impacts to surrounding habitat.
Component 2b. Temporary Work Areas	TWAs would result in a 50.1-acre reduction of suitable habitat as a result of temporary project activities.
Component 3. Segment 4 Reroute Alternatives	
Alternative Route 1 with Subroute 1A-1	Each route modification has the potential to reduce suitable riparian habitat as a result of permanent and temporary project activities. Local Alternatives 1A-6 and 1A-7 are outside of suitable habitat.
Alternative Route 1 with Subroute 1A-2	
Alternative Route 1 with Subroute 1A-3	
Alternative Route 1 with Subroute 1A-4	
Local Alternative 1A-6	
Local Alternative 1A-7	
Alternative Route 2 with Subroute 2A-1	
Alternative Route 2 with Subroute 2A-2	
Alternative Route 2 with Subroute 2A-3	
Alternative Route 2 with Subroute 2A-4	
Alternative Route 3 with Subroute 3A-1	
Alternative Route 3 with Subroute 3A-2	
Alternative Route 3 with Subroute 3A-3	
Alternative Route 3 with Subroute 3A-4	
Local Alternative 3B-1	
Local Alternative 3B-2	
Component 4. SunZia West Substation	No effect.

AID-7 BLM Sensitive Wildlife Species

Would the proposed project reduce the quantity or quality of habitat or reduce the populations for other State and BLM sensitive species and/or their habitat found to have potential to occur in proximity to the project?

Would vegetation removal associated with construction of the proposed project components reduce suitability or availability of pinyon jay (*Gymnorhinus cyanocephalus*) nesting habitat?

Would vegetation removal related to construction of proposed project roads and power lines reduce the quantity or quality of Bendire's thrasher (*Toxostoma bendirei*) habitat?

Would the proposed project disturbance reduce populations of Gunnison's prairie dog (*Cynomys gunnisoni*)?

3.4.13 Affected Environment

The analysis area for BLM sensitive wildlife species[8] includes an 8-mile corridor in which ecological characteristics including vegetation cover, aquatic resources, soils, elevation, and other factors were evaluated to identify suitable habitat. Within the analysis area, eight special-status species listed as BLM sensitive, four of which are also listed as endangered by the State of New Mexico, have the potential to occur due to the presence of habitat which meet species life history requirements and known range and were identified by BLM biologists as having potential to be adversely affected by proposed project activities (Table 3-87).

The BLM manages certain sensitive species that are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. The authority for this policy and guidance is established by the ESA, as amended; Title II of the Sikes Act of 1960, as amended; Migratory Bird Memorandum of Understanding (BLM and USFWS 2010); BLM Manual 6840, *Special Status Species Management* (BLM 2008c), and EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds. The SunZia Biological Resource Report (POWER Engineers, Inc. 2021g) describes the BLM sensitive wildlife species considered for analysis, habitat and range descriptions, and potential occurrence within the analysis area.

The desert ecosystems within the analysis area provide habitat for a variety of BLM sensitive wildlife species, eight of which are known to occur within the analysis area (see Table 3-87). BLM biologists determined that based on habitat models and existing occurrence data, these species' known occupied habitats had a high likelihood of being affected by proposed project activities and are therefore analyzed in detail below or in other issue statements as shown in Table 3-87. Additional species which have the potential to occur within the analysis area may also be affected by impacts such as increased habitat fragmentation, habitat loss, temporary displacement by construction noise and activities, and increased risk of mortality from vehicular collision. However, BLM biologists determined that these impacts are anticipated to be short term and that the likelihood of these impacts is low to moderate, and therefore they do not pose a threat to the viability of species populations.

Additional habitat information and documentation of the full evaluation process for BLM sensitive species is further detailed in the 2013 FEIS (BLM 2013), and Biological Resource Report (POWER Engineers, Inc. 2021g) and is considered incorporated by reference in the following analysis.

[8] No potential impacts to USFS sensitive species have been identified. Therefore, the USFS sensitive species are not addressed in this EIS.

3.4.13.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact suitable habitat for BLM sensitive wildlife species. These include transmission line projects including the constructed Western Spirit 345-kV transmission line and planned High Plains Express Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trends could reduce the quality and quantity of habitat for these species through the varying annual precipitation and potential reduction of riparian habitat.

Table 3-87. BLM Sensitive Species Brought Forward for Detailed Analysis

Species Common Name (Scientific Name)	Status	Analysis Area
Pinyon jay (*Gymnorhinus cyanocephalus*)	BLM Sensitive	Species modeled habitat within 8-mile-wide analysis area
Bendire's thrasher (*Toxostoma bendirei*)	BLM Sensitive	Species modeled habitat within 8-mile-wide analysis area; extent of proposed Important Bird Area
Gunnison's prairie dog *(Cynomys gunnisoni*)	BLM Sensitive	Species range within 8-mile-wide analysis area
Monarch butterfly *(Danaus plexippus plexippus*)	BLM Sensitive	See AIB-18
Sonoran desert tortoise (*Gopherus morafkai*)	BLM Sensitive	See AIB-17
Bald eagle (*Haliaeetus leucocephalus*)	BLM Sensitive	See AID-5
Mexican long-tongued bat (*Choeronycteris mexicana)*	BLM Sensitive	See AIB-19
Townsend's big-eared bat (*Corynorhinus townsendii*)	BLM Sensitive	See AIB-19

3.4.13.2 Pinyon jay (Gymnorhinus cyanocephalus)

STATUS AND LIFE HISTORY

The pinyon jay (*Gymnorhinus cyanocephalus*) is a migratory bird species designated as an immediate priority Species of Greatest Conservation Need in New Mexico (SGCN) (NMDGF 2016a), and it is also listed as vulnerable on the Red List of Threatened Species by the International Union for the Conservation of Nature (IUCN). This species has a distribution ranging from New Mexico to southern Canada. In the United States, the species is found as far east as Oklahoma and west to California, generally occupying the western half of the country. Pinyon jays, as their name suggests, are typically found in association with mature pinyon-juniper woodlands, and also breed within sagebrush, scrub oak, chaparral, ponderosa pine, and Jeffrey pine forests (Balda 2002). It relies heavily on pinyon seeds but is omnivorous and may eat pine seeds, acorns, juniper berries, and small invertebrates (Gillihan 2006). This species operates in a social construct and nests in colonies of up to 500 birds within these habitat types, generally associated with areas of high pinyon nut production the previous season (Ulev 2006). However, pinyon seed crops tend to be unpredictable, which may influence population viability and dynamics as well as distribution across otherwise suitable habitat. Pinyon jays nest earlier than other Pinyon-Juniper and passerine bird species, and nesting may begin as early as late February (Somershoe et al. 2020).

Though this species has a strong association with nesting habitat, it is also a foraging generalist and will occupy a variety of habitat types depending on the available food source including other seeds, fruit, and insects. Based on a model of suitable nesting habitat based on SWReGAP vegetation communities, the analysis area contains approximately 475,369 to 617,721 acres of suitable nesting habitat for the species (Sadoti and Johnson 2021).

OCCURRENCE IN ANALYSIS AREA

Based on a habitat model of suitable vegetation communities the analysis area contains approximately 475,014 to 619,125 acres of suitable habitat for the species (POWER Engineers, Inc. 2021g).

3.4.13.3 Bendire's thrasher (Toxostoma bendirei)

STATUS AND LIFE HISTORY

The Bendire's thrasher (*Toxostoma bendirei*) is a migratory bird species with a rapidly declining population in North American (Salas and Desmond 2021; Sauer 2011). It is designated as a Species of Greatest Conservation Need (SGCN) in most southwestern U.S. States, and it is also listed as vulnerable on the Red List of Threatened Species by the International Union for the Conservation of Nature. The species is a year-round resident of the southwestern United States from New Mexico to southeastern California and into the interior highlands of Mexico. Summer breeding populations extend into southern Utah and Nevada (Sauer 2011).

In New Mexico, Bendire's thrashers are generally found in the valleys of the southwest, in Chihuahuan desert areas of open creosote bush stands interspersed with succulents, agricultural annual grasslands, and dense shrub and low tree vegetation of the Sonoran Desert. They also occur throughout New Mexico and Arizona in low density and scattered juniper savanna habitat. Breeding territories are often characterized by the presence of dense low shrubs, trees, or cacti, such as cholla, yucca, mesquite, or acacia. Suitable habitat for this species is included in present vegetation communities including sparse desert shrubland, degraded grasslands with scattered shrubs, and open woodlands with scattered shrubs, particularly at lower elevations and in valleys (Menke and Bushway 2015). Additional environmental conditions that likely influence Bendire's thrasher habitat selection and reproductive success include abundance of preferred forage such as fruits that may provide "an important source of carbohydrates, water, vitamins, and minerals" (Salas and Desmond 2021:3). Native fruit-producing shrubs of the Chihuahuan Desert include prickly pear cactus (*Opuntia* spp.), hackberry (*Celtis* spp.), sumac (*Rhus* spp.), wolfberry (*Lycium torreyi*), graythorn (*Ziziphus obtusifolia*), and juniper species (*Juniperus* spp.) (Salas and Desmond 2021:3).

OCCURRENCE IN ANALYSIS AREA

Based on a habitat suitability model for Bendire's thrasher, up to approximately 4,319,290 acres of suitable habitat for the species occurs within the analysis area (Salas and Desmond 2021). Additionally, approximately 72,041 acres of a proposed Important Bird Area for the protection of Bendire's thrasher breeding colonies is within the analysis area.

3.4.13.4 Gunnison's prairie dog (Cynomys gunnisoni)

STATUS AND LIFE HISTORY

Gunnison's prairie dog (*Cynomys gunnisoni*) is a BLM sensitive species (encompassing two subspecies, *Cynomys gunnisoni gunnisoni* and *Cynomys gunnisoni zuniensis*) and an NMDGF SGCN as identified in the State Wildlife Action Plan for New Mexico (NMDGF 2016a). This species has a distributed range across the Four Corners states of New Mexico, Arizona, Utah, and Colorado (NatureServe 2021). This species is found in grassland and shrub-steppe habitat types at a wide range of elevations (NMDGF 2008). In New Mexico, this species is typically found between 4,500 and 10,000 feet amsl in montane grassland, juniper savanna, plains-mesa sand scrub, desert scrub, and desert grassland vegetation communities (NMDGF 2008). Prairie dog species, including Gunnison's, are considered keystone species which provide important roles in grassland ecosystem structure and functions (NMDGF 2008). Such services include mixing of surface and subsurface soils, aeration of soils, providing burrow habitat for other wildlife species, and providing disturbed surface habitat for various plant species (NMDGF 2008).

Compared with the other species of prairie dog which occurs in New Mexico, black-tailed prairie dog (*Cynomys ludovicianus*), Gunnison's prairie dog are distinct in that they hibernate in the winter months, with populations typically entering hibernation between September and November and emerging between March and April dependent on snow cover (NMDGF 2008).

OCCURRENCE IN ANALYSIS AREA

Habitat for Gunnison's prairie dog and existing colonies is known to occur within the analysis area. Based on a model of suitable vegetation communities, approximately 635,608 to 748,183 acres of suitable habitat occur within the analysis area.

3.4.13.5 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for federally protected species. These include transmission line projects including the constructed Western Spirit 345-kV transmission line and the planned Southline Transmission Line Project. Additionally, environmental trends and variations in global and regional environmental conditions related to climate change could reduce the quality and quantity of habitat via varying annual precipitation and potential reduction of suitable vegetation (SWCA 2021).

3.4.14 Environmental Consequences

3.4.14.1 Methods and Assumptions

The following impact indicators are considered factors which may contribute to species population decline:

- Loss or degradation of terrestrial riparian or aquatic habitat:
    - Loss or degradation of habitat from clearing of vegetation during construction.
    - Decreased forage availability and foraging habitat quality due to removal of or disturbance within habitat (e.g., noise, vibrations, aerial activity).
    - Loss of important historic breeding sites due to vegetation removal or disturbance within habitat.
    - Degradation of terrestrial habitat due to increased vehicular traffic and human activity.
    - Degradation of habitat from increased soil erosion and/or chemical contamination.
- Displacement or decrease in fitness due to noise and human activity associated with all aspects of construction, operation, and maintenance.
- Decreased forage availability and foraging habitat quality due to the spread of invasive and noxious weed species and the removal of habitat.

The analysis assumes application of the following design features and environmental protection measures on a species-specific basis as shown in Table 3-88. Full design features and EPMs are provided in Appendix C.

Table 3-88. Design Features and Environmental Protection Measures Applicable to Species-Specific Impacts

Species Common Name (Scientific Name)	Relevant Design Features	Applicable EPMs
Bendire's thrasher (*Toxostoma bendirei*)	1, 2, 3, 4, 5, 6, 8, 12, 14, 21, 25, 26, 29	3, 5, 12
Pinyon jay (*Gymnorhinus cyanocephalus*)	1, 2, 3, 4, 5, 6, 8, 12, 14, 21, 25, 26, 29	3, 5, 12
Gunnison's prairie dog *(Cynomys gunnisoni)*	1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 21, 25, 26	2, 3, 8

3.4.14.2 Impacts Common to All Components

CONSTRUCTION

Potential construction-related impacts from the proposed project components common to all species analyzed would include the following:

- loss, degradation, and/or fragmentation of breeding, rearing, foraging, and dispersal habitats;
- collisions with and crushing by construction vehicles;
- loss of burrowing animals in burrows where grading would occur;
- increased invasive and noxious weed establishment and spread;
- increased fragmentation of habitat;
- avoidance of otherwise suitable habitat or behavioral changes due to increased activity; and
- increased noise/vibration levels.

EPMs and co-location of the project components, substations, and access road corridors with existing infrastructure and routing of the transmission line to avoid sensitive areas would reduce these impacts. EPMs as disclosed in Table 3-88 and Appendix C would apply and reduce the amount of habitat that would be lost, fragmented, or degraded during construction activities. Some areas of disturbance would be restored following completion of construction activities as described in the project POD (POWER Engineers, Inc. 2021b). However, restoration in arid environments is difficult and vegetation is slow to reestablish and may require 50 to 100 years or more to achieve full habitat functionality.

OPERATION AND MAINTENANCE

Potential impacts from operation and maintenance activities would be similar in nature to those previously described above for construction activities but would be lower in magnitude. Impacts from ongoing maintenance activities would be short term and would occur intermittently over the life of the project. It is estimated that maintenance activities would occur once or twice a year under normal circumstances. Given the short-term and limited nature of maintenance activities, impacts to BLM sensitive wildlife species would be minor/negligible and short term.

Pinyon Jay

The pinyon jay is known to occur within the analysis area and is intersected by Components 2a, 2b, and 3 (POWER Engineers, Inc. 2021g) (Table 3-89). Project components intersect vegetation communities that serve as both nesting and foraging habitat for the species, which is anticipated to result in adverse impacts related to vegetation removal and general disturbance related to increased human activity, including traffic and noise. Potential impacts to pinyon jay populations within the analysis area include long-term habitat loss and degradation, including the potential loss of historic colony sites, reduction or changes in habitat use during construction and maintenance activities due to avoidance of anthropogenic noise disturbance, as well as increased risk of collision with power lines (see AID-3 Avian Collisions for analysis related to collisions risk and AID-4 Migratory Bird Corridors for general impacts to migratory birds and loss of breeding habitat).

Table 3-89. Pinyon Jay Habitat within the Analysis Area per Project Component

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	4,345.3
4. Las Palomas Area	0.0	0.0	--	313.1
5. Highlands Area	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0
Component 2a. Access Roads	43.0	38.9	6.8	17,4166.3
Component 2b. Temporary Work Areas	--	--	41.8	12,3751.3
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	89.0	386.7	394.2	481,081.9
Alt Route 1 with Subroute 1A-2	89.0	387.7	394.2	481,081.9
Alt Route 1 with Subroute 1A-3	89.9	390.6	398.2	481,978.4
Alt Route 1 with Subroute 1A-4	89.0	386.2	394.2	480,946.1
Local Alternative 1A-6	0.4	2.5	1.8	--
Local Alternative 1A-7	0.5	2.8	2.2	--
Alt Route 2 with Subroute 2A-1	60.5	248.4	268.2	335,496.2
Alt Route 2 with Subroute 2A-2	60.5	248.6	268.2	335,496.2
Alt Route 2 with Subroute 2A-3	61.5	251.8	272.2	336,392.8
Alt Route 2 with Subroute 2A-4	60.5	248.1	268.2	335,360.3
Alt Route 3 with Subroute 3A-1	53.0	222.7	234.7	306,930.7
Alt Route 3 with Subroute 3A-2	53.0	223.0	234.7	306,930.7
Alt Route 3 with Subroute 3A-3	53.9	226.5	238.7	307,827.3
Alt Route 3 with Subroute 3A-4	53.0	222.4	234.7	306,794.8
Local Alternative 3B-1	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	--

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 4. SunZia West Substation	0.0	0.0	0.0	0.0

The amount of suitable vegetation removed from both permanent and temporary project activities and the resulting loss of nesting and foraging habitat is both component and alternative specific, and is therefore discussed below. However, impacts are similar in nature in that removal of suitable pinyon-juniper woodland vegetation used as preferred nesting locations as well as foraging areas would equate to long-term loss of habitat for the species. Revegetation and reclamation activities of areas of disturbance as well as primary EPMs applicable to all alternatives which would reduce effects of habitat loss include EPMs 1, 2, and 3 which minimize disturbance of access roads; EPM 8 which outlines the spanning of habitat within the limits of standard structure design; and EPM 14 which minimizes the clearing of trees in and adjacent to the right-of-way to the greatest extent practicable to satisfy conductor-clearance requirements (POWER Engineers, Inc. 2021g). However, pinyon pine and juniper tree species are slow growing in comparison to ground cover species that are quicker to revegetate following reclamation activities, therefore tree removal resulting from construction of the proposed project is anticipated to result in long-term impacts to the species.

During the construction phase of the project, it is expected that pinyon jay behavioral changes would include avoidance due to noise and human activity as well as vegetation removal. Maintenance activities also have the potential to cause short-term avoidance and displacement from suitable, occupied, and critical habitat. Displacement from otherwise suitable habitat is expected to occur for the duration of these project activities and not during standard operation. Therefore, adverse impacts of species behavioral changes and degradation of habitat suitability is anticipated to be short term. Additionally, construction and related avoidance of nesting habitat is assumed to occur outside of migratory bird breeding season (May–August) and therefore is not anticipated to reduce the ability of the species to conduct nest building and breeding activities, nor lead to the abandonment or removal of active nests. Preconstruction migratory bird nest clearance surveys (see AID-4 Migratory Bird Corridors) will be conducted as early as mid-February, which will ensure detection of nesting activity for early breeders such as pinyon jays (POWER Engineers, Inc. 2021m; Somershoe et al. 2020). Due to their body weight, wing size, flight speed, visual acuity, and generally diurnal activity, pinyon jays are less susceptible to collisions with transmission lines, resulting in minor potential impacts from collision (APLIC 2012).

Bendire's Thrasher

Bendire's thrasher is known to occur within the analysis area and suitable habitat for the species would be intersected by each of the project components and alternatives in proportion with acres of permanent and temporary project activities (disclosed in Table 3-90). Additionally, the proposed Important Bird Area, which contains the highest documented nest density for the species, would be intersected by Components 2a and 2b.

Impacts to Bendire's thrasher populations and habitat would be similar nature to those described above for pinyon jay, with the distinction of removal of vegetation that includes species of succulents (yucca), low shrubs (mesquite and acacia), and cacti species (cholla) would equate to long-term reduction in suitable nesting and foraging habitat for the species. Additionally, Bendire's thrasher behavior is also expected to be altered due to avoidance of construction and maintenance activities.

Table 3-90. Bendire's Thrasher Habitat within the Analysis Area per Project Component

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	2.7	0.8	--	4,4943
2. SunZia South Area	4.6	1.4	--	53,560.34
3. Macho Springs Area	9.4	2.9	--	78,139.59
4. Las Palomas Area	5.1	1.6	--	58,306.48
5. Highlands Area	6.2	1.9	--	63,302.07
6a. Pinal Central Area- North Route	3.4	1.0	--	28,788
6b. Pinal Central Area- Steele Route	1.2	0.4	--	25,195
6c. Pinal Central Area- Earley Route	2.1	0.7	--	32,700
Local Alternative East Tie-In	0.3	0.1	--	9,308
Local Alternative Central Tie-In	0.3	0.1	--	9,462
Local Alternative West Tie-In	0.5	0.1	--	9,911
Component 2a. Access Roads	708.5	763.8	59.8	37,518.6
Component 2b. Temporary Work Areas	--	--	1179.8	34,524.1
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	115.53	502.1	511.8	641,069.7
Alt Route 1 with Subroute 1A-2	114.62	499.4	507.8	637,970.5
Alt Route 1 with Subroute 1A-3	117.62	511.1	521.1	641,502.9
Alt Route 1 with Subroute 1A-4	118.06	512.5	523.0	640,200.4
Local Alternative 1A-6	0.2	0.0	0.0	--
Local Alternative 1A-7	0.2	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	96.392	395.5	427.0	533,717.3
Alt Route 2 with Subroute 2A-2	96.032	394.3	425.4	526,945.6
Alt Route 2 with Subroute 2A-3	97.389	399.1	431.4	519,071.5
Alt Route 2 with Subroute 2A-4	98.877	405.2	438.0	532,853.1
Alt Route 3 with Subroute 3A-1	97.362	409.3	431.3	529,120.8
Alt Route 3 with Subroute 3A-2	97.051	408.4	429.9	522,348.1
Alt Route 3 with Subroute 3A-3	98.407	413.6	435.9	514,348.6
Alt Route 3 with Subroute 3A-4	99.895	419.3	442.5	528,256.6
Local Alternative 3B-1	5.0	0.0	0.0	--
Local Alternative 3B-2	5.6	0.0	0.0	--
Component 4. SunZia West Substation	--	80.2	--	25,467.2

Gunnison's Prairie Dog

Gunnison's prairie dog habitat occurs within the analysis area and would be intersected by Components 1, 2a, 2b, and all alternatives of Component 3 (Table 3-91). Potential impacts to Gunnison's prairie dog from the project components would include those described above for avian species. Potential impacts are estimated to be both short and long term in nature. Gunnison's prairie dogs, active or hibernating, and their burrows are susceptible to being crushed by construction equipment or vehicles during operation and maintenance activities. However, surveys would be conducted prior to construction activities to identify occupied colonies. The potential for direct mortality, habitat loss, and disturbance would be reduced and possibly avoided by spanning occupied habitat within the limits of standard structure design (see Appendix C, EPM 8). If occupied burrows cannot be avoided, translocation of prairie dogs in immediate risk of injury to a nearby occupied colony would be considered in coordination with the appropriate agency.

Prairie dogs may be subject to long-term adverse impacts of increased predation in proximity to the transmission line route(s) by raptors and ravens which use transmission towers to forage, potentially resulting in a permanent impact to adjacent habitat suitability.

Table 3-91. Gunnison's Prairie Dog Habitat within the Analysis Area per Project Component

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0
5. Highlands Area	6.3	1.9	--	63,613.7
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	0.0	0.0
Local Alternative Central Tie-In	0.0	0.0	0.0	0.0
Local Alternative West Tie-In	0.0	0.0	0.0	0.0
Component 2a. Access Roads	79.8	92.7	10.0	245,499.6
Component 2b. Temporary Work Areas	--	--	167.4	209,082.8
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	74.7	324.6	330.9	399,460.0
Alt Route 1 with Subroute 1A-2	73.3	319.4	324.7	392,371.5
Alt Route 1 with Subroute 1A-3	73.5	319.5	325.7	394,418.6
Alt Route 1 with Subroute 1A-4	74.4	322.8	329.4	398,615.9
Local Alternative 1A-6	0.2	1.1	0.8	--
Local Alternative 1A-7	0.1	0.7	0.5	--
Alt Route 2 with Subroute 2A-1	57.7	236.9	255.8	292,839.0
Alt Route 2 with Subroute 2A-2	54.5	224.0	241.6	278,428.0
Alt Route 2 with Subroute 2A-3	49.8	204.0	220.5	262,899.2

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Alt Route 2 with Subroute 2A-4	57.4	235.1	254.1	292,007.2
Alt Route 3 with Subroute 3A-1	56.0	235.6	248.3	294,113.0
Alt Route 3 with Subroute 3A-2	52.9	222.5	234.3	279,701.0
Alt Route 3 with Subroute 3A-3	48.1	202.2	213.2	264,008.2
Alt Route 3 with Subroute 3A-4	55.7	233.8	246.8	293,281.2
Local Alternative 3B-1	5.2	19.4	23.1	--
Local Alternative 3B-2	5.5	21.6	24.3	--
Component 4. SunZia West Substation	--	0.0	0.0	0.0

3.4.14.3 Impacts of Localized Route Modifications

Component 1 does not intersect with permanent surface disturbance within pinyon jay suitable habitat. Component 1 would result in up to 2.9 acres (<1% of the analysis area) of surface disturbance within Bendire's thrasher suitable habitat. The Highlands Area alternative route within Component 1 would result in approximately 1.9 acres (<1% of the analysis area) of surface disturbance within Gunnison's prairie dog habitat.

3.4.14.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs have the potential to disturb species habitat, which could result in reduced populations. Component 2 would result in approximately 38.9 (<1% of the analysis area) of surface disturbance as a result of permanent project activities and 48.6 acres (<1% of the analysis area) of temporary disturbance as a result of permanent project activities within pinyon jay habitat. It would also result in 763.8 acres (<1% of the analysis area) and 48.6 acres (<1% of the analysis area) of surface disturbance from permanent and temporary project activities, respectively, within Bendire's thrasher habitat. This component would also result in 92.7 acres (<1% of the analysis area) and 177.4 acres (<1% of the analysis area) of surface disturbance within Gunnison's prairie dog habitat attributed to permanent and temporary project activities, respectively.

3.4.14.5 Impacts of Segment 4 Reroute Alternatives

All Segment 4 reroute alternatives intersect suitable habitat for pinyon jay, Bendire's thrasher, and Gunnison's prairie dog. The Segment 4 reroute alternatives temporary and permanent disturbance acreages and miles of habitat crossed within pinyon jay, Bendire's thrasher, and Gunnison's prairie dog are broken out by alternative in Table 3-92.

Table 3-92. Summary of Impacts for Pinyon Jay, Bendire's Thrasher, and Gunnison's Prairie Dog

Project Component	Pinyon Jay Habitat	Bendire's Thrasher Habitat	Gunnison's Prairie Dog Habitat
Component 1: Localized Route Modifications			
1. Mavericks Area	No effect.	No effect.	No effect.
2. SunZia South Area		No effect.	No effect.
3. Macho Springs Area		No effect.	No effect.
4. Las Palomas Area		No effect.	No effect.
5. Highlands Area		No effect.	Route modification would result in a reduction of suitable habitat.
6a. Pinal Central Area-North Route		No effect.	No effect.
6b. Pinal Central Area-Steele Route		No effect.	No effect.
6c. Pinal Central Area-Earley Route		No effect.	No effect.
Local Alternative East Tie-In		No effect.	No effect
Local Alternative Central Tie-In		No effect.	No effect.
Local Alternative West Tie-In		No effect.	No effect.
Component 2a. Access Roads	Access roads would result in a 46-acre reduction of suitable habitat as a result of permanent and temporary surface disturbance and as indirect impacts to surrounding habitat.	Access roads would result in a 59.8-acre reduction of suitable habitat as a result of permanent and temporary surface disturbance and as indirect impacts to surrounding habitat.	Access roads would result in a 103-acre reduction of suitable habitat as a result of permanent and temporary surface disturbance and as indirect impacts to surrounding habitat.
Component 2b. Temporary Work Areas	TWAs would result in a 42-acre reduction of suitable habitat as a result of temporary surface disturbance.	TWAs would result in a 1,180-acre reduction of suitable habitat as a result of temporary surface disturbance.	TWAs would result in a 167-acre reduction of suitable habitat as a result of temporary surface disturbance.
Component 3. Segment 4 Reroute Alternatives	Each route modification would contribute to reducing suitable habitat due to temporary (234.7 to 394.6 acres) and permanent (222.4 to 390.9 acres) surface disturbance.	Each route modification would contribute to reducing suitable habitat due to temporary (425.4 to 523.0 acres) and permanent (394.3 to 512.5 acres) surface disturbance.	Each route modification would contribute to reducing suitable habitat due to temporary (213.2 to 330.9 acres) and permanent (202.2 to 324.6 acres) surface disturbance.
Alternative Route 1 with Subroute 1A-1			
Alternative Route 1 with Subroute 1A-2			
Alternative Route 1 with Subroute 1A-3			
Alternative Route 1 with Subroute 1A-4			
Local Alternative 1A-6			
Local Alternative 1A-7			
Alternative Route 2 with Subroute 2A-1			

Project Component	Pinyon Jay Habitat	Bendire's Thrasher Habitat	Gunnison's Prairie Dog Habitat
Alternative Route 2 with Subroute 2A-2			
Alternative Route 2 with Subroute 2A-3			
Alternative Route 2 with Subroute 2A-4			
Alternative Route 3 with Subroute 3A-1			
Alternative Route 3 with Subroute 3A-2			
Alternative Route 3 with Subroute 3A-3			
Alternative Route 3 with Subroute 3A-4			
Local Alternative 3B-1			
Local Alternative 3B-2			
Component 4. SunZia West Substation	No effect.	The SunZia West Substation would result in an 80.2-acre reduction in suitable habitat as a result of permanent surface disturbance.	No effect.

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 would result in impacts to up to approximately 390.6 acres (<1% of the analysis area) and up to 398.2 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within pinyon jay habitat. There are two local alternatives within Alternative Route 1: Local Alternative 1A-6 intersects 2.5 acres and Local Alternative 1A-7 intersects 2.8 acres of suitable habitat. Local alternatives are expected to have similar effects on pinyon jay habitat conditions.

Alternative Route 1 would result in impacts to up to approximately 512.5 acres (<1% of the analysis area) as a result of permanent project activities and up to 523.0 acres (<1% of the analysis area) for temporary project activities within Bendire's thrasher habitat. Both local alternatives within Alternative Route 1 are outside of suitable habitat for this species.

Alternative Route 1 would result in impacts to up to approximately 324.6 acres (<1% of the analysis area) related to permanent project activities and up to 330.9 acres (<1% of the analysis area) related to temporary project activities within Gunnison's prairie dog habitat. There are two local alternatives within Alternative Route 1: Local Alternative 1A-6 intersects 1.1 acres and Local Alternative 1A-7 intersects 0.7 acre of suitable habitat. Local alternatives are expected to have similar effects on Gunnison's prairie dog habitat conditions.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 would result in impacts to up to approximately 251.8 acres (<1% of the analysis area) and up to 272.2 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within pinyon jay habitat.

Alternative Route 2 would result in impacts to up to approximately 405.2 acres (<1% of the analysis area) and up to 438.0 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within Bendire's thrasher habitat.

Alternative Route 2 would result in impacts to up to approximately 237.0 acres (<1% of the analysis area) and up to 255.8 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within Gunnison's prairie dog habitat.

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 would result in impacts to up to approximately 251.8 acres (<1% of the analysis area) and up to 238.7 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within pinyon jay habitat. Both local alternatives within Alternative Route 3 are outside of suitable habitat for this species.

Alternative Route 3 would result in impacts to up to approximately 419.3 acres (<1% of the analysis area) and up to 442.5 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within Bendire's thrasher habitat. Both local alternatives within Alternative Route 3 are outside of suitable habitat for this species.

Alternative Route 3 would result in impacts to up to approximately 236.5 acres (<1% of the analysis area) and up to 248.3 acres (<1% of the analysis area) as a result of permanent and temporary project activities, respectively, within Gunnison's prairie dog habitat. There are two local alternatives within Alternative Route 3: Local Alternative 3B-1 intersects 19.4 acres and Local Alternative 3B-2 intersects 21.6 acres of suitable habitat. Local alternatives are expected to have similar effects on Gunnison's prairie dog habitat conditions.

3.4.14.6 Impacts of SunZia West Substation

The SunZia West Substation would not result in impacts to pinyon jay and Gunnison's prairie dog suitable habitats. The SunZia West Substation would result in approximately 80.2 acres (<1% of the analysis area) of impacts within Bendire's thrasher suitable habitat as a result of long-term project activities.

3.4.14.7 No Action Alternative

The no action alternative consists of the previously permitted transmission line route, the 2015 Selected Route (BLM 2013, 2015a). Compared with the action alternatives, the no action alternative would still intersect habitat for Gunnison's prairie dog, pinyon jay, and Bendire's thrasher. However, no disturbance to the Bendire's thrasher proposed IBA would occur.

3.4.14.8 Summary of Impacts

Analysis of the proposed components and alternatives has shown that project construction and operation would disturb species habitat for the long term, which may result in reduced populations of pinyon jay, Bendire's thrasher, and Gunnison's prairie dog. Component 1 localized route modifications and Component 3 Segment 4 alternative routes do not overlap pinyon jay and Bendire's thrasher habitat but could reduce suitable habitat for Gunnison's prairie dog. Component 2 access roads and TWAs would intersect large areas of suitable habitat for all three species, with Gunnison's prairie dog habitat being most impacted by access roads and Bendire's thrasher habitat by TWAs. Component 4 SunZia West Substation construction and operation would impact Bendire's thrasher habitat but not habitat for the other species. Behavioral changes during construction are possible for all species due to noise, human activity, and reduced vegetation. EPM 2, EPM 3, EPM 5, EPM 8, and EPM 12 would be implemented to avoid impacts to vegetation during construction (see Appendix C).

Compared with the no action alternative, impacts to Gunnison's prairie dog habitat are expected to be similar under the components and alternatives due to similar amounts of interaction with the species' range and suitable habitat distribution. However, the proposed components and alternatives are expected to result in increased impacts to pinyon jay and Bendire's thrasher due to an increased amount of disturbance within suitable habitat for these species, including impacts to the Bendire's thrasher proposed IBA.

Cumulative impacts to biological resources are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could result in the removal of up to approximately 479 acres of suitable habitat for pinyon jay, 1,833 acres of suitable habitat for Bendire's thrasher, and 597 acres of suitable habitat for Gunnison's prairie dog. Impacts to suitable habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to suitable habitat may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Vegetation removal would be mitigated by replanting and avoidance, but impacts to the vegetation communities and reductions in pinyon jay, Bendire's thrasher, and Gunnison's prairie dog suitable habitat could be long term. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbance to suitable habitat; however, these would dissipate with distance from the project boundary. Therefore, any adverse impacts likely would be infrequent but potentially long term.

AID-8 Federally Listed Plant Species

Would vegetation removal and ground disturbance associated with the proposed project reduce the quantity or quality of habitat, seed banks, and populations of special-status plant species, including the federally threatened Pecos sunflower (*Helianthus paradoxus*)?

3.4.15 Affected Environment

Pecos sunflower (*Helianthus paradoxus*) occurs in south-central New Mexico in portions of Cibola, Valencia, Socorro, Guadalupe, and Chaves Counties (New Mexico Rare Plants Technical Council 2022). This species is a wetland plant that grows in areas with permanently saturated soils, such as desert springs and seeps formed in wet meadows called *cienegas*, margins of lakes, impoundments, and creeks. Pecos sunflowers are typically observed in correlation with other desert wetland species at 3,300–6,600 feet amsl (USFWS 2005). Suitable soils associated with potential Pecos sunflower habitat include saline or alkaline components, indicating a high level of dissolved solids in the water (USFWS 2005). These soils include silty clays or fine sands with high organic matter content. Pecos sunflower is an annual species, which requires populations to reestablish adult plants each year. The flowering period is typically August through October.

Pecos sunflower was listed as a federally threatened species without critical habitat in 1999 (USFWS 1999). A recovery plan was completed in 2005 (USFWS 2005), and critical habitat was finalized in 2008 (USFWS 2008).

The analysis area for impacts to the Pecos sunflower and its habitat are riparian areas identified with suitable habitat within the 8-mile-wide corridor around project components (see AIB-10 Riparian Habitat). Within the analysis area, there is potentially suitable habitat within proposed project Component

3 along the Rio Grande, Rio Puerco, and Rio Salado due to the presence of Riparian Woodland and Shrubland and Marsh, Wet Meadow, and Playa vegetation communities (see AIB-10 Riparian Habitat). Within the analysis area for Component 1 there are currently 194.9 to 1,525.3 acres of mapped riparian vegetation, or habitat; within the analysis area for Component 2a there are currently 31,253.3 acres of mapped riparian vegetation and for Component 2b there are 31,678.6 acres; within the analysis area for Component 3, acres of mapped riparian vegetation range from 8,501.3 acres to 16,489.1 acres depending on alternative; and within the analysis area for Component 4 there are 2.4 acres of mapped riparian vegetation. In addition, there are known populations of Pecos sunflower within the Sevilleta NWR (USFWS 2005), in particular at La Joya. See EIS Section 5.4 for more information about compliance with ESA Section 7.

3.4.15.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable future environmental trends and planned actions within the analysis area that may impact suitable Pecos sunflower habitat. These actions may include the construction and development of communication sites and transmission lines, livestock grazing and leasing authorizations, and continued demand for groundwater and surface water for human and agricultural uses (SWCA 2021). These reasonably foreseeable future environmental trends include variations in global and regional environmental conditions related to climate change in line with global trends which could reduce the quality and quantity of habitat for the Pecos sunflower through the varying annual precipitation and potential drying of wetland habitat.

3.4.16 Environmental Consequences

3.4.16.1 Methods and Assumptions

The following impact indicators are considered factors which may contribute to loss of or degradation of Pecos sunflower habitat:

- Loss or degradation of habitat from clearing of vegetation, surface disturbance, and fugitive dust related to construction and vehicle use.
- Degradation of terrestrial habitat due to increased soil erosion or introduction of invasive non-native plants.
- Increased risk of direct mortality (crushing) related to construction activities and vehicular use.

The following assumptions were used to analyze impacts to special-status plant species and their habitats:

- Localized populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of special-status species habitat annually.
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of species habitat and/or the loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.

- Special-status plant species occupied habitat (occurrences) may occur within unsurveyed identified suitable habitat.
- USFS screened the portions of the project area that would cross the Cibola National Forest and determined the Zuni fleabane (federally listed threatened plant) does not have the potential to occur within the vicinity of the project.

The impacts analysis for Pecos sunflower assumes application of the design features and environmental protection measures contained in Table 3-93. Full design features and EPMs are provided in Appendix C.

Table 3-93. Design Features and Environmental Protection Measures Applicable to Pecos Sunflower

Relevant Design Features	Applicable EPMs
2, 3, 4, 5	3, 5, 14, 18, 19, 25

3.4.16.2 Impacts of Segment 4 Reroute Alternatives

IMPACTS OF ALTERNATIVE ROUTE 1

Approximately 0.03 mile of Alternative Route 1 intersects the Rio Salado, a saline tributary of the Rio Grande. Although there are no known populations along the Rio Salado, there is potentially suitable Pecos sunflower habitat along the Rio Salado due to the presence of saline and alkaline components and silty sandy soils (Clark 1929; Evans 1963). Therefore, there is the potential for construction-related activities associated with Alternative Route 1 to impact the quality of potentially suitable Pecos sunflower habitat (Table 3-94).

Table 3-94. Impacts of Alternative Route 1 on Pecos Sunflower Habitat

Project Component	Miles of Transmission Line across Rio Salado	Miles of Transmission Line across Rio Puerco	Miles of Transmission Line across Rio Grande	Acres of Transmission Line within Potentially Suitable Pecos Sunflower Habitat
Alternative Route 1 with Subroute 1A-1				
Subroute 1A-1	0.03	0.12	0.12	1.17
Subroute 1A-2	0.03	0.06	0.07	0.70
Subroute 1A-3	0.03	0.06	0.11	0.87
Subroute 1A-4	0.03	0.12	0.12	1.17

Approximately 0.12 mile of Subroutes 1A-1 and 1A-4, 0.07 mile of Subroute 1A-2, and 0.11 mile of Subroute 1A-3 crosses the Rio Grande at their respective locations. Approximately 0.12 mile of Subroutes 1A-1 and 1A-4, and 0.06 mile of Subroutes 1A-2 and 1A-3 also cross the Rio Puerco at their respective locations.

Impacts to the quantity or quality of habitat, seed banks, and populations of Pecos sunflower habitat could occur from vegetation removal and ground disturbance during construction and the use and/or development of access roads.

There are several design features to minimize the risk of reducing the quantity or quality of habitat, seed banks, and populations of Pecos sunflower. The Rio Salado would be spanned, and the transmission towers would be located approximately 200 feet from the stream banks, which would reduce the acreage of impacts to any suitable Pecos sunflower habitat adjacent to the Rio Salado crossing and direct impacts along the bank of the river would be avoided by transmission line structures (see Appendix C).
In addition, EPMs would be implemented to reduce impacts to vegetation, including EPM 3, EPM 5, EPM 8, EPM 14, EPM 18, EPM 19, and EPM 25 (see Appendix C). With consideration of the proposed surface disturbance and project design features to minimize surface distance, the potential risks to Pecos sunflower quantity or quality of habitat, seed banks, and populations from development of the proposed action would be avoided or minimized.

IMPACTS OF ALTERNATIVE ROUTE 2

Approximately 14 miles of Alternative Route 2 is located within the Sevilleta NWR where there are known populations of Pecos sunflower. Alternative Route 2 would be co-located with El Paso Electric's existing transmission line. Temporary work areas and access roads would be required outside of the existing transmission line footprint to construct the proposed project (POWER Engineers, Inc. 2021a:45). Surface disturbance necessary to construct the proposed project would result in soil disturbance and vegetation removal within suitable habitat for the species along drainages which may contain populations. These impacts could result in a reduction of available Pecos sunflower suitable habitat, as well as disturbance of seed banks and potential removal of individual Pecos sunflowers within unrecorded occupied habitat (Table 3-95).

Table 3-95. Impacts of Alternative Route 2 on Pecos Sunflower Habitat

Project Component	Miles of Transmission Line across Sevilleta NWR	Miles of Transmission Line across the Rio Salado	Miles of Transmission Line across the Rio Grande	Acres of Permanent Project Activities within Suitable Pecos Sunflower Habitat	Acres of Temporary Project Activities within Suitable Pecos Sunflower Habitat
Alternative Route 2					
Subroute 2A-1	14.4	0.5	0.11	61.54	66.50
Subroute 2A-2	14.4	0.5	0.05	61.45	66.23
Subroute 2A-3	14.4	0.5	0.09	61.46	66.41
Subroute 2A-4	14.4	0.5	0.11	61.54	66.50

Approximately 0.5 mile of all subroutes cross the Rio Salado and approximately 0.05 to 0.11 mile of all Alternative Route 2 subroutes cross the Rio Grande. Impacts to the quality of suitable Pecos sunflower habitat could occur from vegetation removal and ground disturbance during construction and the use and/or development of access roads. Alternative Route 2 could impact up to 128.04 acres of potentially suitable Pecos sunflower habitat within the analysis area as a result of permanent and temporary project activities, dependent on alternative (see Table 3-95). However, the acreage of impacts may be reduced through the implementation of design features. In addition, Alternative Route 2 is located approximately 3.7 miles west of the known Pecos sunflower occurrence within the Sevilleta NWR, therefore there is minimal risk of impacting a known population of Pecos sunflower (USFWS 2005).

Design features and EPMs implementation and effects would be the same as described under Alternative Route 1.

IMPACTS OF ALTERNATIVE ROUTE 3

Approximately 12 miles of Alternative Route 3 is located within the Sevilleta NWR where there is a known population of Pecos sunflower. Alternative Route 3 would be co-located with 12 miles of Tri-State's existing 115-kV transmission line. However, there are portions of the Alternative Route 3 that would require disturbance outside of the current footprint of existing transmission line facilities, including temporary structure work areas and temporary access roads (POWER Engineers, Inc. 2021a:45). Disturbance to the areas outside of the existing transmission line footprint may result in a reduction of quality of habitat, seed banks, and potentially populations of Pecos sunflower from soil disturbance and vegetation removal (Table 3-96).

Table 3-96. Impacts of Alternative Route 3 on Pecos Sunflower Habitat

Project Component	Miles of Transmission Line across Sevilleta NWR	Miles of Transmission Line across the Rio Salado	Miles of Transmission Line across the Rio Grande	Miles of Transmission Line across the Rio Puerco	Acres of Transmission Line within Suitable Pecos Sunflower Habitat
Alternative Route 3 Subroutes					
Subroute 3A-1	14.1	0.6	0.13	0.13	62.57
Subroute 3A-2	14.1	0.6	0.08	0.08	62.38
Subroute 3A-3	14.1	0.6	0.11	0.11	62.35
Subroute 3A-4	14.1	0.6	0.13	0.13	62.44

Approximately 0.08 to 0.13 mile of all Alternative Route 3 subroutes cross the Rio Grande and Rio Puerco. Approximately 0.6 mile of all subroutes cross the Rio Salado. Impacts to the quality of suitable Pecos sunflower habitat could occur from vegetation removal and ground disturbance during construction and the use and/or development of access roads. Alternative Route 3 could result in up to approximately 62.65 acres of impacts to potentially suitable Pecos sunflower habitat within the analysis area. This impact would represent approximately 4.11% of the analysis area. However, the acreage of impacts may be reduced through the implementation of design features. In addition, Alternative Route 3 is located approximately 2.7 miles west of La Joya where the known Pecos sunflower occurrence is within the Sevilleta NWR, therefore there is minimal risk of impacting a known population of Pecos sunflower (USFWS 2005).

Design features and EPMs implementation and effects would be the same as described under Alternative Route 1.

3.4.16.3 No Action Alternative

Under the no action alternative, the SunZia transmission line would be routed outside of the Sevilleta NWR where known populations of the species exist. However, the transmission line would cross the Rio Grande to the south of these populations in an area of suitable riparian habitat which would equate to a reduction in availability or potential to affect previously unrecorded populations. Under the no action alternative, populations of Pecos sunflower within the Sevilleta NWR would not be impacted (BLM 2013:4-90). The 2013 FEIS also found that the translocated populations located south of Socorro on private property would not be impacted from activities related to the no action alternative, and there are no known native populations within proximity of the translocated population (USFWS 2005). There were no mitigations measures proposed for the Pecos sunflower (BLM 2013:4-90).

3.4.16.4 Summary of Impacts

Segment 4 Alternative Route 1 would be routed outside of Sevilleta NWR and therefore would have less of an impact, compared with Alternatives Routes 2 and 3. However, all segment route alternatives cross the Rio Grande, which could impact Pecos sunflower habitat (Table 3-97). There is also the potential to impact habitat, seed banks, and populations of Pecos sunflower from construction activities that may need to occur outside of the existing right-of-way. Design features such as spanning all river crossings and avoiding the riverbank by 200 feet would be implemented to avoid surface disturbance impacts to potentially suitable habitat, seed banks, and populations. EPM 3, EPM 5, EPM 8, EPM 14, EPM 18, EPM 19, and EPM 25 would be implemented to avoid impacts to vegetation during construction (see Appendix C). Under EPM 25, a preconstruction survey would be conducted to identify locations of occupied Pecos sunflower habitat. Any occupied habitat would be flagged and avoided during construction (POWER Engineers, Inc. 2021g:116).

Table 3-97. Pecos Sunflower Habitat within the Analysis Area per Project Component

Project Component	Pecos Sunflower Habitat
Component 1: Localized Route Modifications	
1. Mavericks Area	No effect.
2. SunZia South Area	
3. Macho Springs Area	
4. Las Palomas Area	
5. Highlands Area	
6a. Pinal Central Area- North Route	
6b. Pinal Central Area- Steele Route	
6c. Pinal Central Area- Earley Route	
Local Alternative East Tie-In	
Local Alternative Central Tie-In	
Local Alternative West Tie-In	
Component 2a. Access Roads	No effect
Component 2b. Temporary Work Areas	No effect.
Component 3. Segment 4 Reroute Alternatives	
Alternative Route 1 with Subroute 1A-1	Each route alternative crosses the Rio Salado, Rio Puerco, and Rio Grande and has the potential to reduce 0.7 to 1.17 acre of suitable habitat.
Alternative Route 1 with Subroute 1A-2	
Alternative Route 1 with Subroute 1A-3	
Alternative Route 1 with Subroute 1A-4	
Local Alternative 1A-6	No effect.
Local Alternative 1A-7	
Alternative Route 2 with Subroute 2A-1	Each route alternative crosses Sevilleta NWR, the Rio Salado, and the Rio Grande, and has the potential to reduce suitable habitat due to permanent (61.5 acres) and temporary (66.5 acres) project activities.
Alternative Route 2 with Subroute 2A-2	
Alternative Route 2 with Subroute 2A-3	
Alternative Route 2 with Subroute 2A-4	
Alternative Route 3 with Subroute 3A-1	
Alternative Route 3 with Subroute 3A-2	

Project Component	Pecos Sunflower Habitat
Alternative Route 3 with Subroute 3A-3	Each route alternative crosses Sevilleta NWR, the Rio Salado, Rio Puerco, and Rio Grande, and has the potential to reduce 62 acres of suitable habitat.
Alternative Route 3 with Subroute 3A-4	
Local Alternative 3B-1	No effect.
Local Alternative 3B-2	
Component 4. SunZia West Substation	

Note: Local Alternatives are exchangeable within their associated alternative route.

Cumulative impacts to biological resources are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could result in the removal of up to approximately 128 acres of suitable habitat for Pecos sunflower. Impacts to suitable habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to suitable habitat may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Habitat and seed bank removal would be avoided and mitigated during construction, but reductions in Pecos sunflower suitable habitat could be long term. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbance of suitable habitat; however, these impacts would dissipate with distance from the project boundary. Therefore, any adverse impacts would be unlikely, but long term if they were to occur.

AID-9 BLM Sensitive Plant Species

Would the proposed project reduce the populations of BLM sensitive plant species, or reduce the quantity or quality of other State and BLM sensitive species habitat found to have potential to occur in proximity to the project?

Would the proposed project reduce the quality or quantity of the Chihuahua scurfpea (*Pediomelum pentaphyllum*) BLM-modeled habitat?

Would the proposed project reduce the quantity or quality of Lordsburg noino (*Muilla lordsburgana*) BLM-mapped habitat?

Would the proposed project reduce the quantity of habitat available for gypsophillic species within BLM-modeled habitat?

3.4.17 Affected Environment

The analysis area for special-status plant species includes an 8-mile corridor in which ecological characteristics including vegetation cover, aquatic resources, soils, elevation, and other factors were evaluated to identify suitable habitat. Within the analysis area, 14 special-status plant species listed as BLM sensitive, four of which are also listed as endangered by the State of New Mexico, have the potential to occur due to the presence of habitat which meet species life history requirements and known range (Table 3-98).

The BLM manages certain sensitive species that are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. The authority for this policy and guidance is established by the ESA, as amended; Title II of the Sikes Act of 1960, as amended; and BLM Manual 6840, *Special Status Species Management* (BLM 2008c). The SunZia Biological Resource Report (POWER Engineers, Inc. 2021g) describes the special-status plant species considered for analysis, habitat and range descriptions, and potential occurrence within the analysis area. The potential for occurrence of a species was identified using the following categories:

- ***Known to occur***—the species has been previously documented in the study area by a reliable observer.
- ***Potential to occur***—the analysis area is within the species' currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.
- ***Unlikely to occur***—the analysis area is within the species' currently known range, but vegetation communities, soils, water quality conditions, etc., do not resemble those known to be used by the species, or the analysis area is clearly outside the species' currently known range.

Of those identified as having suitable habitat within the analysis area, four special-status plant species have been previously recorded and are known to occur within the analysis area—Chihuahua scurfpea (*Pediomelum pentaphyllum*), Lordsburg noino (*Muilla lordsburgana*), Todilto stickleaf (*Mentzelia todiltoensis*), and Yeso twinpod (*Physaria newberryi* var. *yesicola*) (Alexander 2021b; BLM 2013; POWER Engineers, Inc. 2021m). BLM botanists determined that based on habitat models and existing occurrence data, these species' known occupied habitats had a high likelihood of being affected by proposed project activities and are therefore analyzed in detail below. Additional species with potential to occur (see Table 3-98; see Appendix R6-B of POWER Engineers, Inc. 2021g) were determined to have a low to moderate likelihood of being affected based on the available suitable habitat.

3.4.17.1 Reasonably Foreseeable Trends and Planned Actions

There are reasonably foreseeable future environmental trends and planned actions within the analysis area that may impact suitable Chihuahua scurfpea, Lordsburg noino, Todilto stickleaf, and Yeso twinpod habitat. These actions may include the construction and development of communication sites and transmission lines and livestock grazing and leasing authorizations (SWCA 2021). These reasonably foreseeable future environmental trends include variations in global and regional environmental conditions related to climate change in line with global trends which could reduce the quality and quantity of habitat for special-status plant species.

Table 3-98. Special-Status Plant Species with Potential to Occur within the Study Area

Species Common Name (*Scientific Name*)	**Status***	**Brief Habitat Description and Range**†	**Potential to Occur within the Study Area**
Fugate's amsonia (*Amsonia fugatei*)	BLM S	Ridges and slopes in Chihuahuan desert scrub habitat within Socorro County, New Mexico. Existing populations are known to occur in proximity to the Rio Grande Corridor.	Potential to occur
Aravaipa sage (*Salvia amissa*)	BLM S	Understory plant of shady floodplain terraces on alluvial soils	Potential to occur
Aravaipa woodfern (*Thelypteris puberula* var. *sonorensis*)	BLM S	Moist soils of shaded riverbanks in mesic canyons, seeps, and wet meadows	Potential to occur
Night-blooming cereus (*Peniocereus greggii* var. *greggii*)	BLM S, NM E	Mostly in sandy to silty gravelly soils in gently broken to level terrain in desert grassland or Chihuahuan desert scrub. Typically found growing up through and supported by shrubs, especially *Larrea tridentata* and *Prosopis glandulosa.*	Potential to occur
Chihuahua scurfpea (*Pediomelum pentaphyllum*)	BLM S, NM E	Bare areas in desert scrub and desert grasslands on sandy or loamy soils; 3,600 to 4,500 feet amsl	Known to occur
Fish Creek fleabane (*Erigeron piscaticus*)	BLM S	Alluvial soils in shady canyon bottoms between 2,250 and 3,500 feet amsl	Potential to occur
Giant sedge (*Carex spissa*)	BLM S	Saturated soils at seeps, springs, and streams	Potential to occur
Tumamoc globeberry (*Tumamoca macdougalii*)	BLM S	Undisturbed soils along washes below 3,000 feet amsl	Potential to occur
Lordsburg noino (*Muilla lordsburgana*)	BLM S	Sandy alluvium derived at least in part from intrusive igneous rocks. Associated species include *Leptosiphon aureus*, *Nuttallanthus texanus*, *Linanthus bigelovii*, *Pectocarya platycarpa*, *Logfia depressa*, *Evolvulus sericeus*, *Xanthisma gracile*, and *Cymopterus multinervatus*.	Known to occur
Pima Indian mallow *(Abutilon parishii*)	BLM S	Rocky slopes and canyon bottoms in desert scrub, and up into semidesert grassland; 2,500 to 4,900 feet amsl	Potential to occur
San Pedro River wild buckwheat (*Eriogonum terrenatum*)	BLM S	Gravelly to clayey soils of the Pantano and Saint David formations	Potential to occur
Sand pricklypear (*Opuntia arenaria*)	BLM S, NM E	Sandy soils and stable dunes in Chihuahuan desertscrub; 3,800 to 4,300 feet amsl	Potential to occur
Todilto stickleaf (*Mentzelia todiltoensis*)	BLM S	Outcrops of gypsum in the Todilto formation; 5,600 to 5,840 feet amsl	Known to occur
Yeso twinpod (*Physaria newberryi* var. *yesicola*)	BLM S	Wet, alkaline and gypsum soils of seeps, marshy areas, and streams; 3,450 to 8,500 feet amsl	Known to occur

* Status: BLM S= BLM Sensitive Species, NM E= New Mexico State Endangered.

† Full species habitat descriptions and range information can be found in the 2013 FEIS (BLM 2013) and SunZia Biological Resource Report (POWER Engineers, Inc. 2021g).

3.4.17.2 Chihuahua Scurfpea (Pediomelum pentaphyllum)

STATUS AND LIFE HISTORY

Chihuahua scurfpea, a BLM sensitive species, is a small desert perennial species well adapted to survive drought conditions of the southwestern United States. The species generally occurs "in areas of deep, sandy soils in shrublands or marginal grasslands of the Chihuahuan Desert" ecoregion (USFWS 2018b:iii). The historic range of the species includes New Mexico, Arizona, and Chihuahua, Mexico, with a potential for occurrence in west Texas (USFWS 2018b). The species' known occupied habitat is limited to southwestern New Mexico and southeastern Arizona, however there is a significant amount of unsurveyed suitable habitat adjacent to these areas and the phenology of the plant makes species detection highly dependent on seasonal moisture (USFWS 2018b). Additional life history information is available in the 2013 FEIS (BLM 2013) and the SunZia Biological Resource Report (POWER Engineers, Inc. 2021g).

OCCURRENCE IN THE ANALYSIS AREA

Chihuahua scurfpea is known to occur within the analysis area based on the results of 2014, 2015, and 2017 species-specific surveys as well as the presence of suitable habitat conditions (EPG 2017). Known occurrences of the species are concentrated along the project's intersection of Lordsburg Mesa and in an area surveyed west of the Peloncillo Mountains and south of the San Simon River (EPG 2017). The BLM has developed a suitable habitat model based on known occurrences as well as suitable substrates (BLM 2021f). Modeled suitable habitat for this species occurs between Willcox, Arizona, and Deming, New Mexico, and is intersected by proposed project components (BLM 2021f). Additional surveys were conducted in August–September 2021, and will occur pre-construction per Stipulation 14 of the 2016 right-of-way grant to identify locations of additional plants (BLM 2016c:Exhibit C; POWER Engineers, Inc. 2021g, 2021m:2).

3.4.17.3 Lordsburg noino (Muilla lordsburgana)

STATUS AND LIFE HISTORY

Lordsburg noino is a recently described species as of September 2020, and is listed as BLM sensitive (Alexander 2021a). This species was identified within southwestern New Mexico and is a relative of a similar, but distinct species, *Muilla coronata*, which occurs in the Mohave Desert of California and Nevada (Alexander 2021a). Lordsburg noino occurs at elevations from 4,430 to 4,960 feet amsl on "gentle western and southwestern slopes where the bajada of the Bio Burro Mountains meets the flatter topography of Lordsburg mesa" (Alexander 2021a:2). Observations of the species have determined that occupied habitat is limited to substrates of "aeolian find sand sheets overlying clay loams" (Alexander 2021a:2).

OCCURRENCE IN THE ANALYSIS AREA

Lordsburg noino occupied and suitable habitat is known to occur within the project analysis area. The BLM Las Cruces District Office developed a spatial data layer of mapped suitable habitat of which approximately 30% to 60% is considered occupied with at least one individual within a 10-m radius (Alexander 2021c). Suitable habitat for this species occurs between Deming, New Mexico and Willcox, Arizona (Alexander 2021a).

3.4.17.4 Gypsophillic Species

STATUS AND LIFE HISTORY

Gypsophillic plant species can be described as those which are adapted to inhabit gypsiferous soil. These gypsum soils are broken, eroded exposures of gypsiferous rocks and earths or shallow loams over these gypsiferous materials. In gypsum soils, the organic matter content is low, and the vegetative cover is sparse, which leads to rapid runoff and a decrease in water-holding capacity. Plant roots are limited by salinity and the gypsiferous layer close to the surface; these soils are subject to severe erosion if the vegetative cover is lost. Therefore, gypsum soils are highly sensitive to disturbance and difficult to reclaim if impacted.

Gypsophillic species fall into generally two groups: gypsophiles, which are gypsum obligate (specialist) species and only grow on gypsum outcroppings or in soils which contain a gypsum components; and generalist species which have the ability to grow in gypsiferous habitat, called gypsovags (Ochoterena et al. 2020). While chemical composition of gypsum soils vary across the region, limited outcroppings of suitable gypsum-rich soils provide habitat for species with diverse ecological strategies. Gypsum deposits occur globally, and are generally restricted to arid and semi-arid regions with gypsum soil crusts only being created under specific environmental conditions (Muller 2015). The distribution of gypsum soils is patchy and therefore movement of populations between areas of suitable conditions is inherently limited (Muller 2015). The New Mexico portion of the Chihuahuan Desert contains multiple areas of gypsum outcroppings and distributed areas of gypsiferous soils which provide habitat for a multitude of endemic species.

OCCURRENCE IN THE ANALYSIS AREA

Within proximity of the SunZia transmission line, occurrences of gypsophillic species include tufted sand verbena (*Abronia bigelovii*), gypsum Townsend's aster (*Townsendia gypsophila*), Sivinski's scorpionweed (*Phacelia sivinskii*), Todilto stickleaf (*Mentzelia todiltoensis*), and Yeso twinpod (*Physaria newberryi* var. *yesicola*) are known to occur; some of these are listed as BLM sensitive species.
To quantify occurrence of suitable habitat for gypsophillic species, the BLM has created a model based on gypsum outcroppings and mapped soils containing gypsum concentrations suitable for plant inhabitants (Alexander 2021c).

3.4.17.5 Reasonably Foreseeable Environmental Trends and Planned Actions

There are reasonably foreseeable trends and future actions within the analysis area that may impact habitat for special-status plant species. These include approved and planned transmission line projects including, but not limited to, the constructed Western Spirit 345-kV transmission line (SWCA 2021). Additionally, environmental trends and variations in global and regional environmental conditions related to climate change in line with global trends could reduce the quality and quantity of habitat for species analyzed through the varying annual precipitation and potential reduction of suitable special-status plant species habitat.

3.4.18 Environmental Consequences

3.4.18.1 Methods and Assumptions

The following impact indicators are considered factors which may contribute to loss of or degradation of special-status plant species habitat:

- Loss or degradation of habitat from clearing of vegetation, surface disturbance, and fugitive dust related to construction and vehicle use.
- Degradation of terrestrial habitat due to increased soil erosion or introduction of invasive non-native plants.
- Increased risk of direct mortality (crushing) related to construction activities and vehicular use.

The following assumptions were used to analyze impacts to special-status plant species and their habitats:

- Localized populations are naturally affected by non-human-caused factors such as climate, natural predation, disease outbreaks, natural fire regimes, and competition for available habitat from other native species.
- Climatic fluctuation (e.g., drought) would continue to influence the health and productivity of special-status species habitat annually.
- Actions affecting one analyzed species would have similar impacts on other species that use the same habitats type(s) or area(s).
- Surface-disturbing activities could lead to modification (positive or negative), loss (short or long term), or fragmentation of species habitat and/or the loss or gain of individuals, depending on the amount of area disturbed, species affected, and location of the disturbance.
- Changes in air, water, and habitat quality could lead to direct impacts and could have cumulative impacts on species survival.
- In disturbed areas, reestablishment of a vegetative landscape and plant composition similar to adjacent undisturbed lands, including trees and shrubs, has taken more than 50 years and in some areas could take more than 100 years (BLM 2013). Habitats such as biological soil crusts, mature shrub habitats, and reference grasslands will take the longest to reestablish, while disturbance to adapted plant communities will regenerate more quickly. Special-status plant species occupied habitat (occurrences) may occur within unsurveyed identified suitable habitat.
- Suitable gypsophillic plant habitat was considered to be a 200-m area around outcroppings of mapped gypsum soils to account for scale of gypsum soil model and ensure the inclusion of surface with suitable habitat conditions where gypsophillic plant populations are either known to occur or have the potential to occur.
- The analysis assumes application of Design Features 2, 3, 4, 5, and 6 as well as EPMs 1, 2, 3, 5, 8, and 26. Full design features and EPMs are provided in Appendix C.
- Analysis areas for species-specific and species group quantitative analyses are defined in Table 3-99.
- Species listed as having the "potential to occur" in Table 3-98 may be affected in a manner discussed below as "Impacts Common to All Components" if unsurveyed occupied habitat is present within areas of disturbance.

- The analysis assumes additional surveys for Chihuahua scurfpea would be conducted prior to construction of new project components as outlined in Stipulation 14 of the 2016 right-of-way grant per the following excerpt: "As outlined in Section 4.6.4.1 of the FEIS 2013 (Mitigation Planning), preconstruction surveys for special-status species [plants] shall be conducted on lands within the right-of-way project area, and within all areas of potential new surface disturbance as determined by the BLM Authorized Officer to identify those areas where the Chihuahua scurfpea plant could exist. Final preconstruction survey requirements and protocols will be outlined in the Biological Resources Protection Plan and Vegetation Management Plan of the Final POD" (BLM 2016c:Exhibit C).
- Surveys for Chihuahua scurfpea will continue, as identified in the SunZia *Biological and Aquatic Resources Survey Plan* (POWER Engineers, Inc. 2021m:2).

Table 3-99. BLM Special-Status Plant Species Analysis Areas

Species or Group	Analysis Area Description	Analysis Area (acres)
Chihuahua scurfpea (*Pediomelum pentaphyllum*)	Extent of BLM-mapped suitable habitat	17,765
Lordsburg noino (*Muilla lordsburgana*)	Extent of BLM-mapped suitable habitat	24,951
Gypsophillic species	Extent of BLM-modeled gypsiferous habitat	3,965–11,609

3.4.18.2 Impacts Common to All Components

The proposed project has the potential to cause varying types of impacts to special-status plants related to surface disturbance, increased risk of introduction of invasive or noxious weeds, and increased fugitive dust. These impacts are of similar nature to those described for AIB-8 Native Vegetation. However, special-status species tend to be at higher risk for significant impacts due to limited population sizes, distribution, and often times adaptations to specialized or rare habitat conditions. Inherent to the "special-status" designation, many of the species with potential to occur within the analysis area are vulnerable to extinction by natural processes or human disturbance. Subtle increases or decreases in available suitable habitat, weeds (see AIB-11), water availability, and habitat fragmentation (see AIB-14) can greatly affect the distribution, health, and survival of sensitive plant species. The degree to which these impacts could occur varies by component and alternative, with the understanding that activities which are in close proximity to or disturb special-status plant species' suitable habitat(s) generally have greater potential impacts to the species (Table 3-100). The analysis in this section is largely based on the assumption that increased interaction between project components and identified suitable habitat equates to greater severity of impacts to the species and the potential to cause disturbance events to occupied habitat with these range which may decrease the fertility and survival of present populations.

Project design features and EPMs are planned to reduce the surface disturbance necessary to complete the project, as well as to provide dust control measures and survey requirements so that occupied habitat may be avoided during final route and tower placement.

IMPACTS TO GYPSOPHILLIC PLANT SPECIES HABITAT

The unique nature of soil conditions of gypsophillic plant habitat within New Mexico makes these areas a valuable resource as they support biodiversity and habitat for several BLM sensitive species. As suitable gypsophillic plant habitat is generally sparse and widely distributed across the state, impacts to these areas carry increased impacts compared with general vegetation removal. Many gypsophillic plants are highly adapted and specialized to exist only within gypsum soils and therefore there is a high likelihood of removal of individuals and reduction of population with the removal of this habitat by surface disturbance. Standard reclamation activities and revegetation are not able to reconstruct the nature of gypsum soils, which often form crust-like structures of little nutrient and water content, and therefore surface disturbance generally equates to permanent, long-term, removal of such conditions (Muller 2015). Similar to the impacts described above for all special-status plant species, gypsophillic plant species exist under conditions of 1) limited suitable habitat availability, 2) populations sizes which indicate instability and downward trends, 3) disjointed or patchy habitat distribution limiting opportunity for population or range expansion by establishment of plants in suitable unoccupied habitat, and 4) limited nutrient and water availability. These conditions as well as ongoing development within suitable habitat result in increased threat of survival of gypsophillic plant species due to increased habitat fragmentation, reduction of availability habitat, and reduced reproductive success.

Therefore, due to the sensitive nature of this habitat and incompatibility for successful reclamation, both permanent and temporary project activities resulting in surface disturbance within gypsophillic plant species habitat are expected to result in a long-term or permanent reduction of available habitat and suitable conditions for these species (Table 3-101). In addition, project activities may result in a high risk of reducing gypsophillic plant populations, including BLM sensitive species listed in Table 3-98.

Table 3-100. Chihuahua Scurfpea and Lordsburg Noino Habitat within the Analysis Area per Project Component

Project Component	Habitat Crossed (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Habitat Crossed (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
	Chihuahua scurfpea				Lordsburg noino			
Component 1: Localized Route Modifications								
1. Mavericks Area	0.0	0.0	--	0.0	1.7	0.5	--	14,684.9
2. SunZia South Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0	0.0	0.0	--	0.0
Component 2a. Access Roads	4.3	4.4	0.7	12,948.2	3.1	6.3	1.2	14,636.8

Project Component	Habitat Crossed (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)	Habitat Crossed (miles)	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
	Chihuahua scurfpea				Lordsburg noino			
Component 2b. Temporary Work Areas	--	--	0.2	9,442.8	--	--	21.4	14,932.7
Component 3. Segment 4 Reroute Alternatives								
Alt Route 1 with Subroute 1A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 1 with Subroute 1A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 1A-6	0.0	0.0	0.0	--	--	0.0	0.0	--
Local Alternative 1A-7	0.0	0.0	0.0	--	--	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alt Route 3 with Subroute 3A-4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Local Alternative 3B-1	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	--	0.0	0.0	0.0	--
Component 4. SunZia West Substation		0.0	0.0	0.0		0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-101. Gypsophillic Habitat within the Analysis Area per Project Component

Project Component	Miles	Permanent Project Activities (acres)	Temporary Project Activities (acres)	Habitat within Analysis Area (acres)
Component 1: Localized Route Modifications				
1. Mavericks Area	0.0	0.0	--	0.0
2. SunZia South Area	0.0	0.0	--	0.0
3. Macho Springs Area	0.0	0.0	--	0.0
4. Las Palomas Area	0.0	0.0	--	0.0
5. Highlands Area	0.0	0.0	--	0.0
6a. Pinal Central Area- North Route	0.0	0.0	--	0.0
6b. Pinal Central Area- Steele Route	0.0	0.0	--	0.0
6c. Pinal Central Area- Earley Route	0.0	0.0	--	0.0
Local Alternative East Tie-In	0.0	0.0	--	0.0
Local Alternative Central Tie-In	0.0	0.0	--	0.0
Local Alternative West Tie-In	0.0	0.0	--	0.0
Component 2a. Access Roads	0.0	0.0	0.0	0.0
Component 2b. Temporary Work Areas	--	--	0.0	0.0
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	3.9	16.8	17.1	14,748.0
Alt Route 1 with Subroute 1A-2	3.9	16.8	17.1	14,748.0
Alt Route 1 with Subroute 1A-3	3.9	16.8	17.1	14,748.0
Alt Route 1 with Subroute 1A-4	3.9	16.8	17.1	14,748.0
Local Alternative 1A-6	0.0	0.0	0.0	--
Local Alternative 1A-7	0.0	0.0	0.0	--
Alt Route 2 with Subroute 2A-1	0.4	1.4	1.6	5,719.7
Alt Route 2 with Subroute 2A-2	0.4	1.4	1.6	5,719.7
Alt Route 2 with Subroute 2A-3	0.4	1.4	1.6	5,719.7
Alt Route 2 with Subroute 2A-4	0.4	1.4	1.6	5,719.7
Alt Route 3 with Subroute 3A-1	0.4	1.5	1.6	5,719.7
Alt Route 3 with Subroute 3A-2	0.4	1.5	1.6	5,719.7
Alt Route 3 with Subroute 3A-3	0.4	1.5	1.6	5,719.7
Alt Route 3 with Subroute 3A-4	0.4	1.5	1.6	5,719.7
Local Alternative 3B-1	0.0	0.0	0.0	--
Local Alternative 3B-2	0.0	0.0	0.0	--
Component 4. SunZia West Substation	--	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.18.3 Impacts of Localized Route Modifications

The Component 1 Mavericks Area route modification would result in approximately 2 miles of right-of-way corridor and 0.5 acre (<1% of the habitat within the analysis area) of impacts resulting from permanent project activities within Lordsburg noino mapped habitat. Impacts would include long-term loss of suitable habitat, direct mortality via removal of plants, and increased fragmentation of the species habitat range. As this species has only recently been described by the scientific community, its full range and population size is not well understood. As the species' mapped suitable habitat is known to include areas of occupied habitat, additional short-term indirect impacts such as increased fugitive dust during construction may adversely affect individual plants of this species. The risk of these effects is increased if construction were to occur during the blooming season for the species.

All Component 1 route modifications are outside of mapped habitat for Chihuahua scurfpea and gypsophillic plant habitat and are therefore not anticipated to impact these species' habitats.

3.4.18.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

The access roads would cross approximately 4.3 miles (<1% of the habitat within the analysis area) of Chihuahua scurfpea mapped habitat, resulting in impacts to up to 4.4 acres and 0.7 acre (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively. The access roads would cross approximately 3 miles (<1% of the habitat within the analysis area) of Lordsburg noino mapped habitat resulting in impacts to up to 6.3 acres and 1.2 acre (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively. Component 2b TWAs would result in disturbance of up to 0.2 acre (<1% of the habitat within the analysis area) from temporary project activities within Chihuahua scurfpea mapped habitat and 21.4 acres (<1% of the habitat within the analysis area) of Lordsburg noino mapped habitat. Component 2 access roads and TWAs are not anticipated to result in impacts to habitat for gypsophillic species.

Impacts would include removal of habitat and increased effects from fugitive dust, increased vehicular traffic and risk of crushing plants during construction/road use, and off-road vehicle use in TWAs during construction. These impacts are similar to those described under Component 1 but effects related to increased fugitive dust are likely to continue for the life of the project and be long term (Webb et al. 2020).

3.4.18.5 Impacts of Segment 4 Reroute Alternatives

Segment 4 Routes intersect varying degrees of gypsophillic special-status plant species mapped habitat, but are outside of mapped habitat for Lordsburg noino and Chihuahua scurfpea. Impacts related to Segment 4 routes are similar in nature to those described above as common to all special-status plant species and Component 1 routes. Component 3 Alternative Route 1 would result in greater impacts on gypsophillic plant species habitat, compared with Alternative Routes 2 and 3, due to the occurrence of gypsum soils within the Alternative Route 1 proposed area.

IMPACTS OF ALTERNATIVE ROUTE 1

Component 3 Alternative Route 1 would cross approximately 3.9 miles of gypsophillic plant species habitat resulting in impacts to up to 16.8 acres (<1% of the habitat within the analysis area) and 17.1 miles (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively. Both local alternatives within Alternative Route 1 are outside of suitable habitat for these species.

IMPACTS OF ALTERNATIVE ROUTE 2

Component 3 Alternative Route 2 would cross approximately 0.4 mile of gypsophillic plant species habitat resulting in impacts to up to 1.5 acres (<1% of the habitat within the analysis area) and 1.6 miles (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively.

IMPACTS OF ALTERNATIVE ROUTE 3

Component 3 Alternative Route 3 would cross approximately 0.4 mile of gypsophillic plant species habitat resulting in impacts to up to 1.5 acres (<1% of the habitat within the analysis area) and 1.6 miles (<1% of the habitat within the analysis area) as a result of permanent and temporary project activities, respectively. Both local alternatives within Alternative Route 3 are outside of suitable habitat for this species.

3.4.18.6 Impacts of SunZia West Substation

Component 4 was not found to intersect special-status plant species habitat and therefore no impacts are anticipated.

3.4.18.7 No Action Alternative

The no action alternative consists of the previously permitted transmission line route, the 2015 Selected Route (BLM 2013, 2015a). Additionally, no access roads or TWAs would be allowed to be developed outside of the previously permitted right-of-way. Compared with the action alternatives, the no action alternative would still involve impacts to special-status plant species habitat types discussed. It should be noted that at the time of development of the 2013 FEIS, impacts to Lordsburg noino and gypsophillic special-status plant species were not analyzed in detail, as neither had available mapped habitat at the time of analysis.

3.4.18.8 Summary of Impacts

Analysis of the proposed project area has shown that project construction and operation would disturb species habitat permanently, which may result in reduced populations. All seven Component 1 localized route modifications overlap less than 0.5 acre within Lordsburg noino habitat and do not overlap with Chihuahua scurfpea and gypsophillic plant species habitat, and therefore are expected to have limited adverse impacts on the species (Table 3-102). Segment 4 Alternative Route 1 would result in greater impacts on gypsophillic plant species habitat, compared with Alternative Routes 2 and 3 because it intersects an area of gypsiferous soils in the northern portion of the proposed route area that would be avoided by the other two routes. However, Segment 4 route alternatives are not expected to impact Chihuahua scurfpea and Lordsburg noino suitable habitat. While design features could be used to avoid impacts to vegetation during construction, disturbance of gypsiferous soils should be avoided because the soils conditions essential to the growth of highly specialized gypsophillic plant species cannot be reclaimed.

Cumulative impacts to biological resources are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project components could result in the removal of up to approximately 5.3 acres of Chihuahua scurfpea suitable habitat, 58.8 acres of Lordsburg noino suitable habitat, and 33.9 acres of gypsophillic plant species. Impacts to suitable habitat from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to suitable habitat may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Habitat removal would be avoided and mitigated during construction, but reductions in suitable habitat for the Chihuahua scurfpea, Lordsburg noino, and gypsophillic plant species could be long term. Construction and maintenance of the transmission lines and renewable energy projects could contribute to further disturbance to suitable habitat; however, these impacts would dissipate with distance from the project boundary. Therefore, any adverse impacts likely would be infrequent but potentially long term.

Table 3-102. Summary of Impacts for Chihuahua Scurfpea, Lordsburg Noino, and Gypsophillic Plant Species

Project Component	Chihuahua Scurfpea Habitat	Lordsburg Noino Habitat	Gypsophillic Plant Species Habitat
Component 1: Localized Route Modifications			
1. Mavericks Area	No effect.	Route modification would result in a 0.5-acre reduction of suitable habitat as a result of permanent surface disturbance and as indirect impacts to surrounding habitat.	No effect.
2. SunZia South Area		No effect.	
3. Macho Springs Area			
4. Las Palomas Area			
5. Highlands Area			
6a. Pinal Central Area- North Route			
6b. Pinal Central Area- Steele Route			
6c. Pinal Central Area- Earley Route			
Local Alternative East Tie-In			
Local Alternative Central Tie-In			
Local Alternative West Tie-In			
Component 2a. Access Roads	Access roads would result in a 5.1-acre reduction of suitable habitat as a result of permanent and temporary surface disturbance and as indirect impacts to surrounding habitat.	Access roads would result in a 7.5-acre reduction of suitable habitat as a result of permanent and temporary surface disturbance and as indirect impacts to surrounding habitat.	No effect.
Component 2b. Temporary Work Areas	TWAs would result in a 0.2-acre reduction of suitable habitat as a result of temporary surface disturbance.	TWAs would result in a 21.4-acre reduction of suitable habitat as a result of temporary surface disturbance.	No effect.
Component 3. Segment 4 Reroute Alternatives			
Alternative Route 1 with Subroute 1A-1	No effect.	No effect.	Each route alternative (Route 1) would result in reduced suitable habitat as a result of permanent (16.8 acres) and temporary (17.1 acres) disturbance.
Alternative Route 1 with Subroute 1A-2			
Alternative Route 1 with Subroute 1A-3			

Project Component	Chihuahua Scurfpea Habitat	Lordsburg Noino Habitat	Gypsophillic Plant Species Habitat
Alternative Route 1 with Subroute 1A-4			Local alternatives do not intersect suitable habitat.
Local Alternative 1A-6			Each route alternative (Routes 2 and 3) would result in reduced suitable habitat as a result of permanent (1.4 to 1.5 acres) and temporary (1.6 acres) disturbance. Local alternatives do not intersect suitable habitat.
Local Alternative 1A-7			
Alternative Route 2 with Subroute 2A-1			
Alternative Route 2 with Subroute 2A-2			
Alternative Route 2 with Subroute 2A-3			
Alternative Route 2 with Subroute 2A-4			
Alternative Route 3 with Subroute 3A-1			
Alternative Route 3 with Subroute 3A-2			
Alternative Route 3 with Subroute 3A-3			
Alternative Route 3 with Subroute 3A-4			
Local Alternative 3B-1			
Local Alternative 3B-2			
Component 4. SunZia West Substation	No effect.	No effect.	No effect.

Note: Local Alternatives are exchangeable within their associated alternative route.

AID-10 Cultural Resources

Would surface disturbance from construction and operation of the proposed project affect archaeological and built environment cultural resources, including historic properties?

3.4.19 Affected Environment

Cultural resources are both the physical manifestations of the activities of past or present cultures and the intangible elements of the landscape important to cultures. These intangible elements, which include traditional cultural properties, are discussed in AIB-20. Historic properties are those archaeological sites, historic structures and buildings, historic districts, and objects listed in or eligible for listing in the National Register of Historic Places (NRHP). The analysis incorporates by reference data and analysis for the no action alternative presented in Sections 3.8 and 4.8 of the 2013 FEIS (BLM 2013:3-146 through 3-199, 4-122 through 4-148). For a list of laws and regulations regarding cultural resources see Table 3-35 in Section 3.8.1.3 Regulatory Framework of the 2013 FEIS (BLM 2013:3-150 through 3-154). The most pertinent law/regulation for this analysis is Section 106 of the NHPA and its implementing regulations, 36 CFR 800. EIS Chapter 5 provides a summary of consultation and coordination efforts that have occurred for the proposed project, including a summary of the programmatic agreement development in compliance with Section 106 of the NHPA.

For the NEPA analysis, per the 2013 FEIS (BLM 2013:3-182 through 3-195) and the previous EPG Class I inventory (Swanson and Rayle 2015), the analysis area for ground disturbance to cultural resources is 0.25 mile (400 m) from the centerline of proposed transmission line alternatives and new project components outside the current right-of-way.

3.4.19.1 Cultural Resources Records Search

A Class I records search was conducted for the 2013 FEIS; the results of that search are found in Sections 3.8.3.1 Class I Study Results through 3.8.3.4 Route Group 4: Willow-500 kV Substation to Pinal Central Substation (BLM 2013:3-182 through 3-195). The 2013 FEIS also provided a comprehensive culture history background that can be found in the 2013 FEIS Section 3.8.2 Cultural History (BLM 2013:3-154 through 3-178). Following the methods used in the 2013 FEIS (BLM 2013:3-182 through 3-195), a records search was completed for this Draft EIS of the analysis area of previously recorded sites and surveys (Trowbridge et al. 2021).

Per the programmatic agreement for the SunZia project, a cultural resources inventory of the 2015 Selected Route was conducted to identify historic properties that may be affected by the project (BLM 2015a:Appendix B) (Swanson and Rayle 2018).

3.4.19.2 Previous Surveys and Survey Coverage

Component 1 consists of six localized route modifications in New Mexico: Mavericks Area, SunZia South Area, Macho Springs Area, Las Palomas Area, Highland Area, and the Pinal Central Area reroutes (North Route, Steele Route, and Earley Route). Survey coverage across all six areas ranges from 31% to 25% within the analysis area. Component 2 consists of access roads and temporary work areas outside the permitted right-of-way. Approximately 40% of the Component 2 analysis area has been previously surveyed for cultural resources. Component 3 consists of Segment 4 reroute alternatives. Less than 16% of the Segment 4 reroute alternatives have been previously surveyed. Component 4 is the newly proposed location of the SunZia West Substation. Less than 10% of the analysis area for the substation has been previously surveyed; only two surveys have taken place within the analysis area.

3.4.19.3 Previously Recorded Cultural Resources within the Analysis Area

PROJECT COMPONENT 1: LOCALIZED ROUTE MODIFICATIONS

Table 3-103 shows cultural resources within the analysis area for each localized route modification. Each route modification is discussed below.

Table 3-103. Cultural Resources within the Analysis Area

Localized Route Modifications	NRHP-Eligible or Listed	NRHP-Ineligible	NRHP-Unevaluated/ Undetermined	Total
1. Mavericks Area				
Prehistoric	0	0	0	**0**
Historic	0	0	0	**0**
2. SunZia South Area				
Prehistoric	2	0	2	**4**
Historic	0	1	2	**3**

Localized Route Modifications	NRHP-Eligible or Listed	NRHP-Ineligible	NRHP-Unevaluated/ Undetermined	Total
Multicomponent	1	0	0	**1**
3. Macho Springs Area				
Prehistoric	0	0	0	**0**
Historic	1	0	2	**3**
4. Las Palomas Area				
Prehistoric	0	0	0	**0**
Historic	0	6	2	**8**
Unknown	1	1	0	**2**
5. Highlands Area				
Prehistoric	0	0	0	**0**
Historic	0	1	2	**3**
6a. Pinal Central Area-North Route				
Prehistoric	1	0	2	**3**
Historic	7	8	0	**15**
6b. Pinal Central Area-Steele Route				
Prehistoric	0	0	1	**1**
Historic	6	2	0	**8**
6c. Pinal Central Area-Earley Route				
Prehistoric	3	0	1	**4**
Historic	6	4	0	**10**
Local Alternative West Tie-in				
Prehistoric	2	0	1	**3**
Historic	2	3	1	**6**
Unknown	0	0	4	**4**
Local Alternative Central Tie-in				
Prehistoric	1	0	1	**2**
Historic	1	1	0	**2**
Unknown	0	0	3	**3**
Local Alternative East Tie-in				
Prehistoric	1	0	1	**2**
Historic	1	1	0	**2**
Unknown	0	0	2	**2**

Note: Local Alternatives are exchangeable within their associated alternative route.

The Mavericks Area localized route modification is located north of Lordsburg, New Mexico. No previously recorded sites are within the analysis area of the Mavericks Area localized route modification.

The SunZia South Area localized route modification is located northeast of Deming, New Mexico. Eight archaeological sites have been previously documented within the analysis area of the SunZia South Area route modification: four prehistoric, three historic, and one multicomponent (see Table 3-103). Three of the sites are eligible for the NRHP, one is ineligible, and four are "not entered" and should be considered unevaluated.

The Macho Springs Area localized route modification is located near the old town of Nutt. Three sites have been recorded within the analysis area of the Macho Springs route modification (see Table 3-103). All three sites are historic-era and consist of a refuse dump, a residence, and a road or unnamed trail. One site is eligible for the NRHP; two are ineligible.

The Las Palomas Area localized route modification is located west of Truth or Consequences, New Mexico. Ten sites are found within the analysis area: eight sites are historic-era and two are of indeterminate temporal or cultural affiliation (see Table 3-103). The historic sites include three habitations/residences, one agricultural site, two linear transportation resources, and two historic sites with structures of unknown function. One site is eligible for the NRHP, seven are ineligible, and two are unevaluated.

The Highlands Area localized route modification is located northeast of Monticello, New Mexico. Three historic-era sites have been recorded within the analysis area the Highlands Area route modification (see Table 3-103). One site consists of an artifact scatter; two have features but are of unknown function. One site is ineligible; two are unevaluated.

The North Route localized route modification is located at the western terminus of the proposed transmission line just east of Casa Grande, Arizona. Eighteen resources have been recorded within the analysis area of the North Route localized route modification (see Table 3-103). The majority of them are historic-era resources; three are Hohokam or Native American. Eight of the resources are eligible, two are unevaluated, and eight are ineligible.

The Steele Route localized route modification is also located at the western terminus of the proposed transmission line just east of Casa Grande, Arizona. Nine resources have been recorded within the analysis area: one prehistoric and eight historic-age (see Table 3-103). Six of the resources are eligible, two are ineligible, and one is unevaluated.

The Earley Route localized route modification is also located at the western terminus of the proposed transmission line just east of Casa Grande, Arizona. Fourteen resources have been recorded within the analysis area of the route modification: four prehistoric and 10 historic-age (see Table 3-103). Nine of the resources are eligible, one is unevaluated, and four are ineligible.

The Local Alternative Tie-ins are at the western terminus of the proposed transmission line. Thirteen resources have been recorded within the analysis area for Local Alternative West Tie-in: four of those are eligible, six are unevaluated, and three are ineligible. Seven resources have been recorded in the analysis area for Local Alternative Central Tie-in; two of the seven are eligible, four are unevaluated, and one is ineligible. Six resources have been recorded in the analysis area for the Local Alternative East Tie-in; two of the six are eligible, three are unevaluated, and one is ineligible.

PROJECT COMPONENT 2: ACCESS ROADS AND TEMPORARY WORK AREAS OUTSIDE OF GRANTED RIGHT-OF-WAY

Project Component 2 consists of access roads and temporary work areas outside of the permitted right-of-way. Within the analysis area of the proposed roads and temporary work areas, a total of 440 archaeological sites and historic buildings or structures have been previously recorded; 267 sites or historic buildings/structures in New Mexico (Table 3-104) and 173 sites in Arizona (Table 3-105). In addition, 59 advanced Arizona State Museum (ASM) numbers have been issued for sites in Arizona; data for these sites beyond location have yet to be uploaded to AZSITE and are not included in the following tables and discussion. Because the access roads and temporary work areas are found all along the permitted right-of-way across many geographic and cultural regions, resource types and functions, as well as cultural and temporal affiliations vary.

Overall, within the analysis area of Component 2, there are 85 NRHP-listed or eligible historic properties in New Mexico and 87 in Arizona, 74 ineligible properties in New Mexico and 24 in Arizona, and 108 unevaluated or unknown eligibility status in New Mexico and 62 in Arizona. The NRHP-listed historic property is the Butterfield Overland Mail and Stage Route (State Route 173) which has been documented in detail by EPG during the initial SunZia Class III resource inventory (Swanson and Rayle 2018).

Table 3-104. Cultural Resources within the Analysis Area of Component 2 in New Mexico

Resource Type	Number of NRHP-Eligible/ Listed Resources	Number of NRHP-Ineligible Resources	Number of NRHP Unevaluated/ Unknown Resources	Total
Prehistoric				
Agricultural	0	0	1	**1**
Habitation/possible habitation	8	0	12	**20**
Lithic quarry	0	0	1	**1**
Petroglyph	1	0	3	**4**
Short-term habitation/possible short-term habitation	1	0	6	**7**
Unknown	34	26	26	**86**
Prehistoric Total	***44***	***26***	***49***	***119***
Historic				
Bridge	1	2	0	**3**
Butterfield Overland Mail Route	1	0	0	**1**
Cemetery	0	0	1	**1**
Culvert	0	1	0	**1**
Dump	0	1	0	**1**
Habitation	3	2	2	**7**
Industry/Utility	0	0	2	**2**
Mine	1	0	0	**1**
Railroad	4	0	0	**4**
Ranching/Agricultural	0	1	3	**4**

Resource Type	Number of NRHP-Eligible/ Listed Resources	Number of NRHP-Ineligible Resources	Number of NRHP Unevaluated/ Unknown Resources	Total
Road/Trail/Transportation	3	6	4	**13**
Unknown	3	10	6	**19**
Historic Total	***17***	***22***	***18***	***57***
Multicomponent				
Habitation	1	0	0	1
Habitation/Agricultural	1	0	0	1
Short-term Habitation	1	0	0	1
Railroad	1	0	0	1
Temporary Shelter/Mining	0	0	1	1
Unknown	2	1	0	**3**
Multicomponent Total	***6***	***1***	***1***	***8***
Unknown Temporal				
Agricultural	0	0	1	**1**
Cairn	0	0	1	**1**
Cemetery	1	0	1	**2**
Habitation/possible habitation	1	0	3	**4**
Industrial	0	1	0	**1**
Quarry	0	1	0	**1**
Ranching/agricultural	0	2	1	**3**
Room block	0	0	1	**1**
Short-term habitation/possible short-term habitation	0	0	4	**4**
Single residence	1	0	0	**1**
Temporary shelter	7	0	0	**7**
Transportation/Communication	1	8	4	**13**
Unknown	7	14	22	**43**
Unknown Temporal Total	***18***	***26***	***39***	***83***
Total	**85**	**75**	**107**	**267**

Table 3-105. Cultural Resources within the Analysis Area of Component 2 in Arizona

Resource Type	Number of NRHP-Eligible/Listed Resources	Number of NRHP-Ineligible Resources	Number of NRHP Unevaluated/ Unknown Resources	Total
Prehistoric				
Accidental loss/pot break	0	3	1	**4**
Agriculture or agriculture/ habitation	9	0	1	**10**
Campsite/possible seasonal occupation	0	2	2	**4**

Resource Type	Number of NRHP-Eligible/Listed Resources	Number of NRHP-Ineligible Resources	Number of NRHP Unevaluated/ Unknown Resources	Total
Habitation/possible habitation	18	0	18	**36**
Tool production/processing	1	0	2	**3**
Passive accumulation	0	0	1	**1**
Resource procurement and/or processing	19	2	6	**27**
Unknown	11	1	20	**32**
Prehistoric Total	***58***	***8***	***51***	***117***
Historic				
Agricultural	4	0	0	**4**
Communication	0	0	1	**1**
Disposal	0	3	0	**3**
Erosion Control	0	1	0	**1**
Habitation	2	0	0	**2**
Mining	3	0	0	**3**
Ranching	0	0	1	**1**
Transportation	7	8	4	**19**
Utility	1	3	0	**4**
Unknown	1	1	2	**4**
Historic Total	***18***	***16***	***8***	***42***
Multicomponent				
Agricultural	1	0	0	1
Habitation/Agricultural	1	0	0	1
Habitation	2	0	0	2
Habitation/processing	0	0	1	1
Resource procurement/ Disposal	1	0	0	1
Resource procurement/ Unknown	1	0	0	**1**
Transportation	0	0	1	**1**
Multicomponent Total	***6***	***0***	***2***	***8***
Unknown Temporal				
Habitation	1	0	0	**1**
Resource procurement and/or processing	1	0	0	**1**
Unknown	4	0	0	**4**
Unknown Temporal Total	***6***	0	0	***6***
Total	**88**	**24**	**61**	**173**

PROJECT COMPONENT 3: SEGMENT 4 REROUTE ALTERNATIVES

Component 3 consists of three reroute alternatives and their subroutes: Alternative Route 1 with Subroute 1A-1, Alternative Route 2 with Subroute 2A-1, and Alternative Route 3 with Subroute 3A-1. Portions of the three alternatives are shared among the routes and many of the subroutes are located near each other which resulted in many redundant cultural resources within the analysis area. Many of the resources found in Table 3-106 through Table 3-108 for each alternative appear in the records review results for more than one of the routes. Predicted site density within 400 m (0.25 mile) for unsurveyed areas were also calculated (see Table 7 in Trowbridge et al. 2021:51).

Alternative Route 1 with Subroute 1A-1

For Alternative Route 1 with Subroute 1A-1, 110 cultural resources have been previously recorded within the analysis area (Table 3-106).

Table 3-106. Resources along Alternative Route 1 with Subroute 1A-1 within the Analysis Area

Resource Type	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Undetermined/ Unevaluated/Unknown	Total
Unknown occupation without features	0	0	7	**7**
Unknown occupation with features	0	4	10	**14**
Unknown habitation	0	0	3	**3**
Prehistoric agricultural site	0	0	2	**2**
Prehistoric artifact scatter without features	3	10	9	**22**
Prehistoric artifact scatter with features	0	0	1	**1**
Prehistoric habitation site	4	0	10	**14**
Prehistoric unknown	2	3	10	**15**
Multicomponent habitation	2	0	0	**2**
Multicomponent artifact scatter	1	0	1	**2**
Multicomponent unknown	1	0	2	**3**
Historic unknown	1	2	3	**6**
Historic trash scatter	1	0	0	**1**
Historic habitation	1	0	2	**3**
Historic ranching site	0	1	2	**3**
Historic mine site	0	0	2	**2**
Historic building	0	0	3	**3**
Historic irrigation	4	0	0	**4**
Historic railroad	3	0	0	**3**
Total	**23**	**20**	**67**	**110**

Alternative Route 2 with Subroute 2A-1

Ninety-four total cultural resources have been previously recorded within the analysis area of Alternative Route 2 with Subroute 2A-1 (Table 3-107) (Trowbridge et al. 2021).

Table 3-107. Cultural Resources along Alternative Route 2 with Subroute 2A-1 within the Analysis Area

Resource Type	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Undetermined/ Unevaluated/Unknown	Total
Unknown occupation without features	1	0	1	**2**
Unknown occupation with features	4	0	7	**11**
Unknown habitation	0	0	2	**2**
Prehistoric agricultural site	0	0	2	**2**
Prehistoric artifact scatter without features	3	10	8	**21**
Prehistoric artifact scatter with features	0	0	1	**1**
Prehistoric habitation site	1	0	10	**11**
Prehistoric unknown	2	2	9	**13**
Multicomponent artifact scatter	1	1	0	**2**
Multicomponent habitation	2	0	0	**2**
Multicomponent unknown	2	0	1	**3**
Historic trash scatter	1	0	0	**1**
Historic habitation	1	0	2	**3**
Historic unknown	1	2	4	**7**
Historic ranching site	1	1	1	**3**
Historic irrigation	4	0	0	**4**
Historic railroad	3	0	0	**3**
Historic building	0	0	3	**3**
Total	**27**	**16**	**51**	**94**

Alternative Route 3 with Subroute 3A-1

For Alternative Route 3 with Subroute 3A-1, 111 cultural resources (archaeological sites and buildings or structures) have been identified within the analysis area. Table 3-108 presents the resources by type, temporal affiliation, and NRHP eligibility.

Table 3-108. Cultural Resources along Alternative Route 3 with Subroute 3A-1 within the Analysis Area

Resource Type	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Undetermined/ Unevaluated/Unknown	Total
Unknown artifact scatter with features	1	2	6	**9**

Resource Type	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Undetermined/ Unevaluated/Unknown	Total
Unknown artifact scatter without features	0	0	1	**1**
Unknown habitation	0	0	2	**2**
Prehistoric Archaic with features	0	0	1	**1**
Prehistoric Archaic artifact scatter without features	0	1	0	**1**
Prehistoric agricultural site	0	0	2	**2**
Prehistoric artifact scatter without features	4	13	9	**26**
Prehistoric artifact scatter with features	2	0	11	**13**
Prehistoric habitation site	5	0	13	**18**
Prehistoric rock art site	1	0	3	**4**
Historic artifact scatter without features	1	5	6	**12**
Historic artifact scatter with features	3	4	2	**9**
Historic ranching site	0	3	2	**5**
Historic town	0	0	1	**1**
Historic irrigation	2	0	0	**2**
Historic building	1	0	2	**3**
Historic railroad	2	0	0	**2**
Total	**22**	**28**	**61**	**111**

PROJECT COMPONENT 4: SUNZIA WEST SUBSTATION

For the SunZia West Substation, one previously recorded site is within the analysis area. Information on the site has not been uploaded to AZSITE other than a location; the site's NRHP status is unknown.

3.4.19.4 Reasonably Foreseeable Environmental Trends and Planned Actions

Four high-voltage transmission lines or energy generating facilities with associated transmission lines are within the spatial boundary for the reasonably foreseeable environmental trends and planned action, which is an 8-mile-wide corridor buffered around the proposed SunZia project components: Southline Transmission Line, High Plains Express Transmission Line Project, Southwest Transmission Co-op Inc., and Western Spirit Wind. Ground disturbance from these projects may affect the same cultural resources or may affect resources avoided by the SunZia project in the same corridor. Other projects planned within the 8-mile-wide corridor which may impact cultural resources include the Great Divide Wind facility, Bowie Power Station, Storey Solar facility, and several residential subdivisions.

3.4.20 Environmental Consequences

Previously recorded cultural resources were identified within the project footprint, broken down by project component. This departs from the analysis presented in the 2013 FEIS Section 4.8.3 Impact

Analysis (BLM 2013:128-145), which focused on a 600-foot-wide corridor. The current analysis focuses on, but is not limited to, the potential impacts from ground disturbance to cultural resources which are listed or eligible for listing in the NRHP (i.e., historic properties under Section 106 of the NRHP) and those whose NRHP status is unevaluated, undetermined, or unknown.

3.4.20.1 Methods and Assumptions

The following assumptions were used to analyze impacts:

- Because cultural resources are finite and nonrenewable, ground disturbance to cultural resources is permanent.
- All ground disturbance will be within the granted right-of-way, new proposed right-of-way, and/or project component footprint only.

The impact indicator used for this analysis is:

- Numbers and types of historic properties within the right-of-way and/or project component footprint.

The impacts analysis assumes application of the design features and environmental protection measures contained in Table 3-109. Full design features and EPMs are provided in Appendix C.

Table 3-109. Design Features and Environmental Protection Measures Applicable to Cultural Resources

Relevant Design Features	Applicable EPMs
1, 3, 4, 6, 14, 15	1, 2, 16

MITIGATION

Measures to resolve adverse effects on cultural resources classified as historic properties per Section 106 of the NHPA have been developed in consultation with the Arizona and New Mexico State Historic Preservation Officers, affected land mangers or landowners, Tribes, and other consulting parties per the project's programmatic agreement signed in December 2014 (also see Standard Mitigation Measure [ST] 15 in the 2015 ROD [BLM 2015a:Appendix E, Table 2-1). The programmatic agreement will be amended to account for current changes to the project's description analyzes in this EIS and if appropriate, include additional mitigation.

3.4.20.2 Impacts Common to All Components

Ground disturbance associated with construction for all components has the potential to impact cultural resources and specifically, those resources which are listed in, eligible for listing in, or may be eligible for listing in the NRHP. Because cultural resources are finite and non-renewable resources, any construction-related ground disturbance within resources is considered permanent including those associated with temporary work areas. Following the above-mentioned mitigation measures could avoid or lesson impacts from ground disturbance.

Ground disturbance associated with operation of transmission line is of a lesser concern because the majority of disturbance occurs during construction; however, continued use of access roads and some maintenance activities does have the potential to impact resources. Review of proposed operational activities to assess those impacts would be done under the process outlined in project's programmatic agreement. Table 3-110 provides a summary of cultural resources within the project footprint, by proposed project component.

Table 3-110. Summary of Cultural Resources within the Project Footprint

Project Component	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Number of Undetermined/ Unevaluated/Unknown	Total
Component 1: Localized Route Modifications				
1. Mavericks Area	0	0	0	**0**
2. SunZia South Area	2	1	0	**3**
3. Macho Springs Area	0	0	0	**0**
4. Las Palomas Area	2	1	0	**3**
5. Highlands Area	0	0	1	**1**
6a. Pinal Central Area- North Route	3	5	0	**8**
6b. Pinal Central Area- Steele Route	2	1	0	**3**
6c. Pinal Central Area- Earley Route	5	2	2	**9**
Local Alternative West Tie-in	2	0	1	**3**
Local Alternative Central Tie-in	1	0	1	**2**
Local Alternative East Tie-in	1	0	1	**2**
Component 2a. Access Roads	27	25	16	**68**
Component 2b. Temporary Work Areas	8	6	10	**24**
Component 3. Segment 4 Reroute Alternatives				
Alternative Route 1 with Subroute 1A-1	10	10	11	**31**
Alternative Route 1 with Subroute 1A-2	6	9	9	**24**
Alternative Route 1 with Subroute 1A-3	7	8	9	**24**
Alternative Route 1 with Subroute 1A-4	10	9	12	**31**
Local Alternative 1A-6	0	0	0	**0**
Local Alternative 1A-7	0	0	0	**0**
Alternative Route 2 with Subroute 2A-1	10	10	10	**30**
Alternative Route 2 with Subroute 2A-2	6	9	10	**25**
Alternative Route 2 with Subroute 2A-3	7	8	10	**25**
Alternative Route 2 with Subroute 2A-4	10	9	11	**30**

Project Component	Number of NRHP-Eligible Resources	Number of NRHP-Ineligible Resources	Number of Undetermined/ Unevaluated/Unknown	Total
Alternative Route 3 with Subroute 3A-1	13	15	12	**40**
Alternative Route 3 with Subroute 3A-2	9	15	12	**36**
Alternative Route 3 with Subroute 3A-3	9	14	12	**35**
Alternative Route 3 with Subroute 3A-4	13	15	13	**41**
Local Alternative 3B-1	0	2	0	**2**
Local Alternative 3B-2	0	0	0	**0**
Component 4. SunZia West Substation	0	0	0	**0**

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.20.3 Project Component 1: Impacts of Localized Route Modifications

No cultural resources are within the project footprint for the Mavericks and Macho Springs Areas localized route modifications; no physical impacts are expected for those route modifications (see Table 3-110). Three archaeological sites are within the project footprint for SunZia South Area localized route modification: LA 179838, LA 190616, and LA 190618. LA 190616, and LA 190618 are NRHP-eligible prehistoric sites. LA 179838 is an ineligible historic resource. Three archaeological sites are within Las Palomas Area localized route modification: LA 190620, LA 45122, and LA 45123. LA 190620 and LA 45123 are NRHP-eligible Native American sites. LA 45122 is an ineligible historic site. One unevaluated historic archaeological site is within the project footprint for the Highlands Area localized route modification.

Eight cultural resources are within the North Route localized route modification project footprint; all of them are historic-age resources. Only three are eligible for the NRHP: AZ AA:3:209(ASM)/Casa Grande Canal, AZ AA:3:211(ASM)/Florence Canal, and AZ AA:2:149(ASM)/State Route 287. Three cultural resources are found within the project footprint for the Steele Route: AZ AA:2:132(ASM), AZ AA:3:209(ASM), and AZ AA:3:211(ASM). Two are eligible for the NRHP; one is ineligible. Ten cultural resources are within the project footprint for the Earley Route. Five of those 10 resources are NRHP-eligible historic era resources: AZ T:10:84(ASM)/Southern Pacific Railroad, AZ AA:2:118(ASM)/State Route 84, AZ AA:3:209(ASM)/Casa Grande Canal, AZ AA:3:211(ASM)/ Florence Canal, and AZ AA:6:63(ASM)/trail. One is an unevaluated historic road. Two are Hohokam artifact scatters: one is eligible and one is unevaluated. The remaining resource, a paved road, is ineligible.

Three resources are found within the project footprint for the Local Alternative West Tie-in: AZ AA:2:176(ASM), AZ AA:2:285(ASM), and AZ AA:3:209(ASM). Two are eligible for the NRHP: AZ AA:3:209(ASM) is the Casa Grande Canal and AZ AA:2:285(ASM) is a Hohokam artifact scatter.

Two resources are found within the project footprint for Local Alternative Central Tie-in and Local Alternative East Tie-in: the NRHP-eligible AZ AA:3:209(ASM)/Casa Grande Canal and the unevaluated road AZ AA:2:176(ASM).

3.4.20.4 Project Component 2: Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Ground disturbance from the proposed access roads outside the granted right-of-way could impact 68 resources in New Mexico and Arizona (see Table 3-110). Twenty-seven resources are NRHP-eligible and 19 are unevaluated. Ground disturbance from the proposed TWAs outside the granted right-of-way could impact 24 cultural resources; eight of the resources are NRHP-eligible and 10 are unevaluated.

Eligible resources include prehistoric, historic, and multicomponent sites, buildings, or structures including several prehistoric and historic habitation sites, trails and roads, and a petroglyph site.

3.4.20.5 Project Component 3: Impacts of Segment 4 Reroute Alternatives

Table 3-110 shows the number of previously recorded cultural resources by NRHP status within the project footprint for each of the alternatives. Total number of resources ranges from 24 to 41; however, the total number of NRHP-eligible and unevaluated resources ranges from 15 to 23. Subroute 1A-2 has the least number of NRHP-eligible and unevaluated at 15; Subroute 3A-1 has the greatest number at 25. However, survey coverage is low and variable for all routes. Based on the available data, Subroute 3A-1 would have the most impact, Subroute 1A-2 the least impacts, and the rest of the alternatives falling somewhere in between. In addition, no NRHP-eligible or unevaluated resources are present in the project footprint for Local Alternatives 1A-6 and 1A-7 or Local Alternatives 3B-1 and 3B-2.

3.4.20.6 Project Component 4: Impacts of SunZia West Substation

No resources have been recorded within the proposed footprint of the SunZia West Substation; however, the majority of the footprint has not been surveyed.

3.4.20.7 No Action Alternative

The no action alternative consists of the previously permitted transmission line route which was the BLM preferred alternative (Routes 1A2-3A2-4C2c) in the 2013 FEIS (BLM 2013, 2015a). According to the 2013 FEIS, the no action alternative, could physically impact five previously recorded Native American habitation sites, potentially could impact up to 567 archaeological sites within their analysis area based on site density calculations, and crosses the NRHP-listed Butterfield Overland Mail and Stage Route, as well as El Camino Real de Tierra Adentro NHT and the Gila Trail, Janos Copper Road, Zuñiga Trail, Southern Pacific Mail Line, and General Cooke's Wagon Road/Mormon Battalion Trail, within the 600-foot corridor analyzed in the 2013 FEIS (BLM 2103:4-128 through 4-145, 4-148). Please note that the 2013 FEIS only presented the number of Native American habitation sites and used a 600-foot-wide corridor for the right-of-way rather than a 400-foot-wide corridor. The 2013 FEIS did not list numbers of sites and eligibility recommendations for prehistoric sites than were not habitations or historic-era sites.

3.4.20.8 Summary of Impacts

According to the 2013 FEIS (BLM 2013:4-148), if resources are not avoided through project design, the surface disturbance from the no action alternative could physically impact five previously recorded Native American habitation sites and seven trails including El Camino Real de Tierra Adentro NHT and Butterfield Overland Mail and Stage Route. For Component 1, no resources are present within the project footprint and no physical impacts from surface disturbance are anticipated for the Mavericks and Macho Springs Areas localized route modifications; two NRHP-eligible historic properties may be impacted by surface disturbance from the SunZia South Area localized route modification because they are found in the project footprint, one NRHP-eligible historic property and one unevaluated site may be impacted by surface disturbance from the Las Palomas Area localized route modification, and one unevaluated site may be impacted by surface disturbance from the Highlands Area localized route modification. Three eligible resources are found within the project footprint and may be impacted by surface disturbance from the North Route localized route modification. Two eligible resources may be impacted by surface disturbance for the Steele Route localized route modification. Five eligible and one unevaluated resource may be impacted by the Earley Route localized route modification surface disturbance.

For Component 2, 68 NRHP-eligible or unevaluated resources are found within the project footprint for the access roads outside the right-of-way and may be physically impacted by surface disturbance associated with those roads and 24 NRHP-eligible or unevaluated resources are within the project footprint for the TWAs outside the right-of-way and may be impacted by surface disturbance associated with those.
For Component 3, surface disturbance associated with Subroute 3A-1 would have the most impact and Subroute 1A-2 would have least impact. NRHP-eligible and unevaluated resources within the project footprints of the alternatives range from 15 to 23. No impacts from surface disturbance to known resources are anticipated from Local Alternatives 1A-6 and 1A-7 or Local Alternatives 3B-1 and 3B-2. No impacts from surface disturbance are anticipated to known resources for Component 4. Adverse effects on historic properties per Section 106 of the NHPA will be resolved per the project's programmatic agreement. The programmatic agreement sets forth the project's Section 106 process which requires that unsurveyed portions of the project footprint be inventoried for historic properties, and if the agency finds that the project will have an adverse effect on a historic property, that those adverse effects be resolved via the mitigation methods outlined in the programmatic agreement.

Cumulative impacts to cultural resources are discussed Section 4.17.4.8 of the 2013 FEIS (BLM 2013:4-330 through 4-335). Incremental impacts from the ground disturbance associated with proposed components could adversely impact historic properties. Impacts from ground disturbance from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to cultural resources may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions (planned actions are estimated to total approximately 74,000 acres and 2,890 miles within the analysis area). Impacts to cultural resources from ground disturbance associated with construction are permanent and long-term. Cumulative impacts from operation and maintenance of the transmission lines and generating facilities are not expected.

AID-11 National Scenic and Historic Trails

Would construction and operation of the proposed project reduce the quality of experience on National Scenic Trails (NSTs), National Historic Trails (NHTs), and trails that are recommended as suitable for designation by disturbing the scenic landscape?

3.4.21 Affected Environment

The National Trails System Act of 1968 established a national network of scenic and historic trails to provide for outdoor recreation needs; promote the enjoyment, appreciation, and preservation of open-air, outdoor areas, and historic resources; and encourage public access and citizen involvement. Federal agencies must consider the effects of proposed actions on NSTs and NHTs under NEPA and the National Trails System Act of 1968 (16 USC 1246). NSTs and NHTs are formally administered by various federal agencies including the BLM, National Park Service (NPS), or USFS; however, land ownership may be in public or private hands. The National Trails System Act of 1968 states that other uses along an NST or

NHT, which will not substantially interfere with the nature and purposes of the trail, may be permitted by the Secretary charged with the administration of the trail. Reasonable efforts should be made to provide sufficient access opportunities to such trails and, to the extent practicable, efforts shall be made to avoid activities incompatible with the purposes for which such trails were established (16 USC 1246). More specifically, the Secretary of the Interior or the Secretary of Agriculture may grant easements and rights-of-way on, over, under, across, or along any component of the national trails system in accordance with the laws applicable to the National Park System and the National Forest System, respectively, provided by the National Trails System Act (16 USC 1248).

The BLM developed Manual 6280 to provide agency direction to inventory and assess project impacts on NSTs, NHTs, and trails that are recommended as suitable for National Trail designation. The 2013 FEIS inventoried trail-associated resources and project effects on those resources for five National Trails associated with the project, consistent with BLM Manual 6280 (El Camino Real de Tierra Adentro NHT [El Camino Real NHT], Juan Bautista de Anza NHT [Anza NHT], Butterfield Overland Mail and Stage Route [Butterfield Trail], Continental Divide NST, and Arizona NST). Additional detail associated with the designation process for NSTs and NHTs, BLM Manual 6280, and NEPA requirements is included in Section 1.2 in Appendix L of the 2013 FEIS (BLM 2013:L-1 through L-4).

The methodology used to inventory trail resources and assess project impacts on those resources is similar to those described in Section 1.4, Appendix L of the 2013 FEIS (BLM 2013:L-5 through L-17) and is in accordance with BLM Manual 6280 and supporting documents. Based on the varying level of proposed changes resulting from different project components, a tiered approach was used to incorporate information from the 2013 FEIS to the extent practicable. For Components 1 and 3, where new project alignments have been proposed, a robust inventory and analysis was conducted using information from the 2013 FEIS, supplemented with new site-specific information and linear analyses. For Component 2, the analysis focused on assessing the additive effect of new access roads, expanded structure work areas, and temporary construction areas, while considering that the no action alternative (2015 Selected Route) is an approved project. This includes the presence of two 500-kV transmission lines, access roads in the approved right-of-way, and vegetation clearing in the right-of-way. Due to the more limited level of change proposed by Component 2, the analysis used new site-specific analysis with narratives to describe potential impacts.

The determination of the analysis area for each trail was based on a viewshed analysis, same as the 2013 FEIS, extended to a distance of 3 miles from trail management components and clipped by a 3-mile buffer from project components, as described in Appendix E. Within these analysis areas, National Trail resources and qualities were inventoried—focusing first on identifying trail management guidance and then based on the spatial limits of the analysis area, for the following trail-associated resources: 1) scenic resources, 2) historic and cultural resources, 3) recreation, and 4) natural resources. For additional detail on the inventory methodology and the affected environment by trail, please refer to Appendix E.

3.4.21.1 Reasonably Foreseeable Environmental Trends and Planned Actions

The landscapes associated with NSTs, NHTs, and trails that are deemed suitable for designation range from mostly intact setting with few visual disturbances to settings dominated by human-made modifications including power generation facilities, linear utilities, transportation corridors, and natural areas converted to agricultural uses. Most development in the trail analysis areas occurs adjacent to the Rio Grande, I-25, and I-10—including expansive residential areas and several existing transmission lines which roughly follow these linear corridors. The historic settings of NHTs have been modified by the presence of modern-day agricultural landscapes that have converted natural, arid lands through the introduction of irrigation along the Rio Grande (El Camino Real NHT) and north of Picacho (Anza NHT and Butterfield Trail).

Section 3.2.1 of this Draft EIS includes a list of reasonably foreseeable environmental trends and planned actions. In general, the settings associated with NSTs, NHTs, and trails that are deemed suitable for designation would continue to be modified through increased development tied to population growth (e.g., Willow Springs Residential subdivision in proximity to the El Camino Real NHT) as well as the proliferation of new energy projects. These energy projects include the Great Divide Wind Farm and Southline Transmission Line Project, which would modify the settings associated with the Continental Divide NST and Butterfield Trail north of Lordsburg, New Mexico, as well as the High Plains Express Transmission Line Project, which may parallel this project. The Western Spirit Wind Project transmission line, now constructed, would parallel alternative routes in Component 3, in proximity to the El Camino Real NHT, potentially leading to increased cumulative effects.

3.4.22 Environmental Consequences

3.4.22.1 Methods and Assumptions

As described previously, the approach to inventory and assess impacts on National Trails tiers to the analysis included in Appendix L of the 2013 FEIS (BLM 2013:L-14 through L-17) with a varying approach for each project component. As part of the assessment of impacts on views from NHT high potential historic sites, auto tour routes, and other trail-associated viewing locations, a series of key observation points (KOPs) was identified as part of the visual resource analysis to meet BLM VRM direction. Contrast rating worksheets were prepared from each of these KOP locations and visual simulations were prepared from four of the trail-associated KOP locations (see Appendix F). For additional detail on the methodology used to assess impacts on National Trails and detailed results, please refer to Appendix E.

The impacts analysis for the NHTs and NSTs assumes application of the design features and environmental protection measures contained in Table 3-111. Full design features and EPMs are provided in Appendix C and described in Appendix E.

Table 3-111. Design Features and Environmental Protection Measures Applicable to National Historic Trails and National Scenic Trails

Relevant Design Features	Applicable EPMs
3, 4, 5, 6, 8, 10, 11, 18, 20, 23	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14, 16

The following analyses are incorporated by reference as they relate to analysis used to inform impacts on NHTs and NSTs:

- AIB-8 Native Vegetation: Impacts on vegetation that would have occurred naturally during the period of trail significance.
- AIB-10 Riparian Habitat: Impacts on riparian vegetation and associated habitat including the crossing of the Rio Grande.
- AIB-21 Recreation: Impacts on recreation sites including those associated with NHTs and NSTs.
- AID-10 Cultural Resources: Impacts on cultural and historic properties including those associated with NHTs.

- AID-12 Visual Resources: Describes the visual resource process used as part of the assessment of impacts on NHTs and NSTs.

3.4.22.2 Impacts Common to All Components

This section describes the effects common to all alternatives, including the no action alternative, during construction, operation and maintenance, and decommissioning of the proposed project. Site-specific impacts are described by alternative in subsequent sections.

CONSTRUCTION

During construction, impacts on trail settings would result from the introduction of construction vehicles, equipment, and construction materials within staging areas, access roads, and within the transmission line right-of-way. Disturbance resulting from construction would be temporary and largely short in duration. Visible effects from active construction would diminish subsequent to clean up and restoration of the temporary staging areas and access roads. The construction of the project would include vegetation clearing in the right-of-way, which depending on the existing vegetation would range from minimal clearing in low-growing vegetation types to a geometric, cleared right-of-way in woodland vegetation types. To reduce effects from right-of-way vegetation clearing, EPM 14 would be applied to minimize disturbance to and clearing of riparian and woodland vegetation to reduce visual contrast to the extent practicable while meeting national conductor clearance requirements. Reclamation efforts would include revegetating the right-of-way after construction. Restoration of vegetation in this arid setting can take several years to complete and conditions in areas of disturbance are expected to change over several years as restoration takes place.

Impacts on views from trail-associated viewing locations (e.g., high potential historic sites, auto tour routes, interpretive sites, etc.) would be affected by the proposed temporary construction activities, generating contrast (visual change) within their viewsheds. However, the transmission line structures would cause the major, long-term change to the trail settings, and to views, whereas construction of the structures and facilities would be short-term and temporary. During construction, the motion associated with construction equipment, structure building, and conductor stringing, as well as vegetation clearing, short-term impacts from dust generation, and landform modification, would be noticeable and create additional visual contrast within the viewshed.

OPERATION AND MAINTENANCE

The transmission line structures, permanent access roads, and substation would generate visual contrast with the existing landscape setting and with views during operation and maintenance of the proposed project. Impacts on the trail's setting, and on views from trail-associated viewing locations, would be evident where cleared areas create surface disturbances, or unnatural lines contrast with the existing setting—which would remain for the life of the proposed project. The most evident and long-term impacts on trail resources would result from the addition of the transmission line structures and access roads within the trail's setting, as well as the geometrically cleared right-of-way in forested or other heavily vegetated settings. The vertical structures (towers), conductors, lines, access roads, and cleared right-of-way would produce long, linear elements contrasting with the trail's existing setting, particularly in areas where no development or existing infrastructure is present.

DECOMMISSIONING

The decommissioning and removal of the project and its components would have similar impacts as the construction process. There would be increased motion associated with construction equipment, short-term impacts from dust generation, and landform modification to more closely match pre-construction conditions. The removal of project components would likely require additional ground disturbance and vegetation clearing resulting in reclamation efforts similar to those conducted after the construction process is completed. The restoration of vegetation in these areas would take several years, due to the area's arid climate, but over time the trail's setting where impacted by the project would begin to more closely match pre-construction conditions.

3.4.22.3 Impacts of Localized Route Modifications

The following descriptions of impacts on National Trails focus on key impact areas, with additional detail contained in Appendix E including tables with mileages of scenery and trail-associated viewer distance zones crossed by the project. See Appendix E (Figures 1–4) for maps depicting the project in context with trail resources. Note, the Continental Divide NST is located approximately 3.5 miles from Localized Route Modification 1 – Mavericks. The alignment for Route Modification 1 deviates from paralleling the existing 345-kV transmission line, which the no action alternative parallels, resulting in similar impacts as described in Appendix L of the 2013 FEIS (BLM 2013:L-46) as the project would be located farther away from the NST with views of the project located beyond an existing transmission line.

EL CAMINO REAL DE TIERRA ADENTRO NHT (ROUTE MODIFICATION AREA 5)

The project would highly impact a short segment of the NHT auto tour route (New Mexico State Route 1) and El Camino Real National Scenic Byway (Interstate 25) northeast of the Fort Craig Rest Area. Adjacent roadside berms offer some intermittent screening of these views but where visible, the project would introduce tall, repeating, vertical transmission line structures parallel to the road for approximately 4 miles. Based on the primary generator of visual contrast being the presence of repeating, tall transmission line structures, there are limited mitigation measures to apply other than moving the project outside of this viewshed. Low impacts would occur on views from the I-25 Fort Craig Rest Area (KOP SO28), Fort Craig (KOP SO27), El Camino Real International Heritage Center, and El Contadero High Potential Historic Site (KOP 22) due to their viewing distance and the presence of existing transmission lines in the viewshed. Moderate impacts on Class B scenery would occur where the vertical transmission lines structures would rise above the flat to gently sloping terrain, contrasting with the existing landscape character northwest of I-25. No impacts on historic and cultural resources are expected as the project would not physically intersect the trail. Low impacts are anticipated on trail natural resources as there are no identified biological, geological, or scientific resources within the trail analysis area. Compared with the overall length of the auto tour route and considering the low impacts on high potential historic sites associated with the NHT, these impacts would not limit the ability to manage the trail for the purpose of identifying and protecting the historic route and its historic remnants and artifacts for public use and enjoyment, nor would it require relocation of the National Trail Management Corridor. The project in this area would not substantially interfere with the trail's nature and purpose.

JUAN BAUTISTA DE ANZA NHT (ROUTE MODIFICATION AREA 6)

Moderate impacts on views from the NHT auto tour route (Arizona State Route 87) (KOP 46) would occur where the project's two 500-kV transmission lines would separate and cross the auto tour route in two different locations. The NHT's setting in this area has been modified by extensive agricultural use, energy development projects, and an existing 500-kV transmission line. Application of EPM 10 (maximize structure span) would reduce visual contrast at the auto tour route crossings by moving the structures as far from the road as possible. No impacts on historic and cultural resources are expected as the project would not physically intersect the trail. Impacts on natural resources associated with the NHT are anticipated to be negligible as there are no identified biological, geological, or scientific resources within the trail analysis area. The separation of the project's two 500-kV transmission lines (up to

2.5 miles apart) along different alignments would expand the area viewed as modified adjacent to the NHT auto tour route (Arizona State Route 87), compared with the no action alternative, but would occur in an area already modified by development as previously described. Therefore, the project would not affect the ability to manage the trail nor would it require relocation of the National Trail Management Corridor. The project would not substantially interfere with the trail's nature and purpose.

BUTTERFIELD OVERLAND MAIL AND STAGE ROUTE

Route Modification Area 3

Low impacts would result from the construction, operation, and maintenance of the project (Route Modification 3) on views from the Butterfield Trail where it would cross New Mexico State Route 26 (KOP LC26, see Appendix F, Attachment 1 for visual simulation). The portion of the trail crossed by the project would occur along the selected alignment analyzed in the 2013 FEIS with the route modification beginning approximately 2 miles to the north. Farther to the west, views from the trail alignment would be more influenced by the project where the existing 345-kV and 115-kV transmission lines are no longer paralleled, resulting in moderate impacts on Class C scenery. No impacts on historic and cultural resources are expected as the project would not physically intersect the trail. Low impacts are anticipated on trail natural resources as there are no identified biological, geological, or scientific resources within the trail analysis area. The project would not affect the ability to manage the trail if designated an NHT, nor would it require relocation of a National Trail Management Corridor.

Route Modification Area 6

North of Picacho Reservoir, the separation of the project's two 500-kV transmission lines along different alignments (Route Modification 6) would result in low impacts on views from the Butterfield Trail as the project would be located more than 2 miles away from the trail in an area modified by expansive agricultural use, energy development projects, and an existing 500-kV transmission line. Negligible impacts on historic and cultural resources, as well as natural resources, were also identified. The project would not affect the ability to manage the trail if designated an NHT nor would it require relocation of a National Trail Management Corridor.

3.4.22.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

The following descriptions of impacts on National Trails focus on key impact areas, with additional detail contained in Appendix E.

EL CAMINO REAL DE TIERRA ADENTRO NHT

In general, the project would incrementally increase surface disturbance associated with new access roads and temporary work areas—resulting in minimal additive effects on the trail's setting, considering the construction of the no action alternative along the approved right-of-way. Impacts associated with the no action alternative are described in the 2013 FEIS. The project would introduce additional access roads and expanded work areas adjacent to New Mexico State Route 1 – NHT auto tour route (KOP SO30) and I-25/ New Mexico State Route 1 – NHT auto tour route/national scenic byway (KOP LC19). These impacts could incrementally add to those described for the no action alternative, which identified moderate-high to high impacts where the project would be located within 0.5 mile of these travel routes. The additional access roads and work areas would be mostly screened from view and where visible would introduce weak visual contrast as analyzed from KOPs SO30 (see Appendix F, Attachment 2 for visual simulation) and LC19. Negligible additive effects are anticipated on other sites associated with the El

Camino Real NHT including Fort Craig, El Camino Real International Heritage Center, and other high potential historic sites due to the viewing distance from these locations (more than 4.5 miles) and the minimal change proposed by the project, compared with the no action alternative. No impacts on historic and cultural resources are expected since the project would not physically intersect the trail. Impacts on natural resources associated with the NHT are anticipated to be negligible as there are no identified biological, geological, or scientific resources within the trail analysis area. Due to the minimal increase in visual contrast proposed by the project, considering the construction of the permitted no action alternative using the approved right-of-way, the project would also not affect the ability to manage the trail to meet its intended nature and purpose. The project in these areas would not substantially interfere with the trail's nature and purpose.

BUTTERFIELD OVERLAND MAIL AND STAGE ROUTE

The addition of short new access roads and temporary work areas would have limited additive effect on the trail's setting when considering the no action alternative along the approved right-of-way and the existing transmission lines that would be paralleled in this visually modified existing landscape. Impacts associated with the no action alternative are described in the 2013 FEIS (BLM 2013). No impacts on historic and cultural resources are expected, as the crossing of the trail would occur along an existing paved road where no improvements are proposed by the project. Impacts on natural resources associated with the trail are anticipated to be negligible since there are no identified biological, geological, or scientific resources within the trail analysis area. Due to the minimal increase in visual contrast proposed by the project, and considering the construction of the permitted no action alternative using the approved right-of-way, the project would not affect the ability to manage the trail if designated an NHT, nor would it require relocation of a National Trail Management Corridor.

CONTINENTAL DIVIDE NST

The project would have minimal additive effects on the Continental Divide NST as access roads outside of the permitted right-of-way would not require improvement (except for short turnout areas) and the proposed pulling and tensioning pads would not be cleared of vegetation. As described for the no action alternative, the NST setting has been modified by an existing 345-kV transmission line, multiple 138-kV transmission lines, and the Hidalgo Substation in addition to the moderate-high impacts generated by the no action alternative. Through application of EPM 2, to use overland travel to access these temporary work areas, long-term impacts associated with these temporary work areas would be minimized.
No impacts on historic and cultural resources are expected since no historic or cultural resources were identified for the trail. The project would introduce minimal additive effects on natural resources as the proposed areas of disturbance outside of the right-of-way are to be temporary and reclaimed after construction. Considering the construction of the permitted no action alternative using the approved right-of-way, and the minimal increase in visual contrast proposed by the project, the project would not affect the ability to manage the trail to meet its intended nature and purpose. The project would not substantially interfere with the trail's nature and purpose.

ARIZONA NST

As described under the no action alternative, high impacts are anticipated for users of the Arizona NST near the Tiger Mine Trailhead, which could result in substantial interference with the NST nature and purpose. The incremental addition of the project, through the construction of two new access roads approximately 0.8 mile away, would have minimal effect on the NST's setting and result in minor additive effects on the trail's nature and purpose since the construction of these new roads would occur along ridgelines, where vegetation removal and visibility of the cleared road surface would not attract attention. Through application of EPM 4 (access road rehabilitation) and EPM 5 (additional reclamation efforts), these effects would be reduced, resulting in no additional interference with trail management associated with the project. No impacts on historic and cultural resources are expected since no historic or cultural resources were identified for the trail. Impacts on natural resources associated with the NHT are anticipated to be negligible as there are no identified biological, geological, or scientific resources within the trail analysis area.

3.4.22.5 Impacts of Segment 4 Reroute Alternatives

Since the El Camino Real NHT is the only National Trail located in proximity to the Segment 4 Reroute Alternatives, the following section focuses on key impact areas associated with that NHT, with additional detail contained in Appendix E. This includes tables with mileages of scenery and trail-associated viewer distance zones crossed, as well as residual impact levels for each project route and subroute. See Appendix E (Figure 5) for a map depicting the project in context with trail resources.

IMPACTS OF ALTERNATIVE ROUTE 1

The project would highly impact the trail setting along the Rio Grande (Class A scenery) where the riparian corridor would be crossed—resulting in the clearing of remnant cottonwoods and other riparian vegetation. The geometrically cleared corridor through riparian vegetation and the presence of repeating, tall transmission line structures would begin to dominate the setting along the river. EPM 14 would be applied to minimize disturbance to and clearing of riparian vegetation to reduce visual contrast to the extent practicable while meeting national conductor clearance requirements.

High impacts are anticipated on views from the Sabinal High Potential Historic Site (KOP 25) where Subroute 1A-2 would be viewed from 0.5 mile away, introducing skylined transmission line structures as the project crosses New Mexico State Route 116 as well as a series of skylined structures on Picho Hill (see Appendix F, Attachment 3 for visual simulation). EPM 10 would be applied to maximize the span at the crossing of the state route but based on the scale of the project, views would still be dominated by the presence of the tall transmission line structures.

The project, including all subroutes, would cross the NPS auto tour route (New Mexico State Route 304) resulting in high impacts where the project would dominate views through the introduction of skylined transmission line structures and a geometrically cleared right-of-way through cottonwood vegetation within the Rio Grande Valley. Subroutes 1A-1 and 1A-4 would cross the auto tour route adjacent to the existing Western Spirit 345-kV transmission line, which has modified the existing setting. Reduced moderate-high impacts are therefore anticipated for those routes. EPMs 10 and 14 would be applied for all subroutes to maximize the span length between transmission line structures at the road crossings to reduce their visual dominance, and to minimize disturbance to and clearing of riparian vegetation to reduce visual contrast to the extent practicable while meeting national conductor clearance requirements.

High impacts would also occur on views from the El Camino Real National Scenic Byway (Interstate 25) where the project would perpendicularly cross the highway and introduce skylined transmission line structures into the viewshed. Alternative Route 1, along all subroutes, would cross the byway—with the location of the crossing differing based on the subroute selected. KOP 8 would have views of the crossing of Subroute 1A-2 and KOP 10 would view the crossing of Subroute 1A-3 (see Appendix F, Attachment 3 for visual simulation). For additional information on these impacts including the subroutes, please refer to Appendix E.

Alternative Route 1 would cross the El Camino Real NHT and may impact the NHT historic and cultural resources in two locations. The locations of the crossings have not been surveyed and will need to be inspected if an Alternative Route 1 route is selected. Impacts on natural resources associated with the

NHT are anticipated to be low as there are no identified biological, geological, or scientific resources within the trail analysis area except at the crossing of the Rio Grande. For additional information regarding impacts on trail natural resources along the Rio Grande, please refer to Appendix E.

The addition of the project would begin to locally compromise the trail's nature and purpose where these areas of high impacts occur along the Rio Grande, including views from the NPS auto tour route and the Sabinal High Potential Historic Site for Subroute 1A-2. Application of EPMs would not be effective at reducing impacts on the El Camino Real NHT, so impacts would remain high in these areas. Based on these impacts, the project could result in substantial interference with the trail's nature and purpose. Compared with the overall length of the auto tour route and considering the low to moderate impacts on the remaining NHT's high potential historic sites, these impacts would not limit the overall ability to manage the trail for the purpose of identifying and protecting the historic route and its historic remnants and artifacts for public use and enjoyment.

IMPACTS OF ALTERNATIVE ROUTE 2

Impacts on the El Camino Real NHT would be similar to Alternative Route 1, including impacts on the NPS auto tour route, except for impacts on views from the El Camino Real National Scenic Byway (Interstate 25) associated with Subroutes 2A-1, 2A-2, and 2A-4. Subroutes 2A-1 and 2A-4 would also parallel the scenic byway for approximately 7 miles—introducing longer-duration views (approximately 6 to 8 minutes at highway speeds) as viewed from KOPs 8 and 10 (see Appendix F, Attachment 3 for alternate visual simulation from KOP 10). These views would include the presence of tall, skylined transmission line structures along the west side of the road. Subroute 2A-2 would have similar impacts but would parallel the scenic byway for a shorter distance of approximately 3 miles. Since the primary generator of visual contrast is associated with the presence of the repeating, tall transmission line structures, there are limited mitigation measures to apply other than moving the project outside of this viewshed. For additional information on these impacts including the subroutes, please refer to Appendix E.

High impacts are anticipated on views from the Sabinal High Potential Historic Site (KOP 25) where Subroute 2A-2 would be viewed from 0.5 mile away—introducing skylined transmission line structures as the project crosses New Mexico State Route 116, as well as a series of skylined structures where the project traverses the area between I-25 and Picho Hill (see Appendix F, Attachment 3 for visual simulation). Comparatively, moderate-high impacts are anticipated on views of Subroutes 2A-1 and 2A-4 where the project would not cross the state route but instead continue to parallel I-25 to the north. By continuing to parallel the interstate, an additional series of skylined transmission line structures would be introduced into the viewshed approximately 1 mile away (see Appendix F, Attachment 3 for alternate visual simulation).

IMPACTS OF ALTERNATIVE ROUTE 3

Impacts on the El Camino Real NHT would be similar to Alternative Route 1 except for additional impacts that would occur between La Joya and Lemitar, New Mexico. In this area, the project traverses a bajada (Class B scenery), between the mountains to the west and the Rio Grande to the east, adjacent to an existing transmission line. The previous conversion of natural lands to agricultural fields and residential development along the Rio Grande has influenced the existing trail setting between La Joya and Lemitar. There is an area of potential high impacts on the NHT's setting in the northern portion of the Sevilleta NWR where the trail is paralleled for approximately 4 miles separated from the NPS auto tour route and the trail's high potential historic sites. Due to the distance between the project and the Rio Grande floodplain (approximately 3 miles), the influence and effect of existing development along that corridor is less noticeable, and the project therefore has the potential to dominate the trail setting in this northern portion of the Sevilleta NWR.

Impacts on views from the Sabinal High Potential Historic Site (KOP 25) associated with Subroute 3A-2 would be the same as those described for Subroute 2A-2. Similarly, impacts on views from the high potential historic site associated with Subroutes 3A-1 and 3A-4 would be the same as Subroutes 2A-1 and 2A-4.

Impacts on the NPS auto tour route (New Mexico State Route 304) would be the same as Alternative Route 1 except for an additional area of high impacts anticipated on views from the portion of the auto tour route co-located with the El Camino Real National Scenic Byway (I-25 [KOP 15]). In this area, near Polvadera, New Mexico, the project would introduce moderate-strong contrast in a panoramic setting. An existing transmission line is paralleled in this area, but due to the scale of the proposed project and the views of the project being within the foreground distance zone, the project would dominate views from the auto tour route, particularly along the alignment of Local Alternative 3B-1. Contrast would be reduced where residential development and associated utilities influence the trail's existing character, reducing project impacts to moderate in those locations. Impacts on views from the El Camino Real National Scenic Byway (Interstate 25) farther to the north would be similar to Alternative Route 2, including Subroutes 3A-1, 3A-2, and 3A-4 paralleling the byway as described for Alternative Route 2.

These additional impacts would not limit the overall ability to manage the trail for its nature and purpose but would begin to locally compromise the trail's nature and purpose in a second area, expanding the influence of the project on the El Camino Real NHT. Application of EPMs would not be effective at reducing impacts on the El Camino Real NHT, and impacts would remain high in these areas. Based on these impacts, the project could result in substantial interference with the trail's nature and purpose.

3.4.22.6 Impacts of SunZia West Substation

No NST, NHT, or trails that are recommended as suitable for National Trail designation are located in proximity to the proposed SunZia West Substation. Therefore, there would be no impacts on trail resources and the project would not affect the ability to manage any national trails, nor would it require relocation of any National Trail Management Corridor.

3.4.22.7 No Action Alternative

Under the no action alternative, based on the 2015 ROD and 2016 Right-of-Way Grant, the BLM Selected Route would continue to be authorized. The impacts on NSTs and NHTs are described in detail in the 2013 FEIS, including Appendix L, and are summarized below (BLM 2013:L-38 through L-62).

EL CAMINO REAL DE TIERRA ADENTRO NHT

High to moderate-high impacts on views from the El Camino Real National Scenic Byway and designated auto tour route would occur where the project is located within 0.5 mile of these routes. Views of the project would be unobstructed as it traverses rolling to steep terrain in an area of limited existing modifications. Mitigation would be applied to maximize the span length at each roadway crossing to reduce visual contrast. Moderate-high to high impacts would occur on Class A scenery associated with the Rio Grande where the project would introduce geometric forms, including removal of riparian vegetation, in an otherwise natural, sinuous landscape along the river. Mitigation would be applied to minimize right-of-way vegetation clearing to the extent practicable to reduce visual contrast in this setting. Low impacts are anticipated on views from other sites associated with the El Camino Real NHT, including Fort Craig and the El Camino Real International Heritage Center. Low impacts on historic and cultural resources as well as natural resources were identified. The project would not affect the ability to manage the trail nor would it require relocation of a National Trail Management Corridor.

JUAN BAUTISTA DE ANZA NHT

Moderate impacts on views from Arizona State Route 87 (auto tour route) would occur as the project traverses an agricultural landscape setting adjacent to an existing 500-kV transmission line. To reduce impacts on views from the auto tour route, mitigation would be applied to maximize the span length at the crossing to reduce visual contrast. Low impacts on historic and cultural resources as well as natural resources were identified. The project would not affect the ability to manage the trail nor would it require relocation of a National Trail Management Corridor.

BUTTERFIELD OVERLAND MAIL AND STAGE ROUTE

Low-moderate impacts would occur on views from the Butterfield Trail as the project is sited in a linear corridor with two existing transmission lines and a railroad (both currently cross the historic trail) which has modified the existing setting. Low impacts on historic and cultural resources as well as natural resources were identified. The project would not affect the ability to manage the trail if designated an NHT nor would it require relocation of a National Trail Management Corridor.

CONTINENTAL DIVIDE NST

Moderate-high impacts for viewers associated with the Continental Divide NST are anticipated where the project would cross the trail. The presence of existing transmission lines (345-kV and multiple 115-kV) converging at the existing Hidalgo Substation have already modified the existing setting, resulting in reduced visual contrast and effects on more distant views. Mitigation measures would be applied to maximize the span of structures at the trail crossing to reduce the visual dominance of structures directly adjacent to the trail and to close the access roads near the trail to prevent unauthorized OHV access onto the NST. Low impacts on historic and cultural resources as well as natural resources were identified. The project would not affect the ability to manage the trail nor would it require relocation of a National Trail Management Corridor.

ARIZONA NST

High impacts are anticipated for users of the Arizona NST near the Tiger Mine Trailhead where the project would be viewed crossing rolling terrain in an area with limited existing modifications. Mitigation measures would be applied to maximize the span of structures at the trail crossing to reduce the visual dominance of structures directly adjacent to the trail and to limit all-terrain vehicle (ATV) access on the trail to keep the route non-motorized. Low impacts on historic and cultural resources as well as natural resources were identified. Based on the trail's primary purpose to "provide a primitive, long distance trail that highlights the State's topographic, biologic, historic, and cultural diversity" (BLM 2013:L-59), the no action alternative could result in substantial interference with the NST nature and purpose. These effects would be mostly limited to a 6-mile-wide corridor representing 0.7% of the total NST length. The 2013 FEIS (BLM 2013) identified potential off-site mitigation measures that may be required to address substantial interference with the nature and purpose.

3.4.22.8 Summary of Impacts

Most of the Localized Route Modifications (Component 1) would have similar or reduced impacts, compared with the no action alternative, except for the El Camino Real NHT in Route Modification Area 5 and the Anza NHT in Route Modification Area 6. The project would highly impact a 4-mile-long segment of the El Camino Real NHT auto tour route (and El Camino Real National Scenic Byway) northeast of the Fort Craig Rest Area, where the project would introduce tall, repeating, vertical transmission line structures parallel to the road. Impacts on the Anza NHT would be similar to the no action alternative except that moderate impacts would be introduced along the NHT auto tour route for up to 2.5 miles in a modified landscape setting where the project's two proposed 500-kV transmission lines would separate and cross the road in different locations. Neither of these impact areas would limit the agency's ability to manage the trails for the purpose of identifying and protecting the historic route or its historic remnants and artifacts for public use and enjoyment. The project would not substantially interfere with these trails' nature and purposes.

Similarly, the impacts associated with additional access roads and temporary work areas outside of the granted right-of-way (Component 2) would minimally and incrementally increase those impacts described for the no action alternative through additional ground disturbance, clearing of vegetation, and the introduction of geometric forms similar to those proposed under the no action alternative.

In general, all Component 3 alternatives would begin to locally compromise the El Camino Real NHT's nature and purpose where areas of high impacts would occur along the Rio Grande Corridor, including views from the NPS auto tour route. Subroutes 1A-1, 1A-4, 2A-1, 2A-4, 3A-1, and 3A-4 would parallel the existing Western Spirit 345-kV transmission line, resulting in reduced impacts on trail resources, including views from the NPS-designated auto tour route. Subroutes 1A-2, 2A-2, and 3A-2 would highly impact views from the Sabinal High Potential Historic Site, whereas Subroutes 2A-1, 2A-4, 3A-1, and 3A-4 would result in reduced moderate-high impacts as the project would not directly cross in front of the historic site. Alternative Route 3, since it more closely parallels the Rio Grande Valley, would introduce additional impacts on the El Camino Real NHT, including views from the auto tour route near Polvadera and the modification of the trail's setting between La Joya and Lemitar, where the landscape is more visually intact. In general, Alternative Route 1 with Subroute 1A-1 or 1A-4 would have the least impacts on the El Camino Real NHT, whereas Alternative Route 3, along all associated subroutes, would have the highest impacts on the El Camino Real NHT. Based on these impacts, the project could result in substantial interference with the trail's nature and purpose.

Cumulative impacts on NSTs, NHTs, and trails that are recommended as suitable for designation are discussed in Appendix L of the 2013 FEIS (BLM 2013:L-62 through L-68). Incremental impacts from the proposed project components could adversely impact the trail's resources, qualities, values, associated settings, or primary use(s). Impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts on NSTs, NHTs, and trails that are recommended as suitable for designation may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Impacts during construction, including the introduction of construction vehicles, equipment, and construction materials within staging areas, access roads, and within the transmission line right-of-way, is temporary and would end upon completion of project construction. Operation and maintenance of the transmission lines and renewable energy projects would introduce additional modifications into trail settings potentially dominating their viewsheds; however, these effects would dissipate with increasing distance from the project boundary. These effects would be most intense from trail-associated viewing locations with foreground views (0–0.5 mile) of multiple, parallel transmission line projects resulting in additive, long-term impacts on the Continental Divide NST (Great Divide Wind Farm and Southline Transmission Line project, Butterfield Trail (Great Divide Wind Farm and Southline Transmission Line project), and the El Camino Real NHT (Western Spirit Wind Project transmission line, now constructed).

AID-12 Visual Resources

Would construction and operation of the power lines and roads associated with the proposed project components reduce the scenic quality of views from sensitive viewing locations, compared with the no action alternative?

3.4.23 Affected Environment

As directed by the FLPMA, the Organic Act of 1916, and Multiple Use-Sustained Yield Act of 1960, and 36 CFR 219(a), the BLM, NPS, and USFS are required to consider scenic values of public land as a resource that merits management and preservation, where appropriate, determined through the land-use planning process. The BLM and USFS have developed specific visual resource management systems to inventory scenic values for lands they administer as well as establish agency visual management objectives. Section 4 of Resource Report 8 – Visual Resources (POWER Engineers, Inc. 2021h) describes the BLM Visual Resource Management (VRM) system (BLM 1984) and USFS Visual Management System (VMS) (USFS 1974). The Cibola National Forest, the only National Forest crossed by the project, is currently using the VMS.

Both visual resource systems have common elements including 1) scenery: continuous units of land comprising harmonized features that result in and exhibit a particular character, 2) views (sensitivity to visual change and visibility): public viewing locations including recreation areas, travel routes, residences, and lands with special management where viewers have sensitivity to landscape changes, and 3) agency visual management objectives: which identify allowable levels of change to landscape character and the attention the project could attract from viewing locations. Table 3-112 identifies the inventory components associated with the above three elements for the BLM and USFS visual management systems as well as the project-level inventory which was developed to provide a consistent inventory for the project across all lands regardless of jurisdiction.

Table 3-112. Agency Planning-Level and Project-Level Inventory Crosswalk

Inventory Element	BLM Visual Resource Management	USFS Visual Management System	Project-Level Inventory
Scenery	Scenic Quality Rating Units	Variety Classes	Scenery Rating Units
Views: sensitivity to change	Sensitivity Level Rating Units	Sensitivity Levels	Concern Levels
Views: visibility	Distance Zones (general views of the landscape)	Distance Zones (general views of the landscape)	Influence Zones (project-specific)
Agency Visual Management Objectives	Visual Resource Management Classes	Visual Quality Objectives	Not applicable

The following section focuses on describing the following four components: 1) scenery, 2) viewing locations and KOPs, 3) BLM Visual Resource Inventory (VRI), and 4) conformance with agency visual management objectives (e.g., BLM VRM Classes and USFS Visual Quality Objectives [VQOs]). These resources were inventoried within the visual analysis area, defined as the area within 3 miles of proposed project alignments, which is the same visual analysis area evaluated in the 2013 FEIS (BLM 2013:3-200).

3.4.23.1 Scenery

As shown in Table 3-112, both the BLM and USFS inventory scenery values—including the delineation of discrete scenery units comprising harmonizing features that result in and exhibit a particular character.

Project-level scenery rating units were developed for the 2013 FEIS and expanded for new/modified alternative routes in Resource Report 8 – Visual Resources (POWER Engineers, Inc. 2021h). These units were compared with the BLM Scenic Quality Rating Units (SQRUs) and USFS variety classes to maintain consistency with the agency visual inventories to the extent possible. The project-level scenery rating units were rated based on BLM Form 8400-1 and the description of Variety Classes outlined in Agricultural Handbook Number 462 (USFS 1974) with the following definitions for each project-level scenery rating unit class: Class A (landscapes with distinctive or outstanding diversity or interest), Class B (landscapes with common or average diversity or interest), Class C (landscapes with minimal diversity or interest), and developed areas where existing land uses dominate the landscape character. These developed area project-level scenery rating units were not included on USFS-administered lands, to maintain consistency with the VMS and the Cibola National Forest VMS inventory (variety class).
The project is located within the Sacramento, Mexican Highlands, and Sonoran Desert sections of the Basin and Range physiographic province; Datil section of the Colorado Plateau physiographic province; and Pecos Valley section of the Great Plains physiographic province (Fenneman 1931). For a description of each project-level scenery rating unit, refer to Table R8-16 in Resource Report 8 – Visual Resources (POWER Engineers, Inc. 2021h). Detailed existing landscape character descriptions for the alternative routes are located in Section 5 of Resource Report 8 – Visual Resources (POWER Engineers, Inc. 2021h).

3.4.23.2 Viewing Locations and Key Observation Points

The identification of viewing locations and KOPs forms the basis for determining impacts on views as well as the assessment of conformance with BLM VRM Classes and USFS VQOs. These locations were identified where the public potentially would view the project and includes viewers on BLM, USFS, USFWS, NPS, state, and private lands. Part of the identification of viewing locations is the determination of viewer concern level, which corresponds to their sensitivity to changes in the viewshed. The process for assigning concern level for the project-level inventory was based on the sensitivity levels criteria in BLM Manual 8410-1 (BLM 1986b) and sensitivity levels described in Agricultural Handbook Number 462 (USFS 1974). The term *concern level* was specifically used to refer to the project-level inventory of sensitive viewing locations as opposed to general viewer sensitivities over large areas (see Table 3-112). The project-level viewer concern levels were based on agency planning-level visual resource data (e.g., BLM Sensitivity Level Rating Unit [SLRU] worksheets and USFS sensitivity levels). For a complete list of viewing locations and the methods used to identify concern levels, refer to Resource Report 8 – Visual Resources (POWER Engineers, Inc. 2021h), including Table R8-17.

Additionally, to meet BLM Manual 8431 (BLM 1986c) requirements and to form a consistent baseline across the project, 67 KOP locations were identified throughout the analysis area. The list of KOP locations is included in Appendix F (Table 1) with their associated project component, rationale for selection, indication of whether a visual simulation was completed in the 2013 FEIS (BLM 2013), and if there is an updated or new simulation prepared for this Draft EIS. A total of 22 visual simulations, located in Appendix F, were prepared from 17 agency-approved KOP locations to illustrate impacts on viewing locations and conformance with agency visual management objectives. Many of the KOP locations are associated with NSTs, NHTs, and trails that are deemed suitable for designation (Butterfield Trail).
The inventory and analysis associated with these trails are located in AID-11 and in Appendix E, to avoid duplication in this section.

3.4.23.3 BLM Visual Resource Inventory

The BLM inventories scenic values for lands they administer in accordance with BLM Manual 8410-1 based on the following factors: 1) diversity of landscape features that define and characterize landscapes in a given planning area (SQRUs), 2) public concern for the landscapes that make up a planning area (sensitivity levels [SLRUs]), and 3) landscape visibility from public viewing locations (distance zones).

These factors are collectively described as the visual resource inventory and are referred to as the VRI for BLM-administered lands. Combined, these three factors determine VRI Classes, which indicate existing scenic values of BLM-administered lands. To provide the BLM with pertinent information associated with each factor of the VRI, including VRI Classes, both the 2013 FEIS (Appendix D3) and Appendix F include tables listing the mileage crossed for each project alternative.

3.4.23.4 Conformance with Agency Visual Management Objectives

Both the BLM and USFS identify visual management classes on lands they administer through the land-use planning process to guide project-level decisions. The BLM manages visual resource values in accordance with VRM objectives designated in resource management plans (RMPs). BLM Manual 8431 (BLM 1986c) defines four VRM Class objectives (Class I–Class IV) that describe an allowable level of change that can occur to the landscape character and the allowable amount of attention the change can attract. Conformance with VRM Class objectives is assessed using a project-specific analysis from KOPs to evaluate the visual contrast resulting from the project, compared with the existing landscape character and the definition of the applicable VRM Class objective. Contrast rating worksheets were prepared using BLM Form 8400-4 from each KOP and are included in Appendix F.

The USFS establishes VQO levels (preservation, retention, partial retention, modification, and maximum modification) through the forest planning process using Agricultural Handbook Number 462 (USFS 1974) to describe the acceptable level of alteration that can be made to the natural characteristic landscape. To assess the level of deviation from the characteristic landscape introduced by the project, KOPs were also identified on USFS-administered lands. This analysis was conducted using contrast rating worksheets, which identify the existing characteristics of the landscape, the changes to the characteristic landscape proposed by the project, and the level of dominance or contrast with the existing natural landscape. These worksheets describe the existing landscape and changes proposed by the project using contrast elements (form, line, color, and texture), which align with the concept of dominance elements as described in the USFS VMS (USFS 1974). For the contrast rating worksheets with views of USFS-administered lands, existing landscape deviations were not included in the assessment of project dominance and whether the project would meet desired conditions (prescribed VQO). Conformance with the USFS LRMPs was based on a review of applicable forest-wide and management area standards to identify if the project meets the desired conditions established in the LRMP (including the prescribed VQO). In addition, management area guidelines were reviewed to identify additional agency direction that a project must strive to meet as well as to provide rationale for additional project mitigation; this information is included in Appendix F of this EIS.

3.4.23.5 Reasonably Foreseeable Environmental Trends and Planned Actions

The landscapes traversed by the project range from mostly intact settings with few visual disturbances to settings dominated by human-made modifications including power generation facilities, linear utilities, transportation corridors, rural communities, and areas converted to agricultural uses. Most of these areas of development are located adjacent to the Rio Grande, I-25, and I-10—including residential areas and several existing transmission lines which roughly follow these linear corridors. Agricultural landscapes are concentrated along the Rio Grande, Sulphur Springs Valley, and north of Picacho, New Mexico. The conversion of arid lands in these areas, through the introduction of irrigation, creates high-chroma green colors which are inconsistent with the existing, natural landscape character. Natural-appearing landscapes are most prevalent in and around the Cibola National Forest, Bosque del Apache Wilderness Area, and Sevilleta NWR.

In general, the landscapes in the visual analysis area would continue to be modified through increased development tied to population growth (e.g., Willow Springs Residential subdivision) as well as the proliferation of new energy projects. These energy projects include the Great Divide Wind Farm, which would modify the settings north of Lordsburg, New Mexico; the High Plains Express Transmission Line Project, which may parallel this project alignment; and the Southline Transmission Line project, which would be located adjacent to the project between Lordsburg and Deming, New Mexico (SWCA 2021). The Western Spirit Wind Project and associated transmission line would parallel alternative routes in proposed project Component 3. For alternatives crossing the Cibola National Forest, there is a revised LRMP currently in development which would include changing the visual resource system on the Forest from the VMS to the Scenery Management System. This change would likely introduce more stringent requirements for visual resources on Cibola National Forest lands and require additional analysis to meet the potential plan conformance requirement contained in the revised plan.

3.4.24 Environmental Consequences

3.4.24.1 Methods and Assumptions

The assessment of impacts on visual resources includes four components: 1) scenery, 2) viewing locations and KOPs, 3) BLM VRI, and 4) conformance with agency visual management objectives (e.g., BLM VRM Classes and USFS VQOs). As described in Section 4 Methodology of Resource Report 8 (POWER Engineers, Inc. 2021h) and in the 2013 FEIS (BLM 2013), the evaluation of impacts was based on project (visual) contrast, which is defined as the degree of visual change introduced by the construction, operation, and maintenance of the project compared to the existing visual setting. Project contrast was assessed based on a range of contrast from strong (where the project demands attention and strongly dominates the landscape), to weak (where the project is discernible but does not attract attention in the landscape). By comparing the level of project contrast with the quality (Class A, Class B, or Class C) and existing characteristics of the landscape, impacts on scenery were identified using the criteria outlined in Table 3-113. Impacts on viewing locations were assessed using project contrast combined with project-level distance zones, concern level (moderate or high), and project visibility (viewshed analysis).

In addition to low, moderate, and high impacts, if impacts were found to be between these levels, low-moderate and moderate-high impact levels were identified to provide additional impact thresholds to describe the intensity of impacts. The assessment of conformance with agency management objectives differed between the BLM and USFS based on the different agency visual management systems.

For conformance with BLM VRM Classes and BLM RMPs, a contrast analysis was conducted from BLM-approved KOPs using BLM Form 8400-4 – Visual Contrast Rating Worksheet (see Appendix F). The assessment of plan conformance with USFS LRMPs considered the LRMP desired VQO, management objectives, and existing landscape character to determine if the project would meet the desired conditions established in the LRMP. For more detail on the methodology used to assess visual resource impacts, please refer to Resource Report 8 (POWER Engineers, Inc. 2021h) and the 2013 FEIS (BLM 2013:4-148 through 4-153). Resource Report 8 will not be updated as part of this EIS, however, all relevant data from Resource Report 8, along with more recent additional data, have been incorporated into this analysis to provide a fully updated assessment of the project's impacts on visual resources.

Table 3-113. Visual Impact Level Definitions

Degree of Impacts	Description
High	**Scenery:** Modification of high-quality, diverse, and rare or unique scenery (Class A or B) or interesting, but not outstanding, scenery (Class C) that results in a high level of change (contrast) to their character. **Viewing Locations:** Contrast produced by the project would demand attention and dominate views from high-concern viewing locations where form, line, color, and texture of project components would be incongruent with existing landscape features (including existing structures); or where the project would completely dominate views and would not be overlooked from moderate-concern viewing locations. **Agency Visual Resource Management:** Project would be inconsistent with BLM VRM Class or USFS VQO due to high visibility of project and strong contrast level seen by high- or moderate-concern viewers, and the implementation of design features and/or EPMs would not reduce impacts sufficiently.
Moderate	**Scenery:** Modification of interesting, but not outstanding, scenery (Class B or C) that results in a moderate level of change (contrast) without substantially altering their character. **Viewing Locations:** Contrast produced by the project would attract attention from high-concern viewing locations and would be co-dominant in the existing landscape; or where project contrasts would demand attention and dominate views from moderate-concern viewing locations. **Agency Visual Resource Management:** Project would be consistent with BLM VRM Class or USFS VQO with the implementation of design features and/or EPMs or due to moderate visibility of project and moderate contrasts seen by high- or moderate-concern viewers.
Low	**Scenery:** Minimal change to the existing character of landscapes that are high-quality, diverse, rare, unique, interesting, or common (Class A, B, or C). **Viewing Locations:** Contrast produced by the project would be subordinate to existing landscape features and would not be as readily seen from high-concern viewing locations; or where the project would attract attention from moderate-concern viewing locations and would be co-dominant with, or subordinate to, existing landscape features. **Agency Visual Resource Management:** Project would be consistent with BLM VRM Class or USFS VQO with the implementation of design features and/or EPMs or due to low/no visibility of project and weak/no contrasts seen by high- or moderate-concern viewers.

The application of EPMs was considered on a case-by-case basis to reduce impacts on scenery and views as well as areas initially not compliant with BLM VRM Classes or USFS VQOs to bring the project into conformance. For a list of these mitigation measures, as well as their application effectiveness, please refer to Section 4.7 of Resource Report 8 (POWER Engineers, Inc. 2021h) and Appendix C of this EIS. EPMs were identified to reduce contrast introduced by the project during construction, operation, and maintenance and are listed in Table 3-114 with relevant project design features. These design features and EPMs were developed considering measures and techniques identified in BLM Manual 8431 (BLM 1986c) and USFS Handbook 478 – National Forest Landscape Management Volume 2, Chapter 2- Utilities (USFS 1975).

Table 3-114. Design Features and Environmental Protection Measures Applicable to Visual Resources

Relevant Design Features	Applicable EPMs
3, 4, 5, 6, 8, 10, 11, 18, 20, 23	3, 5, 7, 8, 9, 10, 11, 13, 14, 16

The following analyses are incorporated by reference as they relate to analysis used to inform impacts on visual resources:

- AID-11 National Scenic and Historic Trails: Impacts to trail resources including views from trail-associated KOP locations introduced in this section.
- AID-16 BLM Special Designations: Impacts on ACECs and other special designations in addition to those visual impacts described in this section.

- AID-17 USFS Inventoried Roadless Area: Impacts to the characteristics and values associated with the Scott Mesa IRA.
- AID-18 Sevilleta National Wildlife Refuge: Overall impacts to the NWR associated with implementation of the project.

3.4.24.2 Impacts Common to All Components

This section describes the effects common to all alternatives, including the no action alternative, during construction, operation and maintenance, and decommissioning of the proposed project. Site-specific impacts are described by alternative in subsequent sections.

CONSTRUCTION

During construction, visual impacts would result from the introduction of construction vehicles, equipment, and construction materials within staging areas, access roads, and the transmission line right-of-way. Disturbance resulting from construction would be temporary and largely short in duration. Visible effects from active construction would diminish subsequent to clean up and restoration of the temporary staging areas and access roads. Construction of the project would include vegetation clearing within the right-of-way which, depending on the existing vegetation, would range from minimal clearing in low-growing vegetation types, to a geometric, cleared right-of-way in woodland vegetation types. To reduce effects from right-of-way vegetation clearing, EPM 14 would be applied to minimize disturbance to and clearing of riparian and woodland vegetation, in order to reduce visual contrast and limit alterations to characteristic landscape to the extent practicable while meeting national conductor clearance requirements. Additionally, reclamation efforts would include revegetating the right-of-way after construction. Restoration of vegetation in this arid setting can take several years to complete and conditions in areas of disturbance are expected to change over several years as restoration takes place.

Viewing locations (viewers) would be affected by the temporary proposed construction activities generating contrast in their viewsheds and altering the characteristic landscape. However, the transmission line structures would cause the major, long-term change to scenery, and to views, while construction of the structures and facilities would be short-term and temporary. During construction the motion associated with construction equipment, structure building, and conductor stringing as well as vegetation clearing, short-term impacts from dust generation, and landform modification would be noticeable and potentially create visually dominant elements within the viewshed. No construction would occur at night, therefore there would no additional contrast introduced from night lighting as viewed from identified viewing locations.

OPERATION AND MAINTENANCE

The transmission line structures, permanent access roads, and substation would alter the characteristic landscape and potentially create visually dominant elements within the viewshed during operation and maintenance of the proposed project. Visual impacts would be evident where cleared areas create surface disturbances or unnatural lines contrasting with the characteristic landscape which would remain for the life of the proposed project. The most evident and long-term visual contrasts would result from the addition of transmission line structures and access roads within the landscape as well as the geometrically cleared right-of-way in forested or other heavily vegetated settings. The vertical structures (towers), conductors, lines, access roads, and cleared right-of-way would produce long, linear elements contrasting with the characteristic landscape, particularly in areas where no development or existing infrastructure occurs. In some areas, the alterations to landscape character and level of visual contrast could be out of conformance with agency visual management objectives (e.g., BLM VRM Classes and USFS VQOs). Details of these potential nonconformance areas are described by alternative. No lighting is proposed for the transmission line structures, as indicated in Table 1-2, therefore there would no additional contrast introduced from night lighting as viewed from identified viewing locations.

DECOMMISSIONING

The decommissioning and removal of the project and its components would have similar impacts as the construction process. There would be increased motion associated with construction equipment, short-term impacts from dust generation, and landform modification to more closely match pre-construction conditions. The removal of project components would likely require additional ground disturbance and vegetation clearing resulting in reclamation efforts similar to those conducted after the construction process was completed. The restoration of vegetation in these areas would take several years, due to the area's arid climate, but over time the landscape where impacted by the project would begin to more closely resemble pre-construction conditions.

3.4.24.3 Impacts of Localized Route Modifications

Based on adjustments to the project centerline, six route modifications areas were proposed and analyzed, compared with the no action alternative. The following descriptions summarize key impacts on scenery, views, and whether the project would meet objectives associated with the BLM VRM Class III and IV areas that are crossed by the project. The baseline resource inventory (scenery and viewing locations) and agency visual management objectives, including project conformance, for Component 1 are presented in Tables 3-115 through 3-119. Tables depicting BLM VRI data are included in Appendix F. See Appendix F (Maps 1–6) for maps depicting the KOP locations, VRM Classes, and where the project is in conformance or not in conformance with VRM Class objectives.

Table 3-115. Scenery: Component 1 Proposed Localized Route Modifications (in miles)

Localized Route Modifications	Length (miles)	Class A	Class B	Class C	Developed
1. Mavericks Area	2.7	0.0	0.0	2.7	0.0
2. SunZia South Area	4.4	0.0	0.0	4.4	0.0
3. Macho Springs Area	9.3	0.0	0.0	9.3	0.0
4. Las Palomas Area	5.2	0.0	5.2	0.0	0.0
5. Highlands Area	6.4	0.0	6.4	0.0	0.0
6a. Pinal Central Area- North Route	10.1	0.0	5.2	4.9	0.0
6b. Pinal Central Area- Steele Route	6.6	0.0	4.2	2.3	0.1
6c. Pinal Central Area- Earley Route	7.5	0.0	4.0	3.5	0.0
Local Alternative West Tie-in	1.2	0.0	0.3	0.9	0.0
Local Alternative Central Tie-in	0.8	0.0	0.0	0.8	0.0
Local Alternative East Tie-in	0.8	0.0	0.0	0.8	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-116. High-Concern Viewers Distance Zones: Component 1 Proposed Localized Route Modifications (in miles)

Localized Route Modifications	Length (miles)	0.0–0.5 mile	0.5–1 mile	1–2 miles	2–3 miles	Not Seen
1. Mavericks Area	2.7	0.0	0.0	0.0	2.7	0.0
2. SunZia South Area	4.4	0.0	0.0	0.0	4.6	0.0
3. Macho Springs Area	9.3	0.0	0.4	2.1	6.9	0.0
4. Las Palomas Area	5.2	0.0	1.0	1.1	2.7	0.3
5. Highlands Area	6.4	0.0	0.2	4.1	2.0	0.0
6a. Pinal Central Area- North Route	10.1	2.7	6.1	1.3	0.0	0.0
6b. Pinal Central Area- Steele Route	6.6	3.3	3.2	0.1	0.0	0.0
6c. Pinal Central Area- Earley Route	7.5	1.9	4.1	1.4	0.0	0.0
Local Alternative West Tie-in	1.2	0.2	1.1	0.0	0.0	0.0
Local Alternative Central Tie-in	0.8	0.0	0.8	0.0	0.0	0.0
Local Alternative East Tie-in	0.8	0.0	0.8	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-117. Moderate-Concern Viewers Distance Zones: Component 1 Proposed Localized Route Modifications (in miles)

Localized Route Modifications	Length (miles)	0.0–0.5 mile	0.5–1 mile	1–2 miles	2–3 miles	Not Seen
1. Mavericks Area	2.7	0.0	0.0	0.5	2.2	0.0
2. SunZia South Area	4.4	0.0	0.6	0.5	3.5	0.0
3. Macho Springs Area	9.3	0.0	0.5	0.9	7.9	0.0
4. Las Palomas Area	5.2	0.0	0.0	0.0	0.0	5.2
5. Highlands Area	6.4	0.4	0.7	1.1	4.1	0.0
6a. Pinal Central Area- North Route	10.1	0.0	0.0	0.0	0.0	7.7
6b. Pinal Central Area- Steele Route	6.6	0.0	0.0	0.0	0.0	4.1
6c. Pinal Central Area- Earley Route	7.5	0.0	0.0	0.0	0.0	6.4
Local Alternative West Tie-in	1.2	0.0	0.0	0.0	0.0	1.2
Local Alternative Central Tie-in	0.8	0.0	0.0	0.0	0.0	0.8
Local Alternative East Tie-in	0.8	0.0	0.0	0.0	0.0	0.8

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-118. BLM VRM Classes: Component 1 Proposed Localized Route Modifications (in miles)

Localized Route Modifications	Length (miles)	Class I	Class II	Class III	Class IV
1. Mavericks Area	2.7	0.0	0.0	1.1	0.0
2. SunZia South Area	4.4	0.0	0.0	0.8	0.0
3. Macho Springs Area	9.3	0.0	0.0	0.7	0.0
4. Las Palomas Area	5.2	0.0	0.0	0.0	2.8

Localized Route Modifications	Length (miles)	Class I	Class II	Class III	Class IV
5. Highlands Area	6.4	0.0	0.0	0.0	5.9
6a. Pinal Central Area- North Route	10.1	0.0	0.0	0.0	0.0
6b. Pinal Central Area- Steele Route	6.6	0.0	0.0	0.0	0.0
6c. Pinal Central Area- Earley Route	7.5	0.0	0.0	0.0	0.0
Local Alternative West Tie-in	1.2	0.0	0.0	0.0	0.0
Local Alternative Central Tie-in	0.8	0.0	0.0	0.0	0.0
Local Alternative East Tie-in	0.8	0.0	0.0	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-119. Conformance with VRM Classes: Component 1 Proposed Localized Route Modifications (in miles)

Localized Route Modifications	Length (miles)	Compliant	Not Compliant	Not Applicable
1. Mavericks Area	2.7	1.1	0.0	1.6
2. SunZia South Area	4.4	0.8	0.0	3.6
3. Macho Springs Area	9.3	0.7	0.0	8.6
4. Las Palomas Area	5.2	2.8	0.0	2.4
5. Highlands Area	6.4	5.9	0.0	0.5
6a. Pinal Central Area- North Route	10.1	0.0	0.0	10.1
6b. Pinal Central Area- Steele Route	6.6	0.0	0.0	6.6
6c. Pinal Central Area- Earley Route	7.5	0.0	0.0	7.5
Local Alternative West Tie-in	1.2	0.0	0.0	1.2
Local Alternative Central Tie-in	0.8	0.0	0.0	0.8
Local Alternative East Tie-in	0.8	0.0	0.0	0.8

Note: Local Alternatives are exchangeable within their associated alternative route.

LOCALIZED ROUTE MODIFICATION 1 – MAVERICKS AREA

The project would cross Class C landscapes separated from the existing 345-kV transmission line paralleled by the no action alternative. Moderate impacts would occur as the project would introduce vertical transmission line structures and a network of access roads into a more intact landscape setting away from the existing transmission line.

Impacts on views from New Mexico State Route 90 (KOP LC29) and New Mexico State Route 464 would be similar to the no action alternative. Since the alignment for Route Modification 1 deviates from paralleling the existing 345-kV transmission line in this area, expanding the area viewed as developed from these linear viewing locations, low-moderate impacts would occur.

The project, as analyzed from KOP LC29, would meet objectives associated with BLM VRM Class III.

LOCALIZED ROUTE MODIFICATION 2 – SUNZIA SOUTH AREA

The project would traverse Class C scenery resulting in similar moderate impacts as the no action alternative. Impacts on viewing locations would be similar to the no action alternative as the project would be viewed from dispersed residences and U.S. Highway 287 in context with the existing 345-kV and 115-kV transmission lines. The project would meet objectives associated with BLM VRM Class III.

LOCALIZED ROUTE MODIFICATION 3 – MACHO SPRINGS AREA

Impacts on scenery would be similar to the no action alternative since the project would cross Class C scenery in proximity to an existing 345-kV transmission line, 115-kV transmission line, and a wind generation facility. Impacts on views would also be similar to the no action alternative except for views from a dispersed residence located between Route Modification 3 and the existing transmission lines. Moderate impacts would occur on the views from this residence as transmission line structures would be visible approximately 1 mile away both to the east and west. Views from New Mexico State Route 26 (KOP LC26, see Appendix F, Attachment 1 for visual simulation) would be similar to the no action alternative as the project would be visible past the existing transmission lines that parallel the state route. For impacts associated with the Butterfield Trail, please refer to AID-11. The project, as analyzed from KOP LC26, would meet objectives associated with BLM VRM Class III.

LOCALIZED ROUTE MODIFICATION 4 – LAS PALOMAS AREA

Moderate-high impacts would occur on Class B scenery since the route modification would not parallel the existing 345-kV transmission line in this area. The introduction of transmission line structures and access roads in moderate to steep terrain would modify the existing landscape setting and expand the area viewed as developed within this setting. In general, views of the project from residences and other viewing locations would be in context with the existing 345-kV transmission line which is located closer to these viewers than the project. Views from one residence, located between the route modification alignment and the existing 345-kV transmission line, would have moderate-high impacts due to the presence of transmission line structures approximately 1 mile away both to the east and west. The project, as analyzed, would meet objectives associated with BLM VRM Class IV.

LOCALIZED ROUTE MODIFICATION 5 – HIGHLANDS AREA

Moderate-high impacts would occur on Class B scenery as the existing transmission line would not be paralleled in this area and the project would introduce tall, repeating transmission line structures into a currently undeveloped portion of the landscape. Views from I-25 include existing transmission lines to the east of the highway but due to the scale of the project and proximity to the highway, moderate-high impacts would occur on these views. These impacts are elevated, compared with the no action alternative, as the route modification is located closer to the interstate (within 1 mile). High impacts would occur on views from New Mexico State Route 107 where the project would cross the road in an area with limited landscape modifications. Implementation of EPM 10 at the crossing would reduce visual impacts but high residual impacts would remain for a portion of the route. Low impacts would occur on views from the Fort Craig Rest Area (KOP SO28) where the project is located approximately 2 miles away, which is farther from the rest area than the alignment of the no action alternative, and partially screened by vegetation. Impacts on the El Camino Real NHT including views from Fort Craig (KOP SO27) and El Contadero High Potential Historic Site (KOP 22) are described in AID-11. The project would meet objectives associated with BLM VRM Class IV.

LOCALIZED ROUTE MODIFICATION 6 – PINAL CENTRAL AREA

Low impacts are anticipated where the project traverses Class C scenery in an area that has been modified by extensive agricultural use, energy development projects, and an existing 500-kV transmission line. Moderate impacts on views from Arizona State Route 87 (KOP 46) would occur where the project's two 500-kV transmission lines could separate and cross the highway in two different locations up to approximately 2.5 miles apart. As described in AID-11, application of EPM 10 (maximize structure span) would reduce visual contrast at the highway crossings by moving the structures as far from the road as possible. Since the project does not traverse any BLM or USFS lands and there are no specific visual requirements for private lands in Pinal County, the project would be compliant with agency visual management objectives.

3.4.24.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

The no action alternative, analyzed in the 2013 FEIS (BLM 2013), identified impacts on scenery and viewers as well as conformance with BLM VRM Class objectives. The addition of new access roads and temporary work areas outside of the granted right-of-way would lead to incrementally elevated impacts associated with additional ground disturbance, clearing of vegetation, and the introduction of geometric forms similar to those proposed under the no action alternative. Since impacts are similar to the no action alternative, the following descriptions focus on key impact areas associated with additive impacts on scenery and views as well as any areas where the project would not meet objectives associated with BLM VRM Classes II, III, and IV. The baseline resource inventory (scenery and viewing locations) and agency visual management objectives, including project conformance, for Component 2 are presented in Tables 3-120 to 3-124. See Appendix F (Maps 7–11) for maps depicting the KOP locations and VRM Classes.

Table 3-120. Scenery: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	Class A	Class B	Class C	Developed
Component 2a. Access Roads (miles)	17.2	679.2	324.2	9.6
Component 2b. Temporary Work Areas (acres)	5.1	834.0	561.8	1.2

Table 3-121. High-Concern Viewers Distance Zones: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	0–1,000 feet	1,000 feet–0.5 mile	0.5–1 mile	More than 1 mile	Not Seen
Component 2a. Access Roads (miles)	56.8	98.1	135.4	642.7	131.2
Component 2b. Temporary Work Areas (acres)	153.4	202.3	180.8	792.1	73.8

Table 3-122. Moderate-Concern Viewers Distance Zones: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	0–1,000 feet	1,000 feet–0.5 mile	0.5–1 mile	More than 1 mile	Not Seen
Component 2a. Access Roads (miles)	49.3	50.3	79.9	434.4	450.1

	0–1,000 feet	1,000 feet–0.5 mile	0.5–1 mile	More than 1 mile	Not Seen
Component 2b. Temporary Work Areas (acres)	142.5	121.1	85.1	473.3	580.4

Table 3-123. BLM VRM Classes: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	Class I	Class II	Class III	Class IV
Component 2a. Access Roads (miles)	0.0	0.2	64.7	203.8
Component 2b. Temporary Work Areas (acres)	0.0	1.2	102.9	218.2

Table 3-124. Conformance with VRM Classes/VQOs: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	Compliant	Not Compliant
Component 2a. Access Roads (miles)	268.6	0.0
Component 2b. Temporary Work Areas (acres)	322.4	0.0

SCENERY

The construction and operation of new access roads in Class A scenery, associated with the San Pedro River Floodplain/Riparian and Buehman Canyon scenery rating units, would modify the existing vegetation patterns and landforms. In consideration of the impacts on these landscapes from the no action alternative, as described in the 2013 FEIS (BLM 2013:4-185), the project would incrementally increase these impacts. Through implementation of EPMs 5, 7, and 14 in areas where shrubland and woodland vegetation would be removed and where exposed soil/rock would highly contrast with the surface soil color, impacts on scenery would be reduced. The temporary work areas would generate short-term impacts on scenery but since these areas would not be cleared of vegetation, the long-term impacts would be negligible. Impacts on Class B and C scenery would generally be low and occur in the same areas impacted by the no action alternative.

VIEWING LOCATIONS

In general, the project would incrementally increase surface disturbance associated with the construction of new access roads and temporary work areas—resulting in minimal additive effects on views from viewing locations and KOPs, considering the construction of the no action alternative along the 2015 Selected Route. Most viewing locations and KOPs would have views of the additional work areas screened by topography or vegetation including views from the Sierra Bonita Ranch (KOP 48) resulting in negligible visual impacts. Where visible, such as from KOP SA10 (Sulphur Springs Valley), the additional access roads would introduce more linear disturbances—modifying existing vegetation patterns and terrain through their construction. Since these roads provide access to the approved 2015 right-of-way, with its tall, vertical transmission line structures, the addition of the project in these areas would result in weak to weak/moderate project contrast with low to low-moderate project impacts. Impacts on NST, NHT, and trails that are recommended as suitable for National Trail designation are described in AID-11.

PLAN CONFORMANCE

The construction, operation, and maintenance of access roads and temporary work areas would be consistent with BLM VRM Class II, III, and IV objectives as analyzed from 14 KOP locations. The KOP contrast rating worksheets are included in Appendix F.

3.4.24.5 Impacts of Segment 4 Reroute Alternatives

The baseline resource inventory (scenery and viewing locations) and agency visual management objectives, including project conformance, for Component 3 are presented in Table 3-125 to Table 3-129. Tables depicting BLM VRI data are included in Appendix F. See Appendix F (Map 12) for a map depicting the KOP locations, BLM VRM Classes, USFS VQOs, and where the project is in conformance or not in conformance with BLM VRM Class objectives and USFS VQOs.

Table 3-125. Scenery: Component 3 Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	Length (miles)	Class A	Class B	Class C	Developed
Alternative Route 1 with Subroute 1A-1	146.4	0.3	128.2	15.7	2.2
Alternative Route 1 with Subroute 1A-2	145.1	0.3	129.2	15.7	0.0
Alternative Route 1 with Subroute 1A-3	146.3	0.4	130.2	15.7	0.0
Alternative Route 1 with Subroute 1A-4	146.2	0.3	128.0	15.7	2.2
Local Alternative 1A-6	0.4	0.0	0.4	0.0	0.0
Local Alternative 1A-7	0.5	0.0	0.5	0.0	0.0
Alternative Route 2 with Subroute 2A-1	123.1	0.3	113.1	7.4	2.2
Alternative Route 2 with Subroute 2A-2	119.5	0.3	111.8	7.4	0.0
Alternative Route 2 with Subroute 2A-3	115.2	0.4	107.5	7.4	0.0
Alternative Route 2 with Subroute 2A-4	122.8	0.3	112.8	7.4	2.2
Alternative Route 3 with Subroute 3A-1	126.4	0.3	121.7	2.2	2.2
Alternative Route 3 with Subroute 3A-2	122.9	0.3	120.4	2.2	0.0
Alternative Route 3 with Subroute 3A-3	118.7	0.4	116.1	2.2	0.0
Alternative Route 3 with Subroute 3A-4	126.2	0.3	121.5	2.2	2.2
Local Alternative 3B-1	5.5	0.0	5.5	0.0	0.0
Local Alternative 3B-2	5.7	0.0	5.7	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-126. High-Concern Viewers Distance Zones: Component 3 Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	Length (miles)	0.0–0.5 mile	0.5–1 mile	1–2 miles	2–3 miles	Not Seen
Alt Route 1 with Subroute 1A-1	146.4	6.1	17.5	29.3	44.1	49.4
Alt Route 1 with Subroute 1A-2	145.1	6.3	19.8	26.6	43.0	49.4
Alt Route 1 with Subroute 1A-3	146.3	6.4	20.5	27.7	40.0	51.7
Alt Route 1 with Subroute 1A-4	146.2	9.3	16.6	29.4	41.4	49.4

Alternative Route/Subroute	Length (miles)	0.0–0.5 mile	0.5–1 mile	1–2 miles	2–3 miles	Not Seen
Local Alternative 1A-6	0.4	0.0	0.0	0.4	0.0	0.0
Local Alternative 1A-7	0.5	0.0	0.0	0.5	0.0	0.0
Alt Route 2 with Subroute 2A-1	123.1	6.7	19.7	22.3	31.0	43.3
Alt Route 2 with Subroute 2A-2	119.5	6.8	18.7	19.6	31.0	43.3
Alt Route 2 with Subroute 2A-3	115.2	4.6	17.5	21.9	28.0	43.3
Alt Route 2 with Subroute 2A-4	122.8	9.9	18.7	22.5	28.4	43.3
Alt Route 3 with Subroute 3A-1	126.4	8.4	27.2	30.9	40.1	19.7
Alt Route 3 with Subroute 3A-2	122.9	8.5	26.3	28.2	40.1	19.7
Alt Route 3 with Subroute 3A-3	118.7	6.3	25.0	30.5	37.1	19.7
Alt Route 3 with Subroute 3A-4	126.2	11.6	26.2	31.1	37.5	19.7
Local Alternative 3B-1	5.5	1.4	2.7	1.5	0.0	0.0
Local Alternative 3B-2	5.7	0.4	2.4	2.8	0.1	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-127. Moderate-Concern Viewers Distance Zones: Component 3 Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	Length (miles)	0.0–0.5 mile	0.5–1 mile	1–2 miles	2–3 miles	Not Seen
Alt Route 1 with Subroute 1A-1	146.4	19.4	6.4	9.5	8.0	103.1
Alt Route 1 with Subroute 1A-2	145.1	19.4	6.4	9.8	8.2	101.4
Alt Route 1 with Subroute 1A-3	146.3	19.4	6.3	9.5	9.7	101.4
Alt Route 1 with Subroute 1A-4	146.2	19.4	6.4	9.5	8.0	102.9
Local Alternative 1A-6	0.4	0.0	0.0	0.0	0.0	0.4
Local Alternative 1A-7	0.5	0.0	0.0	0.0	0.0	0.5
Alt Route 2 with Subroute 2A-1	123.1	19.2	4.1	13.7	8.2	77.8
Alt Route 2 with Subroute 2A-2	119.5	19.1	4.1	10.3	8.4	77.6
Alt Route 2 with Subroute 2A-3	115.2	19.1	4.1	6.9	8.5	76.6
Alt Route 2 with Subroute 2A-4	122.8	19.2	4.1	13.6	8.2	77.6
Alt Route 3 with Subroute 3A-1	126.4	19.7	6.5	15.8	18.4	66.0
Alt Route 3 with Subroute 3A-2	122.9	19.6	6.4	12.5	18.6	65.7
Alt Route 3 with Subroute 3A-3	118.7	19.6	6.4	9.1	18.7	64.8
Alt Route 3 with Subroute 3A-4	126.2	19.7	6.5	15.8	18.4	65.8
Local Alternative 3B-1	5.5	0.0	0.7	0.7	4.1	0.0
Local Alternative 3B-2	5.7	0.0	0.2	0.9	3.9	0.7

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-128. BLM VRM Classes and USFS VQO: Component 3 Alternatives (in miles) by Route and Subroute

	BLM VRM					USFS VQO
Alternative Route/Subroute	Length (miles)	Class I	Class II	Class III	Class IV	Maximum Modification
Alt Route 1 with Subroute 1A-1	146.4	0.0	3.4	0.0	17.4	4.7
Alt Route 1 with Subroute 1A-2	145.1	0.0	3.4	0.0	17.1	4.7
Alt Route 1 with Subroute 1A-3	146.3	0.0	3.4	0.0	20.5	4.7
Alt Route 1 with Subroute 1A-4	146.2	0.0	3.4	0.0	17.4	4.7
Local Alternative 1A-6	0.4	0.0	0.3	0.0	0.0	0.2
Local Alternative 1A-7	0.5	0.0	0.5	0.0	0.0	0.0
Alt Route 2 with Subroute 2A-1	123.1	0.0	0.0	0.0	6.0	0.0
Alt Route 2 with Subroute 2A-2	119.5	0.0	0.0	0.0	6.0	0.0
Alt Route 2 with Subroute 2A-3	115.2	0.0	0.0	0.0	6.0	0.0
Alt Route 2 with Subroute 2A-4	122.8	0.0	0.0	0.0	6.0	0.0
Alt Route 3 with Subroute 3A-1	126.4	0.0	0.0	0.0	9.6	0.0
Alt Route 3 with Subroute 3A-2	122.9	0.0	0.0	0.0	9.6	0.0
Alt Route 3 with Subroute 3A-3	118.7	0.0	0.0	0.0	9.6	0.0
Alt Route 3 with Subroute 3A-4	126.2	0.0	0.0	0.0	9.6	0.0
Local Alternative 3B-1	5.5	0.0	0.0	0.0	4.0	0.0
Local Alternative 3B-2	5.7	0.0	0.0	0.0	4.6	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Table 3-129. Conformance with VRM Classes/VQOs: Component 3 Alternatives (in miles) by Route and Subroute

Alternative Route/Subroute	Length (miles)	Compliant	Not Compliant
Alt Route 1 with Subroute 1A-1	146.4	22.1	3.4
Alt Route 1 with Subroute 1A-2	145.1	21.8	3.4
Alt Route 1 with Subroute 1A-3	146.3	25.2	3.4
Alt Route 1 with Subroute 1A-4	146.2	22.1	3.4
Local Alternative 1A-6	0.4	0.0	0.3
Local Alternative 1A-7	0.5	0.0	0.5
Alt Route 2 with Subroute 2A-1	123.1	6.0	0.0
Alt Route 2 with Subroute 2A-2	119.5	6.0	0.0
Alt Route 2 with Subroute 2A-3	115.2	6.0	0.0
Alt Route 2 with Subroute 2A-4	122.8	6.0	0.0
Alt Route 3 with Subroute 3A-1	126.4	9.6	0.0
Alt Route 3 with Subroute 3A-2	122.9	9.6	0.0
Alt Route 3 with Subroute 3A-3	118.7	9.6	0.0
Alt Route 3 with Subroute 3A-4	126.2	9.6	0.0

Alternative Route/Subroute	Length (miles)	Compliant	Not Compliant
Local Alternative 3B-1	5.5	4.0	0.0
Local Alternative 3B-2	5.7	4.6	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.24.6 Impacts of Alternative Route 1

SCENERY

The project along Alternative Route 1 would mostly generate moderate impacts on Class B and Class C scenery, including where existing transmission lines are paralleled. On the Cibola National Forest, the project would cross high-quality landscapes (including lands in the Scott Mesa IRA) where there are no existing transmission lines and few existing visual deviations. Due to the intactness of the characteristic landscape, the project would highly impact these areas and would be inconsistent with the existing landscape character. Subroute 1A-7 would avoid crossing the Scott Mesa IRA but would still highly impact other intact landscapes on the Cibola National Forest farther to the southeast. Application of EPMs 3, 5, 11, 14, and 17 (IRA only) would reduce these impacts by beginning to visually blend the project with the USFS characteristic landscape. These mitigation measures would include the development of a site-specific reclamation plan (EPM 5). For additional detail on impacts to USFS landscapes, please refer to Appendix F, and for additional detail regarding impacts on the Scott Mesa IRA, please refer to the subsequent Recreation – Viewing Locations section (below) and Appendix F. High impacts would also occur in association with Subroutes 1A-2 and 1A-3, where the project would cross the Rio Grande (Class A scenery) in an area with no existing transmission lines. The others subroutes would cross the Rio Grande adjacent to the constructed Western Spirit 345-kV transmission line, therefore the project would generate less visual contrast, resulting in moderate impacts on scenery. Application of EPMs 3, 5, 14, and 16 would reduce visual contrast resulting from the project and therefore slightly reduce impacts on scenery.

VIEWING LOCATIONS

Residences

Within the Rio Grande Valley, the project would highly impact views from residences located within the foreground influence zone where no existing transmission lines are paralleled. These impacts are located along all subroutes, with Subroutes 1A-2 and 1A-3 experiencing the greatest impacts since these routes would not parallel the Western Spirit 345-kV transmission line. Two KOPs are located in this area, KOP 5 – Bosque and KOP 7 – Veguita (refer to Appendix F, Attachment 3 for more detail on subroute impacts from these specific locations, including visual simulations). To the east, Alternative Route 1 continues to parallel the constructed Western Spirit 345-kV transmission line generating moderate impacts where the project is located within the foreground of residences until the project turns to the southeast toward the SunZia East Substation. In this area, the project would begin to dominate views from scattered residences as described for KOP 21 –Cedarvale/State Route 42 (see Appendix F, Attachment 3 for contrast rating worksheet and visual simulation). Other areas of high impacts on dispersed residences would occur farther to the west, north, and west of Ladron Peak, where the project traverses an area with limited landscape modifications and would dominate views through the introduction of tall, repeating, vertical transmission line structures.

Recreation

High impacts on views from dispersed recreation areas on the Cibola National Forest (KOPs 32 and 39), as well as the Scott Mesa IRA (KOP 44 [see Appendix F, Attachment 3 for visual simulation]), would occur where the project would cross a highly intact characteristic landscape—introducing a series of transmission line structures, a network of access roads on moderately steep slopes, and a loosely geometrically cleared right-of-way through scattered overstory vegetation, modifying the landscape's form, line, color, texture, and patterns. Application of EPMs 10 and 17 to span the Scott Mesa IRA and apply IRA-specific mitigation measures, EPM 11 to apply Permeon (or equivalent) to weather exposed underlying rocks, and EPM 14 to minimize disturbance to woodland vegetation by blending the geometric right-of-way with the adjacent vegetation patterns would reduce contrast, but due to the scale of the project, high impacts on these views would remain. Subroute 1A-7 would avoid crossing the Scott Mesa IRA but due to its proximity to KOP 44 and the highly intact landscape character, high impacts would be anticipated along this route as well. Moderate-high to high impacts are also anticipated on views from the Riley town site (KOP 38) which has mostly unobstructed views of the Cibola National Forest. Through the introduction of the project, including a series of partially skylined transmission line structures, views would become dominated by the project in an area with limited existing landscape deviations.
For additional detail on impacts to recreation viewers on USFS lands, please refer to Appendix F, including the KOP worksheets in Attachment 3.

High impacts would also occur on views from the Ladron Mountain-Devil's Backbone Complex ACEC (KOP 2) where the project would dominate views from the portions of the ACEC within 0.5 to 1 mile of the proposed transmission line. EPM 14 would be applied to minimize disturbance to woodland vegetation to blend the geometric right-of-way with the adjacent vegetation patterns, but due to the scale of the project, high impacts on these views would remain. For additional detail regarding impacts on ACECs, refer to AID-16 (BLM Special Designations).

Low impacts are anticipated on views from all units of the Salinas Pueblo Missions National Monument, due to the distance from the project and the extent of topographic screening on these views, based on the analysis conducted from the following KOP locations:

- Abo Unit: KOPs 19 (see Appendix F, Attachment 3 for visual simulation), 36, and 37
- Grand Quivira Unit: KOP SO2/SO31
- Quarai Unit: KOP 47

Low impacts on views from locations within the Sevilleta NWR are anticipated including the Visitor Center, San Lorenzo Canyon, and Rio Puerco Hunt Unit. Additional detail regarding impacts on the Sevilleta NWR are described in Section AID-18 Sevilleta National Wildlife Refuge. For impacts on National Scenic and Historic Trails refer to AID-11.

Travel Routes

High impacts on views from Forest Road 354 would occur as both the road and project traverse landscapes south of the Rio Salada. As analyzed from KOPs 2, 3 (see Appendix F, Attachment 3 for visual simulation), and 32, the presence of tall, repeating transmission line structures and associated access roads and right-of-way vegetation clearing would dominate the viewshed from the road. To reduce impacts, EPM 10 would be applied to maximize the span length at the road crossings to decrease their visual dominance and EPM 14 would be applied to minimize disturbance to woodland vegetation to blend the geometric right-of-way with the characteristic landscapes' form, line, color, texture, and patterns. Views from KOP 1 (Forest Road 354) would be moderately impacted by the project as it would be located farther away (approximately 1.5 miles), traversing steep terrain north of the Rio Salada (see Appendix F, Attachment 3 for visual simulation). Similar moderate impacts are anticipated on views from other KOPs located along Forest Road 354, where the project is located approximately 1.5 miles away, including KOPs 33 and 45. For additional detail on impacts to travel route viewers on USFS lands, please refer to Appendix F including the KOP worksheets in Attachment 3.

High impacts would occur on views from I-25 where the project would perpendicularly cross the interstate and introduce skylined transmission line structures into the viewshed. Alternative Route 1, along all subroutes, would cross the interstate with the location of the crossing differing based on the subroute selected. KOP 8 would have views of the crossing of Subroute 1A-2 and KOP 10 would view the crossing of Subroute 1A-3 (see Appendix F, Attachment 3 for visual simulation). For more detail, since I-25 in this area is also the El Camino Real National Scenic Byway, please refer to AID-11 and Appendix E. For impacts on New Mexico State Route 304 (El Camino Real NHT NPS auto tour route), please refer to AID-11.

High impacts would occur on views from County Road 12/Saladito Road, as analyzed from KOP 4, which provides access to the Sierra Ladrones WSA and Ladron Mountain-Devil's Backbone Complex ACEC. Since there are limited existing modifications in this area, the project would dominate views through the introduction of tall, repeating transmission lines structures directly adjacent to the road as the project heads toward Mesa Sarca approximately 6 miles away. Due to the proximity of the project to the road, the structures would be partially skylined and the views would be long in duration as the road is parallel to the project for 4 miles. The road then turns to the south briefly before heading to the north where the project would cross the road—resulting in additional high impacts near Mesa Sarca. To reduce impacts on views as the project traverses Mesa Sarca, where structures would be skylined on the ridge and the construction of access roads would occur in steep terrain, EPMs 11 and 13 would be applied to the extent practicable.

Views from the Abo Pass Trail National Scenic Byway (U.S. Highway 60) would mostly be impacted at a moderate-high level where the road would be crossed in proximity to the Western Spirit 345-kV transmission line and multiple existing pipelines. The project would introduce additional tall, repetitive transmission line structures into view adjacent to those associated with the Western Spirit 345-kV transmission line. EPM 10 would be applied to maximize the span length at the byway crossing, reducing the project's visual dominance adjacent to the road. As viewed from KOP 18, the project would be intermittently screened from view by undulating topography and dense pinyon-juniper vegetation, resulting in moderate impacts. A portion of the project would be visible from this KOP traversing a ridge approximately 1.75 miles away, adjacent to the Western Spirit 345-kV transmission line, with both projects introducing a loose, geometric form as a result of vegetation clearing within the proposed rights-of-way (see Appendix F Attachment 3 for visual simulation). To reduce impacts where pinyon-juniper vegetation would be crossed, EPM 14 would be applied to minimize disturbance to woodland vegetation to better blend the geometric right-of-way with the adjacent vegetation patterns. Similarly, moderate impacts on views from KOP 17 would occur where the project is sited adjacent to an existing transmission line and the Western Spirit 345-kV transmission line, except for a portion of Subroute 1A-3. This subroute would have increased impacts as the project diverges from the existing linear disturbances and would cross the byway approximately 1 mile away from the KOP location.

An area of high impacts on views from the Abo Pass Trail National Scenic Byway (New Mexico State Route 47) would occur where Subroute 1A-4 would parallel the scenic byway for approximately 2 miles, as analyzed from KOP 16. Since the project and the Western Spirit 345-kV transmission line (and existing 115-kV transmission line) would be located on either side of the highway, a "tunnel-like" effect would be created for the highway, resulting in additive impacts on these views.

Moderate-high impacts are anticipated on views from the Salt Missions Trail Scenic Byway (KOP 20) where the project would be viewed unobstructed adjacent to the Western Spirit 345-kV transmission line. Due to the scale of the project and proximity to the viewpoint, the project would begin to dominate views through the introduction of additional tall, repetitive transmission line structures into view (see Appendix F, Attachment 3 for visual simulation). EPM 10 would be applied to maximize the span length at the byway crossing to reduce the project's visual dominance to the extent practicable.

Moderate-high impacts would also occur on views from New Mexico State Route 42 (moderate-concern viewer) where the project would parallel the highway for approximately 17 miles with an existing 115-kV transmission line located on the other side of the road. Since the addition of the project would create a "tunnel effect" for the highway between the two transmission lines, the project would dominate views along the highway.

PLAN CONFORMANCE

The project would be inconsistent with BLM VRM Class II objectives for 3.4 miles as analyzed from KOPs 1, 2, 3, 32, and 38 near the Rio Salada (see Appendix F for KOP contrast rating worksheets). These VRM Class II lands are associated with the Ladron Mountain-Devil's Backbone Complex ACEC, and adjacent lands, with views occurring from within the ACEC as well as from Forest Road 354 and the Riley townsite. The application of EPMs would not reduce visual contrast to a level to meet VRM Class II objectives and the project would dominate views from KOPs in an area with limited existing modifications. A plan amendment to the Socorro Field Office RMP (BLM 2010) would be required for the project (Local Alternative 1A-7 would add 0.2 mile to this RMP amendment through nonconformance with an additional area of BLM VRM Class II).

Based on the 1985 Cibola National Forest LRMP (USFS 1985), the project would be located within an area with a VQO of maximum modification. which is defined as where management activities "may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character. When viewed as a foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations also may be out of scale and contain details that are incongruent with natural occurrences as seen in the foreground or middle ground" (USFS 1974:36).

As analyzed from KOPs 3, 32, 33, 38, 39, 44, and 45, the project would meet the definition of a maximum modification VQO as views of the project within the background distance zone (more than 5 miles) from selected KOP locations would be screened from view and the project's form, line, color, texture, and patterns would be subordinate to the characteristic landscape. The project would meet desired conditions for visual resources on the Forest and would conform to the LRMP. Through coordination with the Cibola National Forest landscape architect, application of EPMs 3, 5 10, 11, 14, and 17, including the development of a detailed site-specific reclamation plan (EPM 5), would facilitate further reduction of these impacts to the characteristic landscape. For additional analysis detail, please refer to Appendix F.

3.4.24.7 Impacts of Alternative Route 2

SCENERY

Impacts on scenery associated with Alternative Route 2 would be similar to Alternative Route 1 except an existing transmission line would be paralleled and co-located for most of the alternative until the route turns to the east toward the Rio Grande. Since the project would be co-located with the existing transmission line across the Sevilleta NWR, requiring taller structures up to 200 feet in height, the project would expand the area visually influenced by transmission lines. Additionally, the visual mass of the proposed structures, to include both an existing 115-kV and proposed 500-kV transmission line, would further alter the area's landscape character and increase visual clutter through the introduction of these more massive, repeating structures.

The Cibola National Forest would not be crossed by this alternative. High impacts on the Rio Grande would occur along Subroutes 2A-2 and 2A-3 and moderate impacts on the subroutes that parallel the Western Spirit 345-kV transmission line (Subroutes 2A-1 and 2A-4).

VIEWING LOCATIONS

Residences

Impacts on residences within the Rio Grande Valley and to the east would be similar to Alternative Route 1 with Subroutes 2A-2 and 2A-3 experiencing the greatest impacts since these routes would not parallel the Western Spirit 345-kV transmission line. Additional high impacts on residences would occur where the project would be seen along the western side of the Rio Grande Valley, within the foreground influence zone, crossing the river and paralleling the valley along the west side of I-25.

Recreation

Impacts on the Sevilleta NWR would vary based on the visibility of the existing transmission lines and local viewing considerations. High impacts would occur on views from a spring site within San Lorenzo Canyon (KOP 40) where the project would dominate views as the existing, smaller transmission line is mostly screened from view except for conductors crossing over the canyon (see simulation in Appendix F, Attachment 3). To reduce these impacts, EPM 8 would be applied to modify the tower locations and span the canyon to reduce visibility of the proposed, skylined transmission line structures to the extent practicable. Where the existing transmission line is visible in the setting, such as the view from the highpoint along a recreation trail in San Lorenzo Canyon (KOP 42), the project would impact views from approximately 1 mile away in an area already modified by the existing transmission line (see simulation in Appendix F, Attachment 3). The increased height of the structures, as a result of co-location, would be apparent but since the project would be backdropped against distant mountains in most locations, moderate impacts are anticipated on these views. Similarity, unobstructed views from the Mesa View Trail (KOP 35) would include views of the project in an area with two existing transmission lines from approximately 2.5 miles away (see simulation in Appendix F, Attachment 3). Based on the distance and the modifications present in the viewshed, the project would generate low-moderate impacts on views from trail. Views of the project from the visitor center would be completely screened by topography, resulting in no impacts. Additional detail regarding impacts on the Sevilleta NWR are described in AID-18. Impacts on the Salinas Pueblo Missions National Monument, including the Gran Quivira, Abo, and Quarai Units, would be the same as Alternative Route 1. For impacts on National Scenic and Historic Trails refer to AID-11.

Travel Routes

Impacts on views from I-25 would be similar to Alternative Route 1 except that Subroutes 2A-1, 2A-2, and 2A-4 would parallel the interstate for approximately 3 to 7 miles depending on the subroute alignment (see Appendix F, Attachment 3 for alternate visual simulation from KOP 10). These longer-duration views would further impact the viewshed as motorists would have views of the project directly adjacent to the highway for several minutes. For more detail on these impacts to I-25 (El Camino Real National Scenic Byway) and New Mexico State Route 304 (El Camino Real NHT NPS auto tour route), please refer to AID-11 and Appendix E.

Impacts on views from the Abo Pass Trail National Scenic Byway would be similar to those described for Alternative Route 1, including the increased impacts associated with Subroute 2A-3 as described for Subroute 1A-3. Additional high impacts on views from the Abo Pass Trail National Scenic Byway (New Mexico State Route 47) would occur where Subroute 2A-4, same as described for Alternative Route 1 Subroute 1A-4, would parallel the scenic byway for approximately 2 miles as analyzed from KOP 16. Impacts on the Salt Missions Scenic Byway and New Mexico State Route 42 are the same as Alternative Route 1.

PLAN CONFORMANCE

The project would meet BLM VRM Class IV objectives where BLM lands are crossed by Alternative Route 2, therefore no plan amendment would be required for this alternative and its associated subroutes.

3.4.24.8 Impacts of Alternative Route 3

SCENERY

Impacts on scenery associated with Alternative Route 3 would be similar to Alternative Route 2, except the areas of high impact on the Rio Grande would be associated with Subroutes 3A-2 and 3A-3. The other subroutes would parallel the Western Spirit 345-kV transmission line, resulting in moderate impacts.

VIEWING LOCATIONS

Residences

Impacts on residences within the Rio Grande Valley and to the east would be similar to Alternative Route 2, with Subroutes 3A-2 and 3A-3 experiencing the greatest impacts since these routes would not parallel the Western Spirit 345-kV transmission line. Farther to the south, Alternative Route 3 would be visible within the foreground of residences between Socorro and Alamillo (KOPs 13 – Alamillo and 14 – Lemitar [see Appendix F, Attachment 3 for visual simulation]) as well as an area north of Sevilleta NWR, generating moderate-high to high impacts on residential views.

Recreation

Impacts on the Sevilleta NWR would be similar to Alternative Route 2 but since the project would occur along a different alignment, different impacts would be generated from the identified KOP locations. The project would not be visible from KOPs 40 and 42 (San Lorenzo Canyon) but would cross the San Lorenzo Canyon Road (KOP 41) adjacent to an existing transmission line. Based on the distance from the project (less than 0.5 mile), and the scale of the proposed transmission line compared with the existing line, the project would attract attention and begin to dominate the setting. From this location, the project would be visible extending to the north and south for a long distance—generating moderate-high impacts on these views. To reduce contrast on these views, EPM 9 would be applied to modify tower spacing, where feasible, to match the existing transmission line being paralleled. Similar impacts are anticipated on views from County Road 12, providing access to the Rio Puerco Hunt Unit (KOP 12). Views from the Mesa Trail (KOP 35) would be similar to Alternative Route 2, except the project would be located approximately 1.5 miles away, generating moderate impacts on these views (see simulation in Appendix F, Attachment 3). Views from the visitor center (KOP 34) would potentially include the tops of a few proposed transmission line structures, resulting in a faint, vertical, repeating, geometric form approximately 2 miles away, and resulting in low-moderate impacts on these views. From this location, most of the project would be screened by topography. Additional detail regarding impacts on the Sevilleta NWR are described in AID-18. Impacts on the Salinas Pueblo Missions National Monument, including the Gran Quivira, Abo, and Quarai Units, would be the same as Alternative Route 1. For impacts on National Scenic and Historic Trails refer to Section AID-11.

Travel Routes

Impacts on I-25 would be similar to Alternative Route 1 except that Subroutes 3A-1, 3A-2, and 3A-4 would parallel the interstate for approximately 3 to 7 miles, depending on the subroute (see Appendix F, Attachment 3 for visual simulation from KOP 10). These longer-duration views would further impact the viewshed as motorists would have views of the project directly adjacent to the highway for several minutes. High impacts are also anticipated on views from the I-25 (KOP 15) near Polvadera where the project would introduce moderate-strong contrast in a panoramic setting. An existing transmission line would be paralleled, but due to the scale of the proposed project and the views being within the foreground distance zone, the project would dominate views from the interstate, particularly along Local Alternative 3B-1. Contrast would be reduced where residential development and associated utilities influence the trail's existing character, reducing project impacts to moderate in those locations. For more detail on these impacts to I-25 (El Camino Real National Scenic Byway) and on the El Camino Real NHT NPS auto tour route (New Mexico State Route 304 and portion of I-25), please refer to AID-11 and Appendix E.

Impacts on views from the Abo Pass Trail National Scenic Byway would be similar to those described for Alternative Route 1 including increased impacts associated with Subroute 3A-3, as described for Subroute 1A-3. Additional high impacts on views from the Abo Pass Trail National Scenic Byway (New Mexico State Route 47) would occur where Subroute 3A-4 (in the same manner as described for Alternative Route 1 Subroute 1A-4) would parallel the scenic byway for approximately 2 miles as analyzed from KOP 16. Impacts on the Salt Missions Scenic Byway and New Mexico State Route 42 are the same as Alternative Route 1.

PLAN CONFORMANCE

The project would meet BLM VRM Class IV objectives where BLM lands are crossed by Alternative Route 3, therefore no plan amendment would be required for this alternative and its associated subroutes.

3.4.24.9 Impacts of SunZia West Substation

Low/moderate impacts on the Sonoran Palo Verde Mixed Cacti Desert Valley scenery rating unit (Class B) would result from the introduction of the SunZia West Substation into the landscape, adjacent to existing 500-kV and 115-kV transmission lines, as well as the no action alternative. There would be limited grading required, due to the relatively flat siting area, with the primary impacts associated with the removal of Sonoran Desert Scrub vegetation and the construction of the substation, including associated transmission line structures and substation equipment.

Views from residences and Park Link Drive would occur in context with the existing transmissions and adjacent to the no action alternative, resulting in a low-moderate impact associated with the project. To reduce impacts from potential glint, glare, and reflectivity associated with galvanized steel structures and other equipment, dulled galvanized steel or self-weathering steel would be used.

Since the SunZia West Substation would not be situated on BLM or USFS lands and there are no state visual requirements for this area, the project would be compliant with agency visual management objectives.

3.4.24.10 No Action Alternative

Under the no action alternative, based on the 2015 ROD and 2016 Right-of-Way Grant, the BLM 2015 Selected Route would continue to be authorized. The impacts on visual resources are described in detail in the 2013 FEIS (BLM 2013:4-153 through 4-202) and are summarized below.

SCENERY

The introduction of the project into the landscape would primarily result in moderate-high impacts to Class B scenery (Madrean Mountain landscapes, Chihuahuan Desert Creosote Bajadas, foothills, Peloncillo Mountains, San Pedro River Valley). A small area of Class A scenery associated with the Rio Grande would be crossed, resulting in high impacts on scenery due to the intact visual setting at the crossing area and proposed riparian vegetation removal at the river crossing. Contrast would be reduced by maximizing the span at the river crossing and selectively removing vegetation to reduce contrast created by right-of-way clearing. No other areas of high impacts on scenery were identified.

VIEWING LOCATIONS

Residences

High to moderate-high impacts would occur on views from residences near Socorro, Willow Springs, Deming, La Palma, and other residential areas and dispersed residences located immediately adjacent (0.5 mile or less) to the project. These areas generally comprise largely intact natural landscapes with few existing modifications in their viewshed, which would become dominated by the presence of repeating, vertical transmission line structures.

Recreation

High to moderate-high impacts would occur on views from high-concern viewers associated with the Stallion WSA, Veranito WSA, Sevilleta NWR, Johnson (Gordy's) Hill SRMA, Peloncillo Mountains Wilderness, Buehman Canyon Trail, and the Rio Grande where the project would be viewed from within 0.5 mile in settings that are generally intact and undisturbed. Moderate-high impacts are also anticipated for views from moderate-concern viewers associated with Ladron Mountain-Devil's Backbone Complex ACEC. Low impacts on views from the Gran Quivira Unit of the Salinas Pueblo Missions National Monument would occur where the project would be located approximately 4.7 miles away. For impacts on National Scenic and Historic Trails refer to AID-11.

Travel Routes

High to moderate-high impacts on views would occur from multiple travel routes including Salt Missions Trail Scenic Byway (a travel route that provides access to Gran Quivira), WSMR Route 3607, WSMR Route 5, U.S. Route 54, State Route 55, Quebradas Back Country Byway SRMA, Geronimo National Scenic Byway, Lake Valley Back Country Byway, U.S. Route 180, Cascabel Road, Redington Road Scenic Drive, State Route 77, Muleshoe Ranch Road, Black Hills Mine Road/Catalina Ridge, Webb Road, and Park Link Drive.

High to moderate-high impacts on views from the El Camino Real National Scenic Byway would occur where the project is located within 0.5 mile of the route. Views of the project would be unobstructed as it traverses rolling to steep terrain in areas with limited existing modifications.

BLM VRI

Based on BLM direction, the BLM VRI data were assessed for portions of the proposed project crossing BLM land. Appendix D3 of the 2013 FEIS contains a series of tables describing the VRI classifications crossed by the project. In summary, the no action alternative would cross:

- **SQRU:** No Class A scenery would be crossed. Approximately 13% Class B and 23% Class C scenery, with the remaining 64% occurring on non-BLM-administered land.
- **SLRU:** Approximately 12% in high sensitivity, 10% in moderate sensitivity, and 14% in low sensitivity landscapes as inventoried by the BLM. The remaining 64% would occur on non-BLM-administered land.
- **VRI Distance Zone:** Approximately 36% of the project (all of the BLM-administered lands crossed) would occur in the foreground/middle ground distance zone as inventoried by the BLM. The remaining 64% would occur on non-BLM-administered land.
- **VRI Classes:** No VRI Class I lands would be crossed. Approximately 3% of the project would be in VRI Class II, 13% in VRI Class III, and 20% in VRI Class IV, with the remaining 64% occurring on non-BLM-administered land.

PLAN CONFORMANCE

There are portions of this alternative which were assessed to not be in conformance with VRM Class II and VRM Class III objectives. Nonconformance with BLM VRM Class II objectives would occur for 7.7 miles as viewed from Veranito WSA, Johnson (Gordy's) Hill SRMA, and WSMR Route 5. Nonconformance with BLM VRM Class III objectives would occur for 6.1 miles as viewed from Veranito WSA, Johnson (Gordy's) Hill SRMA, WSMR Route 5, and WSMR Route 3607. See Section 4.18 of the 2013 FEIS (BLM 2013) for more detail regarding nonconformance with BLM VRM Classes and associated resource management plan amendments.

3.4.24.11 Summary of Impacts

Most of the Localized Route Modifications (Component 1) would have similar impacts as the no action alternative and would meet BLM VRM Class objectives where BLM land is traversed. Increased impacts are anticipated on scenery and on views where the route modifications would deviate from paralleling the existing transmission lines that had otherwise decreased visual contrast associated with the no action alternative alignment.

The impacts associated with access roads and temporary work areas outside of the granted right-of-way (Component 2) would incrementally increase those described for the no action alternative through additional ground disturbance, clearing of vegetation, and the introduction of geometric forms similar to those proposed under the no action alternative. The project would be consistent with BLM VRM Class II, III, and IV objectives where BLM land is traversed.

In general for the Segment 4 Reroute Alternatives (Component 3), Alternative Route 1 would generate the highest impacts on visual resources as fewer existing linear facilities (e.g., transmission lines, pipelines) would be paralleled—increasing contrast introduced by the project. Alternative Routes 2 and 3 would parallel existing transmission lines for long stretches including where the Sevilleta NWR would be crossed. Views from the Sevilleta NWR, including San Lorenzo Canyon, would be highly impacted by Alternative Routes 2 and 3 whereas Alternative Route 1 would not impact views from the NWR. Views from the Salinas Pueblo Missions National Monument (including the Abo, Gran Quivira, and Quarai Units) would be minimally impacted by the project (all alternatives). Visual resources on the Cibola

National Forest would only be impacted by Alternative Route 1, resulting in high impacts on landscape character and views, including those from the Scott Mesa IRA for Local Alternative 1A-6. Based on the 1985 USFS LRMP, the project would meet the definition of a maximum modification VQO and would conform to the LRMP where USFS lands would be crossed. Portions of Alternative Route 1 also cross BLM VRM Class II lands, where the project was found to be inconsistent with VRM objectives for 3.4 miles—requiring an amendment to the Socorro Field Office RMP (Local Alternative 1A-7 would add 0.2 mile to this RMP amendment). Alternative Routes 2 and 3 would meet BLM VRM Class IV objectives where BLM land would be traversed.

Cumulative impacts on visual resources are discussed in Section 4.17.4.9 of the 2013 FEIS (BLM 2013:4-336 through 4-338). Incremental impacts from the proposed project components could adversely impact scenery (landscape character) and views from viewing locations. Impacts on visual resources from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative visual resource impacts may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Impacts during construction, including the introduction of construction vehicles, equipment, and construction materials within staging areas, access roads, and within the transmission line right-of-way, is temporary and would end upon completion of project construction. Operation and maintenance of the transmission lines and renewable energy projects would introduce additional modifications into the landscape potentially dominating the existing landscape character and views from viewing locations; however, these effects would dissipate with increasing distance from the project boundary. These effects would be most intense from viewing locations with foreground views (0–0.5 mile) of multiple, parallel transmission line projects resulting in additive, long-term impacts on viewers near Lordsburg (Great Divide Wind Farm and Southline Transmission line project) and in the Rio Grande Valley where the project would parallel the existing Western Spirit transmission line.

AID-13 Existing and Future Land Uses

Would construction and operation of the proposed project components conflict with existing or future land uses, including residential areas, agriculture, commercial/industrial areas, zoning districts, planned subdivisions, or lands designated for parks or preservation?

3.4.25 Affected Environment

Land use is defined as the human use of areas for economic, residential, recreational, conservation, and government purposes. State and municipal governments establish comprehensive plans and zoning ordinances to guide long-range development and preservation goals. The environmental setting and regulatory context for land use resources within the analysis area is described in Sections 3.10.2 and 3.10.1.3, respectively, of the 2013 FEIS (BLM 2013:3-245 through 3-252).

This section focuses on private and municipal land uses. As discussed in the 2013 FEIS, “where the Project would cross private and state lands, it would be subject to applicable land use planning regulations, zoning ordinances, or other requirements enforced by state, county, or local jurisdiction. The Applicant would also need to secure any necessary ministerial permits, such as dust control, grading or drainage permits” (BLM 2013:1-18 to 1-19). Impacts to land uses on state and federal lands and conformance with federal land use plans developed by the BLM, USFWS, USFS, and other federal agencies are discussed in Chapter 4 of this Draft EIS.

The analysis area for the proposed project components is defined as follows:

- Components 1 and 3: A 6-mile-wide corridor centered on the reference centerline of the proposed transmission line
- Component 2: 150-foot-wide study corridor centered on access-road centerline of proposed access road alignments outside 400-foot right-of-way; boundary of temporary work areas
- Component 4: 80.3-acre substation siting area (including the 40 acres of the substation siting area in the existing right-of-way).

The analysis area passes through portions of Greenlee, Graham, Cochise, Pima, and Pinal Counties in Arizona, and Hidalgo, Grant, Luna, Sierra, Socorro, Valencia, Torrance, and Lincoln Counties in New Mexico. Other towns, municipalities, and unincorporated areas within the analysis area include the towns of Benson, Oracle, San Manuel, and Willcox in Arizona and the towns of Abeytas, Alamillo, Bosque, Casa Colorada, Jarales, Lemitar, Polvadera, San Acacia, Socorro, and Veguita in New Mexico.

The land use types present within the analysis area are substantially similar to those disclosed in the 2013 FEIS (BLM 2013:3-253 through 3-266) and include undeveloped (i.e., agriculture, rangeland, parks and preservation lands, conservation easements, and other vacant areas) and developed uses (i.e., residential, commercial, institutional, and industrial). The majority of the analysis area consists of undeveloped federal and state land used for agriculture or rangeland (see AIB-23 Livestock Grazing). In general, agricultural lands are located primarily near populated areas and along major waterways, such as the Rio Grande in New Mexico. Active dairy farms also are located in the analysis area for Component 3, particularly in Valencia County. The analysis area for Component 3 includes some areas within Valencia County that are zoned for agricultural preservation or outland.

Residential areas and subdivisions are found scattered throughout the analysis area, with concentrations near towns and cities. The majority of residences within the analysis area are generally rural/low-density in nature. The analysis area for Component 1 includes the Apache Hills subdivision, located north of Deming in Luna County. Rural and medium- to high-density residential areas are present within the Component 2 analysis area near the towns of Benson and Willcox in Cochise County. Planned subdivisions and developments within the Component 2 analysis area include the Earley and La Palma and Rancho Coronado subdivisions in Pinal County. Medium- to high-density residential areas are present within the Component 3 analysis area primarily east of I-25 in Socorro and Valencia Counties. The Polvadera Heights neighborhood is located west of I-25 near the town of Polvadera. The Santa Rita Ranches subdivision, located within the analysis area for Component 3 along Alternative Route 1, is centered around the historic town of Riley, New Mexico, approximately 20 miles north of the town of Magdalena on Forest Service Road 354. The subdivision consists of approximately 107 parcels between 20 and 30 acres in size (Woods Canyon Archaeological Consultants, Inc. 2005). The Abo Valley Ranchettes subdivision is located on either side of the Socorro and Valencia County line east of New Mexico Highway 304. Also within the Component 3 analysis area are several platted, master-planned subdivisions in Socorro and Valencia Counties consisting of several thousand lots ranging from 1 to 40 acres in size that are largely vacant and undeveloped, including Rancho Rio Grande West, Rio Grande Estates, and Tierra Grande. These subdivisions generally allow for unrestricted residential use, including RVs and other unconventional homes (Capital Fund III 2021; Hemingway Land Company 2021).

Commercial uses include restaurants, gas stations, banks, grocery stores, motels and hotels, and other businesses. Industrial uses include warehouse businesses, manufacturing companies, storage facilities, and other similar uses. Commercial and industrial areas and other developed land uses within the analysis area are concentrated around cities, towns, and major transportation corridors. The Macho Springs solar development is located within the analysis area for Route Modification 3 under Component 1. The Route Modification 6 analysis area in Pinal County, Arizona, includes the Arizona Training Program at

Coolidge, a federally funded Medicaid facility that provides specialized long-term medical care and housing. The Component 3 analysis area includes industrial and mixed-use areas associated with the platted Tierra Grande subdivision along an existing railroad in Socorro and Valencia Counties.

Two special zoning districts governed by independent zoning boards within Socorro County are located within the analysis area for Component 3. The Abeytas/Sabinal Special Zoning District is located west of the Rio Grande. Special Zoning District 2 is located east of the Rio Grande. Zoning ordinances for these districts designate all lands in the districts as agricultural, rural residential, or cottage industries. Retail, commercial, and industrial uses and mixed-use developments are restricted. Furthermore, the special zoning districts prohibit the expansion or change in usage on any tract of land on which current usage is non-compliant with the ordinance unless a variance or zoning change is requested from the District Commissioners (Socorro County 2006).

Preservation and conservation areas include privately owned or non-profit conservation easements and areas zoned or designated as conservation, preservation, or open space by municipal or regional land use plans. State and local parks, recreation areas, and federally designated conservation areas (i.e., Sevilleta NWR, IRAs, Special Designations) are discussed in Sections AID-18, AID-17, and AID-16, respectively. No private or local conservation areas are within the analysis area for Component 1. Several conservation easements, including the A7 Ranch, are located within the Component 2 analysis area. The A7 Ranch was purchased by Pima County to support conservation efforts outlined in the Sonoran Desert Conservation Plan and contains both state, county, and private lands. Approximately 471 acres of the ranch are under conservation easements held by The Nature Conservancy (POWER Engineers, Inc. 2021i:7). Other areas owned by Pima County for open space, habitat, and resource protection within the Component 2 analysis area include Oracle Ridge, the Bingham Cienega Natural Preserve, and Buehman Canyon. Additionally, several private ranches and grazing allotments within Pima County are mitigation lands with restrictive covenants limiting development. According to the restrictions outlined the Pima County Master Restrictive Covenant for Pima County Multi-species Conservation Plan Mitigation Land, development of, or the granting of, right-of-way easements for new roads or new utilities are prohibited; however, any pre-existing use of the restricted property is exempt (Pima County 2016).

The Component 3 analysis area includes the Middle Rio Grande Conservation District and designated open space and agricultural preservation areas in Valencia County. Several New Mexico Land Conservancy conservation easements are within the Component 3 analysis area. However, these areas were avoided in the Segment 4 Reroute Siting Study (SunZia 2020a). The Comanche Ranch, owned by the federally recognized Pueblo of Isleta Tribe, is located within the Component 3 analysis area west of Rio Puerco, within 0.5 mile north of Segment 4 Alternative Route 1 for approximately 13 miles. The Bureau of Indian Affairs signed the ranch into trust on behalf of the Isleta Pueblo tribe in 2016, which expanded the tribal boundary by approximately 90,000 acres. The property operates as a ranch with approximately 1,500 head of cattle and encompasses a large portion of Valencia County and adjacent Socorro County (Pueblo of Isleta 2012, 2016).

3.4.25.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Planned land uses within the analysis area include planned infrastructure projects, including transmission lines, substations, wind farms, and solar developments; medium- to high-residential or mixed-use developments (also referred to as urban neighborhood uses in Pinal County); rural residential uses, and military activities. Several planned residential developments, including the Earley and La Palma mixed-use, single-family, and multifamily residential subdivision with a start date of 2030, have been approved within the analysis area for Route Modification 6. As the population in the counties within the analysis area continue to grow, additional residential development is expected to occur, particularly around existing cities and towns, requiring additional associated commercial uses, transportation, power generation, and utility infrastructure. This trend of increasing development would continue to encroach upon agricultural and grazing lands. However, existing and future conservation areas, grazing allotments, open space designations, and other conservation initiatives would limit development to certain areas.

3.4.26 Environmental Consequences

3.4.26.1 Methods and Assumptions

The impact assessment methodology for land use is substantially similar to the 2013 FEIS (BLM 2013:4-206 through 4-207). The following assumptions were used to analyze impacts to existing and future land uses:

- Unless otherwise noted, proposed project components are assumed to be largely compatible with existing and planned industrial uses, roads, railroads, and utility corridors.
- Temporary impacts would be restored to preexisting conditions and would therefore have no long-term impacts to land use.
- SunZia would be expected to resolve land use conflicts through landowner or lease agreements, including appropriate compensation for economic impacts on landowners (POWER Engineers, Inc. 2021i:66).

The impact indicators used for this analysis are:

- Number of residences within 300 feet of the proposed right-of-way
- Number of subdivisions crossed
- Acres of agricultural land uses crossed
- Acres of commercial and industrial land uses crossed
- Number of conservation easements crossed

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to land use:

- AIB-23 Livestock Grazing
- AID-12 Visual Resources

The impacts analysis for existing and future land uses assumes application of the design features and environmental protection measures contained in Table 3-130. Full design features and EPMs are provided in Appendix C.

Table 3-130. Design Features and Environmental Protection Measures Applicable to Existing and Planned Land Uses

Relevant Design Features	Applicable EPMs
1, 2, 3, 5, 6, 8, 9, 13, 21	2, 3, 4, 5, 7, 8, 9, 16

3.4.26.2 Impacts Common to All Components

CONSTRUCTION

During construction and decommissioning, construction activities would result in short-term, direct, moderate impacts to agricultural properties, to include temporarily reducing planting areas or prohibiting access to agricultural fields and ancillary facilities (i.e., canals) during construction. Where private lands would be intersected outside of existing rights-of-way, easements would be negotiated with the landowner. When construction is complete, all temporarily disturbed areas would be restored as required by the landowner, including reestablishing pre-construction contours, reseeding, and erosion control (Design Feature 8). Furthermore, in addition to standard reseeding and recontouring practices, a detailed reclamation plan would be developed to mitigate site-specific resource impacts to agricultural properties (EPM 5). Watering facilities used for agricultural operations (e.g., tanks, developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities, as required by the landowner or land management agency (Design Feature 9).

Indirect, short-term impacts to agricultural properties, residences, and developed land uses surrounding the project footprint would be minor and would result from increased traffic, noise, dust, and potential delays. To minimize indirect impacts to adjacent land uses, all vehicle movement outside the right-of-way would typically be restricted to designated access, contractor acquired access, or public roads (Design Feature 2). The boundaries of construction activities would typically be predetermined, with activity restricted to and confined within those limits (Design Feature 3). While the overall construction period would continue for up to 3 years, construction activities would be conducted in segments and would cease when construction activities within that segment are completed; thus, temporary construction impacts to any one area would not persist for the full duration of construction. Existing land uses surrounding the proposed project would not be precluded during the construction period. Existing access to agricultural properties, residences, commercial and industrial properties, and other developed land uses would be maintained during and after construction in accordance with the POD (Design Feature 1).

OPERATION AND MAINTENANCE

Impacts to land use during operation and maintenance of the proposed project would be similar to the impacts disclosed in the 2013 FEIS (BLM 2013:4-206 through 4-221).

DECOMMISSIONING

Decommissioning activities would result in similar short-term impacts as construction, including temporary increases in noise, dust, and heavy equipment use. Decommissioning of the project would make the right-of-way available for other similar uses, or the right-of-way could be completely reclaimed and reverted back to the existing land uses.

3.4.26.3 Impacts of Localized Route Modifications

Proposed Route Modifications 1 through 5 would cross vacant BLM, state, or private lands only. Route Modifications 1 and 2 were designed to avoid or minimize impacts to private properties per the landowners' preference. Route Modification 3 has been designed to avoid impacts to the Alta Luna Solar Facility and the Macho Springs wind farm. Route Modifications 1 and 3 each intersect with less than 0.1 acre of land used for agriculture. Under Route Modification 6, all route modification options would generally follow existing roads and property boundaries through undeveloped or agricultural lands and would largely avoid scattered single-family homes and small businesses in Pinal County. Of the three options under Route Modification 6, Route 6a would have the greatest impact to agricultural properties at nearly 1 acre; Route 6c would affect the least amount of agricultural land. Route 6a would pass within 400 feet of the Arizona Training Program at Coolidge; no direct impacts to the facility would occur. Route 6c would indirectly affect the greatest number of residences within 300 feet; Route 6a would affect the lowest number of residences. Flexibility in the placement of transmission structures would allow for some residences to be avoided, or for the transmission structures to be placed in locations agreed upon by landowners, thereby reducing direct impacts due to ground disturbance and indirect impacts due to visual contrast (EPM 8). All Route Modification 6 options, including the 2015 Selected Route, would cross the planned Earley and La Palma mixed-use development; Route 6c would intersect the planned development to the greatest extent. However, Route 6c would be co-located with the existing Earley Road (EPM 16), which would minimize any conflicts with the planned development and any existing developed land uses. SunZia would be expected to resolve land use conflicts along the routes selected for construction, including any zoning variances, comprehensive plan amendments, or compensation for economic impacts through landowner agreements and permissions.

Short-term moderate effects on agricultural land uses from construction may include temporarily reducing or prohibiting access to agricultural fields and ancillary facilities (i.e., canals) during construction. Long-term impacts include permanent removal of croplands from production at structure locations. Depending on the type of crop and the methods and equipment used for planting and harvesting, long-term effects could also include permanent removal of croplands from production in the permanent right-of-way. To minimize impacts to agricultural lands, the proposed right-of-way has been aligned to the extent practicable to reduce the impact to farm operations and agricultural production (Design Feature 13). Structures would be placed to span agricultural lands to avoid and minimize the permanent removal of agricultural fields (EPM 8). SunZia would be expected to resolve conflicts concerning the removal of croplands through landowner or lease agreements, including appropriate compensation for economic impacts on landowners.

3.4.26.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs may potentially result in long- and short-term impacts to agricultural, residential, and developed land uses and conservation areas.

New permanent access roads in agricultural areas would result in permanent removal of croplands from production for the life of the project (50 years) until decommissioning; however, the routes have been sited along property lines to reduce removal of croplands from production to the extent possible (Design Feature 13). SunZia would be expected to resolve conflicts concerning the removal of croplands through landowner or lease agreements, including appropriate compensation for economic impacts on landowners (POWER Engineers, Inc. 2021i:66). New permanent disturbance for access roads in developed areas would primarily consist of improvements along existing roads and is therefore not likely to result in long-term impacts. Use of existing roads has been proposed to the extent possible to minimize ground disturbance, changes to existing land uses, and changes in access to and within individual properties (Design Feature 6). All existing roads will be left in a condition equal to or better than the condition prior to construction, in accordance with BLM, state, and/or local road standards or private landowner agreements (Design Feature 5) (POWER Engineers, Inc. 2021a:21). SunZia would maintain the road rights-of-way in a safe, useable condition and maintenance agreements will be executed with applicable land-management agencies, counties, local agencies, and private landowners (POWER Engineers, Inc. 2021a:25). Therefore, the use of existing roads would have no long-term impacts to existing or future land use.

Construction of temporary access roads and TWAs would result in short-term impacts within agricultural and developed land uses. In agricultural areas, overland access (i.e., drive-and-crush or cut-and-clear) would be used to the greatest extent possible in areas where no grading would be needed to access work areas (EPMs 2 and 3), which would minimize impacts to cropland (POWER Engineers, Inc. 2021a:21). On completion of construction, all new temporary access roads not required for maintenance would be permanently closed and reclaimed to their pre-construction condition, with concurrence of the landowner or appropriate land management agency (EPM 4). This would limit long-term effects on existing land uses.

TWAs and proposed new access roads have been sited outside of restrictive conservation areas and official conservation easements where possible. However, some access roads and TWAs would result in short-term impacts to conservation areas such as the A7 Ranch that may have restrictive covenants attached. Where conservation areas cannot be avoided, SunZia would be required to review the nature of the easement recorded and any restrictive covenants that may apply. If no restrictions apply, then the acquisition of the right-of-way or temporary construction easement would be handled as a negotiation between the property owner and SunZia on a case-by-case basis, similar to an unrestricted property (BLM 2013:3-255).

3.4.26.5 Impacts of Segment 4 Reroute Alternatives

Under all Segment 4 reroute alternatives, the proposed alignment within Torrance and Socorro Counties partially parallels, when possible, with the planned Western Spirit 345-kV transmission line where possible for the easternmost 65 miles. Co-locating the proposed line with the Western Spirit transmission line would minimize ground disturbance, visual contrast, and potential land use conflicts (EPM 16). Tower design and typical spans would be modified to correspond with the spacing of existing or proposed transmission line structures where feasible, and within limits of standard tower design. This would reduce visual contrast and/or potential operational conflicts (EPM 9).

All Segment 4 alternative routes would cross residential properties, including portions of the Tierra Grande subdivision in Valencia and Socorro Counties. In addition to the impacts described under Construction, the long-term presence of the transmission line would result in direct, long-term visual and aesthetic effects for some residences (see AID-12), and would permanently preclude other land uses in the right-of-way. Flexibility in the placement of transmission structures would allow for some residences or developed land uses to be avoided, or for the transmission structures to be placed in locations agreed upon by landowners, thereby reducing direct impacts due to ground disturbance and indirect impacts due to visual contrast (EPM 8). SunZia would be expected to resolve land use conflicts along the route selected for construction, including any compensation for economic impacts through landowner agreements and permissions.

All Segment 4 alternative routes would cross agricultural land uses. Short-term moderate effects on agricultural properties from construction would include temporarily reducing or prohibiting access to agricultural fields and ancillary facilities (i.e., canals) during construction. When construction is complete, all temporarily disturbed areas would be restored as required by the landowner, including reestablishing pre-construction contours, reseeding, and erosion control (Design Feature 8). Furthermore, in addition to standard reseeding and recontouring practices, a detailed reclamation plan would be developed to mitigate site-specific resource impacts to agricultural properties (EPM 5). Watering facilities used for agricultural operations (e.g., tanks, developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities, as required by the landowner or land management agency (Design Feature 9). Long-term impacts include permanent removal of croplands from production at structure locations and other permanent features. Where possible, agricultural activities could resume within the undisturbed areas of the right-of-way following construction; however, depending on the type of crop and the methods and equipment used for planting and harvesting, long-term effects may include permanent removal of croplands from production in the right-of-way. Transmission structures would be placed to minimize the permanent removal of agricultural fields (EPM 8). SunZia would be expected to resolve conflicts concerning the removal of croplands through landowner or lease agreements, including appropriate compensation for economic impacts on landowners.

IMPACTS OF ALTERNATIVE ROUTE 1

Up to five residences would be impacted if Alternative Route 1 is selected, depending on the subroute. The residences are located within or adjacent to (i.e., within 300 feet of) the proposed Alternative Route 1 to the east and west of the Rio Grande and in rural residential areas. All Alternative Route 1 subroutes would cross multiple properties within the Santa Rita Ranches subdivision in Riley, New Mexico. Alternative Route 1 with Subroute 1A-3 would cross through vacant properties within the Rio Grande Estates subdivision along Nieto Avenue. Alternative Route 1 with Subroutes 1A-1 and 1A-4 would cross several residential properties within and north of the Abo Valley Ranchettes subdivision. Subroute 1A-4 would also pass through portions of the Tierra Grande subdivision that are zoned for future industrial and mixed use. The proposed route would be co-located with the Western Spirit 345-kV Transmission Line in this area and would be compatible with future industrial land uses. All Alternative Route 1 subroutes would avoid Comanche Ranch; no direct impacts are anticipated.

Alternative Route 1 would impact up to 9.4 acres of agricultural land uses. Irrigated agricultural areas crossed along Alternative Route 1 are primarily located east and west of the Rio Grande. Alternative Route 1 crosses other types of agriculture such as dryland (including livestock and dairy farms). No conservation easements would be impacted.

IMPACTS OF ALTERNATIVE ROUTE 2

Up to four residences would be impacted if the Alternative Route 2 route is selected, depending on the subroute. The residences are located within or adjacent to (i.e., within 300 feet of) the proposed right-of-way to the east and west of the Rio Grande and in rural residential areas. All Alternative Route 2 subroutes would avoid the Santa Rita Ranches subdivision and Comanche Ranch. Alternative Route 2 with Subroute 2A-3 would cross through vacant properties within the Rio Grande Estates subdivision along Nieto Avenue. Alternative Route 2 with Subroutes 2A-1 and 2A-4 would cross several residential properties within and north of the Abo Valley Ranchettes subdivision. Subroute 2A-4 would also pass through portions of the Tierra Grande subdivision that are zoned for future industrial and mixed use. The proposed route would be co-located with the Western Spirit 345-kV Transmission Line in this area and would be compatible with future industrial land uses. Alternative Route 2 would impact up to 10 acres of agricultural land uses. No conservation easements would be impacted.

IMPACTS OF ALTERNATIVE ROUTE 3

Up to seven residences would be impacted if Alternative Route 3 is selected, depending on the subroute. The residences are located in or adjacent to (i.e., within 300 feet of) the proposed right-of-way to the east and west of the Rio Grande, in rural residential areas, and in the Polvadera Heights neighborhood. Local Alternative 3B-1 would be located east of the Polvadera Heights neighborhood and would be co-located with an existing power line. Local Alternative 3B-2 would pass west of the Polvadera Heights neighborhood through vacant land. All Alternative Route 3 subroutes would avoid the Santa Rita Ranches subdivision and Comanche Ranch. Alternative Route 3 with Subroute 3A-3 would cross through vacant properties within the Rio Grande Estates subdivision along Nieto Avenue. Alternative Route 3 with Subroutes 3A-1 and 3A-4 would cross several residential properties within and north of the Abo Valley Ranchettes subdivision. Subroute 3A-4 would also pass through portions of the Tierra Grande subdivision that are zoned for future industrial and mixed use. The proposed route would be co-located with the

Western Spirit 345-kV Transmission Line in this area and would be compatible with future industrial land uses.

3.4.26.6 Impacts of SunZia West Substation

The SunZia West Substation footprint consists entirely of vacant, non-developed Arizona State Trust lands directly adjacent to two existing high-voltage transmission lines (POWER Engineers, Inc. 2021i:57). Therefore, no impacts to land use are anticipated.

3.4.26.7 No Action Alternative

Impacts to land use under the no action alternative would be as described in Section 4.10 of the 2013 FEIS (BLM 2013:4-206 through 4-221). There would be few impacts to land uses because a major portion of the no action alternative would be constructed along established utility corridors or other linear features. Approximately 53% (273 miles) of the route is parallel to existing or designated utility corridors, including 229 miles parallel to existing transmission lines (BLM 2013:4-221). For the remainder of the corridor, only minor to moderate, indirect, short- and long-term impacts to agricultural, residential, or developed uses would occur due to indirect conflicts or temporary construction impacts. No direct, long-term impacts to existing land uses (e.g., displacement of homes, businesses, or industrial facilities) or future land uses (e.g., physical conflict with planned subdivisions at final plat stage) would occur.
The 2015 Selected Route would potentially cross private and public conservation easements within both New Mexico and Arizona, particularly near the Rio Grande and San Pedro River. However, at the time of publication of the 2013 FEIS, no specific conservation easement crossings had been identified (BLM 2013:4-255). Conservation easement crossings would be addressed as discussed under Section 3.4.26.4.

3.4.26.8 Summary of Impacts

Table 3-131 below provides a summary of the impacts to residences, subdivisions, agricultural areas, developed land uses, and conservation easements anticipated as a result of the proposed action and alternatives.

Table 3-131. Summary of Land Use Impacts

Project Component	Residences within 300 feet of ROW (number)	Subdivisions Crossed (number)	Agricultural (permanent) (acres)	Agricultural (temporary) (acres)	Developed (permanent) (acres)	Developed (temporary) (acres)	Conservation Easements Crossed (number)
Component 1: Localized Route Modifications							
1. Mavericks Area	0	0	0.0		0.0	0	0
2. SunZia South Area	0	0	0.0		0.0	0	0
3. Macho Springs Area	0	0	0.0		0.0	0	0
4. Las Palomas Area	0	0	0.0		0.0	0	0
5. Highlands Area	0	0	0.0		0.01	0	0
6a. Pinal Central Area – North Route	3	1 (planned)	1.2		0.8	0	0

Project Component	Residences within 300 feet of ROW (number)	Subdivisions Crossed (number)	Agricultural (permanent) (acres)	Agricultural (temporary) (acres)	Developed (permanent) (acres)	Developed (temporary) (acres)	Conservation Easements Crossed (number)
6b. Pinal Central Area – Steele Route	4	1 (planned)	0.8		0.8	0	0
6c. Pinal Central Area – Earley Route	5	1 (planned)	0.9		0.7	0	0
Local Alternative West Tie-in		0	0.1		0.1		
Local Alternative Central Tie-in		0	0.1		0.1		
Local Alternative East Tie-in		0	0.1		0.0		
Component 2a. Access Roads	12	0	12	2	18	26	1
Component 2b. Temporary Work Areas	8	0	N/A	89	N/A	69	1
Component 3. Segment 4 Reroute Alternatives							
Alt Route 1 with Subroute 1A-1	4	3	9.4	9.6	3.3	3.3	0
Alt Route 1 with Subroute 1A-2	2	2	6.4	6.5	2.4	2.4	0
Alt Route 1 with Subroute 1A-3	2	3	6.7	6.8	2.3	2.4	0
Alt Route 1 with Subroute 1A-4	5	3	9.2	9.4	3.5	3.6	0
Local Alternative 1A-6	0	0	0.0	0.0	0.0	0.0	0
Local Alternative 1A-7	0	0	0.0	0.0	0.0	0.0	0
Alt Route 2 with Subroute 2A-1	3	2	10.0	10.8	3.2	3.4	0
Alt Route 2 with Subroute 2A-2	1	1	7.1	7.7	2.2	2.4	0
Alt Route 2 with Subroute 2A-3	1	2	7.4	8.0	2.2	2.4	0
Alt Route 2 with Subroute 2A-4	4	2	9.8	10.5	3.4	3.7	0
Alt Route 3 with Subroute 3A-1	6	2	9.1	9.6	4.8	5.0	0
Alt Route 3 with Subroute 3A-2	4	1	6.2	6.5	3.8	4.0	0
Alt Route 3 with Subroute 3A-3	4	2	6.4	6.8	3.8	4.0	0
Alt Route 3 with Subroute 3A-4	7	2	8.9	9.4	5.0	5.3	0

Project Component	Residences within 300 feet of ROW (number)	Subdivisions Crossed (number)	Agricultural (permanent) (acres)	Agricultural (temporary) (acres)	Developed (permanent) (acres)	Developed (temporary) (acres)	Conservation Easements Crossed (number)
Local Alternative 3B-1	2	0	0.0	0.0	1.7	2.1	0
Local Alternative 3B-2	1	0	0.0	0.0	0.5	0.5	0
Component 4. SunZia West Substation	0		0.0	0.0	0.0	0.0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

Impacts to land uses under the proposed action and alternative routes would not differ substantially from the no action alternative. The implementation of the proposed action would result in minor short-term impacts to conservation easements and long-term impacts to agricultural areas. With the implementation of the design features and EPMs discussed above, and by co-locating with established and planned utility corridors and other linear features, the proposed action and alternatives would be compatible with existing land uses. The implementation of the proposed action and alternatives would not preclude any planned land uses. SunZia would be expected to resolve land use conflicts within the project area, including any compensation for economic impacts through landowner agreements and permissions.

Cumulative impacts to existing and future land uses are discussed in Section 4.17.4.10 of the 2013 FEIS (BLM 2013:4-339 through 4-344). Incremental impacts from the proposed project components could result in long-term adverse impacts to up to 32 residential properties, three subdivisions, 23.3 acres of agricultural land uses, and 23.9 acres of developed land uses and short-term adverse impacts to 101.8 acres of agricultural land uses, 100.3 acres of developed land uses, and the A7 Ranch. Land use impacts from reasonably foreseeable environmental trends and planned actions would include increased conversion of agricultural and grazing lands to other uses, similar in nature to the proposed project components. Adverse cumulative impacts to existing land uses may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, solar developments, military activities, and residential subdivisions (planned actions are estimated to total approximately 76,600 acres and/or 2,890 miles within the analysis area). Existing and future federally owned lands, conservation areas, grazing allotments, open space designations, and other conservation initiatives would limit development to certain areas. Similar to the proposed action, proponents of planned actions would be expected to resolve land use conflicts, including any compensation for economic impacts through landowner agreements and permissions. Therefore, adverse impacts to land use would be minimized.

AID-14 Proposed and Future Rights-of-Way

Would construction and operation of the proposed project components cross any existing or proposed rights-of-way or leases under the BLM Lands and Realty Program?

3.4.27 Affected Environment

Existing rights-of-way for infrastructure, such as transmission lines and pipelines, can provide opportunities to site new linear energy facilities, as the consolidation of infrastructure within common or parallel corridors can reduce visual and ground disturbance. Energy facilities observed within the project study corridors included distribution and transmission lines of 115 kV or larger, natural gas or petroleum pipelines with 6-inch diameters or larger, major and minor substations, and power plants (BLM 2013:3-259). Additional information about existing rights-of-way and associated infrastructure is provided in Section 3.10 of the 2013 FEIS (BLM 2013:3-259 through 3-262).

The analysis area for this issue statement is the total size of any existing utility corridor, existing right-of-way, or right-of-way avoidance or exclusion area that overlaps with the proposed project components.

3.4.27.1 Existing Utility Corridors

A utility corridor is a linear strip of land identified for the present or future location of utility lines such as electricity, water, and sewer within its boundaries. Utility corridors can provide an opportunity to place new facilities in parallel corridors, which, in turn, helps to minimize impacts. The U.S. Department of Energy (DOE) West-wide Energy Corridors were created by Section 368 of the Energy Policy Act of 2005 and are referred to as the West-wide Energy Corridors (WWEC). The *Programmatic EIS for the Designation of Energy Corridors on Federal Land in the 11 Western States* (DOE and BLM 2008) identified potential energy WWEC on federal land for oil, gas, and hydrogen pipelines, and electricity transmission and distribution facilities. These corridors are considered preferred locations for future energy transport projects on federal lands (DOE and BLM 2008). Relevant to the SunZia project (Component 3), Energy Corridor No. 81-272 was developed generally to parallel portions of existing 115-kV and 345-kV transmission lines and the I-25 transportation corridor. Energy Corridor No. 81-213 was developed to follow two planned 500-kV transmission lines and generally follows I-10 in New Mexico. Approximately 6 miles of the 2015 Selected Route is located within the WWEC. No other existing energy corridors are present in the analysis area for proposed project Components 1, 2, or 3 (POWER Engineers, Inc. 2021i). See Table R9-7 in POWER Engineers, Inc., Land Use and Recreation Resource Report for more information about the potential revision to Energy Corridor No. 81-272 (POWER Engineers, Inc. 2021i:16). Maps 52, 109–120, 125–133, 136, 138, 141, 156, 158, 164–167, 169, and 170 display existing utility corridors near the project (see Appendix A).

In the 2010 Socorro RMP, the BLM incorporated the Section 368 energy corridors and also locally designated a north-south utility corridor that is approximately 2 miles wide (1 mile on either side to the corridor centerline), which was established generally along the I-25 transportation corridor (BLM 2010: Map 2). “This corridor was one of four recommended in the Western Utility Group Study (Michael Clayton and Associates 1992). Applicants requesting new rights-of-way are encouraged to use this corridor” (BLM 2010:19).

3.4.27.2 Existing Rights-of-Way

New transmission facilities are planned in the analysis area, including the Southline Transmission Project discussed in Section 3.10.3.8 and Section 4.15.4.9 of the 2013 FEIS (BLM 2013), the existing SunZia right-of-way, and the constructed Western Spirit Project. Western Spirit is located near Segment 4 (project Component 3). There is a formal agreement to use the SunZia project as the primary transmission system for the electricity generated at Pattern Energy’s wind-generation projects in eastern New Mexico, including the Corona area (Lincoln, Torrance, and Guadalupe Counties) in proximity to the eastern end of SunZia project. Appendix A, Maps 1–7, 10–15, 18–22, 24, 26–32, 34–40, 44, 45, 48, 52–56, 59–120, 125–130, 132–141, 143–146, 148, 150, 152–154, 161–163, 175–178, 184, 185, and 191 display existing rights-of-way near the project.

There are reasonably foreseeable environmental trends and planned actions that could also overlap existing rights-of-way and utility corridors. Planned actions include other transmission lines, transportation improvements, solar arrays, and wind turbines (SWCA 2021).

3.4.27.3 Right-of-Way Avoidance and Exclusion Areas

The proposed project components would overlap with BLM avoidance and exclusions areas. These areas are described in detail and potential RMP amendments are identified in Chapter 4.

3.4.27.4 Reasonably Foreseeable Environmental Trends and Planned Actions

Future trends and planned actions in the analysis area include infrastructure projects, such as transmission lines, substations, wind farms, and solar developments. The 2013 FEIS includes an energy development forecast analysis which anticipated up to 4,500 MW of potential renewable energy in the analysis area for the original right-of-way application (BLM 2013). Further, the number of wind and solar projects operating, under construction and/or under development currently, has and will continue to grow in the United States and in the Southwest. In New Mexico alone, there are over 2,700 MW of operating wind facilities, with 1,600 MW more under construction, and 1,200 of operating solar facilities (New Mexico Energy, Minerals and Natural Resource Department 2021). Some of these energy projects may overlap with existing utility corridors or rights-of-way proposed for use by the SunZia project.

3.4.28 Environmental Consequences

3.4.28.1 Methods and Assumptions

The following assumptions were used to analyze impacts to proposed and future rights-of-way:

- the proposed project components would span all pipelines and water conveyances, and tower construction would avoid other facilities.
- Where proposed project components are located near existing utilities, SunZia would coordinate with utilities prior to construction to avoid disruption of services.

The impact indicators used for this analysis are:

- Miles and acres of existing rights-of-way crossed
- Acres of right-of-way avoidance and exclusion areas crossed

The impacts analysis for this issue statement assumes application of the design features and EPMs described in Appendix C. The design features and EPMs specific to proposed and future rights-of-way are presented in Table 3-132.

Table 3-132. Design Features and Environmental Protection Measures Applicable to Rights-of-Way

Relevant Design Features	Applicable EPMs
2, 3, 4, 5, 6, 8, 17, 21, 22, 23	4, 8

3.4.28.2 Impacts Common to All Components

Project components could impact various types of land use authorizations, easements, and rights-of-way. Potential conflicts would be addressed on a case-by-case basis with each federal land management agency. Land use authorizations may be temporarily impacted during construction and decommissioning. Operation of the project components would be generally compatible with most types of land use authorizations, since authorized activities could likely resume within the granted right-of-way once construction was complete; however, land uses such as energy development would likely be permanently precluded from the granted right-of-way. Project components would have to conform to the terms and conditions of other previously issued, overlapping rights-of-way in the analysis area (e.g., transportation rights-of-way, transmission rights-of-way, and other linear rights-of-way). In places where a conflict is unavoidable, minor shifts in the transmission line route or adjustments to the land use authorization may be required.

Where project components are located near existing utilities, SunZia would coordinate with utilities prior to construction to avoid disruption of services. No long-term adverse impacts on existing rights-of-way and the associated utilities from TWAs are anticipated as these areas would be reclaimed after construction.

Project components would have terms and conditions (applicable to those BLM-managed lands on which the components would occur) that would be developed under Title V of the FLPMA, as amended (43 USC 1761–1771). Therefore, there would be no conflicts to other existing BLM-designated utility corridors or existing BLM right-of-way authorizations. Existing, authorized adjacent or intersecting linear land use facilities (transmission and utility corridors) would not be impacted by the project components.

Rights-of-way for transmission line facilities on private lands would be obtained as easements. Land for substations would be obtained in fee simple where located on private land. A good-faith effort would be made to purchase the land and/or obtain easements on private lands through reasonable negotiations with the landowners.

Long-term adverse impacts from project components to BLM avoidance and exclusion areas would include permanent ground disturbance and removal of vegetation in the construction right-of-way. There would also be long-term visual impacts to VRM Class II areas (for which the affected right-of-way avoidance and exclusion areas are managed) and VRM Class III areas. Where the project components overlap with BLM avoidance and exclusions areas, the necessary RMP amendments would need to be approved, as described in EIS Chapter 4, for the component to be approved.

Design features and EPMs listed in Table 3-132 would help mitigate impacts to proposed and future rights-of-way.

3.4.28.3 Impacts of Localized Route Modifications

Table 3-133 displays the overlap between the localized route modifications and existing rights-of-way.

Localized Route Modification 1 would overlap with an existing 345-kV transmission line and a gas pipeline that parallel the 2015 Selected Route approximately 0.1 mile and 0.3 mile west, respectively.

Localized Route Modification 2 would overlap with existing 115-kV and 345-kV transmission lines that parallel a segment of the localized route modification immediately to the southeast. Localized Route Modification 3 would overlap with two existing transmission lines (115 kV and 345 kV), located east of the route modification. Localized Route Modification 4 would cross an existing 345-kV transmission line. Localized Route Modification 5 would overlap with two existing transmission lines, one 115-kV transmission line and one 345-kV transmission line. Localized Route Modifications 6a, 6b, and 6c would cross two existing rights-of-way, one for a railroad and the other is an irrigation canal. See Table 3-133 for a summary of existing rights-of-way, avoidance, and exclusion areas crossed by project Component 1.

Table 3-133. Rights-of-Way, Avoidance, and Exclusion Areas Crossed by Project Component 1

Localized Route Modification	Existing Rights-of-Way (miles)	Existing Rights-of-Way (acres)	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
1. Mavericks Area	1.0	0.3	0	0
2. SunZia South Area	1.3	0.4	0	0
3. Macho Springs Area	0.8	0.3	0	0
4. Las Palomas Area	1.4	0.4	0	0
5. Highlands Area	1.8	0.5	0	0
6a. Pinal Central Area- North Route	0.5	0.2	0	0
6b. Pinal Central Area- Steele Route	1.3	0.4	0	0
6c. Pinal Central Area- Earley Route	2.4	0.7	0	0

3.4.28.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Approximately 258.1 acres of proposed access roads and 471.6 acres of TWAs would overlap existing rights-of-way. Proposed access roads would cross 40 acres of BLM avoidance area and 0.2 acre of BLM exclusion area. Table 3-134 summarizes existing rights-of-way, avoidance, and exclusion areas crossed by project Component 2.

Table 3-134. Rights-of-Way, Avoidance, and Exclusion Areas Crossed by Project Component 2

Access Roads or Work Areas	Existing Rights-of-Way (miles)	Existing Rights-of-Way (acres)	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
Access Roads	280	258	40	0.2
Temporary Work Areas	Not applicable	471.6	13.8	0

Short-term adverse impacts from road improvements or construction of access roads categorized *Existing Roads – Improvements Required* and *New Roads* and the TWAs would include ground disturbance and removal of vegetation in the construction right-of-way. New roads and TWAs not required for maintenance would be reclaimed. However, 40 acres of impacts from access roads would be long term within avoidance and exclusion areas, requiring a plan amendment (see Chapter 4, Land Use Plan Amendments).

There would be no long-term impacts from access roads categorized as *Existing Roads – No Improvement Required* that cross the BLM exclusion area in the Socorro Field Office because the roads are existing and currently in-use.

3.4.28.5 Impacts of Segment 4 Reroute Alternatives

IMPACTS OF ALTERNATIVE ROUTE 1

Up to 53 acres of Alternative Route 1 subroutes would overlap existing rights-of-way (depending on the subroute). Approximately 335 acres of Alternative Route 1 would cross BLM avoidance areas. Local Alternative 1A-6 would cross approximately 12 acres of BLM avoidance areas. Local Alternative 1A-7 would cross approximately 20 acres of BLM avoidance area and 4.7 acre of BLM exclusion. Table 3-135 summarizes existing rights-of-way, avoidance, and exclusion areas crossed by Alternative Route 1 subroutes.

IMPACTS OF ALTERNATIVE ROUTE 2

Approximately 35 acres of Alternative Route 2 subroutes would overlap existing rights-of-way or easements. Approximately 69 acres of Alternative Route 2 would cross BLM avoidance areas. Table 3-135 summarizes existing rights-of-way, avoidance, and exclusion areas crossed by Alternative Route 2 subroutes.

IMPACTS OF ALTERNATIVE ROUTE 3

Up to 78 acres of Alternative Route 3 subroutes would overlap existing rights-of-way or easements. All Alternative Route 3 subroutes, using Local Alternative 3B-2, would cross 59 acres of BLM avoidance areas. Local Alternative 3B-1 would not cross avoidance nor exclusion areas. Local Alternative 3B-2 would cross 59 acres of right-of-way avoidance area and no exclusion areas. Table 3-135 summarizes existing rights-of-way, avoidance, and exclusion areas crossed by Alternative Route 3 subroutes.

Table 3-135. Rights-of-Way, Avoidance, and Exclusion Areas Crossed by Project Component 3

Action Alternative and Subroute	Existing Rights-of-Way/ Easements (miles)	Existing Rights-of-Way/ Easements (acres)	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
Alternative Route 1, Subroute 1A-1	3.2	28.1	334.9	0
Alternative Route 1, Subroute 1A-2	3.2	28.1	334.9	0
Alternative Route 1, Subroute 1A-3	6.0	53.1	334.9	0
Alternative Route 1, Subroute 1A-4	3.2	28.0	334.9	0
Local Alternative 1A-6	0	0	12.1	0
Local Alternative 1A-7	0	0	19.7	4.7
Alternative Route 2, Subroute 2A-1	4.1	35.1	68.5	0
Alternative Route 2, Subroute 2A-2	4.1	35.1	68.5	0
Alternative Route 2, Subroute 2A-3	4.1	35.0	68.5	0
Alternative Route 2, Subroute 2A-4	4.1	35.0	68.5	0
Alternative Route 3, Subroute 3A-1	9.0	78.1	0	0
Alternative Route 3, Subroute 3A-2	9.0	78.1	0	0
Alternative Route 3, Subroute 3A-3	9.0	78.1	0	0
Alternative Route 3, Subroute 3A-4	9.0	78.0	0	0
Local Alternative 3B-1	4.0	32.7	0	0
Local Alternative 3B-2	3.3	27.2	58.9	0

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.28.6 Impacts of SunZia West Substation

The SunZia West Substation is located on vacant, non-developed Arizona State Trust lands directly adjacent to two existing high-voltage transmission lines (115 and 500 kV). No existing rights-of-way, right-of-way avoidance, or right-of-way exclusion areas would be crossed for the substation.

3.4.28.7 No Action Alternative

The no action alternative would cross pipelines, existing utilities, and designated utility corridors, similar to the proposed project components. The types of impacts to those rights-of-way would be the same as disclosed in Impacts Common to All Components. A portion of the no action alternative is within or adjacent to the DOE WWEC and crosses portions of a BLM-designated utility corridor (BLM 2013:3-279 through 3-281).

The no action alternative also crosses BLM avoidance areas associated with the Socorro and Mimbres Safford RMPs (BLM 2013:3-261, 3-262). As part of the ROD, the necessary plan amendments were approved as part of the Selected Route (BLM 2015a:8-11).

3.4.28.8 Summary of Impacts

All project components would cross existing rights-of-way (Table 3-136 and Appendix A, Maps 1–7, 10–15, 18–22, 24, 26–32, 34–40, 44–45, 48, 52–56, 59–120, 125–130, 132–141, 143–146, 148, 150, 152–154, 161–163, 175–178, 184–185, 191). Components 2 and 3 would cross right-of-way avoidance areas (see Table 3-136). Access roads and Alternative Routes 1 and 2 would also cross right-of-way exclusion areas (see Table 3-136). Figures 2-1 through 2-3 display where proposed project components overlap with BLM avoidance and exclusion areas. Long-term adverse impacts from project components to right-of-way avoidance and exclusion areas would include permanent ground disturbance and removal of vegetation in the construction right-of-way. There would also be long-term visual impacts to VRM Class I and Class II areas for which the affected right-of-way avoidance and exclusion areas are managed. Where the project components overlap with BLM avoidance and exclusion areas, the necessary RMP amendments would need to be approved, as described in EIS Chapters 2 and 4, for the component to be approved.

Cumulative impacts to right-of-way avoidance and exclusion areas are discussed in Section 4.10 of the 2013 FEIS (BLM 2013:4-206 through 4-225). Incremental impacts from the proposed project components could adversely impact up to 159 acres of right-of-way avoidance areas and 14.8 acres of right-of-way exclusion areas. The project would also cross up to 808 acres of existing right-of-way. Impacts to existing rights-of-way and right-of-way avoidance and exclusion areas from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to right-of-way avoidance and exclusion areas may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Construction and operation of the project as well as the transmission lines, renewable energy projects, and ongoing military training would occur throughout the life of the project.

Table 3-136. Summary of Rights-of-Way, Avoidance, and Exclusion Areas Crossed by the Project

Project Components and Action Alternatives	Existing Rights-of-Way (miles)	Existing Rights-of-Way (acres)	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
1. Mavericks Area	1.0	0.3	0	0
2. SunZia South Area	1.3	0.4	0	0
3. Macho Springs Area	0.8	0.3	0	0
4. Las Palomas Area	1.4	0.4	0	0
5. Highlands Area	1.8	0.5	0	0
6a. Pinal Central Area- North Route	0.5	0.2	0	0
6b. Pinal Central Area- Steele Route	1.3	0.4	0	0
6c. Pinal Central Area- Earley Route	2.4	0.7	0	0
Access Roads	280	258	40	0.2
Temporary Work Areas	Not applicable	471.6	13.8	0
Alt Route 1 with Subroute 1A-1	3.2	28.1	334.9	0
Alt Route 1 with Subroute 1A-2	3.2	28.1	334.9	0
Alt Route 1 with Subroute 1A-3	6.0	53.1	334.9	0
Alt Route 1 with Subroute 1A-4	3.2	28.0	334.9	0
Local Alternative 1A-6	0	0	12.1	0
Local Alternative 1A-7	0	0	19.7	4.7
Alt Route 2 with Subroute 2A-1	4.1	35.1	68.5	0
Alt Route 2 with Subroute 2A-2	4.1	35.1	68.5	0
Alt Route 2 with Subroute 2A-3	4.1	35.0	68.5	0
Alt Route 2 with Subroute 2A-4	4.1	35.0	68.5	0
Alt Route 3 with Subroute 3A-1	9.0	78.1	0	0
Alt Route 3 with Subroute 3A-2	9.0	78.1	0	0
Alt Route 3 with Subroute 3A-3	9.0	78.1	0	0
Alt Route 3 with Subroute 3A-4	9.0	78.0	0	0
Local Alternative 3B-1	4.0	32.7	0	0
Local Alternative 3B-2	3.3	27.2	58.9	0

Note: Local Alternatives are exchangeable within their associated alternative route.

AID-15 Military Operations

Would construction and operation and the relocation of the planned power line outside of the Northern Call-up Area improve military testing and operations at White Sands Missile Range, compared with the no action alternative?

How would the Component 3 - Segment 4 Reroute Alternatives impact critical military testing and training operations and data collection/instrumentation systems that serve WSMR, Holloman Air Force Base (AFB), Kirtland AFB, and Cannon AFB?

Would construction and operation of the proposed project components limit the use of military helicopter landing zones in the Cibola National Forest and on lands administered by the BLM Socorro Field Office?

3.4.29 Affected Environment

The analysis area for the issue statements for military operations encompasses project Component 3 alternatives and the no action alternative, because these are the only components of the project applicable to military operations. The analysis area includes: 1) the WSMR NCUA, and 2) a minimum 2-nautical mile buffer around each designated military drop zone or helicopter landing zone identified by the DOD to protect the safety of military training operations around the drop zones (more details in Section 3.4.30 Methods and Assumptions) (SunZia 2020b:Appendix A).

The 2013 FEIS notes multiple military installations and airspace restrictions in the vicinity of the SunZia project, including the WSMR, Holloman Air Force Base (AFB), Fort Bliss-McGregor Range, and Fort Bliss-Doña Ana Range in New Mexico, and Davis-Monthan AFB, Pinal Air Park, and several military training routes in Arizona. Descriptions of military installations and airspace are described in Section 3.10.3.7 of the 2013 FEIS and depicted in the Map Volume (Figure M 10-3E and M 10-3W) of the 2013 FEIS (BLM 2013). None of the alternatives cross lands managed by major military installations in New Mexico or Arizona. The WSMR NCUA would be crossed by the no action alternative (Figure 3-3).

3.4.29.1 White Sands Missile Range Northern Call-Up Area

WSMR is the largest overland test facility with unlimited restricted airspace in the DOD, at 2.2 million acres (Office of the Assistant Secretary of Defense 2022). The National Defense Strategy identifies WSMR as a critical asset in supporting modernization efforts for national security. "WSMR is, in the view of DOD, a national security asset of the first order and protecting its continued viability in support of the national defense is a paramount concern of the DOD" (McMahon 2018:1). The WSMR NCUA is located directly north of the WSMR and comprises BLM-administered, New Mexico State, and private lands (see Figure 3-3).

WSMR is a tri-service installation operated by the U.S. Army, under the responsibility of the Secretary of the Army, with Deputies representing the U.S. Navy and U.S. Air Force and all three having future emerging needs to test extended long-range weapon systems. WSMR provides Holloman, Kirtland, and Cannon AFBs air space and range operations for training, special air operations, and other missions. WSMR, inclusive of the NCUA, provides testing and training missions and unique support to long-range systems. As weapon systems obtain longer ranges, spatial limitations and structural encroachments in and around testing and training ranges constrain DOD's ability to test those weapon systems and support the National Defense Strategy (Office of the Assistant Secretary of Defense 2022).

WSMR was established by the War Department in July 1945, and is home to Trinity Site, where the first atomic bomb was detonated, also in July 1945. The years following included many technical developments and tests in rocket propulsion, guidance, and space. WSMR has supported numerous joint programs in support of Operation Enduring Freedom over the last 20 years. In 2018, a request for airspace corridors into the NCUA for low-flying systems with potential of ground disturbance was approved. Later that year the scope increased to include the development of an impact area for hypervelocity projectiles, which is the next-generation guided projectile capable of executing multiple missions for the Navy, U.S. Marine Corps, and Army (Office of the Assistant Secretary of Defense 2022).

The airspace associated with WSMR is a complex of restricted airspace from surface to unlimited, designated to ensure the separation of non-participating aircraft from potentially hazardous operations. The restricted airspace over WSMR was designated in the 1950s and 1960s, with changes to the WSMR NCUA in 1982. The airspace is a key component of the joint mission at WSMR. It is designated in the Federal Register and is a part of the FAA regulations, FAA 7400.10 (Office of the Assistant Secretary of Defense 2022).

For over half a century, the NCUA and Western Call-Up Area (collectively referred to as the Call-Up Areas) and the associated restricted airspace have provided the necessary safety, security, and frequency buffers for intercept debris, presentation of threat targets including cruise missiles, tactical ballistic missiles, supersonic attack weapons, and denied environments (electronic warfare) against and with DOD premier weapons. DOD weapon system capability testing would have been severely restricted or impossible without using the Call-Up Areas. Therefore, the use of the WSMR Call-Up Areas will continue to increase in the future as new weapon systems, offensive and defensive, are developed for national security (Office of the Assistant Secretary of Defense 2022).

Examples of strategic national defense operations within the WSMR Call-Up Areas and restricted airspace include, but are not limited to:

- Theater High Altitude Area Defense (THAAD) Initial Development Program and the associated launch complex in the NCUA.
- Testing and evaluation of extended range capability of Precision Fires or similar unitary missiles in the Lee Impact Area of the NCUA.
- Development and testing of hypervelocity projectiles and future naval electromagnetic Railgun weapon systems within the NCUA.
- Use of temporary airspace corridors into the NCUA restricted airspace for use in long-range Launch Test Article Testing. Low-flying systems use airspace corridors over portions of Valencia, Bernalillo, and Torrance Counties north of the WSMR NCUA. Additionally, potential ground disturbance associated with target intercept test operations over a temporary debris impact area in the NCUA.
- Test activities such as launching missiles and long-range targets from Fort Wingate Launch Complex to WSMR to test the extended range capability of the missile and in support of a layered defense system.
- Special Use Airspace (SUA) optimization for Holloman AFB
- Development of long-range overland flight corridors terminating at WSMR in support of future long-range weapon system testing demand, including hypersonic testing.

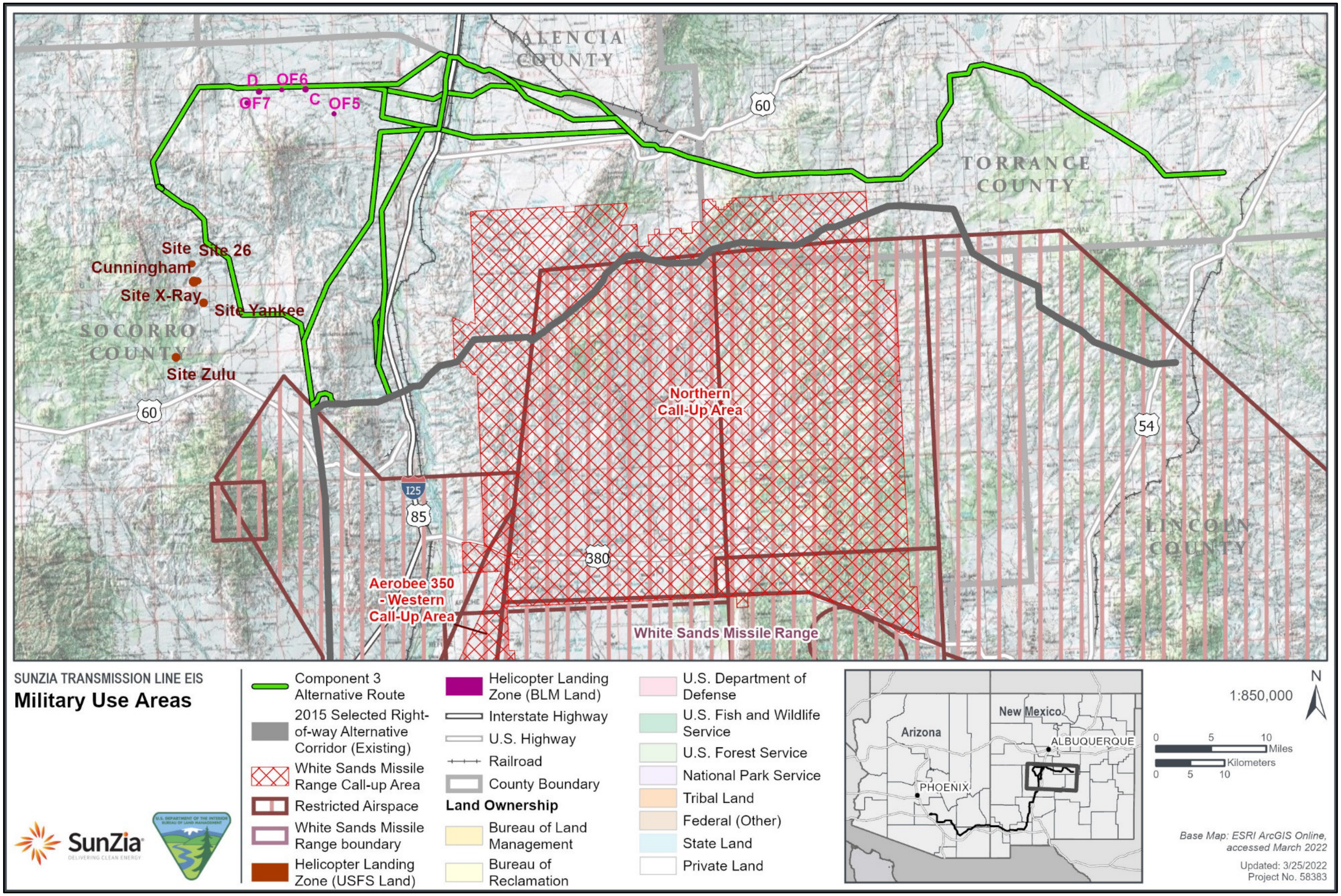

Figure 3-3. Map of WSMR NCUA and Restricted Airspace

3.4.29.2 Military Drop Zones on BLM-managed Lands and Cibola National Forest

Several designated military drop zones and helicopter landing zones are in the analysis area (see Figure 3-3 and Appendix A, Maps 142, 143, 150, 152, 153). Five of these sites are within the Cibola National Forest in New Mexico (three military helicopter landing zones and two drop zones for specialized C130 airdrop training) within the Ladron Mountain-Devil's Backbone Complex ACEC. Existing and scheduled uses of the Cibola National Forest include U.S. Air Force training by the 351st Special Warfare Training Squadron (Pararescuemen/Combat Rescue Officer); 58th Special Operations Wing; and 4th Reconnaissance Battalion, U.S. Marine Corps. Such training has occurred on the National Forest since the 1970s under various special use permits. A corridor of USFS lands along Forest Road 354, east of the Bear Mountains is used by the Air Force for "practice of low level aerial reconnaissance, approach, landing and departures of CV-22 Osprey, UH-1N Iroquois, and HH-60G Pave Hawk helicopters" and other similar activities (U.S. Air Force 2020). The area also has a zone for specialized C130 airdrop training. The Air Force is currently seeking expansion of their training activities to a total of four helicopter landing zones, and increased frequency of usage of both the helicopter landing and specialized C130 drop zone (U.S. Air Force 2020).

Military training and helicopter landing sites are also present on BLM lands in the analysis area. The 58th Special Operations Wing at Kirkland AFB holds an existing right-of-way permit (BLM 2019) to conduct military training on BLM land at the northern boundary of the Sierra Ladrones WSA.

The NAVAID System database was reviewed to identify Very high-frequency Omnidirectional Range/Tactical Air Navigation (VORTAC) navigation aids near the project (POWER Engineers, Inc. 2021i). VORTAC is a radio-based navigational aid for pilots that consists of a very high-frequency omnidirectional range beacon and a tactical air navigation beacon (referred to as TACAN). One VORTAC is within the vicinity of Component 3 near the SunZia East Substation and is located approximately 9 miles northwest of the community of Corona, New Mexico (FAA 2022).

3.4.29.3 Reasonably Foreseeable Environmental Trends

Reasonably foreseeable future actions in the WSMR include escalated testing activities for new weapons and countermeasures to protect the nation and its allies. The WSMR has had an increasing trend of military operations or missions from 2015 to 2020, which is expected to continue to increase in support of Army modernization efforts and National Security (U.S. Department of the Army 2021). WSMR has prepared multiple Environmental Assessments for operations in the NCUA, including some after the BLM 2013 FEIS and 2015 Selected Route across the NCUA (U.S. Department of the Army 2021). The Test Resource Management Center, an Office of the Secretary of Defense, will soon prepare a Programmatic EIS to review environmental impacts associated with the increase in testing and training activities, which involves off-site launches coming into WSMR and using the restricted airspace in the Call-Up Areas.

In addition, the Western Spirit 345-kV Transmission Line Project is located north of the 2015 Selected Route in Segment 4 of the SunZia project (the no action alternative in this EIS). There is a formal agreement to use the SunZia project as the primary transmission system for the electricity generated at Pattern Energy's wind-generation projects in eastern New Mexico, including the Corona area (Lincoln, Torrance, and Guadalupe Counties) in proximity to the eastern end of the SunZia project. Segment 4 of the SunZia project (Reroute Alternatives) would partially parallel the Western Spirit Project corridor.

3.4.30 Environmental Consequences

3.4.30.1 Methods and Assumptions

The following assumptions were used to analyze impacts to proposed and future military operations:

- SunZia would coordinate with DOD to ensure proper distance and structure height recommendations or requirements are met to reduce impacts on military training activities.
- Based on DOD's October 26, 2020, communication with SunZia (SunZia 2020b:Appendix A), if the project meets the following conditions, there would be minimal impact on DOD's mission in the area and would allow military training operations to continue:
    - placing the transmission line a minimum of 2 nautical miles from designated military drop zones and helicopter landing zones,
    - maintaining vertical structures below 100 feet in height, and
    - fitting the transmission lines with reflective aviation obstruction balls in accordance with FAA standards.

The impact indicators used for this analysis are:

- Distance to helicopter landing zones and the number of landing zones within 2 nautical miles (2.3 miles) of the transmission line (based on DOD conditions described above in assumptions)
- Acres of military lands or lands in the NCUA crossed

The impacts analysis for this issue statement assumes application of the design features and EPMs described in Appendix C. The design features and EPMs specific to proposed and future military operations are presented in Table 3-137.

Table 3-137. Design Features and Environmental Protection Measures Applicable to Military Operations

Relevant Design Features	Applicable EPMs
2, 12, 22	None

3.4.30.2 Impacts Common to All Components

There would be no impacts to military operations that are common to all components.

3.4.30.3 Impacts of Localized Route Modifications

None of the proposed localized route modifications cross or come into close proximity to areas used for military operations. The closest route modification would be 33.9 miles from a helicopter landing area. There would be no impacts from the proposed project component to military operations.

3.4.30.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Access roads and TWAs outside the granted right-of-way in Segments 1, 2 and 3 do not cross any areas used for military operations. There would be no impacts from the proposed project component to military operations.

3.4.30.5 Impacts of Segment 4 Reroute Alternatives

Under proposed Component 3, Segment 4 of the project (including the transmission lines and the SunZia East Substation) would be rerouted to avoid the NCUA and co-locate the project with portions of the Western Spirit 345-kV transmission line.

IMPACTS OF ALTERNATIVE ROUTE 1

Alternative Route 1 would be within 0.2 mile of two military helicopter landing zones (zones C and D) and three opposing force training areas on BLM land at the northern boundary of the Sierra Ladrones WSA (Table 3-138). Alternative Route 1 would also be located 2.3 miles from military aircraft landing zones located along Forest Road 345 in the Cibola National Forest.

Table 3-138. Proximity of Project Component 3 Alternatives to Existing Helicopter Landing or Drop Zones

Action Alternative and Subroute	Miles to Helicopter Landing or Drop Zones (BLM)	Miles to Helicopter Landing or Drop Zones (USFS)	Acres in the Northern Call-up Area
Alternative Route 1, Subroute 1A-1	0.2	2.3	0
Alternative Route 1, Subroute 1A-2	0.2	2.3	0
Alternative Route 1, Subroute 1A-3	0.2	2.3	0
Alternative Route 1, Subroute 1A-4	0.2	2.3	0
Local Alternative 1A-6	10.9	7.3	0
Local Alternative 1A-7	10.8	7.3	0
Alternative Route 2, Subroute 2A-1	4.5	9.6	0
Alternative Route 2, Subroute 2A-2	4.5	9.6	0
Alternative Route 2, Subroute 2A-3	4.5	9.6	0
Alternative Route 2, Subroute 2A-4	4.5	9.6	0
Alternative Route 3, Subroute 3A-1	7.8	13.0	0
Alternative Route 3, Subroute 3A-2	7.8	13.0	0
Alternative Route 3, Subroute 3A-3	7.8	13.0	0
Alternative Route 3, Subroute 3A-4	7.8	13.0	0
Local Alternative 3B-1	17.8	16.1	0
Local Alternative 3B-2	17.8	15.5	0

Note: Local Alternatives are exchangeable within their associated alternative route.

Helicopter landing zones on BLM land would not meet the conditions stipulated by DOD in order to have minimal impact on DOD's mission and training operations in the area. Because the transmission line would be less than 2 nautical miles from designated military drop zones and helicopter landing zones (it would be 0.2 mile, see Table 3-138), it would have adverse impacts on military training operations at these five locations.

Alternative Route 1 would not cross the WSMR NCUA and would have no impacts to military operations in that location.

IMPACTS OF ALTERNATIVE ROUTE 2

Alternative Route 2 would not cross any areas used for military operations and would be greater than 2 nautical miles from designated military drop zones and helicopter landing zones. Alternative 2 would not cross the WSMR NCUA. There would be no impacts from the Alternative Route 2 to military operations.

IMPACTS OF ALTERNATIVE ROUTE 3

Alternative Route 3 would not cross any areas used for military operations and would be greater than 2 nautical miles from designated military drop zones and helicopter landing zones. Alternative 3 would not cross the WSMR NCUA. There would be no impacts from the Alternative Route 3 to military operations.

3.4.30.6 Impacts of SunZia West Substation

The proposed location for the SunZia West Substation does not cross any areas used for military operations. There would be no impacts from the proposed project component to military operations.

3.4.30.7 No Action Alternative

As presented in Chapter 1, the 2015 ROD approved issuance of the right-of-way grant on BLM-administered land and approved the SunZia project route across the WSMR NCUA. Under the no action alternative, the project would cross 2,084 acres of the WSMR NCUA and 3,109 acres of restricted airspace (note: these are overlapping acreage estimates.) The no action alternative includes burial of approximately 5 miles of the transmission lines in three locations to mitigate impacts on mission capability associated with the WSMR, which was requested by DOD after the 2013 FEIS. Burial of part of the line was evaluated in a separate environmental assessment and finding of no new significant impact (BLM 2015b, 2015d). The subsequent right-of-way grant was issued on September 1, 2016, for a lease term of 50 years. The 2015 Selected Route in Segment 4 of the SunZia project (i.e., the no action alternative in this EIS) crosses the NCUA (see Figure 3-3).

DOD prefers an alternative route that does not traverse the NCUA and that has less impact on WSMR's mission (Office of the Assistant Secretary of Defense 2022). The no action alternative is a significant concern to the DOD because of the test range infrastructure needed to support the emerging technologies and systems identified in the 2018 National Defense Strategy. This concern was formally expressed in December 2018, when the former Assistant Secretary of Defense Robert H. McMahon issued a letter (McMahon 2018) reiterating DOD's concerns and indicating that rerouting the transmission line out of the NCUA would significantly benefit capabilities at WSMR by enhancing use of the NCUA for testing of future systems.

The WSMR NCUA restricted airspace comprises R-5107C (9,000 feet to Unlimited), R-5107H (surface to 9,000 feet), and R5107J (surface to 9,000 feet). R-5107J airspace was created as a buffer for the Red Rio Impact area for the aircraft bombing range. In addition, the FAA at Albuquerque Air Traffic Control could potentially transition through WSMR restricted airspace either lower or upper portions of R5107C, H, and J (Office of the Assistant Secretary of Defense 2022). Note that two restricted airspace categories, R-5107H and R5107J, range from the ground surface to 9,000 feet, which is the same airspace categories where the no action alternative transmission line structures would occur.

Table 3-139 summarizes the use of the WSMR NCUA restricted airspace from 2015 to 2020. There is an increasing trend in total numbers of military missions across the board for all three Airspaces R-5107C, R-5107H, and R-5107J, with a percentage increase of 178%, 174%, and 197%, respectively (see Table 3-139).

Table 3-139. WSMR NCUA Restricted Airspace Missions

Restricted Airspace	2015	2016	2017	2018	2019	2020
R-5107H (Surface to 9,000 feet)*	4,575	6,909	6,071	6,400	10,453	12,546
R-5107J (Surface to 9,000 feet)*	4,606	6,972	6,126	6,570	11,073	13,675
R-5107C (9,000 feet to unlimited)	4,522	6,845	6,029	6,731	10,434	12,590

Source: Office of the Assistant Secretary of Defense (2022)

* Restricted airspace that would be partially occupied by the no action alternative

Total missions in 2020 was 5,665 which is a 33% increase from the year 2015 (Table 3-140). Missions generally involve both surface areas and airspace and can encompass a variety of activity categories. The missions are classified into two mission categories: Hot and Non-Hot. Hot missions on WSMR are potentially hazardous events that require evacuation of personnel and all non-participants during the period of the events. The total number of hot missions for 2020 was 451 which is a 2% increase from 2015 (see Table 3-140) (Office of the Assistant Secretary of Defense 2022).

Table 3-140. Scheduled Missions

Mission Type	2015	2016	2017	2018	2019	2020*
Total Hot missions	444	557	425	496	785	451
Total Non-Hot missions	3,821	3,839	4,060	4,680	4,827	5,214
Total all missions	**4,265**	**4,396**	**4,485**	**5,176**	**5,612**	**5,665**

Source: Office of the Assistant Secretary of Defense (2022).

* The number of hot missions in 2020 was reduced due to COVID-19 travel restrictions.

Modern weapons require increasingly large areas of unobstructed airspace and the presence of transmission line structures would severely interfere with the use of the airspace for DOD testing and training activities in support of the National Defense Strategy and Army Modernization. WSMR is a critical asset for national security modernization to support future and emerging requirements for Army and Joint Force modernization and transformation into a multi-domain force (Office of the Assistant Secretary of Defense 2022).

Under the no action alternative, aerial transmission lines in the NCUA could constrain DOD's ability to provide realistic operational environments including very-low-altitude test-flight profiles for missiles, drones, and other unmanned vehicles and to adequately replicate the advancing threats of our adversaries.

3.4.30.8 Summary of Impacts

Impacts to military operations would occur from Segment 4 Alternative Route 1 and from the no action alternative. Impacts would be limited to five helicopter landing zones or training areas on BLM land near the Segment 4 Alternative Route 1 and to aerial transmission lines that could be constructed in the NCUA (no action alternative only). Effects would occur throughout the life of the project, as the components would conflict with aviation activities as long as they are in place.

Cumulative impacts to military operations are discussed in Section 4.17.4.10 of the 2013 FEIS (BLM 2013:4-341 through 4-343). Incremental impacts from the proposed project components could adversely impact helicopter landing zones or training areas on BLM or USFS land. The no action alternative would adversely affect 2,084 acres of the WSMR NCUA. Impacts to military operations from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to military operations in the NCUA could occur due to other military actions that occur in the NCUA. Cumulative effects to military helicopter landing zones or training areas may result from construction of the proposed project, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions, if these actions occur within 2 nautical miles of the landing or training areas. Effects of the project in addition to the transmission lines, renewable energy projects, and ongoing military training would occur throughout the life of the project.

AID-16 BLM Special Designations

Would the construction or operation of the proposed project reduce the quantity or quality of the resource values for which special designation were established?

3.4.31 Affected Environment

The following describe the analysis areas for this issue statement.

- Component 1 – Localized Route Modifications: The special designations analysis area for project Component 1 includes a 6-mile-wide analysis area centered on the Phase I transmission line (3 miles on each side) of the 2015 Selected Route (BLM 2015a).
- Component 2 – Access Roads and Temporary Work Areas Outside of Granted Right-of-Way: The special designations analysis area for project Component 2 includes a 150-foot-wide buffered area, which represents the temporary right-of-way within which potential temporary construction activities could take place; an approximate 24-foot-wide permanent right-of-way centered on the proposed access roads; and temporary work areas outside of the 400-foot-wide transmission line right-of-way.
- Component 3 – Segment 4 Reroute Alternatives: The special designations analysis area for project Component 3 includes a 6-mile-wide analysis area (3 miles on each side of the reference centerline of the 400-foot right-of-way corridor) of the alternative routes.
- Component 4 – SunZia West Substation: not included in the analysis area, because no BLM special designations are near this component.

BLM special designations are applied to public lands to provide special protections to areas while maintaining regular, multi-use functions. BLM special designation areas, which are identified in BLM land use planning documents, are managed with a particular focus to provide public recreation or to conserve a significant resource (BLM 2021g). These special designations are recognized by land managers as areas that require extra attention to protect exceptional resource values, whether that be pristine undeveloped lands, outstanding natural, recreational or cultural values, or areas with critical environmental concerns.

There is one backcountry byway—Lake Valley Backcountry Byway—within the analysis areas of Components 1 and 2, and there is one ACEC—the Ladron Mountain-Devil's Backbone Complex ACEC—within the analysis area of Component 3. There are five WSA units in the Component 3 analysis area: Sierra Ladrones, Stallion, Devil's Backbone, Presilla, and Veranito. These units are summarized in Table 3-141 and shown in Appendix A, Maps 90–92, 143–145, 148, and 150.

Table 3-141. Wilderness Study Area Units Adjacent to the Project

Wilderness Study Area	Total Acres	Location	Associated Project Component or Alternative (Distance to Wilderness Study Area Boundary)
Sierra Ladrones	47,936	West-central New Mexico, approximately 22 miles northwest of Socorro	Proposed project Component 3 (159 feet)
Stallion	24,238	Central New Mexico, approximately 15 miles east of Socorro	No action alternative (0.7 mile to Segment 4)
Devil's Backbone	8,770	West-central New Mexico, approximately 23 miles southwest of Socorro	No action alternative (5.2 miles to Segment 3)
Presilla	8,680	Central New Mexico, approximately 10 miles east of Socorro	No action alternative (2.4 miles to Segment 4)
Veranito	7,206	Central New Mexico, approximately 5 miles east of Socorro	No action alternative (0 miles to Segment 4)

Component 4 does not cross any BLM special designations. Therefore, the analysis for this issue statement is focused on the Lake Valley Backcountry Byway, the Ladron Mountain-Devil's Backbone Complex ACEC, and the Sierra Ladrones WSA.

This EIS incorporates by reference existing conditions and potential impacts on BLM special designations from the 2013 FEIS (BLM 2013). Information from the 2013 FEIS in addition to the project's special designation technical report (POWER Engineers, Inc. 2021j) and most recent GIS data were reviewed for the analysis areas for the project components.

Other land designation types including National Scenic and Historic Trails and SRMAs are described in AID-11 and AIB-21, respectively.

BLM NATIONAL BACKCOUNTRY BYWAYS

BLM backcountry byways are a component of the National Scenic Byways Program (BLM 2021h) system that focuses primarily on corridors along backcountry roads that have high scenic, historical, archaeological, or other public interest values (BLM 1993b). Byways are managed according to management objectives and prescriptions identified in applicable RMPs.

The Lake Valley Backcountry Byway would not be crossed by the project centerline, but approximately 10 miles of the byway would fall within the Component 1 analysis area, and approximately 43.2 miles of the Lake Valley Backcountry Byway would be overlapped by proposed access roads under Component 2. The Lake Valley Backcountry Byway is approximately 5.5 miles west of I-25 and 50 miles north of Deming, New Mexico. The Lake Valley Backcountry Byway provides opportunities for scenic views and recreation and tourism. It is currently managed in accordance with the White Sands RMP and Mimbres

RMP, although neither RMP provides specific management prescriptions for the Lake Valley Backcountry Byway.

Additional information regarding the Lake Valley Backcountry Byway is provided in the Special Designations technical report (POWER Engineers, Inc. 2021j).

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

BLM ACECs are areas that require special management attention to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources (BLM 2021g). ACECs can also be designated to protect human health and safety from natural hazards. ACECs are evaluated through land use planning using the best available information and extensive public involvement.

The Ladron Mountain-Devil's Backbone Complex ACEC (57,474 acres) is within the Component 3 analysis area. The Ladron Mountain-Devil's Backbone Complex ACEC has multiple clusters in Socorro County to the west of I-25 that extend north, starting from the southernmost unit between the Devil's Reach and Devil's Backbone WSAs, another unit just south of the Sevilleta NWR, with the last units surrounding the Sierra Ladrones WSA (BLM 2010).

The Ladron Mountain-Devil's Backbone Complex ACEC is currently managed in accordance with the BLM's Socorro RMP (BLM 2010). The ACEC was designated to manage the enhancement and protection of wildlife and wildlife habitat, with an emphasis on habitat for desert bighorn sheep, wildlife habitat wilderness characteristics, and special-status species (BLM 2010). This ACEC was also designated for the protection and management of scenic resources and cultural resources. The protection of primitive recreation resources was noted in the Socorro RMP (2010) as a management concern in the ACEC. The following management decisions, which are described in the Socorro RMP (BLM 2010:53-54), apply to this ACEC.

1. Limit motor vehicle use to designated routes within the ACEC.
2. Exclude the authorization of right-of-way and leases within the ACEC. Avoid the authorization of right-of-way and leases within the desert bighorn sheep corridor.
3. Apply fluid mineral leasing stipulations S-NSO-W (no surface occupancy to protect wildlife resources) within the ACEC.
4. Allow mineral material disposals within the ACEC contingent upon site-specific assessment of resources and mitigation as necessary.
5. Pursue acquisition of nonpublic land within and contiguous to the ACEC.
6. Exclude grazing on land that has not been allotted.
7. Maintain and/or implement closure to domestic sheep and goats within 10 miles of bighorn habitat.
8. Maintain viable populations of desert bighorn sheep through activities such as habitat improvements and coordination with NMDGF on desert bighorn sheep transplants and reintroductions.
9. Withdraw from location and entry for locatable minerals under the mining laws all land with medium and high mineral potential (23,567 acres) for the protection of desert bighorn sheep within the ACEC.
10. Encourage inventory and research of cultural resource sites and apply Cultural Resource use Category A: Scientific Use to cultural resource sites.

11. Permit commercial woodcutting only to support BLM-authorized projects to meet resource management objectives.
12. Exclude the San Lorenzo area from vegetative material sales, with the exception of exotic species. Allow vegetative sales elsewhere within the ACEC contingent upon site-specific assessment of resources and mitigation as necessary.

Additional information regarding the Ladron Mountain-Devil's Backbone Complex ACEC is provided in the 2013 FEIS (BLM 2013) and the Special Designations technical report (POWER Engineers, Inc. 2021j).

WILDERNESS STUDY AREAS

Wilderness characteristics are defined in Section 2(c) of the Wilderness Act and incorporated in FLPMA as having at least 5,000 contiguous acres, naturalness, outstanding opportunities for solitude or a primitive and unconfined type of recreation, and supplemental values. The BLM manages and protects WSAs to preserve the wilderness characteristics and to not impair the suitability of such areas for designation by Congress as wilderness (BLM 2012, 2021e). Proposed uses or facilities within a WSA are subject to review requirements of the BLM's WSA Management Manual 6330 (BLM 2012). Projects outside of WSAs that may impact a WSA's wilderness characteristic must also be included in the NEPA analysis (BLM 2021e). All uses or facilities proposed on public lands within or adjacent to WSAs are also subject to the applicable RMP. All WSAs in this analysis area are located in the Socorro Field Office.
The Socorro RMP states that WSAs are to be managed in accordance with the *Interim Management Policy for Lands Under Wilderness Review* (BLM 1995), which allows some recreation and other uses and requires protection of wilderness values. Management prescriptions specific to WSAs are identified in the Socorro RMP (BLM 2010), including actions that are prohibited in WSAs (fluid mineral leasing, rights-of-way, mineral materials disposal and locations where limited motor vehicle use is permitted or prohibited. The Sierra Ladrones WSA overlaps with a portion of the Ladron Mountain-Devil's Backbone Complex ACEC, and the management prescriptions identified for the ACEC are also applicable to the Sierra Ladrones WSA (BLM 2010).

There is existing development (roads, residential areas, agriculture, high-voltage transmission lines, wind turbines, and solar fields) in proximity to these WSAs that contributes to the existing condition of wilderness characteristics of the WSA units. Linear infrastructure outside of WSAs that is visible from within the WSA units contribute to a loss of solitude and naturalness in the WSAs.

REASONABLY FORESEEABLE ENVIRONMENTAL TRENDS AND PLANNED ACTIONS

BLM Special Designations would continue to be managed with special protections in accordance with management decisions. Reasonably foreseeable planned actions within the analysis areas for BLM special designations would include the construction of other transmission projects, including the High Plains Express Transmission Line Project (SWCA 2021). It is not known at this time if the High Plains Express Transmission Line Project would overlap the Ladron Mountain-Devil's Backbone Complex ACEC or the Lake Valley Backcountry Byways. If this planned action does overlap or come within the vicinity of a BLM special designation area, there could be short- to long-term reductions in resource values due to project activities or associated infrastructure.

Reasonably foreseeable future trends that may contribute adverse impacts to WSA wilderness characteristics, including naturalness and solitude may include other planned infrastructure projects, such as transmission lines, substations, wind farms, and residential subdivisions if they occur within the viewshed of WSAs.

3.4.32 Environmental Consequences

3.4.32.1 Methods and Assumptions

The following assumptions was used to analyze impacts to BLM special designations:

- No improvements would be made to existing backcountry byways used as access roads for the project.
- Construction noise is expected to attenuate to ambient (35 to 50 dB) or near ambient levels within approximately 3,000 feet (see AID-21 Noise).

The impact indicators used for this analysis are:

- Miles of permanent disturbance to BLM special designations
- WSA units within 3,000 feet of construction for project Component 3
- Acres of WSA from which the project would be visible
- Temporary or permanent disturbance to BLM special designations that would interfere with management prescriptions and/or disrupt resource values

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to BLM special designations:

- AIB-20 Traditional Cultural Properties and Resources with Tribal Importance: Impacts to traditional cultural properties and resources with tribal importance
- AID-10 Cultural Resources: Impacts to cultural resources.
- AID-11 National Scenic and Historic Trails: Impacts to national scenic and historic trails.
- AID-21 Noise: Discloses noise-related impacts from project-related activity.

The impacts analysis for BLM special designations assumes application of the design features and environmental protection measures shown in Table 3-142. Full design features and EPMs are provided in Appendix C.

Table 3-142. Design Features and Environmental Protection Measures Applicable to BLM Special Designations

Relevant Design Features	Applicable EPMs
1, 2, 4, 5, 6, 14, 15	7, 9, 11, 14, 16

3.4.32.2 Impacts of Component 1 – Route Modifications

SCENIC RESOURCE VALUES

The Lake Valley Backcountry Byway is the only BLM special designation within the Component 1 analysis area, and the Lake Valley Backcountry Byway offers scenic and recreation resource values. Although Component 1 would not physically cross the byway and would therefore not interfere with the management prescriptions applicable to the byway, project-related activities could result in changes to scenic and recreation resource values offered by the Lake Valley Backcountry Byway (Appendix F).

Approximately 10 miles of the Lake Valley Backcountry Byway is within the Component 1 analysis area (Appendix A, Maps 90–96, 99, 100). The northern portion of the Localized Route Modification 3 – Macho Springs Area would come within approximately 0.2 mile (at its closest point) of the Lake Valley Backcountry Byway. The temporary or intermittent presence of equipment, personnel, and vehicles during construction, operation and maintenance, and decommissioning of the project would disrupt views along the Lake Valley Backcountry Byway, thereby resulting in adverse impacts on scenic and recreation resource values provided by the byway (Appendix F). However, these adverse impacts would be short term, as views would be restored at the conclusion of activities.

The long-term presence of the project-related infrastructure would result in changes to scenic views along the Lake Valley Backcountry Byway. As a result, there would be long-term (lasting the life of the project) adverse impacts on scenic and recreation resource values of the Lake Valley Backcountry Byway.

3.4.32.3 Impacts of Component 2 – Access Roads and Temporary Work Areas Outside of Granted Right-of-Way

SCENIC RESOURCE VALUES

The Lake Valley Backcountry Byway is the only BLM special designation within the Component 2 analysis area, and it offers scenic views and recreation values. Approximately 43 miles of proposed access roads under Component 2 would overlap the backcountry byway, although no road improvements would be needed. Component 2 would not interfere with the management prescriptions applicable to the byway. During construction, the temporary or intermittent presence of equipment, personnel, and vehicles within temporary work areas would disrupt views along the Lake Valley Backcountry Byway, thereby resulting in adverse impacts on scenic and recreation resource values (Appendix F). These adverse impacts would be short term, as views would be restored at the conclusion of activities.

Where the byway follows NM-27 and NM-152 southwest of Truth or Consequences, New Mexico, the byway would be within approximately 50 feet of a temporary work area (construction yard) for Segment 3 (Appendix A, Maps 90–96, 99, 100); however, as this section of the byway is not on BLM or other federally administered lands, conformance with proposed agency management objectives would not be applicable.

3.4.32.4 Impacts of Component 3 – Segment 4 Reroute Alternatives

The Ladron Mountain-Devil's Backbone Complex ACEC and the Sierra Ladrones WSA are the two BLM special designations within the Component 3 analysis area.

AREA OF CRITICAL ENVIRONMENTAL CONCERN

The Ladron Mountain-Devil's Backbone Complex ACEC was designated for the enhancement and protection of wildlife and the protection and management of scenic and cultural resources.
The proximities of Component 3 alternative routes to the Ladron Mountain-Devil's Backbone Complex ACEC are as follows (see Appendix A, Maps 132, 133, 135, 136, 138, 140, 141, 143–146, 148, 150–152, 155).

- Alternative Route 1 with Local Alternative 1A-6 would pass within approximately 0.25 mile and 150 feet of the northern and western boundaries, respectively, of the ACEC.
- Alternative Route 1 with Local Alternative 1A-7 would directly cross the ACEC in the southwest corner. The alignment of the transmission line right-of-way would cross 0.7 acre (approximately 0.001%) of the ACEC. Under this Local Alternative, 4.7 acres of the ACEC would be removed

from the ACEC, through an RMP amendment, to avoid fragmenting a small portion of the ACEC by the transmission line right-of-way. Therefore, permanent impacts to the ACEC would occur on 4.7 acres and the 12 resource management decisions identified in the Socorro RMP would no longer apply to the area removed from the ACEC (Table 3-143; BLM 2010:53–54).

- Alternative Route 2 with Subroute 2A-1 would pass within approximately 1 mile of the ACEC.
- Alternative Route 3 with Local Alternative 3B-1 would parallel the southernmost unit of the ACEC, coming within approximately 500 feet of the southern ACEC boundary and 1.5 miles of the eastern ACEC boundary.
- Alternative Route 3 with Local Alternative 3B-2 would parallel the southernmost unit of the ACEC, coming within approximately 500 feet of the southern ACEC boundary and 1 mile of the eastern ACEC boundary.

Table 3-143. Summary of Direct Impacts within BLM Special Designation Areas

Project Component	Lake Valley Backcountry Byway – Temporary / Permanent (acres)	Quebradas Backcountry Byway – Temporary / Permanent (acres)	Ladron Mountain-Devil's Backbone Complex ACEC – Temporary / Permanent (acres)
Component 1: Localized Route Modifications	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
1. Mavericks Area	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
2. SunZia South Area	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
3. Macho Springs Area	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
4. Las Palomas Area	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
5. Highlands Area	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
6a. Pinal Central Area- North Route	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
6b. Pinal Central Area- Steele Route	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
6c. Pinal Central Area- Earley Route	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative West Tie-in	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative Central Tie-in	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative East Tie-in	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Component 2a. Access Roads	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Component 2b. Temporary Work Areas	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Component 3. Segment 4 Reroute Alternatives	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 1 with Subroute 1A-1	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 1 with Subroute 1A-2	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 1 with Subroute 1A-3	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 1 with Subroute 1A-4	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative 1A-6	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative 1A-7	0.0 / 0.0	0.0 / 0.0	**0.7 / 4.7**
Alt Route 2 with Subroute 2A-1	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 2 with Subroute 2A-2	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 2 with Subroute 2A-3	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 2 with Subroute 2A-4	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0

Project Component	Lake Valley Backcountry Byway – Temporary / Permanent (acres)	Quebradas Backcountry Byway – Temporary / Permanent (acres)	Ladron Mountain-Devil's Backbone Complex ACEC – Temporary / Permanent (acres)
Alt Route 3 with Subroute 3A-1	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 3 with Subroute 3A-2	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 3 with Subroute 3A-3	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Alt Route 3 with Subroute 3A-4	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative 3B-1	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Local Alternative 3B-2	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0
Component 4. SunZia West Substation	0.0 / 0.0	0.0 / 0.0	0.0 / 0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

Wildlife Resource Values

Activities during construction, operation and maintenance, and decommissioning, such as increased human presence, equipment use, and vehicle traffic, would result in increased noise. Wildlife present near these activities could be startled from the noise and leave the area; however, it is anticipated they would return to the area after the conclusion of the activity. Long-term adverse impacts would result from 0.7 acre of surface disturbance within the Ladron Mountain-Devil's Backbone Complex ACEC and protected wildlife habitat (see AIB-12 Desert Bighorn Sheep Habitat and AIB-15 Wildlife Corridors). Furthermore, 4.7 acres of the ACEC would be permanently removed from the ACEC through an RMP amendment (see EIS Chapter 4 for more information about the RMPA). The ACEC management decisions identified in the Socorro RMP would no longer apply, thereby reducing the wildlife protections in this area. Additional details on noise-related impacts from the project are provided in AID-21 Noise.

Scenic Resource Values

The temporary or intermittent presence of equipment, personnel, and vehicles present during construction, operation and maintenance, and decommissioning of the project would disrupt views of scenic resources within and around the Ladron Mountain-Devil's Backbone Complex ACEC, thereby resulting in adverse impacts on scenic resource values.

The project would erect new transmission line structures and conductors as part of Component 3. This infrastructure would be present throughout the life of the project. The project would use existing utility corridors, where possible. Where existing corridors are used, structures for the project would be matched to existing structures (EPM 7). Also in these areas, the span of structures could be modified to correspond with existing structures (EPM 9). In addition, the separation between the transmission line and existing utilities or other corridors would be minimized to the extent possible (EPM 16).

In areas where existing transmission line corridors are not used, the long-term presence of the project-related transmission line would result in changes to the visual character of the surrounding area, including the Ladron Mountain-Devil's Backbone Complex ACEC. A modified tower design or alternate tower type would be used to reduce visual contrast (EPM 7) where the project would be backdropped by the natural, unmodified landscape setting of the Ladron Mountain-Devil's Backbone Complex ACEC. Where ground disturbance is anticipated for the construction of the transmission line, mineral or asphalt emulsions would be applied in rocky areas to reduce contrasts from newly exposed rock color with the existing landscape (EPM 11). In addition, the clearing of trees in and adjacent to the corridor would be minimized to the extent practicable and trees or other vegetation would be removed selectively using techniques such as edge feathering to reduce visual contrasts between the project and the existing landscape (EPM 14). These measures would reduce, although not avoid, disruptions to the scenic views in the Ladron Mountain-Devil's Backbone Complex ACEC. As a result, there would be long-term, adverse impacts on scenic resource values in the Ladron Mountain-Devil's Backbone Complex ACEC (see AID-12 Visual Resources).

Cultural Resource Values

Alternative Route 1, Local Alternative 1A-7 would result in 0.7 acre of permanent surface disturbance and removal of 4.7 acres from the ACEC, which could affect cultural resources in the Ladron Mountain-Devil's Backbone Complex ACEC (see EIS Chapter 4 for more information about the RMPA).
The ACEC management decisions identified in the Socorro RMP would no longer apply, including the decision to "encourage inventory and research of cultural resource sites and apply Cultural Resource Use Category A: Scientific Use to cultural resource sites" (BLM 2010:53). However, no historic properties have been identified along Local Alternative 1A-7 (see AID-10 Cultural Resources). Additional details on cultural resources impacts from the project are provided in AID-10 Cultural Resources and AIB-20 Traditional Cultural Properties and Resources with Tribal Importance.

WILDERNESS STUDY AREAS

Segment 4 Alternative Route 1 with Subroute 1A-1 through 1A-4 (project Component 3) would be located adjacent to the southwestern and northern boundaries of the Sierra Ladrones WSA. There would be temporary impacts to the wilderness characteristic of *outstanding opportunities for solitude or a primitive and unconfined type of recreation* during construction of the transmission towers under this alternative due to visual impacts and noise. Short-term displacement of wildlife due to noise and human presence during project construction could occur, which would also temporarily reduce the recreation experience in the WSA. Construction noise is expected to attenuate to ambient (35 to 50 dB) or near ambient levels within approximately 3,000 feet. The Sierra Ladrones WSA is the only unit within 3,000 feet of construction for project Component 3 (see Table 3-141).

The proposed action and alternatives would be located adjacent to, but outside of all WSAs, and thus would have no direct impacts to WSAs. Therefore, the proposed action and alternatives meet the non-impairment standard as there would be no new surface disturbance within WSAs. In addition, the proposed action and alternatives do not change the management of WSAs.

The introduction of linear features (two new high-voltage transmission lines and associated access roads) adjacent to these WSAs has the potential to impact viewers and recreationists within the WSA. These would not be impacts to the WSA, but to people who use WSA lands for recreation. In general, users of the WSA would experience adverse impacts in terms of solitude and primitive recreation during construction by being able to see and hear construction activity adjacent to the WSA. During operation, the transmission line would be visible (in the foreground and middle ground) of approximately 10,754 acres (or 22%) of the 49,096-acre Sierra Ladrones WSA. Approximately 536 acres would be visible within 0.5 mile of the WSA boundary, 729 acres would be visible within 0.5 to 1 mile, and 9,489 acres would be visible within 1 to 3 miles. The foreground and middle ground visibility would occur primarily where the Segment 4 Subroutes 1A-1 through 1A-4 parallel the WSA's southwestern boundary. Topographical screening provided by the rolling terrain and more mountainous areas of the WSA's interior minimize the potential for visual impacts within the remaining portion of the WSA.
In addition, the implementation of design features (including Design Features 3, 4, 5, 6, 10, and 11) would reduce overall impacts on dispersed viewers within the WSA, but impacts would remain in the foreground or proximate middle ground. Environmental protection measures would also reduce impacts, such as EPMs 7, 9, 10, 11, 13, and 16 (see Appendix C).

3.4.32.5 No Action Alternative

Under the no action alternative, the project would continue to be authorized through the 2015 ROD and the 2016 Right-of-Way Grant (Serial Number NM-114438). The project under the no action alternative would not cross BLM special designation areas; however, three BLM special designation areas—Lake Valley and Quebradas Backcountry Byways and the Ladron Mountain-Devil's Backbone Complex ACEC—fall within the analysis areas of the no action alternative.

Impacts on scenic resource values provided the Lake Valley Backcountry Byway and Quebradas Backcountry Byway were identified in the 2013 FEIS (BLM 2013:4-148 through 4-205). The 2013 FEIS concluded travel route viewers along the Lake Valley and Quebradas Backcountry Byways would be impacted by the presence of infrastructure that would contrast existing views of the natural landscape (BLM 2013:4-202). These adverse impacts would be long term (lasting the life of the project).

No impacts on wildlife or cultural resource values of the ACEC were identified in the 2013 FEIS; however, the impacts on scenic resources of the Ladron Mountain-Devil's Backbone Complex ACEC were identified (BLM 2013:4-148 through 4-205). The 2013 FEIS concluded viewers in the ACEC would be impacted by the presence of infrastructure as it would contrast existing views of the natural, unmodified landscape (BLM 2013:4-161). These adverse impacts would be long term (lasting the life of the project).

The no action alternative would be located just south of the Veranito WSA, just north of the Stallion and Presilla WSAs, and just east of the Devil's Backbone WSA. The BLM states there would be high to moderate impacts to visual resources from the proximity of the no action alternative to the Devil's Backbone, Stallion, Presilla, and Veranito WSAs (BLM 2013:4-161). The no action alternative would be visible from approximately 1,840 acres (19%) of the Devil's Backbone WSA, 4,741 acres (20%) of the Stallion WSA, 1,211 acres (15%) of the Presilla WSA, and 5,064 acres (70%) of the Veranito WSA. The visibility of the no action alternative would have impacts to outstanding opportunities for solitude from within the WSAs. However, due to the size and varying terrain of the WSA, there would still be ample opportunity for solitude (BLM 2013:4-161).

3.4.32.6 Summary of Impacts

Under the no action alternative, the project would result in disruptions to views along the Lake Valley and Quebradas Backcountry Byways. These adverse impacts on these byways would be long term (lasting the life of the project). The project under the no action alternative would also result in long-term, adverse impacts on scenic resource values of the Ladron Mountain-Devil's Backbone Complex ACEC due to disruptions to views from the presence of infrastructure over the life of the project. No impacts on wildlife or cultural resource values of the Ladron Mountain-Devil's Backbone Complex ACEC were identified in the 2013 FEIS. The no action alternative would be visible from approximately 1,840 acres (19%) of the Devil's Backbone WSA, 4,741 acres (20%) of the Stallion WSA, 1,211 acres (15%) of the Presilla WSA, and 5,064 acres (70%) of the Veranito WSA.

Components 1 and 2 of the project would include the temporary or intermittent presence of equipment, personnel, and vehicles during construction, operation and maintenance, and decommissioning of the project. These activities would temporarily disrupt views along the Lake Valley Backcountry Byway; however, views would be restored at the conclusion of activities. As a result, Components 1 and 2 of the project would result in short-term, adverse impacts on scenic and recreation resource values provided by the byway. Component 1 would also result in long-term adverse impacts on scenic and recreation resource values provided by the Lake Valley Backcountry Byway due to the long-term presence (lasting the life of the project) of structures that would result in disruptions to scenic views. There would be no impacts on backcountry byways from Components 3 and 4 of the project.

Construction, operation and maintenance, and decommissioning of the project for Component 3 would result in temporary noise that could startle wildlife in the Ladron Mountain-Devil's Backbone Complex ACEC and cause them to leave the area. Local Alternative 1-A7 would result in permanent surface disturbance within 0.7 acre of the ACEC and removal of 4.7 acres from the ACEC through an RMP amendment (see EIS Chapter 4 for more information about the RMPA). As a result, adverse impacts on wildlife resource values in the Ladron Mountain-Devil's Backbone Complex ACEC would be long term under Alternative Route 1 and short term under Alternative Routes 2 and 3. The long-term (lasting the life of the project) presence of project structures under Component 3 would disrupt scenic views within and adjacent to the ACEC. Measures would reduce, although not avoid, disruptions to scenic views in the Ladron Mountain-Devil's Backbone Complex ACEC. As a result, there would be long-term, adverse impacts on scenic resource values in the ACEC. Component 3 is not expected to directly impact cultural resource values in the ACEC because no historic properties are present (see AID-10).

The visibility of project Component 3 and the no action alternative would have impacts to outstanding opportunities for solitude from within the WSAs. The Sierra Ladrones WSA is the only unit within 3,000 feet (the zone of elevated noise) of construction for project Component 3 and this is the only unit in which users of the WSA may be affected by construction noise. During operation, the transmission line in Segment 4 Alternative Route 1 with Subroute 1A-1 through 1A-4 (project Component 3) would be visible (in the foreground and middle ground) from approximately 10,754 acres (or 22%) of the 47,936-acre Sierra Ladrones WSA.

Cumulative impacts to special designations are discussed in Section 4.17.4.11 of the 2013 FEIS (BLM 2013:4-344 through 4-345). Incremental impacts from the proposed project Components 1 and 2 would adversely impact scenic and recreation resource values for the Lake Valley Backcountry Byway. Incremental impact from proposed project Component 3, Local Alternative 1A-7, would result in permanent surface disturbance within 0.7 acre of the Ladron Mountain-Devil's Backbone Complex ACEC. Impacts to special designations from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to special designations may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines.
The cumulative impacts to special designations would include long-term, adverse impacts on resource values the special designations are intended to protect.

Cumulative impacts to WSAs are discussed in Section 4.17.4.12 of the 2013 FEIS (BLM 2013:4-345 through 4-347). Incremental impacts from the proposed project components could adversely impact one to four WSAs (as described above) because visibility of the project from within the WSA would impact outstanding opportunities for solitude. Impacts to WSAs from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to WSAs may result from construction of the proposed project components, in addition to other planned infrastructure projects, including transmission lines, substations, wind farms, and residential subdivisions. Visibility of the project as well as other transmission lines, renewable energy projects, and ongoing military training that would impact solitude within the WSAs would occur throughout the life of the project.

AID-17 USFS Inventoried Roadless Area

Would the proposed project reduce the roadless characteristics of the Scott Mesa Inventoried Roadless Area unit?

3.4.33 Affected Environment

USFS IRAs were established by the 2001 Roadless Area Conservation Rule (at 36 CFR 294.11, Subpart B; Special Areas; Roadless Area Conservation; Final Rule, 66 Federal Register 3243) that prohibits road construction and timber harvesting on 58.5 million acres of National Forest System lands (USFS 2001). The intent of the 2001 Roadless Area Conservation Rule is to provide lasting protection for IRAs within the National Forest System in the context of multiple-use management.

The Scott Mesa IRA would be crossed by proposed project Component 3 and is within the analysis area for this issue statement. Components 1, 2, and 4 do not cross any IRAs. Therefore, the following analysis is focused on the Scott Mesa IRA.

IRAs were not addressed in the 2013 FEIS (BLM 2013), because at the time, there were no routes proposed crossing IRAs or any IRAs identified within the study area.

The Scott Mesa IRA is made of 39,515 acres in the Bear Mountains, within Cibola National Forest, just north of Magdalena, New Mexico. The Scott Mesa IRA was not identified in the 1985 Cibola National Forest LRMP (USFS 1985), which predates the 2001 Roadless Rule. Official inventoried roadless area boundaries were established in the final environmental impact statement of the 2001 Forest Service Roadless Area Conservation Rule (USFS 2000) and related ROD. While the 1985 LRMP does not provide specific management objectives or prescriptions for Scott Mesa IRA, the 2021 Cibola National Forest Land Management Plan includes management guidelines and approach, as well as desired future conditions for IRAs, for the Scott Mesa IRA (USFS 2021a).

The desired future conditions for IRAs in the 2021 Forest Plan include: 1) “Inventoried roadless areas encompass large, relatively undisturbed landscapes and unfragmented landscapes that function as biological strongholds for populations of threatened and endangered species. They serve as safeguards against the spread of invasive species and provide reference areas for study and research,” 2) “In inventoried roadless areas, ecosystems are intact and function to provide a full range of ecosystem services,” and 3) “Inventoried roadless areas appear natural, have high scenic quality, and provide opportunities for dispersed recreation” (USFS 2021a). Guidelines for IRAs in the 2021 Forest Plan state that 1) “Inventoried roadless areas should be managed for semi-primitive nonmotorized and semi-primitive motorized recreation settings as defined in the recreation opportunity spectrum,” and 2) “Management activities should be consistent with the scenic integrity objective of high in inventoried roadless areas as defined in the scenery management system” (USFS 2021a).

The nine Roadless Area characteristics, as defined by the 2001 Roadless Area Conservation Rule, must also be considered for the Scott Mesa IRA.

- *High quality or undisturbed soil, water, or air resources.* These three key resources are the foundation upon which other resource values and outputs depend. Healthy watersheds provide clean water for domestic, agricultural, and industrial uses; help maintain abundant and healthy fish and wildlife populations; and are the basis for many forms of outdoor recreation.
- *Sources of public drinking water.* National forests contain watersheds that are important sources of public drinking water. Careful management of these watersheds is crucial in maintaining the flow of clean water to a growing population.

- *Diversity of plant and animal communities.* Roadless areas are more likely than roaded areas to support greater ecosystem health, including a diversity of native and desired non-native plant and animal communities, due to the absence of disturbances caused by roads and accompanying activities. Roadless areas also may conserve native biodiversity by providing areas where nonnative invasive species are rare, uncommon, or absent serving, and by serving as a bulwark against the spread of nonnative invasive species.
- *Habitat for threatened, endangered, proposed, candidate, and sensitive species and species dependent on large undisturbed areas of land.* Roadless areas function as biological strongholds and refuges for many species, including terrestrial and aquatic plant and animal species. Many of the nation's species currently listed as threatened, endangered, or proposed for listing under the Endangered Species Act, and those listed by the Forest Service as sensitive, might have habitat within roadless areas.
- *Primitive, semi-primitive nonmotorized and semi-primitive motorized classes of dispersed recreation.* These areas often provide outstanding recreation opportunities such as hiking, camping, picnicking, wildlife viewing, hunting, fishing, and cross-country skiing, and canoeing. Although roadless areas with these recreation opportunities could have many wilderness-like attributes, they often allow the use of mountain bikes and other mechanized and motorized means of travel, in contrast to designated wilderness areas. Primitive, semi-primitive non-motorized, and semi-primitive motorized areas can also take pressure off heavily used wilderness areas by providing additional solitude and quiet, and dispersed recreation opportunities.
- *Reference landscapes for research study or interpretation.* The body of knowledge about the effects of management activities over long periods of time and on large landscapes is very limited. Reference landscapes can provide comparison areas for evaluation and monitoring. These areas provide a natural setting that may be useful as a comparison to study the effects of more intensely managed areas.
- *Natural appearing landscapes with high scenic quality.* High quality scenery, especially scenery with natural-appearing landscapes, is a primary reason that people choose to recreate in or around an area. Quality scenery contributes directly to real estate values in neighboring communities and residential areas.
- *Traditional cultural properties and sacred sites.* Roadless areas may contain traditional cultural properties and sacred sites. Traditional cultural properties are places, sites, structures, art, districts, or objects that are historically significant in the beliefs, customs, history and practices of a community. Sacred sites are places that have special religious significance to a group or that are determined sacred by virtue of their established religious significance to or ceremonial use by a Native American religion. Federal agencies are to accommodate access to and ceremonial use of Native American sacred sites by Native American religious practitioners, and are to avoid adversely affecting traditional cultural properties and sacred sites, when practicable. Traditional cultural properties and sacred sites may be eligible for protection under the NHPA. However, many of them have not yet been inventoried, especially those that occur in IRAs.
- *Other locally unique characteristics.* Roadless areas can offer unique characteristics that are not covered by the other categories. Examples include uncommon geological formations, which are valued for their scientific and scenic qualities, or unique wetland complexes. Unique social, cultural, or historical characteristics could depend on the roadless character of the landscape. Examples include places for local events, areas prized for collection of non-timber forest products, or exceptional hunting and fishing opportunities.

Additional information regarding the Scott Mesa IRA is provided in the Special Designations technical report (POWER Engineers, Inc. 2021j).

3.4.33.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable planned actions within the analysis area would include the implementation of the 2021 Cibola National Forest Land Management Plan, currently in the administrative review period. One other reasonably foreseeable planned action within the vicinity/analysis area is the High Plains Express Transmission Line Project. The status of that project is unknown, including the exact proposed project footprint. This analysis assumes that the High Plains Express Transmission Line Project would not cross the Scott Mesa IRA.

3.4.34 Environmental Consequences

3.4.34.1 Methods and Assumptions

The following assumptions were used to analyze impacts to the Scott Mesa IRA:

- No transmission line structures would be placed within the Scott Mesa IRA (POWER Engineers, Inc. 2021j:24).
- No project disturbance, including roads, is proposed in the IRA.
- Vegetation in the proposed right-of-way within the IRA consists of low-growing grasses and shrubs with scattered junipers. The height of the vegetation satisfies conductor-clearance requirements, and no tree removal would be required in the IRA (POWER Engineers, Inc. 2021j:43).

The impact indicator used for this analysis is:

- Miles of permanent aerial disturbance from the span of the transmission line across the Scott Mesa IRA.

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to the Scott Mesa IRA:

- AIB-1 Regional Air Quality: Impacts to air quality from project-related activity
- AIB-2 Fugitive Dust: Risk of increased particulate matter in the air
- AIB-7 Sedimentation to Surface Water Resources
- AIB-15 Wildlife Corridors
- AIB-20 Traditional Cultural Properties and Resources with Tribal Importance
- AIB-21 Recreation
- AID-3 Avian Collisions: Collision risk for avian species
- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species
- AID-8 Federally Listed Plant Species: Impacts to federally listed species
- AID-10 Cultural Resources
- AID-12 Visual Resources: Discloses impacts to visual resources and associated federal land management decisions

The impacts analysis for the Scott Mesa IRA assumes application of the design features and environmental protection measures included in Table 3-144. Full design features and EPMs are provided in Appendix C.

Table 3-144. Design Features and Environmental Protection Measures Applicable to Scott Mesa IRA

Relevant Design Features	Applicable EPMs
10, 11	3, 7, 8, 9, 11, 12, 13, 15, 17

Specific to the Scott Mesa IRA, EPM 17 states:

- To avoid ground disturbance in the Scott Mesa IRA, transmission structures would be placed outside of the IRA boundary.
- There would be no creation of new access roads and no widening or upgrading of existing roads in the Scott Mesa IRA for construction and operations.
- No laydown yards or TWAs will be located within the IRA.
- No vegetation will be cut or trimmed in the Scott Mesa IRA for construction. If vegetation removal needs to occur during operations, the Applicant will coordinate this need with the USFS.
- Nonspecular conductors would be used to span the Scott Mesa IRA to reduce visual impacts.
- “Dulled” metal or self-weathering finish structures would be used immediately adjacent to the IRA to reduce visual impacts.
- To reduce visual contrast, mineral or asphalt emulsions (e.g., Permeon or approved equivalent) would be applied in rocky areas immediately adjacent to the IRA where newly exposed rock color would create strong landscape contrasts.
- Helicopter placement of structures may be used to reduce ground disturbance immediately adjacent to the Scott Mesa IRA caused by permanent access road construction.
- To minimize bird collisions, bird diverters would be installed and maintained on groundwires, transmission lines, and/or guywires crossing over and immediately adjacent to the IRA. Groundwires would be replaced with 1-inch-diameter OPGWs to increase visibility where practicable and appropriate.

3.4.34.2 Impacts Common to All Components

There would be no impacts common to all alternatives for the Scott Mesa IRA.

3.4.34.3 Impacts of Localized Route Modifications

There would be no impacts to the Scott Mesa IRA from the localized route modifications.

3.4.34.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

There would be no impacts to the Scott Mesa IRA from the access roads and TWAs.

3.4.34.5 Impacts of Segment 4 Reroute Alternatives

IMPACTS OF ALTERNATIVE ROUTE 1

Under Local Alternative 1A-6, 0.2 mile of Alternative Route 1 would aerially span the northeastern boundary of the Scott Mesa IRA (POWER Engineers, Inc. 2021j). SunZia would avoid ground disturbance within the IRA (see Appendix A, Map 145) (POWER Engineers, Inc. 2021b). Transmission structures would be placed outside of the Scott Mesa IRA boundary (POWER Engineers, Inc. 2021j:24), and the project would not include construction or improvement of roads requiring cut and fill or timber cutting within the Scott Mesa IRA (Table 3-145). There would only be conductors hanging over the IRA (aerially spanning it); there would be no other activities or facilities within the IRA boundary. All construction activities and related permanent facilities would be located outside the IRA on BLM lands.

Table 3-145. Impacts within Scott Mesa IRA

Project Component	Aerial Span across Scott Mesa IRA (miles)	Surface Disturbance within Scott Mesa IRA (acres)
Alt Route 1 with Subroute 1A-1	0.2	0
Alt Route 1 with Subroute 1A-2	0.2	0
Alt Route 1 with Subroute 1A-3	0.2	0
Alt Route 1 with Subroute 1A-4	0.2	0
Local Alternative 1A-6	0.2	0
Local Alternative 1A-7	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

The following analysis presents impacts to the Scott Mesa IRA based on the nine Roadless Area characteristics, as defined in the 2001 Roadless Area Conservation Rule (36 CFR 294.11, Subpart B; Special Areas; Roadless Area Conservation; Final Rule, 66 Federal Register 3243).

HIGH QUALITY OR UNDISTURBED SOIL, WATER, AND AIR

Ground disturbance in the Scott Mesa IRA would not occur and would be avoided by spanning the IRA and placing transmission structures outside of the IRA boundary (POWER Engineers, Inc. 2021j:24, 43). In addition, the project would not include construction or improvement of roads requiring cut and fill or timber cutting within the Scott Mesa IRA (see Table 3-145). Equipment used during construction, operation and maintenance, and deconstruction activities for the project would be adjacent to the IRA and could contribute to emissions that would disturb air quality; however emissions are not anticipated to result in degradations to air quality that would exceed established standards (see AIB-1 Regional Air Quality and AIB-2 Fugitive Dust). Specifically, within the portion of the Scott Mesa IRA potentially crossed by the project (Local Alternative 1A-6), the landscape is characterized by Cañon del Alamito and its ephemeral stream corridor. There would be surface disturbance within or near waterbodies within the Scott Mesa. As a result, there would be no disturbance to soil, air or water resources within the IRA, and there would be no impact to the Scott Mesa's IRA's characteristic of *high quality or undisturb*ed soil, water, or air resources.

SOURCES OF PUBLIC DRINKING WATER

To avoid ground disturbance in the Scott Mesa IRA, transmission structures would be placed outside of the IRA boundary, and the project would not include construction or improvement of roads requiring cut and fill or timber cutting within the Scott Mesa IRA (POWER Engineers, Inc. 2021j:24, 43). As a result, there would be no construction activities within the IRA that would contribute impacts to sources of public drinking water or impacts to water rights. There would be no impact on the IRA's characteristic of *sources of drinking water*.

DIVERSITY OF PLANT AND ANIMAL COMMUNITIES

There would be no ground disturbance within the Scott Mesa IRA, because Local Alternative 1A-6 would aerially span the IRA. Transmission structures would be placed outside of the IRA boundary (POWER Engineers, Inc. 2021j:24, 43). In addition, the project would not include construction or improvement of roads requiring cut and fill or timber cutting within the Scott Mesa IRA (POWER Engineers, Inc. 2021j:24). As a result, ground disturbance in the Scott Mesa IRA would be avoided and there would be no impacts on the IRA's characteristic of *diversity of plant and animal communities.*

HABITAT FOR THREATENED, ENDANGERED, PROPOSED, CANDIDATE, AND SENSITIVE SPECIES AND SPECIES DEPENDENT ON LARGE UNDISTURBED AREAS OF LAND

See AID-5 Federally Listed Wildlife Species and AID-8 Federally Listed Plant Species for information about federally listed wildlife and plants that may occur within the analysis area. The Scott Mesa IRA may provide suitable habitat for protected species, such as bald and golden eagles. Ground disturbance would be avoided within the IRA by avoiding construction or improvement of roads requiring cut and fill or timber cutting in the Scott Mesa IRA, spanning the IRA, and placing transmission structures outside of the IRA boundary (POWER Engineers, Inc. 2021j:24, 43). Therefore, potential adverse impacts to protected species would be limited to impacts associated with the aerial transmission line conductors that would span the IRA. These potential impacts resulting from avian collision are disclosed in AID-3 Avian Collisions. Approximately 0.2 mile of the Scott Mesa IRA would be aerially spanned by the project, therefore this area would pose potential collision and electrocution threats to avian species foraging in this portion of the IRA. Risk of electrocution on high-voltage transmission lines is low as they rarely cause avian electrocution due to the larger spacing between conductors than on lower-voltage distribution lines. Mitigation measures to improve visibility of groundwires (EPM 15), such as the use of bird diverters on groundwires and guywires, and the use of 1-inch fiber-optic groundwire rather than 0.5-inch overhead groundwire where practicable, would reduce the collision risk for sandhill cranes and other large birds, and those design specifications are detailed in the project's Avian Protection Plan (POWER Engineers, Inc. 2021g:113). As a result, there would be 0.2 mile of adverse impacts to the IRA's characteristic of *habitat for threatened, endangered, proposed, candidate, and sensitive species and species dependent on large undisturbed areas of land.*

PRIMITIVE, SEMI-PRIMITIVE NONMOTORIZED, AND SEMI-PRIMITIVE MOTORIZED CLASSES OF DISPERSED RECREATION

The presence of personnel, equipment, and vehicles immediately adjacent to the Scott Mesa IRA during construction, operations and maintenance, and decommissioning would disturb the views and experience of recreationists seeking semi-primitive recreation within the IRA. The long-term presence of the overhead transmission line across 0.2 mile of the Scott Mesa IRA would result in changes to the visual character of the IRA and would disturb the views and experience of recreationists to the IRA. The IRA is 39,515 acres and the arial span of 0.2 mile of the northeastern corner of the line would result in changes to the visual character of this corner of the IRA. The application of EPMs 3, 5, 11, and 14 would reduce landform and vegetation contrasts adjacent to Scott Mesa IRA. While no project-related activities would cause surface disturbance within the Scott Mesa IRA, visual impacts to the viewshed would occur with 6,744 acres of the IRA, and the transmission line would be visible from within the IRA up to approximately 3 miles away. As a result, adverse impacts on the IRA's characteristic of natural appearing landscapes with high scenic quality would be long term and represent 17% of the IRA. As a result, adverse impacts on the IRA's characteristic of *primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of dispersed recreation* would be long term and represent 17% of the IRA.

REFERENCE LANDSCAPES FOR RESEARCH STUDY OR INTERPRETATION

The 2001 Roadless Area Conservation Rule recognizes IRAs as reference landscapes potentially useful for research or interpretations. As explained in the rule, managers can use reference landscapes of relatively undisturbed areas to gauge the health and condition of other land uses (66 Federal Register 3243). The impacts from proposed project Component 3 would be limited to visual resource impacts from aerially spanning the IRA and no surface disturbance would occur within the boundary of the IRA. Therefore, the proposed project would not adversely impact the health and condition of the IRA and it could continue to serve as a reference landscape. Therefore, there would be no impacts on the IRA's characteristic of *reference landscapes for research study or interpretation.*

NATURAL APPEARING LANDSCAPES WITH HIGH SCENIC QUALITY

The existing landscape character in this area is defined by irregular, dissected foothills and slopes dominated by grasses and shrubs, with dispersed pinyon-juniper trees. Erosion along ridgelines has exposed rock outcroppings introducing a range of red, gray, and tan hues into the setting. Multiple ephemeral streams form small canyons leading toward the Rio Salada, with its more defined riparian corridor, north of the Cibola National Forest. Specifically, within the portion of the Scott Mesa IRA potentially crossed by the project (Local Alternative 1A-6), the landscape is characterized by Cañon del Alamito and its ephemeral stream corridor, which form a natural-appearing landscape character. Due to the increased presence of water, vegetation is dense along the flat-bottomed canyon, introducing a wide range of greens and seasonal colors. The stream also has eroded the canyon walls, displaying bands of red, gray, and tan-hued rocks in addition to the outcroppings visible on the ridgelines.

The portion of the Cibola National Forest crossed by the project is highly intact with limited landscape character deviations except for Forest Service roads. Range improvements (including corrals) are also visible in this area, but occur on adjacent private and BLM lands. Due to the intactness of the characteristic landscape and the modifications introduced by the project, high impacts on landscape character were identified for all lands on the Cibola National Forest, including where the Scott Mesa IRA would be crossed by Local Alternative 1A-6. EPMs 3 and 11would reduce contrast and begin to blend the project with the characteristic landscape, but high impacts would remain due to the presence of tall, vertical repeating transmission line structures and the network of project access roads constructed in rolling to steep terrain—modifying the valued natural landscape. High impacts were identified on views from Forest Service Road 354 and the Scott Mesa IRA, especially where the project would be viewed skylined on ridges and where the construction of access roads in steep terrain would modify existing landforms within the foreground distance zone. The application of EPM 3 to use overland construction techniques where possible, EPM 10 to span Forest Service Road 354 (and Scott Mesa IRA), and EPM 11 to apply Permeon (or equivalent) to weather exposed underlying rocks would reduce visual contrast, but high impacts would remain on these foreground views due to the presence of tall, vertical repeating transmission line structures within their viewsheds. Potential impacts could also be created as a result of glint, glare, and reflectivity caused by the galvanized steel structures and conductors. Dulled galvanized steel or choosing other surface finishes such as self-weathering steel would reduce these potential visual impacts as described for project Design Feature 10 and Design Feature 11.

The long-term presence of the project-related transmission line would result in changes to the visual character where the 0.2-mile segment of the transmission line would span the IRA and be visible to other portions of the Scott Mesa IRA (approximately 6,744 acres or 17% of the IRA).

Based on the definition of the maximum modification VQO, the proposed project Component 3, Local Alternative 1A-6, would meet desired conditions for visual resources on the Cibola National Forest (Appendix F). This also aligns with the LRMP statement regarding future conditions for visual resources to place more disruptive activities such as timber harvest, overstory modification, and road construction in areas with a VQO of modification and maximum modification.

Adverse visual resource impacts have been identified for views within Scott Mesa IRA as summarized above and provided in detail in Appendix F.

While no project-related activities would cause surface disturbance within the Scott Mesa IRA, visual impacts to the viewshed would occur with 6,744 acres of the 39,515-acre IRA, and the transmission line would be visible from within the IRA up to approximately 3 miles away. As a result, adverse impacts on the IRA's characteristic of natural appearing landscapes with high scenic quality would be long term and represent 17% of the IRA. As a result, adverse impacts on the IRA's characteristic of *natural appearing landscapes with high scenic quality* would be long term and represent 17% of the IRA.

TRADITIONAL CULTURAL PROPERTIES AND SACRED SITES

There are no identified traditional cultural properties or sacred sites within the portion of the Scott Mesa IRA that would be spanned by the project. As a result, no known impacts to the IRA's characteristic of *traditional cultural properties and sacred sites* are expected.

OTHER LOCALLY UNIQUE CHARACTERISTICS

There are no identified other locally unique characteristics documented for the Scott Mesa IRA. As a result, no known impacts to the IRA's characteristic of *other locally unique characteristics* are anticipated.

IMPACTS OF ALTERNATIVE ROUTE 2

There would be no impacts to the Scott Mesa IRA from Alternative Route 2.

IMPACTS OF ALTERNATIVE ROUTE 3

There would be no impacts to the Scott Mesa IRA from the Alternative Route 3 subroutes.

3.4.34.6 Impacts of SunZia West Substation

There would be no impacts to the Scott Mesa IRA from the SunZia West Substation.

3.4.34.7 No Action Alternative

Under the no action alternative, the project would continue to be authorized through the 2015 ROD and the 2016 Right-of-Way Grant. IRAs were not addressed in the 2013 FEIS, because there are no IRAs identified within the project study area under the no action alternative. As a result, there would be no impacts to the Scott Mesa IRA under the no action alternative.

3.4.34.8 Summary of Impacts

Potential long-term adverse impacts to the Scott Mesa IRA's characteristic of *habitat for threatened, endangered, proposed, candidate, and sensitive species and species dependent on large undisturbed areas of land* would occur under the proposed project Component 3, Alternative Route 1 for the duration of the project's life (at least 50 years and up to 75 years). These impacts would occur in the event a forging avian species collides with the aerial transmission line that would span the IRA. The long-term presence of the overhead transmission line across 0.2 mile of the Scott Mesa IRA would result in changes to the visual character of the IRA and would disturb the views and experience of recreationists to the IRA, thereby resulting in long-term (throughout the duration of the project's life) adverse impacts to the IRA characteristics of *primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of dispersed recreation* and *natural appearing landscapes with high scenic quality* under the proposed project Component 3.

There would be no impact on the Scott Mesa IRA's characteristic of *high quality or undisturbed soil, water, or air resources; sources of drinking water*; *diversity of plant and animal communities*; *reference landscapes for research study or interpretation*; *traditional cultural properties and sacred sites*; and *other locally unique characteristics* under proposed project Component 3.

There would be no impacts to IRAs from proposed project Components 1, 2, and 4 nor the no action alternative.

Incremental adverse impacts from proposed project Component 3 would result from presence of the overhead transmission line across 0.2 mile of the Scott Mesa IRA under Local Alternative 1A-6.
No adverse cumulative impacts have been identified for the Scott Mesa IRA because only one reasonably foreseeable planned action has been identified for the IRA, the implementation of the 2021 Cibola National Forest Land Management Plan, currently in the administrative review period. Implementation of the revised Forest Plan is expected to result in beneficial management policies for the IRA.

AID-18 Sevilleta National Wildlife Refuge

Where Component 3: Segment 4 Reroute alternatives cross the Sevilleta National Wildlife Refuge, how would the construction or operation and maintenance of the proposed project components affect the function and purpose of the Refuge?

3.4.35 Affected Environment

The Sevilleta NWR is the only NWR unit within the analysis area of Component 3. Components 1, 2, and 4 do not cross any NWRs. Therefore, the analysis area for this issue statement is the extent of the Sevilleta NWR.

The NWR System was established in 1903 with the purpose of conserving fish and wildlife heritage (USFWS 2021k) by targeting the conservation of native species that are dependent on the NWR's lands and waters (USFWS 2020e). In 1966, the National Wildlife Refuge System Administrative Act was passed to define the various ways in which NWRs may be established (USFWS 2017). It was not until 1997 that an act—the National Wildlife Refuge System Improvement Act—was passed that identified guidance for the management of NWR resources and uses (USFWS 2012b). The NWR Improvement Act of 1997 defines the mission of the NWR System as follows (USFWS 2020e):

> *[T]o administer a national network of lands and waters for the conservation, management and where appropriate, restoration of fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

The USFWS administers and coordinates the management actions of NWRs with other stakeholders. The USFWS is responsible for reviewing activities (or uses) within an NWR to determine compatibility with the mission of the NWR System and the purpose (or goals) the NWR (USFWS 2000b).

The Sevilleta NWR is located in central New Mexico and is the seventh largest NWR in the contiguous United States, spanning 30 miles east to west and 18 miles north to south and covering a total of 228,770 acres (USFWS 2000a). The Sevilleta NWR was established in 1973 with the purpose of preserving and enhancing the integrity and natural character of the ecosystems (USFWS 2000a); see also Section 1.6.3 in Chapter 1 for the background on the Sevilleta NWR.

- The United States obtained the land that is now the USFWS-administered Sevilleta National Wildlife Refuge in New Mexico by donation from The Nature Conservancy in 1973. The Refuge land is encumbered by "all reservations, restrictions, leases and easements of record and all rights-of-way and easements known to Grantee or apparent on the ground" (USFWS and The Nature Conservancy 1973:7), including the pre-existing rights for the existing EPE and Tri-State transmission lines which predate the conveyance in 1973.

Subject to pre-existing rights, the 1973 warranty deed between the USFWS and The Nature Conservancy establishes ownership and the purpose of the Sevilleta NWR:

- The purpose of the NWR is to "preserve and enhance the integrity and the natural character of the ecosystems of the [the Sevilleta NWR] by creating a wildlife refuge managed as nearly as possible in its natural state, employing on those management tools and techniques that are consistent with the maintenance of a natural ecological process" (USFWS and The Nature Conservancy 1973:8).
- "property not be subject to commercial exploitation" (USFWS and The Nature Conservancy 1973:8).
- "the Grantee shall not use pesticides, herbicides, or other biocides or noxious substances unless their use is dictated by (a) emergency situations, (b) requirements of law, or (c) paramount management considerations determined after consultation with the Grantor" (USFWS and The Nature Conservancy 1973:8).
- "property shall not be sold, exchanged, transferred or abandoned, nor shall it be leased or used for any commercial purpose other than where deemed appropriate by the Service and The Nature Conservancy for the purpose of sound wildlife management" (USFWS and The Nature Conservancy 1973:8).
- "The conveyance is made upon the express condition that the property will be administered by the Grantee as a national wildlife refuge" (USFWS and The Nature Conservancy 1973:8).
- "Grantor may grant exceptions to the above restrictions, provided that any such exception does not impair the natural character of the of the area" (USFWS and The Nature Conservancy 1973:9).

The NWR is managed to allow natural processes, such as flood and fire, to prevail and keep the NWR as close as possible to its natural state (USFWS 2000a). Biomes that intersect the Sevilleta NWR are: Colorado Plateau Shrub Steppe, Chihuahuan Desert, Great Plains, Short Grassland Prairie, and Pinon-Juniper Woodland (USFWS 2000a). The Rio Grande runs in a general north to south direction through the center of the NWR and provides riparian habitat that is vital for the NWR's ecosystems (USFWS 2000a).

The Sevilleta NWR provides habitats that contribute to conservation of wildlife at local, ecoregional, and national levels (USFWS 2015a). These habitats within the Sevilleta NWR support 89 mammal species, 250 bird species, 58 reptile species, and 15 amphibian species (USFWS 2000a). Refuge management is focused on restoring, managing, or maintaining habitats or habitat conditions to benefit a suite of species or a suite of plants and animals as identified the Sevilleta NWR Habitat Management Plan (USFWS 2015a:Appendix C). Human disturbance as listed as a key limiting factor and threat for key habitat in the Sevilleta NWR (USFWS 2015a).

Additional information regarding the Sevilleta NWR is provided in the 2013 FEIS (BLM 2013) and the Special Designations resource report (POWER Engineers, Inc. 2021j).

3.4.35.1 Reasonably Foreseeable Environmental Trends and Planned Actions

The Sevilleta NWR would continue to be managed in accordance with USFWS management policies and as guided by the warranty deed. Reasonably foreseeable planned actions within the analysis areas for the Sevilleta NWR would include ongoing research projects through the Sevilleta Field Station managed in partnership with the University of New Mexico (SWCA 2021). Researchers associated with the Sevilleta Field Station were contacted during scoping to determine if the proposed project would interfere with ongoing research. To date, no conflicts with ongoing research on the NWR have been identified for the project.

It is not known at this time if the High Plains Express Transmission Line Project would overlap the Sevilleta NWR. If this planned action does overlap the Sevilleta NWR, there could be temporary to long-term disturbances or changes to primary resources within the Sevilleta NWR that could interfere with the function and purpose of the NWR. Measures established as part of the Sevilleta CCP to protect and enhance water, wetlands, and cultural resources in the Sevilleta NWR would continue (USFWS 2000a). The Sevilleta NWR would continue to be managed to meet established goals of restoring and maintaining natural ecological processes.

3.4.36 Environmental Consequences

3.4.36.1 Methods and Assumptions

The following assumptions were used to analyze impacts to the Sevilleta NWR:

- No conflicts with ongoing research on the NWR have been identified for the project.
- Project construction, operation, and maintenance would adhere to the Preliminary Construction Plan for the Sevilleta NWR (SunZia 2021a).
- Surface disturbance within the Sevilleta NWR outside of the existing transmission line footprints (held by Tri-State and EPE) would be considered a permanent impact to the NWR, regardless of the project activity. For example, the use of a TWA is considered a temporary project activity, but the surface disturbance associated with a TWA would have permanent impacts. Both construction and operation and maintenance impacts within the NWR are likely to be permanent due to the need to adhere to the “natural state” clause in the warranty deed (USFWS and The Nature Conservancy 1973:8).
- The Sevilleta Habitat Management Plan provides a Comprehensive List of Resources (plant and animal species) of Concern (USFWS 2015a:Appendix C). This species list comprises local, state, regional, or national species of conservation concern. This list serves two main purposes: to

support the Refuge purpose and the Refuge System policies. The majority of the species identified in the Sevilleta Habitat Management Plan are covered by analysis in other sections in this Draft EIS (see the list of issue statements incorporated by reference below). Several species' habitat would not be impacted by activities proposed for the Sevilleta NWR (i.e., fish). A list of six reptiles are not covered by other Draft EIS issue statements and may occur within the project vicinity within the Sevilleta NWR and are therefore carried forward for analysis in this issue statement (Table 3-146).

Table 3-146. Reptile Species that May Occur in the Sevilleta NWR and in the Vicinity of the Proposed Project

Species Common Name	Scientific Name	Habitat Description
Madrean alligator lizard	*Elgaria kingii*	The species occurs in southwestern New Mexico, southeastern and central Arizona, and southward to Mexico. Habitat associations typically include woodlands and forests of pinyon-juniper, ponderosa pine-Gambel oak, and Douglas fir-aspen associations. They are typically uncommon to rocky slopes.
Desert massasauga	*Sistrurus tergeminus edwardsii*	This species primarily inhabits desert grasslands or shortgrass prairies with sandy soil in valleys, on low-sloping alluvial fans, and on rolling grass-covered hills within semi-desert grassland habitat. They typically avoid rocky areas. Historically, this species was common in low-growing, shrubby, shinnery oak habitat in southeastern New Mexico where they are associated with pure stands of shinnery oak or a mixture of oak and various herbaceous plants and grasses. Currently, this species occurs in southeastern New Mexico and in isolated populations in the middle and lower Rio Grande Valley across south-central New Mexico at elevations ranging between 3,030 and 6,890 feet amsl (Degenhardt et. al. 1996).
Western diamond-backed rattlesnake	*Crotalus atrox*	This species occurs throughout the southwestern United States and the northern half of Mexico. It can be found in a variety of terrain from flat coastal plains to steep rocky hillsides and canyons and in a variety of vegetation types including mesquite-grassland, desert, and pine-oak forests. It is most abundant in lowland regions that are xeric or seasonally dry.
Western milk snake	*Lampropeltis gentilis*	This species is widely distributed from Montana and South Dakota south to Louisiana and west to Arizona. The species is both terrestrial and riparian and occupies a variety of habitat types including desert and plains grasslands, shrublands, pinyon-juniper woodlands, montane forests, and riparian areas. The species has also been observed in agricultural and cropland habitat.
Western painted turtle	*Chrysemys picta bellii*	This species is found in southern Canada, much of the United States, and northern Mexico. Preferred habitat includes slow-moving, shallow water with muddy bottoms, abundant underwater vegetation, and plenty of half-submerged logs for basking. It is found around the margins of lakes and in river pools, streams, ditches, and cattle tanks. In New Mexico, the species has be known to colonize intermittent ponds that are up to 1 mile from permanent water sources.
Ornate box turtle	*Terrapene ornata*	Ornate box turtles live from South Dakota to Illinois and south to Texas through Arizona. In the Southwest, the species is typically associated with arid and semiarid regions, on plains, grasslands, and in pastures with a preference for open prairies with herbaceous vegetation. The species is primarily terrestrial.

The impact indicators used for this analysis are:

- Acres of surface disturbance outside of existing transmission line footprint held by Tri-State and EPE within the Sevilleta NWR that would interfere with the function and purpose of the NWR (including NWR species)
- Qualitative discussion of the effectiveness of proposed reclamation activities within the Sevilleta NWR

The following analyses are incorporated by reference as they relate to analysis used to inform impacts to the habitat and resources within the Sevilleta NWR:

- AIB-1 Regional Air Quality: Impacts to air quality from project-related activity
- AIB-2 Fugitive Dust: Risk of increased particulate matter in the air
- AIB-7 Sedimentation to Surface Water Resources
- AIB-12 Desert Bighorn Sheep Habitat
- AIB-13 Grasslands and Pronghorn Habitat
- AIB-14 Sensitive Time Periods and Habitat Fragmentation
- AIB-15 Wildlife Corridors
- AIB-21 Recreation
- AID-3 Avian Collisions: Collision risk for avian species
- AID-4 Migratory Bird Corridors
- AID-5 Federally Listed Wildlife Species: Impacts to federally listed species
- AID-6 New Mexico Meadow Jumping Mouse
- AID-7 BLM Sensitive Wildlife Species
- AID-8 Federally Listed Plant Species: Impacts to federally listed species.

The impacts analysis for the Sevilleta NWR assumes application of the design features and environmental protection measures included in Table 3-147. Full design features and EPMs are provided in Appendix C.

Table 3-147. Design Features and Environmental Protection Measures Applicable to the Sevilleta NWR

Relevant Design Features	Applicable EPMs
1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 18, 19, 23, 25, 26, 29	1, 2, 3, 5, 7, 8, 10, 12, 13, 15

3.4.36.2 Impacts Common to All Components

There are no impacts common to all components for this issue statement.

3.4.36.3 Impacts of Localized Route Modifications

There would be no impacts to the Sevilleta NWR from the proposed localized route modifications (Component 1).

3.4.36.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

There would be no impacts to the Sevilleta NWR from the proposed access roads and TWAs outside the granted right-of-way (Component 2).

3.4.36.5 Impacts of Segment 4 Reroute Alternatives

The Sevilleta NWR is within the analysis areas for Alternative Routes 1, 2, and 3 (all subroutes). Alternative Route 1 would not cross the Sevilleta NWR, although it would come within approximately 1 mile of the southwest corner of the Sevilleta NWR. See Appendix A, Maps 140, 141, 155–161, and 176 for Alternative Route 2 and 3 in the Sevilleta NWR.

Approximately 14 and 12 miles of the Sevilleta NWR would be crossed by Alternative Route 2 and Alternative Route 3, respectively (Table 3-148).

Table 3-148. Summary of Direct Impacts within the Sevilleta NWR

Project Component 3 Alternative	Corridor within NWR (miles)	Surface Disturbance within Existing Footprint (acres)	Surface Disturbance Outside of Existing Footprint (acres)
Alternative Route 1 (all subroutes and local alternatives)	0	0	0
Alt Route 2 All Subroutes	**14.2**	**63.3**	**82.7**
Alt Route 2: temporary access roads	N/A	0.5	17.3
Alt Route 2: permanent access roads	N/A	9.8	0
Alt Route 2: pull sites	N/A	1.4	12.9
Alt Route 2: snub sites	N/A	9.7	10.1
Alt Route 2: permanent structure pad	N/A	11.2	0
Alt Route 2: temporary structure removal area	N/A	0	0
Alt Route 2: structure work area	N/A	30.7	42.4
Alt Route 3 All Subroutes	**12.1**	**30.1**	**57.4**
Alt Route 3: temporary access roads	N/A	1.3	9.5
Alt Route 3: permanent access roads	N/A	11.3	0
Alt Route 3: pull site	N/A	0	1.9
Alt Route 3: snub site	N/A	1.1	1.4
Alt Route 3: temporary structure pad	N/A	0	0.001
Alt Route 3: permanent structure pad	N/A	3.9	0
Alt Route 3: temporary structure removal area	N/A	3.9	0
Alt Route 3: structure work area		8.6	44.6
Local Alternative 3B-1	0	0	0
Local Alternative 3B-2	0	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

IMPACTS OF ALTERNATIVE ROUTE 2

Where Alternative Route 2 would cross the Sevilleta NWR, the easement width would be reduced to 100-foot width to conform with the existing EPE 345-kV transmission line easement. The existing EPE 345-kV and proposed 500-kV circuits would be co-located on the same transmission line structures crossing the NWR. Construction crews would need to make temporary use of areas outside of the existing EPE 345-kV transmission line facilities footprint.[9] These temporary use areas would be reclaimed shortly after completion of construction activities following the methods described in the *Reclamation Plan for the Sevilleta National Wildlife Refuge* (SunZia 2021a).

Under Alternative Route 2 (all Subroutes), approximately 83 acres within the Sevilleta NWR and outside of the existing EPE facility footprint would be subject to surface disturbance to allow for construction of the project. Table 3-148 provides a breakdown of the various project activities that would need to occur both inside and outside of the existing EPE footprint, with correspondence acreages of surface disturbance. Surface disturbance within the Sevilleta NWR outside of the existing transmission line footprint (held by EPE) would be considered a permanent impact to the NWR, regardless of the project activity.

Reptiles such as Madrean alligator lizard, desert massasauga, western diamondback rattlesnake, milk snake, western painted turtle, and ornate box turtle may use vegetation communities that would be impacted by Alternative Route 2 within the Sevilleta NWR. Short-term impacts to reptiles would occur during construction and during periodic operation activities. These impacts could include disturbance by operating equipment and human activities as well as potential mortality from collision if reptiles are sunning themselves on roadways. If reptile species are present during construction and operation, they may relocate to adjacent habitat until human disturbances cease. Long-term adverse impacts to reptiles would occur from loss of up to 83 acres of potential habitat. The proposed project could impact individuals but would not likely contribute to a trend toward federal listing or cause a loss of viability for the population or species.

Reclamation activities currently proposed within the Sevilleta NWR include broadcast seeding with USFWS-approved native seed mixes in flat terrain, hydroseeding of moderate to steep terrain, noxious weed management, and maintenance of erosion control measures established for construction, and reclamation monitoring and maintenance (SunZia 2021a). An independent review of the proposed reclamation activities compared to other reclamation efforts in similar biomes and vegetation communities as those found in the NWR was conducted to determine the anticipated success of the proposed reclamation plan for the Sevilleta NWR (SWCA 2022b). Similar reclamation efforts demonstrate:

- Reseeding efforts in one of the revegetation studies was moderately successful in establishing cover by grasses and shrubs 13.5 years post-reclamation (Martinez 2001).
- Reseeding of saltbush shrubs in another reseeding study had relatively low shrub establishment 3.5 years post-reclamation (Cable 1972). This relatively low seeding success illustrates how one or more reseeding treatments may be required, depending on weather and other site conditions, to ensure reclamation success.
- Reseeding in combination with topsoil segregation may result in high revegetation success (across three different vegetation communities). Authors of this study noted that the reclaimed areas received ample precipitation during the growing season immediately following the seeding

[9] For a description of all project facilities and construction proposed within the Sevilleta NWR, see Section 3.1.12 of the Draft POD (POWER Engineers, Inc. 2021b) and the SunZia Southwest Transmission Line Project Preliminary Construction Plan for the Sevilleta NWR (SunZia 2021a), which have been provided by SunZia on behalf of EPE.

efforts, which they speculated was critical to the successful establishment of seeded species. (SWCA 2022b)

- Revegetation treatment studies consistently demonstrate the importance of adequate water being supplied for successful revegetation and potential benefits from strategic planting of potted or transplanted plants (Arnold 2009; Bean et al. 2004; Roundy et al. 2001).

Estimating natural recovery is another important consideration when evaluating potential rates of reclamation success, as natural recovery reflects the maximum estimated time to achieve restoration success, if all attempted restoration efforts fail to accelerate recovery. Abella (2010)[10] compiled results of 47 natural recovery studies from the Mojave and Sonoran Deserts of the southwestern United States. This literature review estimated the time required for recovery of total perennial plant cover was 76 years, and that complete species composition recovery would require 215 years (on average). In a similar literature review from the Mojave and Sonoran Deserts, Lovich and Bainbridge (1999) examined natural recovery studies from a variety of disturbance types. Their evaluation suggests vegetation biomass may recover after 50 to 300 years, and complete vegetation community recovery may take up to 3,000 years (Lovich and Bainbridge 1999).

Based on the findings summarized above, it is anticipated that the currently proposed Sevilleta NWR reclamation plan (SunZia 2021a) would not be effective in reclaiming the 83 acres of surface disturbance within the NWR back to a “natural state.” Therefore, the impacts within the Sevilleta NWR under Alternative Routes 2 would be long term and adverse.

IMPACTS OF ALTERNATIVE ROUTE 3

Where Alternative Route 3 would cross the Sevilleta NWR, the easement width would be reduced to 50-foot width to conform with the existing Tri-State 115-kV transmission line easement. The existing Tri-State 115-kV and proposed 500-kV circuits would be co-located on the same transmission line structures crossing the NWR. Construction crews would need to make temporary use of areas outside of the existing Tri-State 115-kV transmission line facilities footprint.[11] These temporary use areas would be reclaimed shortly after completion of construction activities following the methods described in the *Reclamation Plan for the Sevilleta National Wildlife Refuge* (SunZia 2021a).

Under Alternative Route 3 (all subroutes), approximately 58 acres within the Sevilleta NWR and outside of the existing Tri-State facility footprint would be subject to surface disturbance to allow for construction of the project. Table 3-148 provides a breakdown of the various project activities that would need to occur both inside and outside of the existing Tri-State footprint, with correspondence acreages of surface disturbance. This surface disturbance within the Sevilleta NWR would be considered a permanent impact to the NWR, regardless of the project activity.

Similar to Alternative 2, reptiles such as Madrean alligator lizard, desert massasauga, western diamondback rattlesnake, milk snake, western painted turtle, and ornate box turtle may use vegetation communities that would be impacted by Alternative Route 3 within the Sevilleta NWR. Short- and long-term impacts to these species would be similar to Alternative 2, with long-term adverse impacts to reptiles occurring from loss of up to 58 acres of potential habitat with the Sevilleta NWR and outside the existing

[10] The studies from Abella (2010) and Lovich and Bainbridge (1999) are from the Mojave and Sonoran Deserts, and are therefore, not specific to the dominant vegetation communities of the NWR; however, these studies can serve as high-level proxies from other arid biomes in the southwestern United States.

[11] For a description of all project facilities and construction proposed within the Sevilleta NWR, see Section 3.1.12 of the Draft POD (POWER Engineers, Inc. 2021b) and the SunZia Southwest Transmission Line Project Preliminary Construction Plan for the Sevilleta NWR (SunZia 2021a), which have been provided by SunZia on behalf of Tri-State.

transmission line footprint. The proposed project could impact individuals but would not likely contribute to a trend toward federal listing or cause a loss of viability for the population or species.

Similar to Alternative Route 2 (all subroutes), it is anticipated that the currently proposed Sevilleta NWR reclamation plan (SunZia 2021a) would not be effective in reclaiming the 58 acres of surface disturbance under Alternative Route 3 within the NWR back to a "natural state." Therefore, the impacts within the Sevilleta NWR under Alternative Route 3 would be long term and adverse.

3.4.36.6 Impacts of SunZia West Substation

There would be no impacts to the Sevilleta NWR from the proposed SunZia West Substation (Component 4).

3.4.36.7 No Action Alternative

Under the no action alternative, the project would continue to be authorized through the 2015 ROD and the 2016 Right-of-Way Grant (Serial Number NM-114438). The 2013 FEIS analyzed impacts on the Sevilleta NWR; however, the analysis was focused on visual impacts on the Sevilleta NWR, rather than primary resources. The centerline under the no action alternative would not cross the Sevilleta NWR, and the no action alternative that would interfere with the function and purpose of the NWR. As a result, there would be no impact on the Sevilleta NWR under the no action alternative.

3.4.36.8 Summary of Impacts

Alternative Route 2 (all subroutes) would result in 83 acres of permanent impact within the Sevilleta NWR outside of the existing EPE transmission line footprint. Alternative Route 3 (all subroutes) would result in 58 acres of permanent impact within the NWR outside of the existing Tri-State transmission line footprint. Based on an independent review of the proposed reclamation activities for the Sevilleta NWR, it is unlikely that the surface disturbance caused by the proposed project would be reclaimed to a "natural state" with the methods as proposed in the Sevilleta Reclamation Plan (SunZia 2021a). These long-term impacts would translate to adverse impacts to wildlife habitat at the same locations. Therefore, the impacts within the Sevilleta NWR under Alternative Routes 2 and 3 would be long term and adverse. The proposed reclamation activities could be augmented and improved to ensure more near-term success and to minimize the length of time reclamation may take to recover the impacted areas to a more natural state.

The no action alternative would not cross the Sevilleta NWR; therefore, no impacts would occur under this alternative.

Cumulative impacts to biological resource conservation areas, such as the Sevilleta NWR, are discussed in Section 4.17.4.6 of the 2013 FEIS (BLM 2013:4-321 through 4-328). Incremental impacts from the proposed project Component 3, Alternative Route 2 and Alternative Route 3, would result in permanent surface disturbance 83 acres and 58 acres, respectively, within the Sevilleta NWR. Impacts to the Sevilleta NWR from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Adverse cumulative impacts to Sevilleta NWR may result from construction of the proposed project Component 3, in addition to other planned infrastructure projects, including ongoing operation and maintenance of the existing transmission lines in the NWR. Beneficial cumulative impacts to the Sevilleta NWR are expected to continue through implementation of the Sevilleta CCP and ongoing research projects through the Sevilleta Field Station managed in partnership with the University of New Mexico.

AID-19 Fiscal Economics and Job Creation

How many total jobs would be created from the construction and operation of the proposed project Components 3 and 4?

How many local jobs, and what types of jobs (occupations, wages levels) would be created from the construction and operation of proposed project Components 3 and 4?

What fiscal and economic impacts would the development, construction, and operation of proposed project Components 3 and 4 have on the economies of New Mexico, Arizona, and the counties in which the proposed project would be located?

3.4.37 Affected Environment

The proposed project would traverse portions of seven counties in New Mexico—Grant, Hidalgo, Luna, Sierra, Socorro, Torrance, and Valencia—and portions of five counties in Arizona—Cochise, Graham, Greenlee, Pima, and Pinal. One Arizona county (Pinal County) would be directly affected by project Component 4—the proposed construction of the SunZia West Substation. Three of the New Mexico counties (Socorro, Torrance, and Valencia) would be directly affected by project Component 3—the reroute of Segment 4 of the transmission line.

As shown in Table 3-149, the seven-county analysis area in New Mexico had a total population of 180,845 residents in 2019. Six of the seven New Mexico counties had populations of less than 30,000 residents in 2019, while the most populated New Mexico county in the analysis area (Valencia County) had 76,027 residents. With the exception of Valencia County, which increased in population by just under 2% between 2010 and 2019, the population in the New Mexico portions of the analysis area declined between 2010 and 2019. In percentage terms, the population declines between 2010 and 2019 ranged from −4.6% in Luna County to −13.4% in Hidalgo County (U.S. Census Bureau 2010, 2019).

The Arizona portion of the analysis area had almost 10 times as many residents in 2019 (1,633,385) as the New Mexico portion. However, most of the Arizona residents in the analysis area live in either Pima County or Pinal County. The remaining Arizona analysis area counties had 2019 populations ranging from 125,867 in Cochise County to 9,522 residents in Greenlee County. In contrast to the New Mexico portion of the analysis area, the population of the Arizona portion of the analysis area increased by over 11% between 2010 and 2019. The most rapid growth occurred in Pinal County, which increased in population by more than 100,000 residents (31.4%) between 2010 and 2019. The only analysis area county in Arizona that did not increase in population between 2010 and 2109 was Cochise County, where the total population declined by about 3,400 residents (−2.6%) between 2010 and 2019 (U.S. Census Bureau 2010, 2019).

Table 3-149. Analysis Area Population, 2010–2040

	Actual Population		Projected Population		Percent Change	
	2010	2019	2030	2040	2010–2019	2019–2040
State of Arizona	6,246,816	7,050,299	8,284,900	9,247,200	12.9%	31.2%
Cochise County	129,268	125,867	130,900	130,500	−2.6	3.7
Graham County	36,030	37,996	42,100	45,300	5.5	19.2
Greenlee County	8,318	9,522	11,400	11,900	14.5	25.0
Pima County	964,462	1,027,207	1,129,200	1,195,100	6.5	16.3

	Actual Population		Projected Population		Percent Change	
	2010	2019	2030	2040	2010–2019	2019–2040
Pinal County*	329,297	432,793	616,200	820,900	31.4	89.7
Arizona Study Area	1,467,375	1,633,385	1,929,800	2,203,700	11.3	34.9
State of New Mexico	2,013,122	2,092,454	2,136,414	2,132,755	3.9%	1.9%
Grant County	29,706	27,669	25,585	23,092	−6.9	−16.5
Hidalgo County	4,964	4,297	3,422	2,610	−13.4	−39.3
Luna County	25,252	24,083	23,320	21,963	−4.6	−8.8
Sierra County	11,938	11,031	9,733	8,400	−7.6	−23.9
Socorro County*	17,964	16,858	15,887	14,544	−6.2	−13.7
Torrance County*	16,467	15,519	14,563	13,356	−5.8	−13.9
Valencia County*	74,554	76,027	73,023	69,684	2.0	−8.3
New Mexico Study Area	180,845	175,484	165,533	153,649	−3.0	−12.4

Sources: Arizona Department of Administration, Office of Employment and Population Statistics (2018); University of New Mexico (2020); U.S. Census Bureau (2010, 2019)

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

The population of the New Mexico portion of the analysis area is projected to continue to decline in future decades, falling to 153,649 people by 2040 (−12.4%). Each of the seven New Mexico analysis area counties are projected to lose population during the next two decades (University of New Mexico 2020).

In Arizona, the population of the analysis area is projected to continue to grow in the future. Total population of the five Arizona counties is projected to increase to about 1.93 million people by 2030 and about 2.20 million people by 2040 (34.9%). The population is expected to grow in each of the Arizona counties. The most rapid growth is projected to continue to occur in Pinal County, where over 367,000 new residents are expected by 2040, an increase of 89.7% (Arizona Department of Administration, Office of Employment and Population Statistics 2018).

The demographic characteristics of the populations within the analysis area are important in determining the potential presence of environmental justice communities. Typically, an area is considered to potentially include environmental justice communities if minority residents (any residents except non-Hispanic or non-Latino, white residents) represent more than 50% of the population, or a significantly greater proportion of the population than the appropriate reference group (in this case the states of Arizona and New Mexico). An area may also be considered to potentially include environmental justice populations if Native Americans make up a substantially larger portion of the population than the reference group.

Evaluation of environmental justice effects involves assessment of the potential for disproportionately high adverse effects on minority or low-income populations. The CEQ defines a community with potential environmental justice populations as one that has a greater percentage of minority or low-income populations than does an identified reference community. Minority populations are those populations having 1) 50% minority population in the affected area, or 2) a meaningfully greater minority population than the reference area (CEQ 1997). “Meaningfully greater” is defined as 5 percentage points or more above the statewide average for broad metrics such as the proportion of low-income or Hispanic or Latino residents and 1 percentage point above the statewide average for more detailed metrics such as the percentage of American Indian and Alaska Native residents. Table 3-150 summarizes the racial and ethnic composition of the analysis area counties in Arizona. Graham County can be considered to potentially include environmental justice communities because the proportion of residents who are Native

American (12.5%) is meaningfully greater than the statewide average in Arizona (3.9%). Greenlee County and Pima County can also be considered to potentially include environmental justice communities because the proportion of Hispanic or Latino residents is meaningfully greater than the statewide average (31.3%). Pinal County, which is the only county directly affected by Component 3 or Component 4 in Arizona, would not be considered to potentially have environmental justice communities on a county-wide basis based on the racial and ethnic composition of its population. More localized demographic characteristics in proximity to the proposed SunZia West Substation (Component 4) are discussed below.

Table 3-150. Arizona Analysis Area Population by Race and Ethnicity, 2019

	Statewide	Cochise	Graham	Greenlee	Pima	Pinal*
Ethnicity: Not Hispanic or Latino	**68.7%**	**64.5%**	**67.0%**	**53.2%**	**62.8%**	**69.8%**
White	54.7	55.0	50.9	46.6	51.7	56.8
Black or African American	4.2	3.7	1.8	2.0	3.3	4.1
American Indian and Alaska Native	3.9	0.9	**12.5†**	3.6	2.5	4.3
Asian	3.2	1.9	0.6	0.5	2.8	1.6
Native Hawaiian and Other Pacific Islander	0.2	0.3	0.1	0.0	0.1	0.3
Some other race	0.2	0.2	0.0	0.0	0.1	0.2
Two or more races	2.3	2.5	1.0	0.4	2.3	2.6
Ethnicity: Hispanic or Latino	**31.3%**	**35.5%**	**33.0%**	**46.8%†**	**37.2%†**	**30.2%**
Mexican	27.8	31.4	31.9	45.2	33.5	27.4
Puerto Rican	0.7	1.8	0.2	0.1	0.8	0.5
Cuban	0.2	0.2	0.0	0.0	0.2	0.1
Other Hispanic or Latino	2.6	2.1	0.9	1.4	2.7	2.2

Source: U.S. Census Bureau (2019).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

† Areas where minority population groups are meaningfully greater than their statewide average representation.

Table 3-151 summarizes the racial and ethnic composition of the analysis area counties in New Mexico. With the exceptions of Sierra County and Torrance County, each of the other counties can be considered to have potential environmental justice communities because they have either a meaningfully greater population of Native Americans than the statewide average (Socorro County) or more than 50% of their residents are Hispanic or Latino. More localized demographic characteristics in proximity to the proposed Segment 4 reroutes (Component 3) are discussed below.

Table 3-151. New Mexico Analysis Area Population by Race and Ethnicity, 2019

	Statewide	Grant	Hidalgo	Luna	Sierra	Socorro*	Torrance*	Valencia*
Ethnicity: Not Hispanic or Latino	**51.2**	**49.5**	**41.9**	**32.9**	**69.6**	**50.2**	**56.9**	**39.4**
White	37.4	45.8	39.0	29.5	64.7	34.2	54.7	32.6
Black or African American	1.8	0.9	1.3	1.3	0.4	0.6	0.8	1.1
American Indian and Alaska Native	8.7	1.9	1.3	0.7	2.0	**10.5†**	0.3	3.8
Asian	1.5	0.5	0.0	0.8	0.8	3.3	0.1	0.5

	Statewide	Grant	Hidalgo	Luna	Sierra	Socorro*	Torrance*	Valencia*
Ethnicity: Not Hispanic or Latino	**51.2**	**49.5**	**41.9**	**32.9**	**69.6**	**50.2**	**56.9**	**39.4**
Native Hawaiian and Other Pacific Islander	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Some other race	0.2	0.1	0.0	0.0	0.2	0.0	0.1	0.1
Two or more races	1.6	0.4	0.3	0.5	1.6	1.8	0.8	1.4
Ethnicity: Hispanic or Latino	**48.8**	**50.5†**	**58.1†**	**67.1†**	**30.4**	**49.8**	**43.1**	**60.6†**
Mexican	31.3	46.4	54.4	62.1	23.8	12.3	16.5	32.5
Puerto Rican	0.4	0.1	0.0	0.2	0.0	0.2	0.8	0.3
Cuban	0.2	0.1	0.0	0.4	0.0	0.0	0.1	0.3
Other Hispanic or Latino	16.8	3.9	3.7	4.4	6.6	37.2	25.7	27.5

Source: U.S. Census Bureau (2019).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

† Areas where minority population groups are meaningfully greater than their statewide average representation.

Potential environmental justice communities can also be indicated by high proportions of residents living in poverty. On this basis, Graham County in Arizona and Hidalgo, Luna, Sierra, and Socorro Counties in New Mexico can be considered to have potential environmental justice populations because their poverty rates are more than 5 percentage points higher than the 2019 statewide poverty rate in Arizona of 15.1% or the 2019 statewide poverty rate in New Mexico of 19.1% (U.S. Census Bureau 2019).

In 2019, there were over 100,000 vacant housing units in the Arizona portion of the analysis area—including over 33,000 vacant units in Pinal County, as shown in Table 3-152. Vacancy rates were generally similar to the statewide average, except in Greenlee County where almost 30% of housing units were vacant. Median gross monthly rents were much lower than the statewide average in most of the analysis area counties, except the more urban counties (Pima County and Pinal County).

Table 3-152. Arizona Analysis Area Housing Characteristics 2019

	Total Housing Units	Total Occupied Units (%)	Total Vacant Units (%)	Number of Vacant Units	Median Gross Rent
Arizona	3,003,286	85.6	14.4	432,018	$1,052
Cochise County	61,108	82.1	17.9	10,945	$783
Graham County	13,586	81.1	18.9	2,569	$769
Greenlee County	4,453	70.3	29.7	1,321	$466
Pima County	459,912	88.0	12.0	55,173	$907
Pinal County*	174,329	81.1	18.9	33,029	$1,064

Source: U.S. Census Bureau (2019).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

In the New Mexico portions of the analysis area, there were about 19,000 vacant housing units in 2019—including over 10,000 vacant units in the counties where the Segment 4 Reroutes would occur, as shown in Table 3-153. Vacancy rates in both Socorro County and Torrance County were considerably higher than the statewide average. Median gross monthly rents in these counties 10% to 15% lower than the statewide average, though the median gross monthly rent in Valencia County was slightly higher than the average.

Table 3-153. New Mexico Analysis Area Housing Characteristics, 2019

	Total Housing Units	Total Occupied Units (%)	Total Vacant Units (%)	Number of Vacant Units	Median Gross Rent
New Mexico	937,920	83.2	16.8	157,671	$844
Grant County	15,071	78.6	21.4	3,220	$671
Hidalgo County	2,454	68.4	31.6	775	$501
Luna County	11,287	78.9	21.1	2,383	$562
Sierra County	8,555	64.9	35.1	3,000	$537
Socorro County*	8,234	54.9	45.1	3,714	$715
Torrance County*	8,026	70.3	29.7	2,382	$754
Valencia County*	31,208	86.5	13.5	4,198	$876

Source: U.S. Census Bureau (2019).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

The economic damage from the COVID pandemic increased unemployment rates in the analysis area in 2020. As shown in Table 3-154, the statewide average unemployment rate in Arizona increased from 4.9% in 2019, to 7.9% in 2020. In New Mexico, the 2020 statewide average unemployment rate was 8.4% in 2020—an increase of 3.4 percentage points from the average unemployment rate in 2019.

At the county level, each of the counties in the Arizona portion of the analysis area had increased unemployment rates in 2020. But each Arizona analysis area county had a lower average unemployment rate than the state as a whole. All of the New Mexico counties also experienced increased unemployment in 2020. In New Mexico, several analysis area counties had higher unemployment rates than the statewide average. The highest 2020 unemployment rate in the New Mexico portion of the analysis area was in Luna County (15.9%). As shown in Table 3-154, Luna County has experienced high unemployment since 2016 or earlier.

Table 3-154. Analysis Area Unemployment Rates, 2016–2020

	2016	2017	2018	2019	2020
Arizona	**5.5%**	**4.9%**	**4.8%**	**4.9%**	**7.9%**
Cochise County	6.3	5.6	5.6	5.8	7.0
Graham County	6.8	5.5	5.1	4.9	6.3
Greenlee County	7.7	5.1	4.1	4.0	5.5
Pima County	5.0	4.6	4.4	4.5	7.7
Pinal County*	5.6	5.1	5.0	5.0	7.5
New Mexico	**6.7%**	**6.1%**	**4.9%**	**5.0%**	**8.4%**
Grant County	6.5	6.0	4.8	4.9	9.0
Hidalgo County	5.6	5.1	3.8	4.4	5.8
Luna County	14.6	13.9	11.8	12.5	15.9
Sierra County	8.5	7.7	7.0	6.9	9.2

	2016	2017	2018	2019	2020
Socorro County*	7.4	6.3	5.3	6.0	7.1
Torrance County*	9.2	8.5	7.6	7.0	9.5
Valencia County*	7.3	6.6	5.4	5.5	8.2

Source: Bureau of Labor Statistics (2021).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

Typical of rural areas in the West, average 2019 wages and per-capita income in the analysis area counties were generally lower than the statewide averages in Arizona and New Mexico, as shown in Table 3-155. Among the four counties that would be affected by the proposed Component 3 and Component 4 modifications, 2019 average annual wages per job ranged from $37,280 in Socorro County, New Mexico to $45,540 in Pinal County, Arizona. Average per-capita income—including wages/salaries, transfer payments, dividends, interest, rent, and other income sources—ranged from $32,182 in Pinal County to $35,867 in Socorro County.

Table 3-155. Analysis Area Wage/Salary and Per-Capita Income Averages, 2019

	Average Wage/Salary per Job	Per Capita Personal Income
Arizona	$54,824	$46,058
Cochise County	$50,576	$41,766
Graham County	$44,655	$31,895
Greenlee County	$72,248	$42,296
Pima County	$49,745	$45,456
Pinal County*	$45,540	$32,182
New Mexico	$48,095	$43,326
Grant County	$43,094	$42,959
Hidalgo County	$43,027	$44,716
Luna County	$38,825	$33,927
Sierra County	$34,705	$42,255
Socorro County*	$37,280	$35,867
Torrance County*	$38,121	$33,446
Valencia County*	$39,203	$34,964

Source: Economic Profile; Bureau of Economic Analysis (2020).

* Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

The total number of jobs is one measure of the size of local economies. The breakdown of those jobs by industry provides insight into key sectors within those economies.

Table 3-156 shows the total number of full- and part-time jobs in the Arizona analysis area counties, and the shares of those jobs by sector. In Pinal County, which is the only Arizona county that would be directly affected by the proposed changes in Component 3 and Component 4, the three sectors providing the largest number of jobs are government, retail trade and administrative support, and waste management services. Together, these three sectors comprise almost 41% of the jobs in Pinal County. About 4.7% of the Pinal County economy consists of construction jobs—about 4,800 jobs in 2019 (Bureau of Economic Analysis 2020).

Table 3-156. Jobs by Sector in Arizona Analysis Area

	Statewide	Cochise	Graham	Greenlee	Pima	Pinal*
Total number of jobs (count)	**3,969,347**	**52,115**	**12,847**	**5,816**	**536,686**	**102,834**
Farming	0.8%	2.5%	5.4%	2.7%	0.2%	2.3%
Forestry, fishing, and related activities	0.4	0.9	(D)	(D)	0.1	0.6
Mining, quarrying, and oil and gas extraction	0.5	0.4	(D)	(D)	0.6	1.7
Utilities	0.3	0.6	(D)	(D)	0.4	0.3
Construction	5.9	5.3	4.8	2.1	5.0	4.7
Manufacturing	4.8	1.7	2.2	0.6	5.6	4.6
Wholesale trade	2.8	1.2	1.8	(D)	1.7	1.7
Retail trade	10.0	11.3	13.5	4.6	9.6	12.1
Transportation and warehousing	4.4	2.5	(D)	1.2	3.9	4.2
Information	1.5	1.1	0.7	0.0	1.4	1.0
Finance and insurance	6.7	2.0	2.2	(D)	4.2	3.3
Real estate and rental and leasing	5.8	3.4	(D)	(D)	5.2	5.6
Professional, scientific, and technical services	6.6	6.8	2.7	(D)	6.1	4.6
Management of companies and enterprises	1.0	0.1	0.0	0.0	0.4	0.3
Administrative and support and waste management and remediation services	8.1	5.8	2.3	1.7	7.6	8.1
Educational services	2.0	1.4	(D)	0.1	1.6	1.8
Health care and social assistance	11.3	9.2	10.3	(D)	13.3	7.3
Arts, entertainment, and recreation	2.3	1.8	0.9	(D)	2.4	2.3
Accommodation and food services	7.8	7.5	7.1	(D)	8.0	6.3
Other services	5.3	5.5	5.9	(D)	5.8	6.7
Government and government enterprises	11.6	29.2	22.3	9.9	16.9	20.5
Undisclosed	0.0	0.0	17.8	77.0	0.0	0.0

Source: Total Full-Time and Part-Time Employment by NAICS Industry; Bureau of Economic Analysis (2020).

Notes: (D) indicates data that were not disclosed by the Bureau of Economic Analysis due to confidentiality concerns.

* = Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

Table 3-157 shows the total number of full- and part-time jobs in the New Mexico analysis area counties, and the shares of those jobs by sector. Government jobs are the largest source of employment in Socorro, Torrance, and Valencia Counties, the three counties that would be directly affected by the proposed changes in Component 3 and Component 4. The 35% of all Socorro County jobs in the government sector (over 2,700 of the roughly 7,800 jobs in the county) may be partly due to Department of Defense activities in the NCUA for the WSMR. Valencia County has a large construction sector (10.4% of all jobs, or about 2,500 construction jobs) which may indicate the availability of appropriately skilled workers for construction of the SunZia transmission line in that area.

Table 3-157. Jobs by Sector in New Mexico Analysis Area

	Statewide	Grant	Hidalgo	Luna	Sierra	Socorro*	Torrance*	Valencia*
Total number of jobs (count)	**1,130,618**	**12,906**	**2,153**	**9,631**	**4,980**	**7,793**	**5,337**	**23,829**
Farming	2.5%	3.0%	9.0%	3.3%	6.6%	10.1%	12.2%	6.9%
Forestry, fishing, and related activities	0.5	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Mining, quarrying, and oil and gas extraction	2.9	(D)	(D)	0.3	(D)	(D)	(D)	(D)
Utilities	0.4	0.5	0.4	0.6	0.7	(D)	(D)	0.2
Construction	6.0	4.6	(D)	5.5	6.4	1.9	6.1	10.4
Manufacturing	3.1	(D)	(D)	9.8	2.8	1.8	2.6	4.4
Wholesale trade	2.2	0.9	1.7	1.3	0.7	(D)	3.8	1.0
Retail trade	9.7	10.3	12.9	11.5	11.2	7.0	13.1	13.0
Transportation and warehousing	2.8	1.1	3.4	3.6	1.3	1.3	(D)	6.8
Information	1.3	0.9	0.8	(D)	0.4	0.3	0.6	0.9
Finance and insurance	3.4	2.1	(D)	1.7	2.1	1.7	(D)	2.3
Real estate and rental and leasing	3.8	2.9	0.9	2.5	3.6	2.0	(D)	3.6
Professional, scientific, and technical services	7.5	3.3	2.1	(D)	2.9	5.8	3.4	3.2
Management of companies and enterprises	0.6	1.1	0.0	(D)	0.0	(D)	0.0	0.5
Administrative and support and waste management and remediation services	5.2	2.6	1.2	2.2	2.9	(D)	5.0	2.9
Educational services	1.5	1.2	(D)	(D)	(D)	(D)	(D)	1.0
Health care and social assistance	12.1	9.5	(D)	(D)	(D)	(D)	(D)	10.2
Arts, entertainment, and recreation	2.4	(D)	(D)	1.1	2.4	(D)	(D)	1.6
Accommodation and food services	8.5	(D)	(D)	8.4	10.7	(D)	(D)	7.4
Other services	5.1	5.6	(D)	(D)	5.5	4.0	5.8	5.9
Government and government enterprises	18.4	25.6	29.5	21.5	18.3	34.8	18.8	17.1
Undisclosed	0.0	24.7	38.2	26.8	21.4	29.2	28.6	0.8

Source: Total Full-Time and Part-Time Employment by NAICS Industry; Bureau of Economic Analysis (2020).

Notes: (D) indicates data that were not disclosed by the Bureau of Economic Analysis due to confidentiality concerns.

* = Areas in which Component 3 potential reroutes and Component 4 SunZia West Substation would be located.

Study area employment can also be broken down by occupation. In the one Arizona county that would be directly affected by the construction of the SunZia West Substation under Component 4 (Pinal County), 9.1% of employed residents in 2019 (14,400 people) worked in the types of occupations that might be employed in constructing the SunZia transmission line (construction and extraction operations; installation, maintenance, and repair operations). In the three New Mexico counties that would be affected by Component 3 reroutes of the proposed transmission line, the workforce in these occupations is much smaller, consisting of about 350 workers in Socorro County, 750 workers in Torrance County, and 3,600 workers in Valencia County (U.S. Census Bureau 2019).

Construction of the project, including Component 3 and Component 4, is expected to result in additional revenues for local governments in the analysis area. For purposes of subsequent evaluation, current (2019) tax revenues for the counties that would be affected by Component 3 and Component 4 are incorporated by reference from the social and economic conditions resource report prepared by the economists working on behalf of SunZia (Moss Adams 2021). The 2019 local government revenues in Pinal County from property taxes, the County's share of Arizona Transaction Privilege Tax, and other taxes totaled $182.0 million (Moss Adams 2021:11).

The 2019 local government revenues from similar sources in the three New Mexico counties that would be directly affected by the Segment 4 reroute totaled $82.6 million (Moss Adams 2021:10):

- Socorro County, NM $11.1 million
- Torrance County, NM $12.8 million
- Valencia County, NM $58.7 million

3.4.37.1 Reasonably Foreseeable Environmental Trends and Planned Actions

A number of renewable energy projects at least partly located within the study area are currently in the planning or development stages, including over 1,200 MW of potential wind generation capacity from the Western Spirit Wind project and the Great Divide Wind projects in New Mexico, and about 180 MW of potential commercial-scale solar generation from the East Line Solar project and the Storey Solar project in Arizona.

As shown previously in Table 3-149, each of the counties in the New Mexico portion of the study area is projected to lose population between 2019 and 2040, and the study area's overall population is projected to decline by 12.4% over that time span. Declining populations typically create fiscal challenges for local governments in coping with a shrinking tax base, so additional government revenues from property taxes or payments in lieu of taxes on transmission and renewable energy generation facilities could be helpful.

Conversely, each of the study area counties in Arizona are projected to increase in population between 2019 and 2040, with the overall study area population growing by almost 35% over that time period. This trend could lead to more development in proximity to the proposed routes in portions of the Arizona study area.

In the nearer term, the relatively high 2020 unemployment rates in the study area resulting from the COVID-19 pandemic (shown in Table 3-154) will likely decline to more typical rates in the future, resulting in a tighter labor market for construction workers and potentially more need to bring in workers from outside the study area.

3.4.38 Environmental Consequences

In this EIS, the no action alternative is that the project would be completed as permitted in the 2015 ROD. Consequently, the socioeconomic effects from the no action alternative are incorporated by reference from the socioeconomic effects of the preferred alternative in the 2013 FEIS (BLM 2013). Although the dollar values associated with wages and salaries have increased since 2013 due to inflation, the fundamental socioeconomic findings in the 2013 FEIS remain unchanged.

Among the four components analyzed in this EIS, Component 1 – Localized Route Modifications and Component 2 – Access Roads and Temporary Work Areas Outside the Granted Right-of-Way are anticipated to have little or no socioeconomic effect and are not analyzed further in this section. Instead, the socioeconomic and environmental justice analysis in this EIS focuses on Component 3 – Segment 4 Reroute and Component 4 – SunZia West Substation.

3.4.38.1 Methods and Assumptions

The following assumptions were used to analyze fiscal impacts and job creation:

- The economic and fiscal impacts of Component 3 would be proportional to the length of the transmission lines constructed in Segment 4.
- Economic and fiscal impacts per mile of transmission line would be as estimated in Resource Report 11 Social and Economic Conditions (Moss Adams 2021).
- Economic and fiscal impacts of Component 4 would be as estimated by SunZia's economic consultant (Moss Adams 2021).
- Economic and fiscal impacts of the no action alternative would be as estimated in the 2013 FEIS (BLM 2013:4-236 to 4-247).

The impact indicators used in this analysis are:

- Number of short-term local and non-local jobs during construction.
- Number of indirect jobs supported by local spending during construction.
- Total additional economic output from local spending, including indirect economic output estimated using the IMPLAN model and Arizona and New Mexico IMPLAN data files.
- Total "community benefit payments", also known as payments in-lieu of taxes.

The following analyses are incorporated by reference as they relate to analysis used to evaluate fiscal impacts and job creation:

- SunZia Southwest Transmission Project Amendment of Federal Right-of-Way NM-114438. REVISED Report 11 – Social and Economic Conditions (Moss Adams 2021).
- 2013 FEIS Section 4.13 Social and Economic Conditions (BLM 2013:4-236 to 4-247).

3.4.38.2 Impacts of Segment 4 Reroute Alternatives

SunZia's economic consultants estimated the direct and indirect economic effects associated with construction of the alternative routes within Segment 4. Anticipated economic effects would result from direct employment, wages and per-diem compensation (including per-diem spending by non-local workers), and local purchases of supplies and equipment. Effects were estimated on a per-mile of transmission line basis, and reported in terms of a range (minimum to maximum) reflecting variation in the subroute options within each alternative. The range among the subroute options is narrow, indicating similar economic effects among those options.

IMPACTS OF ALTERNATIVE ROUTE 1

Under Alternative Route 1, project construction is projected to support 52 local construction jobs over a 6.5-year construction period, and 38 non-local jobs. These would be very high-paying jobs, with wage compensation (including overtime and benefits) projected to be nearly $150,000 annually per local job (Moss Adams 2021:14–15). Primary occupations are expected to include:

- Construction
- Operating Engineers and Other Construction Equipment Operators
- Construction Laborers
- Electrical Power-Line Installers and Repairers
- Heavy and Tractor-Trailer Truck Drivers
- First-Line Supervisors of Construction Trades and Extraction Workers
- Financial Managers
- Construction Managers (Moss Adams 2021:15)

Based on the IMPLAN job multiplier for New Mexico used in the 2013 FEIS (1.74), the local construction jobs would support about 40 additional indirect jobs in various sectors (BLM 2013:4-242).

Including additional per-diems paid to local and non-local workers, and local purchases of supplies and equipment, Alternative Route 1 is projected to inject over $22 million per year into the New Mexico economy, producing a total of about $35 million per year in additional economic output including indirect effects.

Most of these economic effects are projected to occur in Socorro County (58% to 62%), with about 38% projected to occur in Torrance County and a very small proportion (0 to 4%) expected to occur in Valencia County (Moss Adams 2021:16). As noted earlier in this section, Socorro County has been experiencing declines in population and relatively low wage and salary levels, though its unemployment rate is lower than the statewide average. Torrance County has similar economic characteristics, though its recent unemployment rate is higher than the statewide average.

IMPACTS OF ALTERNATIVE ROUTE 2 AND ALTERNATIVE ROUTE 3

Alternative Route 2 and Alternative Route 3 would be combined together sequentially as an alternative option to Alternative Route 1. Over the same 6.5-year projected construction period, Alternative Route 2 is assumed to be constructed during the first 3.5 years and Alternative Route 3 is assumed to be constructed next over the following 3 years.

The Alternative Route 2 and Alternative Route 3 combination is projected to support an annual average of about eight fewer local jobs and six fewer non-local jobs than Alternative Route 1. The average annual direct economic impact from local wages, per-diem spending, and local purchases of supplies and materials for construction of around $19.7 million under the Alternative Route 2 and Alternative Route 3 combination would be about $2.3 million less than under Alternative Route 1. The projected total annual economic impact in New Mexico of almost $30 million under the Alternative Route 2 and Alternative Route 3 combination would be about $5 million less than the total annual economic impact from construction of Alternative Route 1. However, either Alternative Route 1 or the Alternative Route 2 and Alternative Route 3 route combination would support more local employment and have a larger effect on the local economies than the originally proposed route in the no action alternative (Moss Adams 2021:14–15).

Although the counties in the New Mexico portion of the analysis area are sparsely populated (as shown earlier in Table 3-149), the projected annual average of between 32 and 38 non-local construction workers should not be very difficult to accommodate. As shown in Table 3-159, there are about 10,000 vacant housing units in the New Mexico analysis area. Non-local workers may also be housed in temporary accommodations such as RV parks, hotels, and motels.

As reported in the 2013 FEIS, operations of the SunZia transmission line would support minimal employment, likely based in Phoenix and Tucson, Arizona and Las Cruces, New Mexico (BLM 2013:4-239). There is likely to be little or no local economic effect in the New Mexico analysis area as defined in this EIS from operational activity specifically associated with Component 3 – the Segment 4 Reroute.

The SunZia Southwest Transmission Project is proposed as a New Mexico Renewable Energy Transmission Authority Project and would be exempt from property taxes and gross receipts taxes in New Mexico. SunZia has indicated it would make "community benefit payments" (typically described as payments in lieu of taxes) to county governments in the amount of $20,000 per mile of transmission line located in their jurisdictions. Because the Alternative Route 1 reroute is longer than the Alternative Route 2 and Alternative Route 3 combination, the community benefit payments under Alternative Route 1 (approximately $2.9 million) would be about $400,000 more per year than the combined payments under Alternative Route 2 and Alternative Route 3. Socorro County would be the largest beneficiary of these community benefit payments, receiving about $1.5 million per year under the Alternative Route 2 and Alternative Route 3 reroute combination, or about $1.9 million per year under Alternative Route 1. This additional revenue would be substantial relative to current tax revenues of about $11 million per year.

3.4.38.3 Impacts of SunZia West Substation

Construction of the SunZia West Substation in Pinal County, Arizona, is projected to occur over a 42-month period. During that period, SunZia is projected to spend about $18.5 million per year on construction of this component. While most of these expenditures would be for supplies and materials, construction is projected to directly support a little more than two jobs per year during this period. Ongoing operation of the substation is projected to support three jobs per year (Moss Adams 2021:18).

During the construction period, property taxes on the substation are projected to produce about $10 million in revenues for local governments in Pinal County (about $3 million per year). During ongoing operations, property taxes on the substation are projected to produce a cumulative total of about $20 million in revenues for local governments in Pinal County over the 35-year period of operations (Moss Adams 2021:19).

3.4.38.4 No Action Alternative

Under the no action alternative, the SunZia Southwest Transmission Line would be constructed as analyzed in the 2013 FEIS and permitted in the 2015 ROD. After converting from the "job-year" basis for reported employment effects in the 2013 FEIS to an average annual job estimate over the "two-to-three" year assumed construction period (BLM 2013:4-238), direct and indirect economic effects were estimated to include the following:

<u>Arizona</u>

- 341 to 558 annual direct jobs over two-to-three-year construction period
- 318 to 605 annual indirect jobs over two-to-three-year construction period
- 659 to 1,162 annual total jobs over two-to-three-year construction period
- Operations employment was not reported
- $12.7 to $38.9 million in cumulative property taxes during construction and operations

<u>New Mexico</u>

- 563 to 888 annual direct jobs over two-to-three-year construction period
- 416 to 649 annual indirect jobs over two-to-three-year construction period
- 979 to 1,537 annual total jobs over two-to-three-year construction period
- Operations employment was not reported
- $47.8 to $77.3 million in cumulative property taxes during construction and operations (BLM 2013:4-242 through 4-244).

The 2013 FEIS did not provide estimates of county-level economic effects. The 2013 FEIS concluded that no significant impacts to environmental justice populations were expected to result from the construction and operation of the BLM preferred alternative (BLM 2013:4-256).

3.4.38.5 Summary of Impacts

Construction of the proposed SunZia transmission line would support several hundred local and non-local jobs over a short-term, two-to-three year period. Construction would also support a short-term increase in economic output in the counties where the transmission line and substations would be located. Although there are differences in the projected cost of construction and corresponding short-term economic stimulus among the proposed alternative routes for the transmission lines in Segment 4, those differences are small in relation to the overall employment and economic activity that would be supported by the project as a whole. The addition of a new substation in Pinal County (Component 4) would likely have a larger effect on the short-term economic contribution from construction than the choice of the transmission route in either Component 3 or Component 4.

Longer-term direct and indirect economic effects from operation of the transmission line would be minimal. However, the community benefit payments to counties with SunZia transmission lines or substations could be substantial relative to existing local government revenues.

Cumulative impacts on social and economic conditions are discussed in Section 4.17.4.13 of the 2013 FEIS (BLM 2013:4-347 through 4-350). Like construction of the proposed SunZia transmission line, other proposed transmission infrastructure and renewable energy projects typically involve large workforces during a one to two-year construction period and provide additional revenues to state and local governments, but produce minimal long-term employment. Renewable energy projects also require access to transmission and capacity in the transmission grid, which could be provided by SunZia and by other planned transmission projects that cross portions of the SunZia project area in Arizona and New Mexico, including the High Plains Express Transmission Line Project and the Willow Substation in Graham County, New Mexico.

AID-20 Environmental Justice

What are the environmental justice differences between the route alternatives in Segment 4 of the transmission line (Component 3) and among the alternatives for Local Route Modification 6 in the Pinal Central Area (Component 1)?

Would the health, safety, property values, or other socioeconomic conditions of environmental justice populations be disproportionately affected by proposed project Components 3 and 4?

3.4.39 Affected Environment

The reader is referred to the affected environment description for AID-19 above.

3.4.40 Environmental Consequences

3.4.40.1 Methods and Assumptions

The following assumptions were used to analyze environmental justice effects:

- Potential environmental justice populations can be identified based on race, ethnicity, and poverty data at the Census Tract level as reported in the 2019 5-Year American Community Survey estimates (U.S. Census Bureau 2019).
- Prior research indicates that one quantitative indicator of effects on nearby properties—impacts on property values (if any)—dissipates rapidly with distance between homes and transmission lines (Headwaters Economics 2012).
- The relative potential for adverse effects on environmental justice populations is proportional to the number of homes within 1 mile, and between 1 and 3 miles, of the proposed transmission line located within Census Tracts identified as containing potential environmental justice populations.

The impact indicators used in this analysis are:

- Number of homes in Census Tracts containing potential environmental justice populations located within 1 mile of the proposed transmission line route.
- Number of homes in Census Tracts containing potential environmental justice populations located between 1 mile and 3 miles of the proposed transmission line route.

The following analyses are incorporated by reference as they relate to analysis used to evaluate potential environmental justice effects:

- 2013 FEIS Section 4.13 Social and Economic Conditions.
- SunZia Southwest Transmission Project Amendment of Federal Right-of-Way NM-114438. REVISED Report 11 – Social and Economic Conditions (Moss Adams 2021).

3.4.40.2 Impacts of Component 1 – Route Modifications

There are environmental justice populations living in close proximity to the Local Route Modification 6 in the Pinal Central Area.

Each of the Local Route Modification 6 options are located within Pinal County Census Tract #12, which is a potential environmental justice community due to its large proportion of low-income residents.

Nearby Pinal County Census Tracts 20.01 and 20.02 are also potential environmental justice communities due to both large proportions of low-income residents and large proportions of minority residents.

Table 3-158 identifies the numbers of homes within potential environmental justice communities within 1 mile, and between 1 and 3 miles from each of the three local route alternatives in the Pinal Central Area, assuming each of those local route alternatives would use the West Tie-in. Potential differences between the West Tie-in and the Central and East Tie-ins are also shown.

The total number of homes in potential environmental justice communities within 3 miles of the North, Steele, and Earley Routes is very similar (101 to 103). However, more of those homes are in close proximity to the North Route (55 within 1 mile). Homes in close proximity are more likely to experience short-term impacts due to noise or dust during construction activity.

Each of the three tie-in options (West, Central, and East) has the same number of homes (84) within 3 miles, and the number of those homes that are within 1 mile is similar (between 13 and 15) among the three options. There appears to be little or no meaningful distinction between the three tie-in options from an environmental justice standpoint.

Table 3-158. Number of Homes in Potential Environmental Justice Areas Located within 3 Miles of Route Modification 6 Alternatives in the Pinal Central Area

Local Route Alternatives	Within 1 Mile	1 to 3 Miles	Total within 3 Miles
6a. Pinal Central Area – North Route	55	48	**103**
6b. Pinal Central Area – Steele Route	39	64	**103**
6c. Pinal Central Area – Earley Route	37	64	**101**
Local Alternative West Tie-In	13	71	**84**
Local Alternative Central Tie-In	14	70	**84**
Local Alternative East Tie-in	15	69	**84**

Note: Local Alternatives are exchangeable within their associated alternative route.

3.4.40.3 Impacts of Segment 4 Reroute Alternatives

Table 3-159 identifies the number of homes within 1 mile, and between 1 and 3 miles, from the various transmission line routes and route alternatives located in Census Tracts with potential environmental justice populations.

Table 3-159. Number of Homes in Potential Environmental Justice Areas Located within 3 Miles of Alternative Transmission Routes

Alternative Route/Subroute	Within 1 Mile	1 to 3 Miles	Total within 3 Miles
Alternative Route 1 with Subroute 1A-1	**117**	**210**	**327**
Subroute 1A-1	99	156	255
Subroute 1A-2	104	157	261
Subroute 1A-3	89	171	260
Subroute 1A-4	89	161	250

Alternative Route/Subroute	Within 1 Mile	1 to 3 Miles	Total within 3 Miles
Alternative Route 2 with Subroute 2A-1	**175**	**236**	**411**
Subroute 2A-1	149	199	348
Subroute 2A-2	119	174	293
Subroute 2A-3	82	177	259
Subroute 2A-4	139	202	341
Alternative Route 3 with Subroute 3A-1 and Local Alternative 3B-1	**303**	**467**	**770**
Subroute 3A-1	149	199	348
Subroute 3A-2	123	173	296
Subroute 3A-3	82	176	258
Subroute 3A-4	139	202	341
Local Alternative 3B-1	150	288	438
Local Alternative 3B-2	125	319	444

In the short term, noise during construction would affect residences within 300 feet of the project, where noise levels during daytime working hours would likely range from 60 to 82 A-weighted decibels (dBA). Seventy dBA can be generally described as "loud" and 80 dBA can be described as very loud. However, very few homes would be within such close proximity to the proposed route alternatives, and design features would help to reduce noise impacts as described in Appendix C and AID-21 Noise. The largest number of homes within 300 feet of the project in any route combination, nine homes in Alternative Route 3 with Subroute 3A-3 and Local Alternative 3B-1 (AID-21 Noise), would be less than 4% of the 236 homes in potential environmental justice areas located within 1 mile of that route.

Emissions of fugitive dust during construction could also impact nearby homes. Construction would result in fugitive dust emissions of PM_{10} and $PM_{2.5}$ as well as PM_{10}, $PM_{2.5}$, NO_x, and SO_2 emissions from mobile source equipment. Like the noise from construction activities, increased dust would be a short-term impact largely limited to the construction and reclamation period of 5 years or less. The duration of construction activity at individual locations would be shorter. Fugitive dust emissions during construction would be reduced by a number of design features and EPMs, as described in Appendix C. Dust emissions during operations are expected to be minimal (AIB-2 Fugitive Dust).

Longer-term, moderate to high visual impacts would occur to views from residences within 0.5 mile or less of the project (AID-12 Visual Resources). The number of homes in potential environmental justice communities that could experience these impacts could be approximately one-half of the homes within 1 mile shown in Table 3-159. Visual effects would likely be the primary long-term concern for these homes, as electric field levels and magnetic field levels would be below reference levels for general public exposure (see AID-22 Electric and Magnetic Fields) and noise levels during operation would be well below EPA recommended levels of 55 dBA (see AID-21 Noise).

IMPACTS OF ALTERNATIVE ROUTE 1

There are five Census Tracts with potential environmental justice populations that include lands that would be within 3 miles of the proposed route under Alternative Route 1 and its subroutes. These tracts include:

- 9781 in Socorro County

- 9637 in Torrance County
- 9709.02 in Valencia County
- 9711 in Valencia County
- 9713 in Valencia County (Moss Adams 2021:23).

Overall, Alternative Route 1 with Subroute 1A-1 would have approximately 117 residences in potential environmental justice communities within 1 mile of the proposed route and 210 such residences within 1 to 3 miles of the proposed route.

Among the Alternative Route 1 subroutes, Subroute 1A-2 has the largest number of potential environmental justice residences within 1 mile (104), while Subroutes 1A-3 and 1A-4 have the fewest (89). Subroute 1A-3 has the largest number of potential environmental justice residences located 1 to 3 miles from the proposed route (171), while Subroute 1A-1 has the fewest (156). Overall, Subroute 1A-4 appears likely to affect the fewest number of potential low-income and/or minority residents among the subroutes, though the differences between the alternatives are small.

IMPACTS OF ALTERNATIVE ROUTE 2 AND ALTERNATIVE ROUTE 3

Alternative Route 2 and its subroutes cross the same Census Tracts with potential environmental justice populations as Alternative Route 1 and its subroutes.

Alternative Route 2 with Subroute 2A-1 would have approximately 175 residences in potential environmental justice communities within 1 mile of the proposed route, and 236 such residences within 1 to 3 miles of the proposed route.

Among the Alternative Route 2 subroutes, Subroute 2A-1 has the largest number of potential environmental justice residences within 1 mile (149), while Subroute 2A-3 has the fewest (82). Subroute 2A-4 has the largest number of potential environmental justice residences located 1 to 3 miles from the proposed route (202), while Subroute 2A-3 has the fewest (82). Overall, Subroute 2A-3 appears likely to affect the fewest number of potential low-income and/or minority residents among the Route 2 subroutes.

Alternative Route 3 and its subroutes cross all of the same Census Tracts with potential environmental justice populations as Alternative Routes 1 and 2 and their subroutes, as well as three additional Census Tracts with potential environmental justice populations:

- 9783.01 in Socorro County
- 9783.02 in Socorro County
- 9783.03 in Socorro County

Alternative Route 3 with Subroute 3A-1 and Local Alternative 3B-1 would have approximately 303 residences in potential environmental justice communities within 1 mile of the proposed route and 467 such residences within 1 to 3 miles of the proposed route.

Among the Alternative Route 3A subroutes, Subroute 3A-1 has the largest number of potential environmental justice residences within 1 mile (149), while Subroute 3A-3 has the fewest (82). Subroute 3A-4 has the largest number of potential environmental justice residences located 1 to 3 miles from the proposed route (202), while Subroute 3A-2 has the fewest (173). Overall, Subroute 3A-3 appears likely to affect the fewest number of potential low-income and/or minority residents among the Route 3A subroutes.

Among the local alternatives under Alternative Route 3, Local Alternative 3B-1 has more potential environmental justice residences within 1 mile (150), but fewer located 1 to 3 miles from the proposed route (288) than Local Alternative 3B-2 (125 within 1 mile and 319 between 1 and 3 miles from the route).

Overall, and bearing in mind that both Alternative Route 2 and Alternative Route 3 would have to be built in order to substitute for Alternative Route 1, the Alternative Route 2 and 3 combination appears to have greater potential to adversely affect environmental justice populations than Alternative Route 1. With Subroute 1A-4, Alternative Route 1 appears likely to affect the fewest number of potential low-income and/or minority residents among the Segment 4 alternatives.

3.4.40.4 Impacts of Component 4 SunZia West Substation

There are no Census Tracts containing potential environmental justice populations within 3 miles of the proposed SunZia West Substation (Component 4).

3.4.40.5 No Action Alternative

The 2013 FEIS identified that low to moderate impacts could occur to environmental justice populations living within 1 to 3 miles of the proposed transmission route, but concluded that "No significant impacts to environmental justice populations are expected to result from the construction and operation of the BLM preferred alternative" (BLM 2013:4-256).

3.4.40.6 Summary of Impacts

Local Route Modification 6 in central Pinal County is proximate to potential environmental justice populations. There are more homes located within 1 mile of the Pinal Central Area – North Route than the Steele Route or the Earley Route.

For the Segment 4 reroute alternatives considered in Component 3 of this EIS, the Alternative Route 2 and Alternative Route 3 combination appears to have greater potential to adversely affect environmental justice populations, compared to Alternative Route 1. The primary short-term impact concern would be noise and dust during construction, however very few homes would be within close enough proximity (e.g., 300 feet) to experience high levels of short-term noise or dust impacts. The primary long-term impact concern would be visual impacts on homes within 0.5 mile of the proposed transmission line. Without specific information regarding the demographic and socioeconomic characteristics of individual residents living within 0.5 mile of the proposed route, it cannot be determined that any of the alternatives would necessarily have disproportionately high and adverse impacts on environmental justice populations.

The SunZia West Substation proposed under Component 4 is not proximate to any environmental justice populations.

Cumulative impacts on environmental justice conditions are discussed in Section 4.17.4.14 of the 2013 FEIS (BLM 2013:4-350 through 4-351). Development of additional transmission or renewable energy infrastructure in the study area could exacerbate impacts on environmental justice populations if these facilities were located in close proximity to the SunZia route in areas where the route would be near environmental justice populations.

AID-21 Noise

Would construction, operation, or maintenance of the proposed project increase ambient noise levels at sensitive receptors, such as schools, hospitals, nursing homes, and residences?

3.4.41 Affected Environment

The analysis area for noise is the 300-foot corridor on either side of the proposed project components for a total corridor of 600 feet. Existing conditions for noise would be similar to those analyzed in the 2013 FEIS (BLM 2013:3-344 through 3-345) and deviations in project locations associated with the components are described below. Table 3-159 shows the number of sensitive receptors associated with each project component within the analysis area for this Draft EIS.

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts 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.

The following sections discuss local noise regulations, how noise levels and increases in noise levels are perceived by the general human population, corona noise generated by transmission lines, and causes and effects of vibration. This EIS incorporated by reference existing conditions and potential impacts on noise from the 2013 FEIS (BLM 2013:3-344 through 3-345). Information from the 2013 FEIS in addition to the Health and Safety/Hazardous Materials Resource Report (POWER Engineers, Inc. 2021k) and most recent GIS data were reviewed for the analysis area for the project components.

Applicable noise ordinances are listed in Section 2 and Tables R12-1, R12-2, and R12-3 of the Health and Safety/Hazardous Materials Resource Report (POWER Engineers, Inc. 2021k).

Community sound levels are generally presented in terms of dBA. The A-weighting network measures sound in a fashion similar to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels (Table 3-160).

Table 3-160. Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	Sound Level (dBA)	Qualitative Description
Carrier deck jet operation	140	–
Civil defense siren (100 feet)	130	Pain threshold
Jet takeoff (200 feet)	120	Deafening
Auto horn (3 feet) Pile driver (50 feet) Rock music concert environment	110	Maximum vocal effort
Jet takeoff (2,000 feet) Shout (0.5 foot) Ambulance siren (100 feet) Newspaper press (5 feet) Power lawn mower (3 feet)	100	–

Noise Source at a Given Distance	Sound Level (dBA)	Qualitative Description
Heavy truck (50 feet) Power mower Motorcycle (25 feet) Propeller plane flyover (1,000 feet)	90	Very loud/annoying; hearing damage (8-hour, continuous exposure)
Pneumatic drill (50 feet) Garbage disposal (3 feet) High urban environment	80	Very loud
Passenger car, 65 mph (25 feet) Living room stereo (15 feet) Vacuum cleaner (3 feet)	70	Loud/intrusive (telephone use difficult)
Air conditioning unit (20 feet) Human voice (3 feet) Department store environment	60	–
Light auto traffic (50 feet) Residential air conditioner (50 feet) Private business office environment	50	Moderate/Quiet
Living room/bedroom bird calls (distant)	40	–
Library soft whisper (5 feet) Quiet bedroom environment	30	Very quiet
Broadcasting/recording studio	20	Faint
-	10	Just audible
-	0	Threshold of human audibility

Source: Adapted from Table E of *Assessing and Mitigating Noise Impacts* (New York Department of Environmental Conservation 2001).

The analysis area is primarily located in rural open space with background noise typical of such settings (BLM 2013:4-444). In rural areas, typical outdoor Ldn values typically range between 35 and 50 dBA (EPA 1974), which range from very quiet to moderate quiet (see Table 3-160). For the purposes of this EIS, the ambient noise level of the analysis area is assumed to fall within the range of 35 to 50 dBA.

Sound propagation, or how sound travels, is affected by terrain and the elevation of the receptor relative to the noise source. From level ground, noise travels in a straight path between the source and receptor. Breaking the line of sight between the receptor and the noise source can affect noise levels; examples include a traffic noise source at a certain elevation and a receptor at a higher elevation and vice versa. Calculating the sound level at receptor locations requires the use of the inverse square rule whereby sound is attenuated over distance. Again, each doubling of the distance from the source of a noise decreases the sound pressure level by 6 dBA at distances of more than 50 feet (New York Department of Environmental Conservation 2001).

Noise-sensitive receptors generally are 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, schools, and parks (or other lands used for recreation purposes). Sensitive receptors within the analysis area were analyzed for potential impacts as a result of project construction and operation. Table 3-161 provides the number of noise-sensitive receptors associated with project components.

Table 3-161. Noise-Sensitive Receptors within the Analysis Area for the Project Components

Project Component	Schools	Hospitals	Residences	Recreation Areas
Component 1: Localized Route Modifications				
1. Mavericks Area	0	0	0	0
2. SunZia South Area	0	0	0	0
3. Macho Springs Area	0	0	0	0
4. Las Palomas Area	0	0	0	0
5. Highlands Area	0	0	0	0
6a. Pinal Central Area- North Route	0	0	1	0
6b. Pinal Central Area- Steele Route	0	0	7	0
6c. Pinal Central Area- Earley Route	0	0	5	0
Local Alternative West Tie-in	0	0	0	0
Local Alternative Central Tie-in	0	0	0	0
Local Alternative East Tie-in	0	0	0	0
Component 2a. Access Roads	0	0	12	2
Component 2b. Temporary Work Areas	0	0	8	1
Component 3. Segment 4 Reroute Alternatives				
Alt Route 1 with Subroute 1A-1	0	0	4	2
Alt Route 1 with Subroute 1A-2	0	0	2	2
Alt Route 1 with Subroute 1A-3	0	0	2	2
Alt Route 1 with Subroute 1A-4	0	0	5	2
Local Alternative 1A-6	0	0	0	1
Local Alternative 1A-7	0	0	0	1
Alt Route 2 with Subroute 2A-1	0	0	3	2
Alt Route 2 with Subroute 2A-2	0	0	1	2
Alt Route 2 with Subroute 2A-3	0	0	1	2
Alt Route 2 with Subroute 2A-4	0	0	4	2
Alt Route 3 with Subroute 3A-1	0	0	6	2
Alt Route 3 with Subroute 3A-2	0	0	4	2
Alt Route 3 with Subroute 3A-3	0	0	4	2
Alt Route 3 with Subroute 3A-4	0	0	7	2
Local Alternative 3B-1	0	0	2	1
Local Alternative 3B-2	0	0	1	1
Component 4. SunZia West Substation	0	0	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

The proposed project components would cross parks and other lands managed by public agencies and private entities for the purpose of recreation. The proposed project components would cross or come into close proximity to the following noise-sensitive receptors falling under the category of "park":

- Scott Mesa IRA managed by the Cibola National Forest (under Component 3)
- Sevilleta National Wildlife Refuge managed by the USFWS (under Component 3)
- Rio Grande Trail managed by New Mexico State Parks (under Components 2 and 3)
- Caballo Lake State Park by New Mexico State Parks (under Component 2)
- New Mexico Tech Golf Course managed by New Mexico Tech (Component 3)
- Sedillo Park managed by the City of Socorro (Component 3)
- Oracle Sate Park managed by Arizona State Parks (Component 2)
- A7 Ranch managed by Pima County (Component 2)

Table 3-161 provides the number of noise-sensitive receptors associated with project components. As shown in Table 3-161, there are up to two recreation areas (parks) within the analysis area for the different project components.

As stated in the 2013 FEIS (BLM 2013), corona generates audible noises during operation of high-voltage transmission lines. Electric fields may become concentrated on surface irregularities and cause an electrical breakdown of the insulating properties of the air, resulting in power loss at the site of breakdown. (i.e., corona). If there is sufficient corona activity, audible noise can be noticeable within a few hundred feet of the transmission line. The intensity is most pronounced directly beneath line conductors, and decreases with increased distance from the transmission line. Corona activity depends on a number of factors: altitude, line voltage, conductor size, conductor geometry, and weather conditions. It is most likely to occur near transmission lines at higher altitudes and is most pronounced during foul weather. When corona occurs on 500-kV transmission line conductors, it is accompanied by an audible snapping sound. If there is enough corona activity on the line, many small snaps from corona sources along a conductor may be sufficient to produce discernible audible noise (sizzling or crackle) at the edge of the right-of-way (BLM 2013:3-344).

3.4.41.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable planned actions within the analysis areas for noise would include the construction of other transmission projects, including the High Plains Express Transmission Line Project, Southwest Transmission Co-Op Inc. San Manual Interconnect Project, and other energy, infrastructure, residential development and military testing and training activities (SWCA 2021). It is not known at this time if the construction periods for planned actions would overlap in time with the construction period for the proposed action.

3.4.42 Environmental Consequences

3.4.42.1 Methods and Assumptions

The following assumptions were used to analyze impacts to noise:

- The noise analysis included in the 2013 FEIS is considered representative of the proposed action due to the scale of changes to the project, including consideration of new sensitive receptors within or near the study corridor (POWER Engineers, Inc. 2021k:7).
- For the purposes of this EIS, the ambient noise level of the analysis area is assumed to fall within the range of 35 to 50 dBA.

The impact indicators used for this analysis are:

- Noise levels generated during construction and operation (in decibels), as measured at the edge of the project's right-of-way and at the nearest sensitive receptor(s), compared with background (ambient) levels and EPA guidelines and local ordinances (if applicable).

These impacts would vary by alternative and the impacts would be short term, lasting the duration of project construction. Furthermore, implementation of Design Features 1–3 would further minimize impacts from noise.

The impacts analysis for noise assumes application of the project design features and environmental protection measures contained in Table 3-162. Full design features and EPMs are provided in Appendix C.

Table 3-162. Design Features and Environmental Protection Measures Applicable to Noise

Relevant Design Features	Applicable EPMs
1, 2, 3	N/A

3.4.42.2 Impacts Common to All Components

CONSTRUCTION

The analysis conducted for the 2013 FEIS assumed foul weather conditions given that conductors are most audible when wet (BLM 2013:4-260). The levels were compared with ambient (background) levels, EPA guidelines, and local ordinances. Noise limits specified in local ordinances are no more stringent than those already predicted in the 2013 FEIS (POWER Engineers, Inc. 2021k).

During construction, noise would be generated by the equipment used for grading (access roads, structures, and substations), assembly and erection of towers, wire pulling and splicing, equipment installation (substations), and surface disturbance reclamation activities. The use of construction equipment would increase ambient noise levels throughout the duration of the construction period. Noise levels generated by construction would vary daily and hourly, depending on the construction activity and the type, age, and numbers of equipment in operation. Most construction sounds are in the 80 to 90 dBA range (American National Standards Institute 2018) and as shown in Table 3-163. Additionally, noise resulting from construction would vary with the type of work being done, the distance between the work and the receptor, and meteorological conditions. Generally, sound levels are expected to be quieter for areas where activities occur at distances greater than 50 feet from the property line of a sensitive receptor.

Although construction would result in an increase in ambient noise levels, the increase would be temporary and would be limited to daytime hours when residential land uses are typically less sensitive to noise intrusion. Additionally, noise related to construction activities is exempt from the county ordinances during daytime hours (POWER Engineers, Inc. 2021k:14). Table 3-163 provides noise level estimates from common construction equipment attenuated at distances ranging from 50 to 3,000 feet. As shown in Table 3-163, noise attenuation for construction equipment with 84 dBA average sound level at 50 feet would be attenuated to 78 dBA at 100 feet from the construction equipment. For each doubling of the distance from the noise source there would be a decrease in the sound pressure level by 6 dBA.

Table 3-163. Noise Levels from Common Construction Equipment

Construction Equipment	Typical Sound Pressure Level (dBA)				
	50 feet	100 feet	500 feet	1,500 feet	3,000 feet
Front end loaders	88	82	68	58	52
Tractors	80	74	60	50	44
Dozers	88	82	68	58	52
Trucks (200–400 horsepower)	86	80	66	56	50
Grader	85	79	65	55	49
Portable generators (50–200 kilowatts)	84	78	64	54	48
Derrick crane (11–20 tons)	83	77	63	53	47
Mobile crane (11–20 tons)	83	77	63	53	47
Concrete pumps (30–150 cubic yards)	81	75	61	51	25

Source: Adapted from Table 4.53, Noise Levels from Common Construction Equipment (EPA 1971 and Barnes et al. 1976, as cited in BLM 2011).

Notes: These typical noise levels at distances away from the pieces of equipment (beyond 50 feet) are conservative because the only attenuating mechanism considered was divergence of the sound waves in open air. In general, this mechanism results in a 6-dBA decrease in the sound level with every doubling of distance from the source. For example, the 84-dBA average sound level associated with generators would be attenuated to 78 dBA at 100 feet, 72 dBA at 200 feet, 66 dBA at 400 feet, and so forth. Attenuation from air absorption, ground effects, and shielding from intervening topography or structures are not included in determining these nominal values. Further, use of these data is considered to be conservative because construction equipment producers have striven to produce quieter models to protect operators from exposure to high noise levels and the community from undue noise intrusion.

Noise resulting from increased construction vehicle traffic would also occur. Worker and material delivery commutes would result in short-term noise that would have little effect on hourly average noise levels within the analysis area.

In determining the impacts of noise, the important factor is the proximity of the activity to wildlife and the persons detecting the sound. The farther a receptor is to the sound source, the more dissipated the sound is due to sound attenuation. As discussed above, the project area is primarily located in rural open space with ambient noise levels ranging from 35 to 50 dBA.

OPERATION AND MAINTENANCE

To assess noise impacts during operation and maintenance, noise levels are measured at the edge of the project's right-of-way and at the nearest sensitive receptor(s) and then compared with background (ambient) levels and EPA guidelines and local ordinances (if applicable). There are no national or state regulations for audible noise levels from transmission lines; however, EPA guidelines recommend levels below 55 dBA for a day-night average in the outdoors (BLM 2013:4-260). Conductors are most audible when wet. Therefore, the noise analysis was conducted assuming foul weather conditions.

Postconstruction, the ambient sound environment would be expected to return to existing levels ranging from 35 to 50 dBA. Noise impacts during operation and maintenance of the project components would be less than those experienced during construction. Maintenance activities for the transmission line would include driving the length of the transmission line, inspecting the transmission line aerially via helicopter, and making any necessary repairs which may involve construction equipment. The noise impacts due to maintenance activities would be temporary and would have less of an impact than construction of the transmission line.

The operation of the transmission line segments would result primarily in corona-generated noise, occurring in the atmosphere near the conductor. Maximum noise levels associated with corona noise typically do not exceed 50 dBA as heard from the edge of the right-of-way during extreme weather events, and noise levels typically do not exceed 25 dBA during fair weather events (EPA 1974). This noise would fall well below the strictest limits established in applicable County ordinances, as well as the EPA-recommended noise levels (POWER Engineers, Inc. 2021k:14). The study conducted for the 2014 FEIS found that the highest noise level within the right-of-way was 49.3 dBA, with an average of 47.7 dBA (BLM 2013:K-11). Therefore, noise levels would be well below the EPA recommended levels of 55 dBA, once the lines are operable. Furthermore, implementation of Design Feature 2 would further minimize impacts from noise.

3.4.42.3 Impacts of Localized Route Modifications

Table 3-161 shows the number of noise-sensitive receptors within the analysis area of localized route modifications. The only sensitive receptors within the analysis for localized route modifications are residences. The North Route has one residence, Steele Route has seven residences, and the Earley Route has five residences within the analysis area. The other localized route modifications do not contain any sensitive receptors within the analysis area. Based on Table 3-163, construction noise levels for these sensitive receptors within 300 feet would likely range from 60 dBA to 82 dBA depending on distance from construction activity, construction equipment, and noise attenuation. These impacts would be temporary, lasting the duration of the construction period, and limited to daytime hours when construction equipment would be operating.

3.4.42.4 Impacts of Access Roads and TWAs Outside of Granted Right-of-Way

Table 3-161 shows the number of noise-sensitive receptors within the analysis area of access roads and TWAs outside the granted right-of-way. Sensitive receptors within the analysis area include residences and recreational areas. Component 2a contains 12 residences and two recreational areas, whereas Component 2b contains eight residences and one recreational area within the analysis area. Based on Table 3-163, construction noise levels for these sensitive receptors within 300 feet would likely range from 60 dBA to 82 dBA depending on distance from construction activity, construction equipment, and noise attenuation. These impacts would be temporary, lasting the duration of the construction period, and limited to daytime hours when construction equipment would be operating.

3.4.42.5 Impacts of Segment 4 Reroute Alternatives

Table 3-161 shows the number of noise-sensitive receptors within the analysis area of Segment 4 Reroutes. Sensitive receptors within the analysis area include residences and recreational areas. Noise-sensitive receptors within the analysis area ranges from zero residences (Local Alternative 1A-6 and Local Alternative 1A-7) to seven residences (Alternative Route 3 with Subroute 3A-4). Segment 4 Reroute alternatives contain one to two recreational areas within the analysis area. Based on Table 3-163, construction noise levels for these sensitive receptors within 300 feet would likely range from 60 dBA to

82 dBA depending on distance from construction activity, construction equipment, and noise attenuation. These impacts would be temporary, lasting the duration of the construction period, and limited to daytime hours when construction equipment would be operating.

3.4.42.6 Impacts of SunZia West Substation

Table 3-161 shows the number of noise-sensitive receptors within the analysis area of the SunZia West Substation. The are no sensitive receptors within the analysis area for the SunZia West Substation. There would be no noise impacts to sensitive receptors within the analysis area as a result of construction of the SunZia West Substation.

3.4.42.7 No Action Alternative

Under the no action alternative, the approved SunZia project would proceed to construction as described under the 2015 Selected Route (BLM 2015a). Noise from construction and subsequent impacts could result in impacts similar to the proposed project components described above. The 2013 FEIS states that noise impacts would be short term and possibly considered as a nuisance. Given the temporary nature of the construction period, impacts from noise are anticipated to be negligible. More information about estimated noise impacts can be found in the 2013 FEIS Section 4.15 (BLM 2013:4-257 through 4-260).

3.4.42.8 Summary of Impacts

The number of sensitive receptors within the analysis area would vary per project component. Localized route modifications as a part of Component 1 would range from zero sensitive receptors (residences) within the analysis area to seven as part of the Steele Route. Access roads and TWAs as a part of Component 2 would range from eight residences and one recreational area to 12 residences and two recreational areas in the analysis area. Segment 4 reroutes as part of Component 3 would range from one recreational area to two, and zero residences to seven residences within the analysis area. There are no noise-sensitive receptors within the analysis area for SunZia West Substation as a part of Component 4. Impacts to sensitive receptors would be temporary, lasting during daytime hours during the construction period. Construction noise levels for these sensitive receptors within 300 feet would likely range from 60 dBA to 82 dBA depending on distance from construction activity, construction equipment, and noise attenuation. Therefore, construction activities would increase ambient noise levels at sensitive receptors; however, these impacts would be temporary, lasting only throughout the construction period. After construction, ambient noise levels would return to existing ambient noise levels ranging from 35 to 50 dBA. Operation and maintenance of the project would result in noise levels less than those experienced during construction. Noise associated with maintenance would also be temporary and less impactful than during construction. Operation of the transmission line may result in corona noise, which could result in average level of 47.7 dBA, which is below the EPA recommended levels of 55 dBA.

Cumulative impacts from noise are discussed in Section 4.17.4.15 of the 2013 FEIS (BLM 2013:4-351 through 4-352). Incremental impacts from the proposed project components could adversely impact up to 35 sensitive receptors. Noise impacts from reasonably foreseeable environmental trends and planned actions would be similar in nature to the proposed project components (described above). Cumulative adverse noise impacts may result from the construction of the proposed project components in addition to other infrastructure projects including transmission lines, substations, wind farms, residential subdivisions. Acreage of planned actions within the analysis area would not indicate the magnitude of potential cumulative noise impacts, as it is the number of sensitive receptors and their distance to the noise producing activities associated with the planned actions. Construction noise is temporary and would end upon completion of project construction. Operations and maintenance of the transmission lines, renewable energy projects, and ongoing military training could generate periodic levels of noise that would dissipate with increasing distance from the project boundary. Therefore, those adverse impacts likely would be infrequent and of short duration.

AID-22 Electric and Magnetic Fields

What are the estimated levels of electric and magnetic fields (EMFs) generated by the transmission line during operation, how do they compare to other sources of EMFs in the human environment, and would these levels impact human health and safety?

Would the EMFs generated by operation of the power lines associated with the proposed project interfere with radio or television signals?

3.4.43 Affected Environment

The analysis area for EMFs is limited to proposed Components 1, 3, and 4 because Component 2, access roads and TWAs, would not generate EMFs. The analysis area for Components 1, 3, and 4 consists of 300 feet on either side of the proposed project components for a total corridor width of 600 feet. This analysis area is consistent with the study area used in the 2013 FEIS (BLM 2013). Existing conditions for EMFs in the analysis area would be similar to those analyzed in the 2013 FEIS. Changes in Components 1, 3, and 4 would change locations but the methods to analyze these impacts would not change. Changes in Component 1, 3, and 4 locations would result in changes to the number of sensitive receptors that may be impacted by EMFs. Table 3-161 shows the number of sensitive receptors associated with each project component within the analysis area.

EMFs are phenomena that occur both naturally (caused by the weather and the Earth's geomagnetic field) and resulting from human activity. As stated in the 2013 FEIS, magnetic fields associated with transmission lines are created when current flows through power lines. The strength of the fields is determined mainly by line current, line height, and distance. Electrical effects of transmission lines are those related to electric fields, magnetic fields, and corona. Electric fields from power lines are directly dependent on the line voltage (i.e., field strength is reduced as the distance from the source increases). EMFs can also interfere with computer monitors, cardiac pacemakers, and defibrillators (BLM 2013:3-342 through 3-343).

This EIS incorporates by reference existing conditions and potential impacts on EMFs from the 2013 FEIS (BLM 2013). Information from the 2013 FEIS in addition to the Health and Safety/Hazardous Materials Resource Report (POWER Engineers, Inc. 2021k), SunZia HVDC Transmission Line Radio Interference Analysis (POWER Engineers, Inc. 2021l), Power Line Measurements with the Mobile Antenna for Radio Frequency Interference (RFI) Characterization and Mobile RFI Identification System (MARC MoRIS) (Dowell et al. 2021), and most recent GIS data were reviewed for the analysis area for the project components.

Data sources used in the 2013 FEIS (BLM 2013) are applicable to the proposed project components. There is currently no regulatory framework or established limits on EMFs in Arizona or New Mexico. The analysis in the 2013 FEIS defers to published recommended limits for EMFs from the International Commission on Non-Ionizing Radiation Protection (ICNIRP). These values are expressed as reference exposure limits for both occupational and general public exposure.

The electric field strength is a measure of the force per unit charge at a given point in space relative to a charged object, and is measured in kilovolts per meter (kV/m). ICNIRP reference levels for electric field strength are 8.33 kV/m for occupational exposure and 4.16 kV/m for general public exposure (ICNIRP 1998). Magnetic field values are the magnetic flux density at a given point in space, which is measured in milligauss (mG). ICNIRP reference levels for magnetic flux density are 4,167 mG for occupational exposure and 833 mG for general public exposure. As a point of comparison, the 2013 FEIS Table 3-74 provides typical magnetic levels for common household goods (BLM 2013:3-343). The 2013 FEIS Table 3-75 lists typical EMF levels associated with 500-kV transmission lines (BLM 2013:3-343) and is provided below as Table 3-164.

Table 3-164. Typical 60-Hz EMF Levels from 500-kV Overhead Power Lines

Line Voltage	Centerline	Approximate Edge of Right-of-Way	Distance 100 feet	Distance 200 feet	Distance 300 feet
Electric Field (kV/m)	7.0	2.0	1.0	0.3	0.1
Magnetic Field (mG)	86.7	29.4	12.6	3.2	1.4

Source: FEIS Table 3-75 (BLM 2013:3-343). Hz = hertz.

Conclusions from scientific review panels have been consistent and none have concluded that either electric fields or magnetic fields are a known or likely cause of any adverse health effect at the long-term, low exposure levels found in the environment. Although electric and magnetic fields induce voltages and currents in the body, the induced currents directly beneath high-voltage transmission lines are very small, compared with thresholds for producing shock and other harmful electrical effects (World Health Organization 2021). While no adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields have been confirmed, scientists are continuing to research this topic (World Health Organization 2021).

Radio and television interference are the degradation of a radio signal by radio frequency electromagnetic disturbances (POWER Engineers, Inc. 2021l:5). This degradation is reported as the field strength of the interference and is often measured in decibels (dB) of 1 microvolt per meter (μV/m), which is a logarithmic scale.

Radio interference is affected by both the signal strength, as well as the level of interference (noise). Depending on location, signal strength can vary significantly; therefore the amount of interference that can be tolerated may vary. Interference values also increase during four weather conditions and other atmospheric conditions can result in a greater degradation of AM radio signals as well. Guidance provided by the Electric Power Research Institute AC Transmission Line Reference Book (see Appendix K of the 2013 FEIS [BLM 2013:K-11]) indicates that the amount of radio interference should be below 38 dB at 100 feet from the outermost conductor (or often examined at the edge of right-of-way); however this is a rough guideline without actual signal strength measurements, and data from the Federal Communications Commission (FCC) on the protected signal contours (within which the signals are protected from interference) for radio stations in the area can only provide an idea of areas that may be of concern (BLM 2013:K-11).

Television interference associated with transmission lines has not been heavily studied (BLM 2013:4-260). Television signals cover multiple bands and a larger range of frequencies. Lately television interference concerns are less of an issue as a result of the switch to digital television. Similar to radio interference, television interference needs both a signal strength and a calculated noise (interference) value to calculate a signal-to-noise ratio, which in turn would provide an idea of reception quality. There has also been no significant published research on what levels of transmission line corona television interference would cause disruption of digital television signals, therefore there are no guidelines, such as those that apply to analog television. However, the FCC has indicated that a signal-to-random noise ratio of 17 dB or greater should be sufficient for reception. Using the digital upper VHF (most stations have moved out of the lower VHF band), average signal strength for a channel of 36 dB and the signal-to-random noise ratio above, a rough limit could be approximated at 19 dB of television interference; however this limit is a rough guideline and not an industry-accepted limit (BLM 2013:K-13).

Additionally, most modern communications systems use either frequency modulation or spread spectrum techniques, and broadcast at higher frequencies. In addition, the signals are often digital which are typically more immune to interference. It is anticipated that most other communications signals would be able to function properly even with the effects of these transmission line interference results.

The BLM received a scoping comment concerning interference to radio astronomy frequencies at the University of New Mexico Long Wavelength Array (LWA-SV). The University of New Mexico operates the LWA-SV station located at the Sevilleta NWR which is approximately 2 east miles of Alternative Route 3 in the Sevilleta NWR. The LWA is a low-frequency radio telescope designed to productive high-sensitivity, high-resolution images in the frequencies between 3 and 88 megahertz (MHz). The scoping commenter expressed concerns about the interference impacts of project components on frequencies utilized for radio astronomy. The commenter cites International Telecommunications Union, which notes that certain bands are specifically reserved for radio astronomy, including 73–74.6 MHz in U.S. Regions 1 and 3, 37.5–38.25 MHz (all regions), and 25.550–25.670 MHz and 13.360–3.410 MHz in Region 2 of the United States (International Telecommunication Union 2010).

As a result of this scoping comment, two studies were conducted to analyze potential radio interference resulting from a DC transmission line. POWER Engineers, Inc. (2021l) conducted a study to calculate baseline radio emissions from the existing 115-kV AC line, which is approximately 2 miles from project Component 3. Calculations for radio interference from AC circuits are based on semi-empirical equation developed by the Bonneville Power Administration and calibrated against long-term measured data. This method, used in this study, has also been validated for frequencies up to 30 MHz and distances “far” from the conductor. POWER Engineers, Inc., noted that significant contamination or surface damage due to corrosion and pitting late in a conductor’s life could further increase radio emission levels. POWER Engineers, Inc., analyzed six case configurations of the existing 115-kV line and proposed co-located 525-kV DC and 115-kV AC transmission line structures with positive poles in different positions (POWER Engineers, Inc. 2021l).

Dowell et al. (2021) describe measures of 120 Hz noise from the Tri-State 115-kV AC line as a part of an effort to understand the impact of the proposed project on the LWA-SV. While the Tri-State line makes its closest approach to LWA-SV at 2 miles west, the access roads do not permit measurements near the line, so Dowell et al. took measurements north of the refuge along Socorro County Road 12 where the lines cross almost perpendicular to the road. These measurements were taken along this road at approximately 1.75 miles from the power line using Mobile Antenna for RFI Characterization and Mobile RFI Identification System (MARC MoRIS) (Dowell et al. 2021).

3.4.43.1 Reasonably Foreseeable Environmental Trends and Planned Actions

Reasonably foreseeable future environmental trends and planned actions that could contribute EMFs to the human and natural environment include the Southwest Transmission Co-op Inc. San Manuel Interconnect Project, Western Spirit Wind, Great Divide Wind, High Plains Express Transmission Line Project, and Southline Transmission Line Project (SWCA 2021).

3.4.44 Environmental Consequences

3.4.44.1 Methods and Assumptions

The following assumptions were used to analyze impacts from EMFs:

- The EMF analysis included in the 2013 FEIS is considered representative of the proposed action due to the scale of changes to the project, including consideration of new sensitive receptors within or near the study corridor (POWER Engineers, Inc. 2021k:7).

The impact indicators used for this analysis are:

- Exposure of people residing or working near the project area or structures to safety hazards or a significant risk of loss, injury, or death
- EMF, radio, and television interference from the project operation phase causing problems with communication to health and safety critical devices (e.g., computer monitors, cardiac pacemakers, and defibrillators)

The impacts analysis for EMF and radio/television interference assumes application of the design features and environmental protection measures contained in Table 3-165. Full design features and EPMs are provided in Appendix C.

Table 3-165. Design Features and Environmental Protection Measures Applicable to Electric and Magnetic Fields

Relevant Design Features	Applicable EPMs
16, 17, 22	N/A

3.4.44.2 Impacts Common to Components 1, 3, and 4

EMF effects were analyzed using the Bonneville Power Administration's Corona and Field Effects Program software in the 2013 FEIS (BLM 2013:4-257) for a variety of conductor configurations and minimum conductor heights. The Corona and Field Effects Program uses the electrical and physical characteristics of the transmission line to calculate resulting fields and interference effects. Once project-generated values were calculated, they were compared with recommended limits for EMFs based on the ICNIRP (BLM 2013:4-257). The analysis conducted in the 2013 FEIS is representative of the proposed project components (POWER Engineers, Inc. 2021k:4).

The study results included in Appendix K of the 2013 FEIS indicate that electric field levels expected to occur at the edge of the project right-of-way are 2.6 kV/m, which is below the reference levels for general public exposure (4.15 kV/m), as well as occupational exposure (8.33 kV/m) per the ICNIRP (BLM 2013:K-4). Magnetic field within the right-of-way would be 496.6 mG, which is below ICNIRP reference levels for magnetic flux density of 833 mG for general public exposure and 4,167 mG for occupational exposure. Table 3-161 shows the number of sensitive receptors within the analysis area by proposed project component which would experience the exposure level of 2.6 kV/m and 496.6 mG. As a part of Component 1, the North Route, Steele Route, and Earley Route would have one, seven, and five residences, respectively, within the analysis area. There are no sensitive receptors within the analysis area for the other alternatives within Component 1. Alternative routes and subroutes associated within Component 3 would have one to two recreational areas within the analysis area and a range between zero and seven residences depending on alternative and subroutes. Component 4 would have zero sensitive receptors of any kind. All components would have electric field levels and magnetic field levels below reference levels for general public exposure. The amount of sensitive receptors experiencing electric field levels and magnetic field exposure would vary by alternative and the impacts would be long term, lasting the duration of project operation. Implementation of Design Feature 17 would further minimize impacts from EMFs.

The 2013 FEIS (BLM 2013:4-258 through 4-259) estimated radio and television interference levels at the edge and within the project's right-of-way and compared these levels with the Radio Noise Design Guide limits and FCC limits. The analysis conducted in the 2013 FEIS is representative of the proposed project components (POWER Engineers, Inc. 2021k:5).

The study conducted to support the 2013 FEIS indicate that the average radio interference within the right-of-way of the proposed action would be 40.7 decibel-microvolts per meter (dBμV/m), with the maximum being 50.0 dBμV/m (BLM 2013:K-24). At the edge of the right-of-way, radio interference would be at or below 38 dBμV/m. The Radio Noise Design Guide recommends a radio interference limit of 38 dBμV/m for high-voltage transmission lines (BLM 2013:4-260). Project configurations in Appendix K indicate values below the 38 dBμV/m recommendation at 100 feet from the outermost conductor. This recommendation is a guideline and some stations that may have low signal strength in an area may suffer interference. Also as noted above, most modern communication systems use higher-frequency or digital systems which are more immune to interference. The study notes most other communications signals would be able to function properly even with the effects of these transmission line interference results (BLM 2013:K-21). Further implementation of Design Features 16 and 22 would further reduce impacts to radio interference.

The study conducted to support the 2013 FEIS indicate that interference with television signals within the right-of-way would be 22.1 dBμV/m, with the maximum being 30.5 dBμV/m (BLM 2013:K-25). There are currently no set guidelines established; however, the FCC has indicated that a signal-to-random noise ratio of 17 dB or greater should be sufficient for reception. Based on the FCC signal to noise ratio, the 2013 FEIS set a rough limit of 19 dBμV/m for television interference for this project. The predicted average interference within the right-of-way is 22.1 dBμV/m, with a maximum of 30.5 dBμV/m. At the edge of the right-of-way, the interference is predicted to range from 8.9 to 19.4 dBμV/m depending on project configuration, which is below the set limit of 19 dBμV/m (BLM 2013:K-13). Implementation of Design Feature 16 would further reduce impacts to television signal interference.

As mentioned above, scoping comments suggested concerns with potential interference from proposed Component 3 to the LWA-SV. POWER Engineers, Inc., found that direct radio interference emissions from the 525-kV HVDC line are expected to be lower at the LWA than those from the existing 115-kV line (POWER Engineers, Inc. 2021l:5). The proposed Segment 4 Alternatives 2 and 3 routes are located on the mesa above the station and there is significant terrain shielding. Dowell et al. (2021) noted that 120 Hz power measurements as a function of distance from the 115-kV AC lines reveal a rapid decline to the noise level of the MARC MoRIS. This measurement, coupled with the LWA-SV's distance from the power lines, indicates that the proposed SunZia line would not have a negative impact on LWA-SV provided that: the power levels of the line as built are in agreement with the predictions made by POWER Engineers, Inc.; and components on the line are kept in good working order such that they are not radiating strongly (Dowell et al. 2021:8). Therefore, with the incorporation of these measures (as cited in POWER Engineers, Inc. 2021l:5) there would be no adverse impacts to LWA-SV:

- Maximize distance between the AC and DC circuits by placing them on opposite sides of the transmission structure.

- Place the positive DC pole in the lower position to minimize positive half-cycle electric field strength on the surface of the 115-kV conductors. AC line positive half-cycle corona produces worse radio interference emissions than negative half-cycle corona.
- If there is a prevailing wind direction, place the 115-kV AC circuit on the upwind side of the transmission structure. Placing the DC line downwind of the AC line increases the probability that space charge will be pushed away from the 115-kV circuit.

3.4.44.3 No Action Alternative

Under the no action alternative, the approved SunZia project would proceed to construction as described under the 2015 Selected Route in the ROD (BLM 2015a). Exposure to electric and magnetic fields would be below general public and occupational exposure levels under the no action alternative. Average radio and television interference at the edge of the right-of-way would be at or below reference standards or limits. More information about estimated EMF impacts can be found in the 2013 FEIS Section 4.15 (BLM 2013:4-258 through 4-261).

3.4.44.4 Summary of Impacts

The number of sensitive receptors within the analysis area would vary per project component. Localized route modifications as a part of Component 1 would range from zero sensitive receptors (residences) within the analysis area to seven as part of the Steele Route. All Segment 4 reroutes contain one to two recreational areas and residences range from zero to seven within the analysis area. There are no sensitive receptors within the analysis area for the SunZia West Substation as a part of Component 4.
All components would have electric field levels and magnetic field levels below reference levels for general public exposure. The studies by POWER Engineers, Inc. (2021l) and Dowell et al. (2021) concluded that there would be no adverse impacts to the LWA-SV as long as: 1) power levels of the line as built are in agreement with the predictions made by POWER Engineers, Inc.; and 2) components on the line are kept in good working order such that they are not radiating strongly (Dowell et al. 2021:8). The amount of sensitive receptors experiencing electric field levels and magnetic field exposure would vary by component and alternative. Implementation of design features would further minimize impacts from EMFs.

Cumulative impacts from EMFs are discussed in Section 4.17.4.15 of the 2013 FEIS (BLM 2013:4-351 through 4-352). Incremental impacts from the proposed project components could impact up to seven sensitive receptors. These transmission line and wind projects would increase potential exposure to EMF radiation and could interfere with radio or television signals. Additional sources of EMF radiation in the analysis area would not combine to create higher levels of EMF radiation but would create discrete locations of EMF radiation. In other words, each additional source would create a certain level of EMF radiation, but that EMF radiation and other EMF radiation nearby would not contribute to a cumulative increase in EMF radiation. The levels of EMFs created by these types of projects would be relatively low, compared with the recommended public and occupational exposure guidelines.

3.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Resources committed to the proposed project would be material and nonmaterial, including financial. An irreversible commitment of resources, for the purposes of this section, has been interpreted as resources that, once committed to the proposed project, would continue to be committed throughout the 50-year life of the project. An irretrievable commitment of resources has been interpreted as resources used, consumed, destroyed, or degraded during the construction and operation of the proposed project, and that could not be retrieved or replaced for future use. Irreversible and irretrievable commitments of resources for the project are summarized in Table 3-166.

Table 3-166. Irreversible and Irretrievable Commitment of Resources

Resource	Type of Commitment/Reason for Commitment	Irreversible	Irretrievable
Air Quality	• Degradation of air quality • Construction activities	No	Construction phase
Soils	• Soil loss and erosion • Construction activities	Yes	Yes
Water	• None (see construction materials and fuels, below)	No	No
Biological	• Disturbance to and/or loss of vegetation, habitat, and wildlife species • Construction and operation	Yes	Project life
Archaeological and Historic Sites	• Disturbance or removal of sites • Construction and operation	Yes	Yes
Important Cultural Sites	• Disturbance or removal of sites • Construction and operation	Yes	Project life
Traditional Cultural Properties	• Disturbance or removal of sites • Construction and operation	Yes	Project life
Paleontological Resources	• Disturbance or removal of fossils • Construction activities	Yes	Yes
Visual Resources	• Degradation of natural scenic quality, viewshed, intrusion • Construction and operation	Yes	Project life
Land Use and Recreation Resources	• Disturbance to agriculture and grazing • Exclusion of residential, institutional, and industrial uses • Increased recreational use along new access roads • Increased access construction • Construction and operation	Yes	Project life
Public Health	• Potential adverse electrical effects • Operation	Unknown	Unknown
Noise	• Noise exceeding ambient levels • Construction and operation	No	Construction Phase
Social and Economic Conditions	• Increased regional and local employment and revenues • Construction and operation	Yes	Project life
Construction Materials and Fuels (use of)	• Aggregate • Water • Steel • Aluminum • Concrete • Wood • Fossil fuels	Yes	Yes

CHAPTER 4. LAND USE PLAN AMENDMENTS

Land use and land management data in applicable BLM, USFS, and USFWS planning documents were used to identify potential conflicts with management objectives or conversion of existing land uses on federal lands to energy transmission facilities associated with the proposed project components. Proposed project impacts to specific physical, biological, and social (visual, socioeconomic) resources, are addressed in the appropriate EIS Chapter 3 issue statements. The availability of data and up-to-date accuracy of some land use and management data, such as land use authorizations and realty actions, was not consistent for all affected federal and state land management agencies; however, the best available data were used for this analysis.

This section includes descriptions of the potential environmental impacts resulting from the proposed RMP amendment to the Socorro RMP. Locations of the proposed RMP amendment are identified in Figure 2-7, and further description is provided in Draft EIS Chapter 2, Table 2-17. As stated, the amendment would include the designation of a 400-foot-wide right-of-way. With the no action alternative, plan amendments would not be implemented.

4.1 SOCORRO RMP: PROPOSED PLAN AMENDMENT

4.1.1 Right-of-Way Avoidance and Exclusion Areas

The BLM identifies right-of-way avoidance or exclusion areas during the RMP planning process. Section 503 of FLPMA directs BLM to "minimize adverse environmental impacts and proliferation of separate ROWs by using common ROWs to the extent practicable." A designated right-of-way corridor is a preferred location for the placement of rights-of-way; however, applicants may propose outside designated corridors, but must follow the prescribed avoidance or exclusion areas as identified by the BLM.

- Avoidance areas are where future rights-of-way may be granted only when no other feasible alternative route is available (BLM 2010:19).
- Exclusion areas are closed to all forms of new right-of-way development, unless mandated by law (BLM 2010:19).

Impacts to BLM right-of-way avoidance and exclusion areas are disclosed in AID-14 Proposed and Future Rights-of-Way. Table 4-1 summarizes the amount of overlap with BLM avoidance and exclusion areas by proposed project component. In these areas, an RMP amendment would be required for the application to be approved.

Table 4-1. Summary of Rights-of-Way, Avoidance, and Exclusion Areas Crossed by the Project that would Require an RMP Amendment

Project Components and Action Alternatives	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
Localized Route Modifications	0	0
Existing road—no improvement required	0	0
Existing road—improvement required	18.9	0
New road	11.9	0
Temporary Work Areas	2.1	0

Project Components and Action Alternatives	Right-of-Way Avoidance Areas (acres)	Right-of-Way Exclusion Areas (acres)
Alt Route 1 with Subroute 1A-1	334.9	0
Alt Route 1 with Subroute 1A-2	334.9	0
Alt Route 1 with Subroute 1A-3	334.9	0
Alt Route 1 with Subroute 1A-4	334.9	0
Local Alternative 1A-6	12.1	0
Local Alternative 1A-7	19.7	4.7
Alt Route 2 with Subroute 2A-1	68.5	0
Alt Route 2 with Subroute 2A-2	68.5	0
Alt Route 2 with Subroute 2A-3	68.5	0
Alt Route 2 with Subroute 2A-4	68.5	0
Alt Route 3 with Subroute 3A-1	0	0
Alt Route 3 with Subroute 3A-2	0	0
Alt Route 3 with Subroute 3A-3	0	0
Alt Route 3 with Subroute 3A-4	0	0
Local Alternative 3B-1	0	0
Local Alternative 3B-2	58.9	0
SunZia West Substation	0	0

Note: Local Alternatives are exchangeable within their associated alternative route.

4.1.1.1 Localized Route Modifications

There are no conflicts with BLM RMPs associated with the localized route modifications (proposed Component 1). No BLM RMP amendments would be necessary for the localized route modifications.

4.1.1.2 Access Roads and TWAs Outside of Granted Right-of-Way

Approximately 37 acres of access roads requiring new surface disturbance would cross the BLM right-of-way avoidance area associated with the Desert Bighorn Sheep travel corridor (see Table 4-1). Approximately 2 acres of temporary work areas would cross the BLM right-of-way avoidance area associated with the Desert Bighorn Sheep travel corridor (see Table 4-1). Therefore, an amendment to the Socorro RMP would be necessary to allow the access roads and TWAs to be used. This RMP amendment would open 39 acres within the Socorro Field Office to right-of-way development that was previously managed as a right-of-way avoidance area.

4.1.1.3 Segment 4 Reroute Alternatives

ALTERNATIVE ROUTE 1

Alternative Route 1 would cross 335 acres of BLM right-of-way avoidance areas associated with the Desert Bighorn Sheep travel corridor and sensitive resource areas (see Table 4-1). Local Alternative 1A-6 would overlap with approximately 20 acres of BLM avoidance area and no exclusion area. Local Alternative 1A-7 would directly cross the Ladron Mountain-Devil’s Backbone Complex ACEC in the southwest corner. The alignment of the transmission line right-of-way would result in a 4.7-acre reduction

of the ACEC and associated right-of-way exclusion area (less than 0.01%) to avoid fragmentation of the ACEC by the transmission line right-of-way (see Appendix A, Map 145). Additionally, under Local Alternative 1A-7, approximately 20 acres would no longer be managed as right-of-way avoidance area. See Figure 2-5 for locations where Alternative Route 1 crosses avoidance and exclusion areas.
An amendment to the Socorro RMP would be necessary to allow any of the Alternative Route 1 subroutes to be used.

Under all Alternative Route 1 subroutes, with Local Alternative 1A-6, the RMP amendment would open 347 acres within the Socorro Field Office to right-of-way development that was previously managed as a right-of-way avoidance area. Under all Alternative Route 1 subroutes, with Local Alternative 1A-7, the RMP amendment would open 343 acres within the Socorro Field Office to right-of-way development that was previously managed as a right-of-way avoidance area.

ALTERNATIVE ROUTE 2

Alternative Route 2 would cross 69 acres of BLM avoidance areas associated with the Desert Bighorn Sheep travel corridor and sensitive resource areas. See Figure 2-5 for locations where Alternative Route 2 crosses avoidance areas. Therefore, an amendment to the Socorro RMP would be necessary to allow any of the Alternative Route 2 subroutes to be used. This RMP amendment would open 69 acres within the Socorro Field Office to right-of-way development that was previously managed as a right-of-way avoidance area.

ALTERNATIVE ROUTE 3

All Alternative Route 3 subroutes, using Local Alternative 3B-2, would cross 59 acres of BLM avoidance areas associated with the Desert Bighorn Sheep travel corridor and sensitive resource areas. Local Alternative 3B-1 would not cross avoidance nor exclusion areas. Local Alternative 3B-2 would cross 59 acres of right-of-way avoidance area and no exclusion areas (see Table 4-1). See Figure 2-5 for locations where Alternative Route 3 subroutes cross avoidance areas. Therefore, an amendment to the Socorro RMP would be necessary to allow Local Alternative 3B-2 to be used. This RMP amendment would open 59 acres within the Socorro Field Office to right-of-way development that was previously managed as a right-of-way avoidance area.

4.1.1.4 SunZia West Substation

There are no conflicts with BLM RMPs associated with the SunZia West Substation (proposed Component 4). There are no conflicts with BLM land use plans associated with the SunZia West Substation.

4.1.2 Special Designations

Impacts to BLM Special Designations are disclosed in AID-16 BLM Special Designations.

4.1.2.1 Localized Route Modifications

The localized route modifications would not cross any BLM special designations; therefore, no RMP amendments would be required for proposed Component 1.

4.1.2.2 Access Roads and TWAs Outside of Granted Right-of-Way

The Lake Valley Backcountry Byway is the only BLM special designation within the Component 2 analysis area, and it offers scenic views and recreation values. Approximately 43 miles of proposed access roads under Component 2 would overlap the backcountry byway, although no road improvements would be needed. As a result, no RMP amendment would be required for proposed Component 2.

4.1.2.3 Segment 4 Reroute Alternatives

ALTERNATIVE ROUTE 1

Alternative Route 1 with Local Alternative 1A-7 would directly cross the Ladron Mountain-Devil's Backbone Complex ACEC in the southwest corner. The alignment of the transmission line right-of-way would result in a 4.7-acre reduction of the ACEC (less than 0.01%) to avoid fragmentation of the ACEC by the transmission line right-of-way (see Appendix A, Map 145). The Socorro RMP identifies 12 management decisions for the ACEC (BLM 2010:53–54):

1. Limit motor vehicle use to designated routes within the ACEC.
2. Exclude the authorization of rights-of-way and leases within the ACEC. Avoid the authorization of rights-of-way and leases within the Desert Bighorn Sheep travel corridor.
3. Apply fluid mineral leasing stipulations S-NSO-W within the ACEC.
4. Allow mineral material disposals within the ACEC contingent upon site-specific assessment of resources and mitigation as necessary.
5. Pursue acquisition of nonpublic land within and contiguous to the ACEC.
6. Exclude grazing on land that has not been allotted.
7. Maintain and/or implement closure to domestic sheep and goats within 10 miles of desert bighorn sheep habitat.
8. Maintain viable populations of desert bighorn sheep through activities such as habitat improvements and coordination with NMDGF on desert bighorn sheep transplants and reintroductions.
9. Withdraw from location and entry for locatable minerals under the mining laws all land with medium and high mineral potential (23,567 acres) for the protection of desert bighorn sheep within the ACEC.
10. Encourage inventory and research of cultural resource sites and apply Cultural Resource Use Category A: Scientific Use to cultural resource sites.
11. Permit commercial woodcutting only to support BLM-authorized projects to meet resource management objectives.
12. Exclude the San Lorenzo area from vegetative material sales, with the exception of exotic species. Allow vegetative sales elsewhere within the ACEC contingent upon site-specific assessment of resources and mitigation as necessary.

Under Alternative Route 1, Local Alternative 1A-7, these management decisions would no longer apply to the 4.7-acre area removed from the ACEC. This RMP amendment would open 4.7 acres within the Socorro Field Office to resource uses that were previously precluded by the ACEC management decisions. The RMP amendment would not reduce the protections provided for the ACEC's relevant and important values in the remaining portion of the ACEC, approximately 57,469 acres.

ALTERNATIVE ROUTE 2

None of the Alternative Route 2 subroutes cross BLM special designations; therefore, no RMP amendments would be required.

ALTERNATIVE ROUTE 3

None of the Alternative Route 3 subroutes cross BLM special designations; therefore, no RMP amendments would be required.

4.1.2.4 SunZia West Substation

The SunZia West Substation would not cross any BLM special designations; therefore, no RMP amendments would be required for proposed Component 4.

4.1.3 Visual Resources

Impacts to visual resources are disclosed in AID-12 Visual Resources.

4.1.3.1 Localized Route Modifications

All of the localized route modifications would meet the necessary BLM visual resource management objectives; therefore, no RMP amendments would be required.

4.1.3.2 Access Roads and TWAs Outside of Granted Right-of-Way

The construction, operation, and maintenance of access roads and temporary work areas would be consistent with BLM VRM Class II, III, and IV objectives as analyzed from 14 KOP locations (Table 4-2). Therefore, no RMP amendments would be required. The KOP contrast rating worksheets are included in Appendix F.

Table 4-2. Compliance with VRM Classes/VQOs: Component 2 Additional Access Roads and Proposed Temporary Work Areas

	Compliant	Not Compliant
Component 2a. Access Roads (miles)	268.6	0.0
Component 2b. Temporary Work Areas (acres)	322.4	0.0

4.1.3.3 Segment 4 Reroute Alternatives

Alternative Route 1, under all subroutes, would be inconsistent with BLM VRM Class II objectives for 3.4 miles and 167 acres as analyzed from KOPs 1, 2, 3, 32, and 38 near the Rio Salada (Table 4-3). These VRM Class II lands are associated with the Ladron Mountain-Devil's Backbone Complex ACEC, and adjacent lands, with views occurring from within the ACEC as well as from Forest Road 354 and the Riley townsite. The application of EPMs would not reduce visual contrast to a level to meet VRM Class II objectives and the project would dominate views from KOPs in an area with limited existing modifications. A plan amendment to the Socorro RMP (BLM 2010) would be required for the project. The amendment under Alternative Route 1 would reclassify up to 167 acres from VRM Class II to VRM Class IV to allow the visual contrast caused by the project to be in compliance with the Socorro RMP.

Based on the 1985 Cibola National Forest LRMP (USFS 1985), the project would be located within an area with a VQO of maximum modification, which is defined as where “management activities may dominate the characteristic landscape. However, when viewed as background, the visual characteristics must be those of natural occurrences within the surrounding area or character. When viewed as a foreground or middle ground, they may not appear to completely borrow from naturally established form, line, color, or texture. Alterations also may be out of scale and contain details that are incongruent with natural occurrences as seen in the foreground or middle ground” (USFS 1974:36). As analyzed from KOPs 3, 32, 33, 38, 39, 44, and 45, the project would meet the definition of a maximum modification VQO, as views of the project within the background distance zone (more than 5 miles) from selected KOP locations would be screened from view and the project’s form, line, color, texture, and patterns would be subordinate to the characteristic landscape. The project would meet desired conditions for visual resources on the Cibola National Forest and would conform to the 1985 Cibola National Forest LRMP. For additional analysis detail, please refer to Appendix F.

Table 4-3. Compliance with VRM Classes/VQOs: Component 3 Alternatives by Route and Subroute

Alternative Route/Subroute	Length (miles)	Compliant (miles)	Not Compliant (miles)	Not Compliant (acres)
Alt Route 1 with Subroute 1A-1	146.4	22.1	3.4	166.7
Alt Route 1 with Subroute 1A-2	145.1	21.8	3.4	166.7
Alt Route 1 with Subroute 1A-3	146.3	25.2	3.4	166.7
Alt Route 1 with Subroute 1A-4	146.2	22.1	3.4	166.7
Local Alternative 1A-6	0.4	0.0	0.3	12.1
Local Alternative 1A-7	0.5	0.0	0.5	23.1
Alt Route 2 with Subroute 2A-1	123.1	6.0	0.0	0.0
Alt Route 2 with Subroute 2A-2	119.5	6.0	0.0	0.0
Alt Route 2 with Subroute 2A-3	115.2	6.0	0.0	0.0
Alt Route 2 with Subroute 2A-4	122.8	6.0	0.0	0.0
Alt Route 3 with Subroute 3A-1	126.4	9.6	0.0	0.0
Alt Route 3 with Subroute 3A-2	122.9	9.6	0.0	0.0
Alt Route 3 with Subroute 3A-3	118.7	9.6	0.0	0.0
Alt Route 3 with Subroute 3A-4	126.2	9.6	0.0	0.0
Local Alternative 3B-1	5.5	4.0	0.0	0.0
Local Alternative 3B-2	5.7	4.6	0.0	0.0

Note: Local Alternatives are exchangeable within their associated alternative route.

The project would meet BLM VRM Class IV objectives where BLM lands are crossed by Alternative Routes 2 and 3; therefore, no plan amendment would be required for these alternatives and their associated subroutes (see Table 4-3).

4.1.3.4 SunZia West Substation

Since no BLM or USFS lands are occupied by the SunZia West Substation and there are no state visual requirements for this area, the project would be compliant with agency visual management objectives.

4.1.4 No Action Alternative

If no action is taken, then the right-of-way for the project would not be granted and no amendment to the Socorro RMP would be granted. There would be no changes made to right-of-way avoidance or exclusion areas, special designations, or VRM Classes.

4.2 CIBOLA NATIONAL FOREST LAND AND RESOURCE MANAGEMENT PLAN

The project as proposed on the Cibola National Forest is currently in conformance with the Amended 1985 LRMP. No amendments to the 1985 LRMP are proposed.

4.3 SEVILLETA NATIONAL WILDLIFE REFUGE COMPREHENSIVE CONSERVATION PLAN

The 2000 Sevilleta NWR CCP provides management tools, directions and priorities for the 230,000-acre Sevilleta National Wildlife Refuge. Decisions made within the CCP "are guided by the established purposes of the refuge, the goals and compatibility standards of the System, and other Service policies, plans, and laws directly related to refuge management" (USFWS 2000a:17).

The USFWS is evaluating a proposal from SunZia that would co-locate its transmission lines with transmission lines in pre-existing easements. The USFWS review is guided by the CCP and applicable laws, regulations, and policies, including USFWS Manual Part 603 FW 2.10, directing that the USFWS work with owners of pre-existing property interests to alleviate or minimize adverse impacts to refuges.

CHAPTER 5. CONSULTATION AND COORDINATION

As during the original NEPA process for this project, consultation and coordination with federal, state, and local agencies, organizations, tribes, and interested groups of individuals is important to the development of this EIS. Agency and public scoping is important to ensure that human and environmental concerns are considered, and the most appropriate data have been gathered and employed for analyses and that agency and public sentiment and values are considered and incorporated into decision making. Throughout the preparation of this EIS, the BLM made both formal and informal efforts to involve these groups in the scoping process and subsequent public involvement activities, formal consultation, and review of the EIS.

This chapter provides a brief description of the consultation and coordination efforts for this EIS.

5.1 CONSULTATION AND COORDINATION

As defined by CEQ regulations, a cooperating agency, or cooperator, is an agency (other than the lead agency) that has special expertise with respect to an environmental issue and/or has jurisdiction by law. Federal, state, and local agencies that have clear jurisdiction over portions of the proposed project routes were invited via formal letter to become a cooperator in the preparation of the EIS. Tribal governments were also invited to participate in the project as a cooperating agency and to provide special expertise with respect to environmental issues.

The role of a cooperator is to participate in the process and provide leadership, expertise, guidance, and review, as well as to offer information related to the agency's authority. Cooperators were asked to submit a signed memorandum of agreement that identifies the agreed-upon responsibilities for preparing and participating in the EIS, including activities outlined in 40 CFR 1501.6(b). A cooperator could be a federal, state, tribal, or local agency with jurisdiction by law or special expertise with respect to an environmental issue. An invitation letter was sent to the potential cooperators listed below.

Agencies, tribes, and organizations that have jurisdiction and/or specific interest in the project were contacted in early 2021 and invited to be cooperating agencies. The following agencies and tribes were invited to be cooperating agencies:

- **Federal:** Bureau of Indian Affairs, Bureau of Reclamation, Department of Army (Fort Bliss, Fort Huachuca, WSMR), U.S. Air Force (Holloman Air Force Base), U.S. DOD Siting Clearinghouse, Office of the Deputy Under Secretary (Installations and Environment), USFWS, USFS (Cibola National Forest), NPS, USACE
- **State:** ADOT, AZGFD, ASLD, NMDGF, New Mexico Spaceport Authority, NMSLO, State of New Mexico Military Base Planning and Support
- **Local:** Arizona Counties (Cochise, Graham, Greenlee, Pima, Pinal), Arizona Cities (Coolidge, Eloy, Willcox), New Mexico Counties (Grant, Hidalgo, Lincoln, Luna, Sierra, Socorro, Torrance, Valencia), New Mexico Cities (Belen, Deming, Lordsburg, Socorro, Truth or Consequences)
- **Tribes:** Ak-Chin Indian Community, Apache Tribe of Oklahoma, Caddo Indian Tribe, Comanche Indian Tribe, Fort Sill Apache Tribe of Oklahoma, Gila River Indian Community, Hopi Tribe, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Navajo Nation, Pascua Yaqui Tribe, Pueblo of Acoma, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Sandia, Pueblo of Santo Domingo, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham

Nation, Tonto Apache Tribe, White Mountain Apache, Wichita and Affiliated Tribes, Yavapai-Apache Nation, Ysleta del Sur Pueblo.

Twenty-one agencies accepted invitations to participate; the following federal, state, and local agencies have signed a Memorandum of Understanding (MOU) and have been consulted as cooperating agencies during the scoping process, alternatives development, and overall preparation of the EIS. The mission statement of each agency can be found on their respective websites. These 21 cooperating agencies are:

- **Federal:** Department of Army (Fort Huachuca, WSMR), USFWS, USFS (Cibola National Forest), NPS, USACE, U.S. Department of Energy
- **State:** AZGFD, ASLD, NMDGF, New Mexico Office of Military Base Planning and Support, NMSLO
- **Local:** Arizona Counties (Graham, Pinal), New Mexico Counties (Grant, Lincoln, Luna, Socorro, Valencia), City of Belen, Claunch-Pinto Soil and Water Conservation District.

The BLM hosted weekly meetings with the federal cooperating agencies in 2021 leading up to the preparation of the Draft EIS. Agencies that regularly participated in these meetings include the USFWS, Cibola National Forest, and NPS. The DOD joined these meetings in Q3 of 2021. The USACE joined these meetings in Q4 of 2021. The BLM also hosted meetings with all cooperating agencies, including the non-federal agencies. The cooperating agencies reviewed the Administrative Draft EIS in January 2022. The cooperating agencies have also reviewed the Initial Action Worksheets, the Resource Reports prepared by POWER Engineers, Inc., the Scoping Report, and the Alternatives Development Report in preparation for the Administrative Draft EIS review.

5.2 FAST-41 COORDINATION

This project was determined to be a covered project under Title 41 of the Fixing America's Surface Transportation Act (FAST-41) and was added to the Permitting Dashboard as of July 29, 2021. (The Permitting Dashboard is a public website that tracks FAST-41 projects. Please visit the Dashboard at https://www.permits.performance.gov/permitting-project/sunzia-southwest-transmission-project.) The BLM prepared and created a Coordinated Project Plan on September 24, 2021. Under statute, the Coordinated Project Plan must be updated quarterly and receive approval from all cooperating agencies. Table 5-1 provides a list of agencies involved in the FAST-41 process for the project.

Table 5-1. Agencies Involved in FAST-41 Coordination

Government Entity	NEPA Status	FAST-41 Status*
Federal Agencies		
Bureau of Land Management	Lead	Lead
Advisory Council on Historic Preservation	--	Participating
USDA Forest Service (Cibola National Forest and National Grasslands)	Cooperating	Cooperating
U.S. Army Corps of Engineers	Cooperating	Cooperating
U.S. Department of the Army, Fort Huachuca	Cooperating	
U.S. Department of Defense Siting Clearinghouse	--	Cooperating
U.S. Department of Defense, White Sands Missile Range	Cooperating	--
U.S. Department of Energy	Cooperating	--
U.S. Environmental Protection Agency Region 6	--	Cooperating

Government Entity	NEPA Status	FAST-41 Status*
U.S. Fish and Wildlife Service	Cooperating	Cooperating
National Park Service	Cooperating	Cooperating
State Agencies		
Arizona Game and Fish Department	Cooperating	--
Arizona State Land Department	Cooperating	--
New Mexico Department of Game and Fish	Cooperating	--
New Mexico Office of Military Base Planning and Support	Cooperating	--
New Mexico State Land Office	Cooperating	--
Local Agencies		
Graham County (Arizona)	Cooperating	--
Pinal County (Arizona)	Cooperating	--
Grant County (New Mexico)	Cooperating	--
Lincoln County (New Mexico)	Cooperating	--
Luna County (New Mexico)	Cooperating	--
Socorro County (New Mexico)	Cooperating	--
Valencia County (New Mexico)	Cooperating	--
Claunch-Pinto Soil and Water Conservation District	Cooperating	--
Belen (New Mexico)	Cooperating	--

*Only federal agencies were invited to become FAST-41 cooperators

5.3 TRIBAL CONSULTATION AND COORDINATION

Government-to-government consultation is conducted in accordance with guidance provided in BLM Manual 8120 (BLM 2004). Consultation efforts are coordinated by the project lead agency for tribal consultation and consultation under Section 106 of the NHPA. All records of coordination and consultation efforts, including logistical support for meetings and preparation of materials, are part of the administrative record.

Extensive tribal consultation and coordination were conducted for the initial right-of-way application and in support of the first EIS process from 2009–2015. That outreach is summarized in Chapter 5, Section 5.3.2 of the 2013 FEIS (BLM 2013).

For the current right-of-way amendment, in support of this current EIS, additional outreach has been conducted. In December 2020, the BLM contacted the following federally recognized tribes to notify them of the requested right-of-way amendment, to re-initiate government-to-government consultation, invite them to participate as cooperating agencies in preparation of the EIS, and to participate in the Section 106 consultation. Twenty-nine federally recognized tribes were contacted in December 2020:

- Ak-Chin Indian Community, Apache Tribe of Oklahoma, Caddo Indian Tribe, Comanche Indian Tribe, Fort Sill Apache Tribe of Oklahoma, Gila River Indian Community, Hopi Tribe, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Mescalero Apache Tribe, Navajo Nation, Pascua Yaqui Tribe, Pueblo of Acoma, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Sandia, Pueblo of Santo Domingo, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, Tonto

Apache Tribe, White Mountain Apache, Wichita and Affiliated Tribes, Yavapai-Apache Nation, Ysleta del Sur Pueblo

This initial outreach and follow-up are listed below in Table 5-2. The scoping report (as described in Section 1.7) was sent to the tribes listed above on August 5, 2021.

Table 5-2. Correspondence and Meetings with Tribes

Date	Native American Tribe/ Tribal Organization	Description
12/7/2020	Ak-Chin Indian Community	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Apache Tribe of Oklahoma	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Caddo Indian Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Comanche Indian Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Fort Sill Apache Tribe of Oklahoma	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Gila River Indian Community	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Hopi Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Jicarilla Apache Nation	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Kiowa Tribe of Oklahoma	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Mescalero Apache Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Navajo Nation (including Alamo Chapter)	Tribal consultation initiation and cooperating agency invitation letter from BLM. In a response received on 12/29/20, the Navajo Nation confirmed that there were no traditional cultural properties within the project area, and that the project could proceed without further consultation.
12/7/2020	Pascua Yaqui Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. In a response received on 1/8/21, the Pascua Yaqui Tribe indicated that there are traditional cultural properties, sacred sites, and resources within the project area and that the Tribe would like to stay informed as the project proceeds. The Tribe indicated that an MOU at the time of writing was not warranted.
12/7/2020	Pueblo of Acoma	Tribal consultation initiation and cooperating agency invitation letter from BLM. In a response received on 1/18/21, the Pueblo of Acoma requested a conference call to learn more about the project.
12/7/2020	Pueblo of Isleta	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Jemez	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Laguna	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Sandia	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.

Date	Native American Tribe/ Tribal Organization	Description
12/7/2020	Pueblo of Santo Domingo	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Taos	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Tesuque	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Pueblo of Zuni	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Salt River Pima-Maricopa Indian Community	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	San Carlos Apache Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Tohono O'odham Nation	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Tonto Apache Tribe	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	White Mountain Apache	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Wichita and Affiliated Tribes	Tribal consultation initiation and cooperating agency invitation letter from BLM. No response from the tribe received.
12/7/2020	Yavapai-Apache Nation	Tribal consultation initiation and cooperating agency invitation letter from BLM. In a response received on 1/7/21, the Yavapai-Apache Nation indicated that they did not wish to be involved as a consulting party after reviewing additional project materials.
12/7/2020	Ysleta del Sur Pueblo	Tribal consultation initiation and cooperating agency invitation letter from BLM. In a response received on 12/15/20, the Ysleta del Sur Pueblo indicated they did not wish to consult on the project at the time of writing but requested to be consulted if any human remains or artifacts are unearthed and are determined to fall under Native American Graves Protection and Repatriation Act (NAGPRA) guidelines.

5.4 FORMAL AGENCY CONSULTATION

5.4.1 Section 106 of the National Historic Preservation Act

The NHPA (54 USC 306108) requires federal agencies to consider the potential effects of a proposed undertaking on historic properties eligible for or listed on the NRHP and provide the Advisory Council on Historic Preservation (ACHP) with an opportunity to consider such effects prior to approving the undertaking. The regulations implementing the NHPA require agencies to inventory and evaluate historic properties potentially affected by a proposed undertaking, and seek to resolve potential adverse effects on such properties through consultation with consulting parties, including the Arizona and New Mexico State Historic Preservation Offices (SHPOs), the ACHP, and potentially affected Indian tribes (see 36 CFR 800).

The Section 106 process for the initial right-of-way request was initiated in May 2009 with the publication of the NOI. The Section 106 process was coordinated with the 2009–2015 NEPA process starting with public scoping in 2009. As noted in the 2013 FEIS (see Chapter 5, page 5-11), “Due to the scope and complexity of the SunZia Project, and because the “effects on historic properties cannot be fully determined prior to the approval of an undertaking” (§800.14[b][1][ii]), the BLM determined early in the process that the undertaking would have an "adverse effect" on historic properties and that, because of the complexity of the project, a Programmatic Agreement (PA) would be needed to govern the resolution of adverse effects. In accordance with 36 CFR 800.6(a)(1), the ACHP was notified of the "adverse effect" determination, concurred with the determination, and agreed to participate in the development of the PA.

The Programmatic Agreement was then developed in consultation with the ACHP, BLM, Arizona SHPO, New Mexico SHPO, and the consulting parties. Development of the PA occurred through consultation with agencies and affected Indian tribes and resulted in the execution of the final PA on December 17, 2014. Execution of the PA set forth the steps for meeting the requirements of Section 106. Twelve parties signed the 2014 PA—the BLM New Mexico State Office, Arizona SHPO, New Mexico SHPO, ACHP, USACE, Bureau of Indian Affairs, San Carlos Irrigation Project, Tohono O'odham Nation, NMSLO, the Arizona State Museum, ASLD, and SunZia Transmission, LLC (see Appendix B of the 2015 ROD).

The BLM has provided annual reports from 2015 to current (2021 as of the writing of this Draft EIS) to the consulting parties and tribes listed in the 2013 FEIS Section 5.3.2, as required by the 2014 PA (Stipulation X.A.3). The annual report includes an update on the project schedule and status, as well as other updates required in Stipulation X.A.3. The annual reports for 2020 and 2021 have included updates on the right-of-way amendment NEPA process as well as updates on implementation of the PA.

For the proposed right-of-way amendment request, an amendment to the 2014 PA is being considered and will be consulted on with the signatories and concurring parties to the 2014 PA. Amendments to the PA being contemplated include modifying the signatories to add the USFWS and/or USFS as consulting parties depending on the route selected; amending and updating the description of the undertaking; and amending and updating the operation and maintenance stipulations to ensure that the USFWS and/or USFS are responsible for ensuring that the stipulations in their right-of-way authorizations and easements are enforced on lands they administer.

5.4.2 Section 7 of the Endangered Species Act

Consultation with the USFWS is required under Section 7 of the ESA, when a project that is carried out, funded, or authorized by a federal agency may affect species listed under the ESA. As part of formal consultation under Section 7 of the ESA, the BLM provided a biological assessment to the USFWS that documents the potential occurrence of threatened, endangered, and candidate species along the Selected Route and potential effects on each species. The USFWS responded on July 2, 2013, that the project may adversely affect the lesser long-nosed bat, Mexican long-nosed bat, southwestern willow flycatcher and its designated critical habitat, Rio Grande silvery minnow designated critical habitat, Kuenzler hedgehog cactus, and Todsen's pennyroyal. In a Biological and Conference Opinion dated November 13, 2013, the USFWS determined that the project would not jeopardize the existence of any listed species (BLM 2015). The USFWS required that certain conservation measures take place to avoid or minimize effects on listed species and provided recommendations for additional discretionary measures. The BLM has included the requirements of the biological opinion as mitigation measures of the Selected Route. On October 3, 2014, the USFWS published a final rule determining threatened status under the ESA for the yellow-billed cuckoo. By memorandum of November 14, 2014, the BLM requested that the USFWS convert the conference opinion, contained in the 2013 biological opinion document in consultation 02EAAZ00-2013-F-0168 for yellow-billed cuckoo, to a biological opinion and to initiate conference for proposed critical habitat for the yellow-billed cuckoo. The USFWS responded by memorandum of December 19, 2014, converting the conference opinion for yellow-billed cuckoo to a Biological Opinion and thus completing formal consultation for yellow-billed cuckoo, satisfying the requirements that prohibit irreversible or irretrievable commitment of resources pursuant to 50 CFR 402.9. In addition, the USFWS advised that it would continue in formal conference with the BLM on yellow-billed cuckoo proposed critical habitat.

The BLM is in the process of evaluating the proposed action (the right-of-way amendment) in coordination with the USFWS. A biological assessment for the right-of-way amendment request is being prepared.

5.5 PREPARERS AND CONTRIBUTORS

This EIS was prepared and reviewed by a team from the BLM, USFWS, USFS, and numerous other cooperating agencies. SWCA assisted the BLM in preparing the EIS and supporting documents. Table 5-3 identifies the team members and their roles.

Table 5-3. List of EIS Preparers and Contributors

Name	Title	Agency	Office
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CHAPTER 6. LITERATURE CITED

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