ENVIRONMENTAL ASSESSMENT

Department of Commerce

National Telecommunications and Information Administration

June 2025

Santa Fe Indian School Pueblo Education Network

FAST – 41 Covered Middle Mile Broadband Project: Bernalillo, Valencia, Socorro, Catron, Cibola, McKinley Counties, New Mexico

Lead Federal Agency
National Telecommunications and Information Administration

Cooperating Agencies

Bureau of Indian Affairs
(Southwest Region, Ramah Navajo, Southern Pueblos, Zuni Agencies)
Bureau of Land Management
(Rio Puerco and Socorro Field Offices)
Federal Highway Administration
National Park Service
(El Malpais and El Morro National Monuments)
US Army Corps of Engineers
(Albuquerque District)
US Environmental Protection Agency
US Fish and Wildlife
(New Mexico Ecological Services)

Participating Agencies

Bureau of Indian Education
Sevilleta National Wildlife Refuge
New Mexico Department of Transportation
Pueblo of Acoma
Pueblo of Isleta
Pueblo of Zuni

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TABLE OF CONTENTS

1 Executive Summary 1
2 Purpose and Need 3
3 Description of Proposed Action and Alternatives 3
3.1 Introduction 3
3.2 Alternative A – Proposed Action 4
3.3 Alternative B – Alternative Action 7
3.4 Alternative C – No Action 8
4 Description of the Affected Environment 8
4.1 Noise 8
4.2 Air Quality 9
4.3 Land Resources ..... **Error! Bookmark not defined.**
4.3.1 Geology 10
4.3.2 Paleontology 10
4.3.3 Soils 11
4.3.4 Land Use ..... **Error! Bookmark not defined.**
4.4 Water Resources 14
4.4.1 Surface Water (i.e., Lakes, Rivers, Wetlands) 15
4.4.2 Groundwater 16
4.4.3 Floodplains 16
4.5 Biological Resources 17
4.5.1 Threatened and Endangered Species 17
4.5.2 Critical or Threatened/Endangered Habitat ..... **Error! Bookmark not defined.**
4.5.3 Bald and Golden Eagles/Migratory Birds ..... **Error! Bookmark not defined.**
4.5.4 Wetland Habitats 21
4.6 Historic and Cultural Resources 22
4.6.1 Archaeological Resources 24
4.6.2 National Register of Historic Places 24
4.6.3 Native American Traditional, Cultural, or Religious Resources 25
4.7 Aesthetic and Visual Resources 26
4.7.1 National Monuments and Conservation Areas 26
4.7.2 National Scenic and Historic Trails 26

4.8 Infrastructure 29
4.9 Socioeconomic Resources 31
4.9.1 Employment and Income 31
4.9.2 Demographic Trends 31
4.10 Human Health and Safety 32
5 Analysis of Environmental Impacts 33
5.1 Noise 33
5.2 Air Quality 34
5.3 Land Resources ..... **Error! Bookmark not defined.**
5.4 Water Resources 36
5.5 Biological Resources 37
5.6 Historic and Cultural Resources 40
5.7 Aesthetic and Visual Resources 41
5.8 Infrastructure 42
5.9 Socioeconomic Resources 44
5.10 Human Health and Safety 44
5.11 Cumulative Impacts 45
6 Applicable Environmental Permits and Regulatory Requirements 47
7 Consultation/Engagement 50
8 Public Comment 51
9 References/Footnotes 52
10 Appendices 53

LIST OF FIGURES & TABLES

Figure 1: USGS Nationwide Hydrologic Unit Map 14
Figure 2: Regeneration Site Locations Along Proposed Project Area..... 30
Figure 3: NM Project Population, 2010 to 2040 (UNM-Geospatial and Population Studies Department) 32

Table 1: Prime and Other Important Farmlands within the Proposed Project Area 12
Table 2: Federal Cooperating Agencies and Respective Authorizations**Error! Bookmark not defined.**
Table 3: FEMA Flood Zones within the Proposed Project Area 17
Table 4: Potential Threatened, Endangered Species within the Proposed Project Area..... 18
Table 5: Potential Migratory Birds within the Proposed Project Area 20
Table 6: EPA Ecoregions (Level IV) within the Proposed Project Area..... 21
Table 7: Historic Properties Listed on the National Register of Historic Places within the Proposed Project Area 25
Table 8: NM Population Demographics, 2010 to 2019 (UNM-Geospatial and Population Studies Department) 32
Table 9: EPA (Region 6) National Priorities List Sites near but not within the Proposed Project Area..... 32
Table 10: Effect Determinations of Threatened, Endangered Species within Proposed Project Area 37
Table 11: Potential Mitigation Measures for Proposed Project 46
Table 12: Potential Applicable Statutory, Regulatory, and Other Requirements 48
Table 13: Federal Entity Consultation and Tribal Engagement..... 50

LIST OF APPENDICES

A: Proposed Action and Alternatives (Maps)
- A-1: Alternative A – Proposed Action & Project Phasing
- A-2: Alternative B – Alternative Considered

B: Other Service Provider and Service Area for Zuni, Ramah, and Grants
C: Proposed Project Area via Public Land Survey System (PLSS)
D: Compiled Maps and Data ofD Various Resources within Proposed Project Area
- D-1: Geologic Features within the Proposed Project Area
- D-2: USFWS NWI Wetlands within the Proposed Project Area
- D-3: NM OSE POD Locations within the Proposed Project Area
- D-4: 100-Year Floodplains within the Proposed Project Area
- D-5: Email From USACE Regarding Section 404 Requirements for the SFIS PEN NTIA Grant
- D-6: EPA Level IV Ecoregions Identified within the Proposed Project Area
- D-7: National Register of Historic Places (NRHP) within the Proposed Project Area

E: Custom Soil Resource Report via NRCS Web Soil Survey
F: Federal Cooperating Agency (BLM, NPS, BIA) Maps
G: Flood Insurance Rate Map Data within the Proposed Project Area via FEMA National Flood Hazard Layer
H: USFWS Section 7 Consultation, Biological Assessment for SFIS Pueblo Education Network, IPaC Report
I: Section 106 –Programmatic Agreement
J: US Census Bureau Information for the Proposed Project Area
- J-1: Employment and Income
- J-2: Demographics

K: Weather and Climate Hazards Assessment and Mitigation Plan for SFIS PEN by 10G Consulting
L: Right-of-Way and Permitting Applications

ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOI	Department of Interior
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
GAO	Government Accountability Office
NAAQS	National Ambient Air Quality Standards
NAID	National Archives Identifier
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
PEN	Pueblo Education Network
POD	Point of Diversion
PLSS	Public Land Survey System
SFIS	Santa Fe Indian School
SHPO	State Historic Preservation Officer
SSA	Sole Source Aquifer
SWPPP	Storm Water Pollution Prevention Plan
TBCP	Tribal Broadband Connectivity Program
THPO	Tribal Historic Preservation Officer
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOI	United States Department of Interior
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey

1 EXECUTIVE SUMMARY

In 2021 and 2023, the US News and World Report identified New Mexico as 50th in Education and 49th in Internet Access. Four reports on tribal broadband have been completed by the Government Accountability Office, (GAO-18-630, GAO-18-682, GAO-19-134T, and GAO-22-104421). In GAO-22-104421, the entity found, "Federal funding from 2015–2020 has increased broadband access for people living on tribal lands, but access continues to lag behind the rest of the country. Nationwide, conservative estimates show more than 18 percent of people living on tribal lands remain unserved by broadband as of 2020, compared to about 4 percent of people in non-tribal areas."

The Santa Fe Indian School (SFIS) is a tribally controlled education institution that serves approximately 700 Native American students per year from the 19 Pueblos, Navajo and two Apache Tribes of New Mexico. Over the past decade, SFIS has established two pueblo tribal broadband consortia, Jemez-Zia and Middle Rio Grande, that built approximately 160 miles of middle mile broadband infrastructure. However, during the height of the COVID-19 pandemic in fall of 2020, a SFIS survey found that only 11% of its student population and 23% of 227 staff continued have in-home internet speeds that met the Federal Communication Commission's (FCC) benchmark speeds of 25/3. Expansion of the SFIS PEN was necessary to connect more students and teachers in their tribal and rural communities.

SFIS applied for and received the National Telecommunications and Information Administration (NTIA) Tribal Broadband Connectivity Program Round One Funding to build upon the existing 160-mile broadband infrastructure in central New Mexico that connects the Pueblos of Cochiti, Jemez, Santo Domingo, San Felipe, and Santa Ana. The SFIS Pueblo Education Network (PEN) seeks to address its student's education disparities by 1) constructing a Middle Mile Fiber Optic Network, and 2) connecting educational facilities to a regional internet exchange in Albuquerque, NM through the Middle Mile Fiber Optic Network. This network builds 324-mile broadband line traversing through the following tribal communities and local municipalities: the City of Albuquerque, Pueblo of Isleta, Village of Los Lunas, City of Belen, City of Socorro, Village of Magdalena, Pueblo of Acoma, City of Grants, and the Pueblo of Zuni.

The SFIS PEN proposes to build an approximate 324-mile broadband line containing a Single Mode SMF-28e cable encased with a 1 ¼-inch High Density Polyethylene conduit. Installation of the broadband line includes the directional boring method (ASTM F1962-22), vibratory plowing, and trenching at a minimum depth of 36 inches from the surface (depending on soil and site conditions). Minimal aerial installation may be required in difficult, steep, and rocky areas that do not allow for easy accessibility of construction equipment. Additional depth may be necessary to avoid existing utilities, major waterways, or highways. Related infrastructure implementation of fiber optic boxes or vaults ("hand-holes") is to facilitate fiber placement and storage area needs for future potential cable damage and repair efforts. The SFIS PEN aims to extend internet connectivity to educational facilities situated along the Middle Mile Fiber Optic Network accomplished by installing Network Management and Monitoring System components, including customer-edge route and switch components, as well as provider-edge route and switch

components, in each of these facilities. Upon completion of the proposed project, 400 Gigabits per second is the estimated top-end network capacity. This is the result of over 40 optical channels installed at 10 Gigabits per second, via Dense Wavelength Division Multiplexing technologies and lambda-banding strategies. With future augmentation of equipment, the PEN has scalability potential of estimated speeds of 1.6, 4, or 16 terabits (TB) per second.

The proposed project all-in cost is an estimated $56 million ($44.42 per foot – with contingency), comprised of construction costs, performance bonds, project engineering, relevant permits, and environmental assessments/reviews. If Zuni, Acoma, and Isleta were to build an independent network to Albuquerque, the estimated total price would be $155,801,952.00. Utilizing the consortium approach would create an economy of scale for cost savings of almost half!

The project will require coordination with multiple jurisdictions to secure necessary rights-of-way across tribal, state, and federal lands, including areas managed by the New Mexico Department of Transportation (NMDOT), Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), and National Park Service (NPS). All installations and infrastructure placements will follow applicable agency, municipal, and tribal requirements.

As described throughout this Environmental Assessment (EA), no significant impacts on air quality, land, water, biological, human health and safety, are identified. With respect to historic/cultural resources, a robust Programmatic Agreement and consultation process has been developed to resolve any potential impacts. Positive impacts on socioeconomics are anticipated for the tribal and rural communities involved. This EA is prepared for SFIS, NTIA, and the Federal Cooperating Agencies including the BLM, US Fish and Wildlife Service (USFWS), NPS, BIA, US Army Corps of Engineers (USACE), NMDOT, US Environmental Protection Agency (EPA), and Federal Highway Administration (FHWA) for the proposed 324-mile SFIS PEN broadband fiber line.

2 PURPOSE AND NEED

The SFIS PEN Middle Mile Project proposes to:

- Connect NM tribal communities using a cost-effective regional approach.
- Increase tribal participation in and access to the global digital economy.
- Provide tribal residents, businesses, and anchor institutions with reliable high-speed internet.
- Create a private education network connecting tribal schools (pre-K through 12th grade) and libraries to each other and to national research and education networks and anchor institutions.
- Connect NM rural community entities such as the Proposed Funded Service Area (PFSA) State Education Network (SEN), NM State Agencies, the federal government, tribes, and private businesses.
- Centralize cybersecurity and network operations by sharing cost and expertise.
- Increase enrollment in online classes.
- Increase education attainment including increasing the pursuit of post-secondary degrees.
- Create student research opportunities.
- Develop historical and cultural activities through tribal education departments and tribal libraries.
- Provide workforce training to tribal members.
- Increase tribal job opportunities.

High-speed accessible and reliable internet is necessary in rural and tribal communities to meet the FCC's benchmark 25/3 standards to ensure underserved students have equitable access to education and potential future employment opportunities. The SFIS PEN closes the broadband infrastructure gap and connects educational facilities in tribal communities including the Pueblo of Isleta, Pueblo of Acoma, and the Pueblo of Zuni, while connecting participating anchor institutions in the City of Albuquerque, Village of Los Lunas, City of Belen, City of Socorro, Village of Magdalena, and City of Grants.

3 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

3.1 INTRODUCTION

To serve the purpose and need of the project, the National Environmental Policy Act (NEPA) requires the consideration and evaluation of alternatives for potential environmental consequences. These alternatives include:

- Alternative A – Proposed Action.
- Alternative B – Alternative Action.
- Alternative C – No Action.

For selection of the alternative, the following factors oversaw the decision: project funding, project timeline, various environmental factors (i.e., geologic constraints such as cliffs and mountains), and effects on historic properties and cultural resources per National Historic Preservation Act

(NHPA). The recommended alternative is the action with the least environmental impacts, all things being equal. **Section 5 includes the evaluation of All project alternatives and respective environmental effects.**

3.2 ALTERNATIVE A – PROPOSED ACTION

The Proposed Action is a 324-mile-long broadband fiber optic cable with appropriate infrastructure (regeneration sites, cabinets, and hand-holes) that traverses federal, state, and tribal lands. Communities include: the City of Albuquerque, Pueblo of Isleta, Village of Los Lunas, City of Belen, City of Socorro, Village of Magdalena, Pueblo of Acoma, City of Grants, and the Pueblo of Zuni (Appendix A-1).

The Proposed Action pathway will encompass a 'buffer zone' for protection of various historical and cultural resources as stipulated in the Programmatic Agreement (Appendix I).

The Proposed Action will require right-of-way (ROW) access across federal NMDOT, public, private, and tribal lands. For the long-haul fiber optic line, a ROW of approximately 10 feet (5 feet from the fiber centerline) is anticipated. The full project area includes a 40-foot-wide corridor (20 feet from centerline), though ground disturbance is expected within a 10-foot area. This EA reviews and evaluates the entirety of the proposed project area (Appendix A-1).

The proposed project area utilizes NMDOT ROW within BLM lands, state highways, El Morro and El Malpais National Monuments, BIA Southern Pueblo Agency, BIA Ramah Navajo Agency, and BIA Zuni Agency lands. Consultations with respective agencies and acquiring necessary permits will occur during the project planning processes (and before construction activities begin). The NMDOT Standard Specifications for Highway and Bridge Construction (2019) will govern the construction of the proposed project.

The broadband fiber optic installation for the proposed project occurs at a minimum depth of 36-inches from the surface via directional boring, vibratory plowing, and trenching (depending on soil and site conditions). Utilization of the directional boring method occurs in areas where water features are present and locations where the proposed path intersects a major roadway. All staging areas and related construction equipment storage will occur within the designated areas near the proposed project area. All construction activities will occur within the defined proposed project area (40 ft total width and 324 miles long).

Three (3) regeneration sites and one (1) cabinet are proposed within the project area footprint at the following locations: 1) New Mexico Tech Grad site location (fiber only), 2) location within Acoma Pueblo on the corner of Anzac Rd. and Airport Rd., 3) Zuni Pueblo along Hwy 53 across BIA-12, and 4) Acoma Pueblo near the 'Ranch House' coordinates are 34.473564 -107.614533.
The purpose of fiber optic regeneration and cabinet sites is to serve as broadband shelters to improve efficiency, performance, and enhance data signals, particularly where two ends of the fiber optic line are spliced together. Co-location sites, ROW will be described as follows:

- Regeneration sites will require a 50-foot by 50-foot ROW footprint. This area accommodates prefabricated buildings, concrete foundation, utility connections, and

security fencing. Placement will follow tribal and local municipal specifications where applicable.

- Cabinet sites will require a 25-foot by 25-foot ROW footprint, supporting each cabinet's installation on concrete foundations, utility connections, and fencing. ROW acquisition for these sites will comply with applicable tribal and municipal standards.

Site preparation will follow NMDOT and FHWA standards and includes vegetation removal, grading, trenching, and slab installation, subject to ROW jurisdiction. These sites allow for regeneration of fiber optic signals along with the full length of the proposed project. The selection of regeneration sites was selected on pre-disturbed municipal areas and tribal authorized development areas with minimal vegetation and geological issues along with consultation with the designated entities or tribes. Additionally, handholes (also referred to as pull boxes or splice vaults) will be installed at approximately 1,750-foot intervals along the fiber route, totaling an estimated 978 locations. These enclosures, typically 30 inches wide by 48 inches long and 36 inches deep, will be installed flush with the ground in previously disturbed ROW. Handholes provide access points for cable splicing, maintenance, and future repair, and will be installed in accordance with tribal, federal, or state requirements as applicable.

Project Phasing by Land Jurisdiction

To facilitate timely implementation and compliance with environmental and historical resource regulations, the SFIS PEN project will be constructed in phases based on land ownership or management jurisdiction. Project phasing corresponds to the land status (tribal, federal, state, municipal, or private) and is detailed in Appendix A-1 (Proposed Action Map and Phasing).

Each project phase will only proceed after the completion of all applicable Section 106 reviews, permitting, and consultation requirements under the Programmatic Agreement. All ROW approvals must be secured in alignment with project timelines and finalized prior to any construction activities. ROW compliance will adhere to the requirements of the appropriate federal, state, municipal, or tribal authority with jurisdiction over each segment of the project including operations and maintenance specifications.

This phased approach ensures that federal trust responsibilities, tribal consultation obligations, and multi-jurisdictional permitting requirements are met, while supporting efficient and coordinated project delivery.

The following are detailed pathways of the Proposed Project Area:

The proposed project pathway originates at the Big Byte Data Center in Albuquerque, NM. From Big Byte, there is a short lateral connection to the UNM Albuquerque GigaPoP (ABQG) at H5 Data Center. The fiber path then utilizes an existing pathway following Central Ave. eastward towards Interstate 25 (I-25) within the NMDOT ROW. The fiber path travels approximately 9.0 miles south on I-25, exits at Highway (Hwy) 47, and continues south entering Isleta Pueblo.

The fiber path travels along established and previously disturbed roads (including I-25, Highways (47, 147, 314), BIA tribal roads (33, 40, 55, 60, 54, 71, 70, Moonlight Dr. SW , 102 and 100), and other residential streets through Isleta Pueblo. The fiber route has been adjusted in Isleta since the

time of the initial public review; however, the proposed project continues to follow previously disturbed roads. While in Isleta Pueblo, the fiber path includes boring underneath the Rio Grande River. The fiber path exits Isleta Pueblo and continues south on I-25 for approximately 59 miles traversing through Bureau of Land Management (BLM) lands, Valencia County, Socorro County, private lands, and enters the City of Socorro. While in Socorro, the path travels south along California St., Abeyta Ave., Bernard, Fisher Ave., Garfield Ave., Reservoir Rd., Molina Hill Rd., Spring St., then Aspen. The path travels around the Firefighter Training Academy, to Canyon Rd., then onto Bravo Rd. through unnamed roads within Water Canyon and exits to Hwy. 60.

The fiber path continues west along Hwy. 60 for approximately 25 miles through the Village of Magdalena. In this area, the path travels through Socorro County, BLM lands, State Land Office (SLO) lands, and various private lands. The fiber path continues west until Montosa Ranch Rd. between milepost (MP) 99 and MP 100, where the path now travels north. The path continues to Montosa Ranch Rd. until it intersects Double H Ranch Rd. In this area, the path crosses through Socorro County, SLO, BLM lands, and private lands until it reaches the southern boundary of the Pueblo of Acoma.

Through the Pueblo of Acoma, the path travels along established, disturbed roads including Montosa Ranch Rd., Double H Ranch Rd., Martin Rd., Red Lake Rd., Indian Service Route 21, Indian Service Route 37, Indian Service Route 38 or Haak'u Rd., Pinsbaari Drive (with laterals at Knots Landing and Sky City Drive), Pueblo Rd., US Route 66, and Anzac Rd. The path continues west on I-40 towards Grants, NM. While in Grants, NM the path travels along existing roads, sidewalks, and utility corridors including US Route 66, West Santa Fe Ave., South 5th Street, San Jose Drive, and Hwy. 53. From Hwy. 53, the path travels south on Ice Caves Rd. through Cibola County, El Morro and El Malpais National Monuments, BLM, SLO, Ramah Navajo Indian Reservation, Zuni Pueblo, and various private lands. The proposed 324-mile PEN fiber path ends in the Pueblo of Zuni, where it will connect Zuni Elementary School, High School, Head Start Building, and the Governor's Office.

With the PEN route concluding in Zuni Pueblo, the only practicable alternative is to follow the existing Highway 53 ROW into Zuni Pueblo, which requires crossing through designated National Park Service managed El Morro and El Malpais National Monuments. Rerouting along I-40 west and then south down Highway 602 would add significant costs due to increased mileage to the project. Moreover, collocation on existing aerial fiber lines through both of the Monuments was assessed, but the additional weight of the fiber line would increase the load on existing power poles and require upgraded pole installation, therefore, collocation would not be feasible. Based on these reasons, utilization of underground utility ROW through El Morro and El Malpais is the only practicable alternative for providing high speed fiber to Zuni Pueblo education facilities.

Refer to Figure 1 for the overall map of the proposed project area. Appendix A-1 and B include the overall proposed project area (Alternative A) and the Public Land Survey System (PLSS) information collected for the proposed project area.

After review, there are minimal effects to overall environmental resources within the boundaries of the proposed project area. Soil and some geologic features will experience temporary effects

due to the directional boring (at a depth of 36 inches) equipment footprint utilized for the broadband line. Related construction activities will not affect biological resources due to the implementation of conservation measures.

3.3 ALTERNATIVE B – ALTERNATIVE ACTION

Alternative B describes the practical alternative routes considered for the PEN. The alternative route traverses through federal, state, and tribal lands, specifically: Zuni Pueblo, City of Grants, Acoma Pueblo, Laguna Pueblo, City of Albuquerque, Pueblo of Isleta, Los Lunas, Belen, and Socorro. The Alternative Action B requires the proposed long-haul fiber optic cable and related hand holds to be installed within Highway 53 to reach Zuni Pueblo, a major participating Indian Tribe supporting the project. Alternative B would be installed within the NMDOT ROW easement that bisects NPS boundaries in El Morro and El Malpais national monuments, similar to the Proposed Action. Appendix A-2 displays the alternative PEN path (Alternative B), with respect to the proposed PEN (Alternative A).

Reasons why Alternative B was NOT the selected alternative:

- Installation of fiber optic line may exceed federal grant funding timelines.
- Currently, Laguna Pueblo was not amenable to the project crossing their lands.
- Various tribal communities along the alternative PEN path already possessed internet services for their respective educational facilities.
- Additional environmental analysis is required for alternative route and impacts to fiber installation within NMDOT pre disturbed areas that may affect soil resources, wetlands, points of diversion, mineral resources, and biological resources.

Similar to the Proposed Action, Alternative B would require a right-of-way access across federal, state, and tribal lands. For long-haul fiber, a ROW of approximately 10 feet (5 feet from the centerline) is required, with additional ROW footprints of 50’x50’ for regeneration sites and 25’x25’ for cabinet sites and hand holds at approximately 1,750’, where applicable. All siting and co-location infrastructure would need to comply with tribal and local jurisdictional requirements.

Installation of the broadband fiber line for this alternative incorporates the same methods described in Alternative A. Additionally, aerial collocation on existing power lines and power poles remains a possibility. However, the additional weight of the actual fiber line would increase the load on existing power poles, therefore, collocation would not be feasible and require upgraded pole installation. Ideally, the application of this collocation concept would occur in areas where procurement of a ROW was not feasible.

Potential effects on these environmental resources and considerable cooperation amongst many federal agencies, state agencies, local municipalities, and tribal communities is not feasible at this point due to time constraints and funding timeline of the project. As a result, Alternative A better represents the overall goal and ideal timeline of the PEN installation.

3.4 ALTERNATIVE C – NO ACTION

Alternative C describes the neutrality of the proposed project. No construction activities would occur through this alternative.

Impacts such as potential loss of employment, education, and telehealth services would negatively affect these communities. These negative impacts are inconsistent with the Tribal Broadband Connectivity Program and other investments in the Inflation Reduction Act to bridge the digital divide and uphold the federal government's trust responsibility with Indian Tribes.

Areas within Zuni, Ramah, and Grants have optional service providers that could cater to the needs of these communities. It is important to emphasize the purpose of the proposed project is to provide essential internet services to areas other service providers may lack such as educational anchor institutions. For context, Appendix B includes this optional service provider and areas with respect to the proposed project.

The No Action, Alternative C is not recommended as the alternative since minimal environmental impacts from Alternative A greatly outweigh the benefits put forth by Alternative C. The No Action alternative will be carried forward for baseline comparison of impacts.

4 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section describes the surrounding environment and respective resources within the 324-mile proposed project area, described as Alternative A. The proposed project will primarily follow previously disturbed corridors, including existing road shoulders, utility easements, and other linear infrastructure alignments. This alignment minimizes new ground disturbance and is generally co-located with existing infrastructure where feasible, consistent with the 10-foot construction footprint described in Section 3.2. Cabinet sites, regeneration nodes, and handhole locations are designed to fall within appropriate jurisdictional boundaries and land management authorities, whether tribal, federal, state, or private—and will not be installed without prior right-of-way (ROW) authorization and historical compliance. This approach is consistent with the permitting and consultation framework established in the Programmatic Agreement for the project. Subsection 4.3.3 describes the Federal cooperating agencies (BLM, FWS, USACE, BIA, EPA, and NPS), their respective lands, and authorizations.

North central New Mexico is dominated by a semi-arid landscape of mountains, canyons, valleys and opens space with a range of vegetation from Juniper, pinion and prairie grasses. Construction sites and access will be predominately on previously disturbed rights of ways (including but not limited to roads and utility corridors) in areas of little precipitation, characteristic of the southern Rocky Mountains. Characteristics of its lands, geology, species and expansive resources are discussed in the following topics:

4.1 NOISE

The construction activities associated with the proposed project will introduce temporary noise levels that are not harmful to the human sound level threshold. Normal (or moderate) sound levels

range from 40 to 70 dBA[1]. According to the Occupational Safety and Health Administration (OSHA), noise levels at or above 85 decibels[2] (dBA) lead to noise hazards and potential hearing loss.

The NMDOT Standard Specifications for Highway and Bridge Construction (2019) will govern the noise standards[3] utilized during the proposed project construction. As a precaution, ear protection requirements on the active construction site are necessary for hearing loss prevention. Some identified biological resources within the proposed project area may be sensitive to loud noise. Noise from construction equipment may affect certain biological resources. Section 5.5 includes conservation measures for these biological resources.

4.2 AIR QUALITY

Administered through the Environmental Protection Agency (EPA), the Clean Air Act (CAA) is the federal law regulating air emissions of stationery and mobile sources, through the establishment of national standards for maintaining ambient air quality against pollutants. Air pollution occurs when pollutant materials exceed the standards specific for a region and have the capacity to cause physical and/or internal harm to any individual. EPA established the National Ambient Air Quality Standards (NAAQS) for six principal pollutants (ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), oxides of nitrogen (NO_x), sulfur dioxide (SO_2), and lead (Pb)) to protect the health and welfare of the public. Additionally, EPA will designate areas based on whether it meets NAAQS standards. These areas include:

Attainment Areas – Air quality in a geographic area that meets or is below the national standard.

Nonattainment Areas – Air quality in a geographic area that does not meet the national standard.

After designation, state and/or local governments will develop an implementation plan that outlines how the area will attain and maintain the standards. Under the CAA, the state implementation plan must be at least equivalent to the NAAQS. Under 40 CFR 51.308, the state of New Mexico must develop their own State Implementation Plan (SIP) to regulate the local, state, tribal, and regional level components. As of August 2023, one NM County identifies as a nonattainment area: Dona Ana County[4] on the southern portion of the state (not within the proposed project area boundary). There are no areas within the proposed project that are nonattainment areas.

During the construction phase of the proposed project, the NM DOT Standard Specifications for Highway and Bridge Construction (2019) will lend guidance to air quality requirements and dust abatement[5].

[1] American Speech-Language-Hearing Association (Loud Noise Dangers)
[2] ANSI/ASSP A10.46-2020
[3] NM DOT Standard Specification for Highway and Bridge Construction (2019) – Section 107.14.6
[4] U.S. Environmental Protection Agency. *Current Nonattainment Counties for All Criteria Pollutants*. 2024.
[5] NM DOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.14.5

4.3 GEOLOGY AND SOILS

4.3.1 Geology

The proposed project traverses several New Mexico counties across the American southwest region. Mountainous features with predominant lowlands form basins, fault-bounded troughs, and trenches that encompass a variety of elevation ranges. Appendix D-1 displays the geologic features across the proposed project area.

Quaternary, Tertiary, Cretaceous, Paleozoic, and Jurassic geologic formations are all present within the proposed project area. The geomorphology identified within the proposed project area includes two provinces, Basin and Range and the Colorado Plateau.

Basin and Range – This province describes areas where steep mountains and low, flat basins coexist in the same region. The surrounding topography and dry climate form distinctive patterns of geology that occur such as alluvial fans, playas, mud flats, lakes, sand dunes, and canyons. Areas in this province provide temperature increase during the summer with varying monsoon season intensities. This province engulfs the stretch of the proposed project from Albuquerque to Socorro.

Colorado Plateau – This province describes primarily mountainous areas of shallow basins, sunken deserts, buttes, and mesas bounded by the Rocky Mountains. Mesas and valleys, distinguished by volcanic features (lava flows and volcanic necks), dominate a portion of this province. This province engulfs the portion of the proposed project from Socorro to the Pueblo of Zuni.

4.3.2 Paleontology

According to NPS, there are some national park service units that include paleontological resources within its boundaries. The current total of NPS areas with fossils is 286 parks which is 67% of all NPS areas[6]. Of these 286 parks, 2 are near the proposed project pathway: El Morro and El Malpais, both from the NPS Intermountain Region. The NPS mandate requires that the lands are to be managed in a manner that protects and preserves resources for future generations. The following measures outline the efforts to ensure compliance with that mandate.

4.3.2.1 El Morro National Monument

Based on the Geologic Resources Inventory Report for El Morro[7], no fossil discoveries occur from the geologic formations within the monument. Although, there is potential for the discovery of paleontological resources because geologic units within the monument contain fossils in other locations other than the monument. As a precaution, further communication with NPS during construction will ensure potential paleontological resources are managed appropriately.

[6] National Park Service. NPS.gov. Fossils and Paleontology. *Fossil Parks Master List*
[7] NPS/NRSS/GRD/NRR-2012/588

4.3.2.2 El Malpais National Monument

Based on the Geologic Resources Inventory Report for El Malpais[8], paleontological resources exist in the form of tree molds found on the surface of the Bandera volcano flows. From the report, it was stated there are four localities where these tree molds are present, but no location explicitly stated. Therefore, further communication with NPS during the construction of the proposed project will occur to avoid these locations. Additionally, a few geologic units within and surrounding the national monument may yield fossils: Pa, Py, Pg, Je, Jz, Kbo, and Kdp. Based upon the review of the project area and geologic mapping, these geologic units do not exist within the proposed project pathway.

4.3.3 Soils

The Proposed Action spans an Area of Potential Effect (APE) that covers approximately 4,179 acres, based on a 324-mile-long route with a 40-foot-wide corridor but only area of disturbance in a 5' from centerline 10' total area. This area intersects 137 soil types across federal, tribal, state, and private lands, as mapped using the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). The soils identified are described in Appendix E. In two (2) semi-arid locations, Magdalena to Acoma Pueblo and Grants to Zuni Pueblo, there lies a potential presence of biological soil crusts. This presence allows for the stability and protection of soil surfaces from wind and water erosion[9]. The proposed project area pathway is within pre-disturbed areas, therefore will not pose a threat to potential biological crusts in these specified locations.

4.3.3.1 Prime and Other Important Farmlands

Passed by Congress, as part of the Agriculture and Food Act of 1981 (Public Law 97-98), the Farmland Protection Policy Act (FFPA) intended to minimize the unnecessary and irreversible impact of federal programs converting farmland to nonagricultural uses. The FFPA intends to protect farmland and instruct federal agencies to adhere to state, local units of government, and private programs. As a result of the FFPA, farmlands should classify as one of the following: 'Prime farmland,' 'Unique farmland,' or 'Farmland of statewide or local importance.'

According to USDA NRCS[10], descriptions of farmland categories are below:

Prime Farmland – Land with the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimal fuel, fertilizer, pesticides, and labor input. Soil erosion is not present in this category. It may include land currently used to produce livestock and/or timber.

Unique Farmland – Land other than prime farmland used for production of specific high-value food and fiber crops. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.

[8] NPS/NRSS/GRD/NRR-2012/578
[9] Technical Reference 1730-2 (2001) – US DOI (BLM) & USGS
[10] USDA/NRCS Special Environmental Resource Concerns (March 2012): Prime and Unique Farmlands

Farmland of Statewide or Local Importance – Used to produce food, feed, fiber, forage, or oilseed crops, as determined by the appropriate state or unit of local government agency or agencies, with the Approval of the Secretary of Agriculture.

Of the soils identified within the proposed project area (324 miles length, 10 ft width), 18 soil types classify as a type of "Farmland" that totals approximately 23.1 acres; although, actual disturbance is anticipated to be less acreage. Table 1 describes these soils.

Table 1: Prime and Other Important Farmlands within the Proposed Project Area

Map Unit Symbol	Map Unit Name	Farmland Category	Land Capability (Class and Subclass)	Acres in Proposed Project Area
Cibola County Area; parts of Cibola, McKinley, and Valencia Counties				
75	Hickman Sandy Clay Loam	Prime farmland if irrigated	Irrigated: 3w Non-Irrigated: 6w	0.8
McKinley County Area; McKinley, parts of Cibola, and San Juan Counties				
42	Suwanee Clay Loam	Farmland of local importance	Irrigated: 4w Non-Irrigated: 6w	1.8
47	Conchovar Clay Loam	Farmland of local importance	Irrigated: 3s Non-Irrigated: 6c	0.0
49	Concho Clay Loam	Farmland of local importance	Irrigated: 3c Non-Irrigated: 6c	1.1
53	Hawaikuh Clay Loam	Farmland of local importance	Irrigated: 2s Non-Irrigated: 6c	0.9
60	Redpen Sandy Clay Loam	Farmland of local importance	Irrigated: 3e Non-Irrigated: 6c	3.5
310	Parkelei Sandy Loam	Farmland of local importance	Irrigated: 3c Non-Irrigated: 6c	2.4
335	Venadito Clay	Farmland of local importance	Irrigated: 4w Non-Irrigated: 6w	0.2
352	Zia Sandy Loam	Farmland of local importance	Irrigated: 3e Non-Irrigated: 6c	2.3
575	Ramah-Pescado Association	Farmland of local importance	Irrigated: 3c Non-Irrigated: 6c	1.3
Socorro County Area				
421	Glenberg-Riverwash Association	Prime farmland if irrigated	Irrigated: none specified Non-Irrigated: 4e	1.7
Valencia County; Eastern Part				
Bm	Bluepoint Loamy Fine Sand	Farmland of statewide importance	Irrigated: 3s Non-Irrigated: 7s	5.6
Bn	Bluepoint Loamy Fine Sand	Farmland of statewide importance	Irrigated: 3s Non-Irrigated: 7s	0.2
Br	Bluepoint Sandy Clay Loam	Farmland of statewide importance	Irrigated: 3s Non-Irrigated: 7s	0.6
Gd	Gila Loam	Farmland of statewide importance	Irrigated: 1 Non-Irrigated: 7c	0.1
Gk	Gila Clay Loam	Farmland of statewide importance	Irrigated: 1 Non-Irrigated: 7c	0.1

Map Unit Symbol	Map Unit Name	Farmland Category	Land Capability (Class and Subclass)	Acres in Proposed Project Area
Vd	Vinton Loamy Fine Sand	Farmland of statewide importance	Irrigated: 3s Non-Irrigated: 7s	0.3
Vg	Vinton Loam	Farmland of statewide importance	Irrigated: 3s Non-Irrigated: 7s	0.2
Source: Prime and Other Important Farmlands (via USDA/NRCS Web Soil Survey)				

Capability classes are groups of capability subclasses that have the same relative degree of hazard or limitation. The risks of soil damage or limitation in use become progressively greater from Class 1 to Class 6. Subclasses are groups that describe conservation or limitations such as erosion and runoff (e), excess water (w), root-zone limitations (s), or climatic limitations (c). Below are descriptions of each land capability classification (Class and Subclass)[11] for the identified soils in Table 1.

Class

1: Soils have few limitations that restrict their use. They may be used safely for cultivated crops, pasture, range, woodland, and wildlife.

2: Soils have some limitations that reduce the choice of plants or require moderate conservation practices.

3: Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

4: Soils have very severe limitations that restrict the choice of plants, require careful management, or both.

6: Soils have severe limitations that make them unsuited to cultivation and limit their use to pasture or range, woodland, or wildlife food and cover.

7: Soils have very severe limitations that make them unsuited to cultivation and that restrict their use to grazing, woodland, or wildlife.

Subclass

(e) erosion: Soils where susceptibility to erosion is the dominant problem or hazard in their use.

(w) excess water: Soils where excess water is the dominant hazard or limitation in their use.

(s) soil limitations within the rooting zone: Soils that have limitations such as shallowness or rooting zones, stones, low moisture-holding capacity, low fertility difficult to correct, and salinity or sodium.

(c) climatic limitation: Soils where the climate (temperature or lack of moisture) is the only major hazard or limitation in their use.

[11] Land-Capability Classification. Agriculture Handbook No. 210. Soil Conservation Service – U.S. Department of Agriculture. Sep. 1961.

Furthermore, no land use conversion will occur. Specific conservation measures (see Section 5.3 and Table 11), including BMPs, are identified and are to be initiated during construction for protection of the soils listed in Table 1.

4.4 WATER RESOURCES

The definition of the Waters of the United States (WOTUS) remains ever changing. With the recent Sackett v. EPA (2022)[12], the definition undergoes another change with many ephemeral and non-permanent waters losing federal jurisdiction status. Water regions, defined by USGS, within the proposed project area boundary includes Region 13: Rio Grande Basin and Region 15: Lower Colorado Region. Figure 1 displays the USGS Hydrologic Unit Map[13].

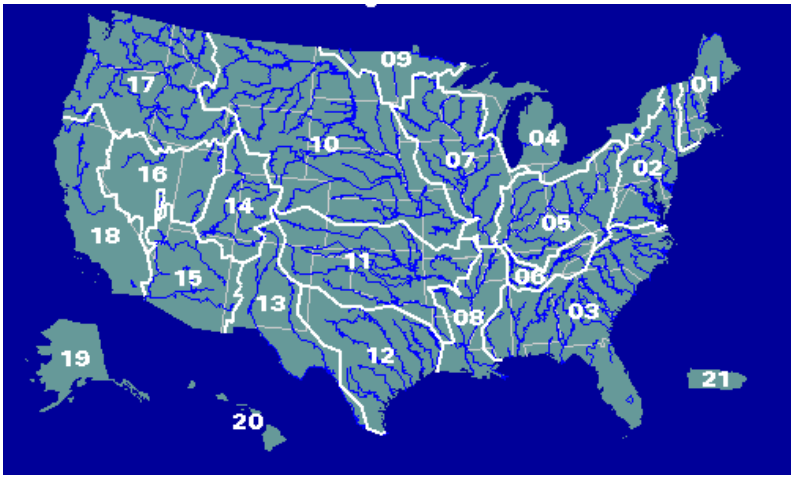

Figure 1: USGS Nationwide Hydrologic Unit Map

Descriptions for the USGS water regions within the proposed project area are as follows:

USGS Region 13 – *The drainage within the United States of: (a) the Rio Grande Basin, and (b) the San Luis Valley, North Plains, Plains of San Agustin, Mimbres River, Estancia, Jornada Del Muerto, Tularosa Valley, Salt Basin, and other closed basins. Includes parts of Colorado, New Mexico, and Texas.*[14]

USGS Region 15 – *The drainage within the United States of: (a) the Colorado River Basin below the Lee Ferry compact point which is one mile below the mouth of the Paria River; (b) streams that originate within the United States and ultimately discharge into the Gulf of California; and (c) the Animas Valley, Willcox Playa, and other smaller closed basins. Includes parts of Arizona, California, Nevada, New Mexico, and Utah.*[15]

[12] "Sackett v. Environmental Protection Agency." *Oyez*
[13] U.S. Geologic Service. *1987 USGS Water Supply Paper 2294*.
[14] U.S. Geologic Service. *1987 USGS Water Supply Paper 2294*.
[15] U.S. Geologic Service. *1987 USGS Water Supply Paper 2294*.

4.4.1 Surface Water (i.e., Lakes, Rivers, Wetlands)

Section 401 and 404 of the Federal Clean Water Act (CWA) provides the protection of wetlands and jurisdictional WOTUS, as defined by the United States Army Corps of Engineers (USACE) and the EPA. Executive Order (EO) 11990 states the provisions taken to minimize the destruction, loss, or degradation of wetlands for conservation and overall protection. Wetlands under EO 11990 include isolated and non-jurisdictional wetlands.

Managed by USFWS, the National Wetlands Inventory (NWI) provides an online mapping tool and database for identifying wetlands within a user-specified area. Utilizing the NWI, Appendix D-3 displays the wetlands identified within the boundary of the proposed project area. Two primary wetland systems were identified: Riverine and Palustrine (includes freshwater emergent wetlands and freshwater ponds). Below are descriptions of these systems, according to the Federal Geographic Data Committee (August 2013)[16]:

> **Riverine** – *The Riverine System includes wetlands and deepwater habitats contained within a channel, with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and 2) habitats with water containing ocean-derived salts of 0.5 ppt (parts per trillion) or greater. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water."*

> **Palustrine** – *The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 ppt. It also includes wetlands lacking such vegetation, but with all the following four characteristics: 1) area less than 8-hectare (or 20 acres); 2) active wave-formed or bedrock shoreline features lacking; 3) water depth in the deepest part of basin less than 2.5 m (meters) at low water; and 4) salinity due to ocean-derived salts less than 0.5 ppt.*

One location along the proposed project path crosses the Rio Grande River, within the Isleta Pueblo boundary. At this location, the method of construction will be directionally boring under the water source at approximately 27 feet depth. There will not be any dredge or fill activities in within the footprint of the Rio Grande River. Based upon the type of construction, boring activities and implementation of appropriate best management practices (found in Section 5.4), the project and project activities will not affect the natural environmental resources nor any biological resources in the vicinity. Continued coordination during the planning and construction phase at this location is critical. Based upon the proposed plan and construction methods, there should be no dredge or fill, or disturbance of wetlands or waters of the U.S. requiring 401 and 404 permitting (see Appendix D-5)

For the Section 408 permitting process, there are three locations along the path that will cross current USACE infrastructure and potential future USACE infrastructure. One location along the

[16] Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States, pp 14, 18. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.

proposed project path crosses the Rio Grande River, within the Isleta Pueblo boundary, it has been determined that a Section 408 permit will be required at the Rio Grande crossing due to infrastructure and other levee construction in forthcoming years. A Section 408 permit will also be required for crossing underneath an USACE managed flood conveyance facility in Escondida, NM. The third location will be along the pathway along the road going west out of Socorro, which is under the levee bisecting the path. The proposed project sponsor will pursue a Section 408 permit following the issuance of a FONSI. The stipulation in Section 408 permit will guide the depth of the directional boring under the water source. Coordination during the planning and construction phase at this location is critical.

4.4.2 Groundwater

4.4.2.1 USGS Gauges

The U.S. Geological Survey provides nationwide groundwater monitoring and display them in a National Water Information System (NWIS). This NWIS contains publicly available water data for wells, springs, and drains across the nation. Utilization of the NWIS, there is no presence of any USGS gauges within the proposed project area.

4.4.2.2 NM OSE Point of Diversions

According to the NM Office of the State Engineer (OSE), a Point of Diversion (POD) is a location of water diversion through means of a river, well, stream, or other water sources that utilize a form of infrastructure (including groundwater wells, water storage dams, diversion dams, and dugouts). Appendix D-4 displays the OSE PODs located within the pathway of the proposed project area. Approximately 22 PODs are within the proposed project area. Implementation of proper BMPs during construction is necessary to avoid disruption of POD functionality and longevity, see Section 5.3.

4.4.2.3 EPA Sole Source Aquifers

A Sole Source Aquifer (SSA) is an aquifer, designated by the EPA, as the sole or principal source of drinking water for a designated area that supplies at least 50 percent of the drinking water to the surrounding communities[17]. Utilization of the EPA interactive map, there is no presence of any SSAs within the proposed project area.

4.4.3 Floodplains

To reduce direct and indirect impacts to floodplains, EO 11988 – the US Water Resources Council adopted Floodplain Management on January 25, 1978. This EO directs federal agencies to assert leadership in the reduction of flood losses and losses to environmental values, avoid actions located in or adversely affecting floodplains, and to establish a process for flood hazard evaluations based on the 100-year base flood standard via National Flood Insurance Program (NFIP).

Described by the Federal Emergency Management Agency (FEMA), a floodplain is ‘any land area susceptible to being inundated by floodwaters from any source.’ Floodplains are typically located in low plain areas adjacent to water sources prone to periodic flooding during high discharge or runoff events. For example, a 100-year floodplain is an area with a 1% chance of flooding that

[17] EPA: Overview of the Drinking Water Sole Source Aquifer Program

occurs in any given year (referred to as the base flood). The floodplains identified within the proposed project area are attached as Appendix D-6.

Additionally, flood zones are geographic areas classified according to varying levels of risk, depicted in Flood Insurance Rate Maps (FIRMs). FIRMs display and describe specific flood classifications for flood management and flood insurance purposes. FEMA manages an online mapping application that displays FIRMs across the nation. Table 3 displays the FEMA Flood Zones within the proposed project area. Appendix G displays the FIRM panels identified within the proposed project area.

Table 2: FEMA Flood Zones within the Proposed Project Area

FEMA Flood Zones	Flood Zone Description
A*	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. No depths or elevations are available within these zones.
AE*	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Base floodplain elevations are present.
AO (Depth 1) *	River/stream flood hazard area, and areas with a 1% greater chance of shallow flooding each year. Areas of shallow flooding with average depths between 1.0 and 1.5 feet.
AO (Depth 2) *	River/stream flood hazard area, and areas with a 1% greater chance of shallow flooding each year. Areas of shallow flooding with average depths between 1.5 and 2.5 feet.
D	Areas with possible, but undetermined flood hazards. NO flood hazard analysis conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.
X (shaded)	Areas between the limits of the base flood and the 0.2% annual chance (or 500-year) flood. Areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile. Areas protected by levees from 1% annual chance flood.
X (unshaded)	500-Year floodplain. Area of minimal flood hazard.
Source: FEMA Flood Map Service Center	

*Special Flood Hazard Area (SFHA) within 100-year floodplain.

According to Table 3 descriptions, multiple Special Flood Hazard Areas (SFHA) are present within the proposed project area. Areas identified as a SFHA acquire special flood, mudflow, or flood-related erosion hazards displayed on the FIRM. Permits are necessary before construction or development begins within any SFHA, according to FEMA.

4.5 BIOLOGICAL RESOURCES

The proposed project traverses through 324 miles of urban and rural areas with various terrain features. These features, particularly in rural areas, provide a prime location for wildlife, plants, and associated habitats to thrive. The following subsections describe the potential biological resources within the proposed project area.

4.5.1 Threatened and Endangered Species

The Endangered Species Act (ESA) of 1973, New Mexico Wildlife Conservation Act, and other related federal, state, and tribal regulations are applicable to endangered or threatened species (including their habitats) for overall conservation and preservation. Below are USFWS classifications and respective definitions:

Endangered – Any species that is in danger of extinction through all or a sizable portion of its range. Prohibitions of Section 9 of ESA identify protection of endangered species.

Threatened – Any species which is likely to become endangered within the near future throughout all or sizable portion of its range. Prohibitions of Section 9 of ESA, consistent with protective regulations under Section 4(d) of ESA, identify protection of threatened species.

Candidate – Any species for which the USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under ESA, but for which development of a proposed listing regulation precluded by other higher priority listing activities. Prohibitions of Section 9 of ESA, identify no protection of candidate species.

Experimental Population, Non-Essential (EXPN) – An established population within its historical range under Section 10(j) of ESA to air recovery of the species. The USFWS has determined a non-essential population is not necessary for the continued existence of the species. For the purposes of consultation, non-essential populations identify as threatened species on National Wildlife Refuge and National Park land and as a proposed species on private land.

The Information for Planning and Consultation (IPaC), managed by USFWS, identifies any wildlife, critical habitats, and migratory birds present within a user-defined area. Utilization of the IPaC tool revealed the potential presence of threatened and endangered species within the proposed project area. Since almost a year passed since the release of the draft EA, an updated IPaC species list was pulled in June of 2025. No existing species were uplisted or downlisted since the original IPaC list pull and all ESA effect determinations remain valid. Table 4 identifies the species, status, potential and habitat location.

Table 3: Potential Threatened, Endangered Species within the Proposed Project Area

Species	Approximate Habitat Location(s) near the Proposed Project Area
New Mexico Meadow Jumping Mouse (E) *(Zapus hudsonius luteus)*	Wherever found within riparian communities along the Rio Grande.
Mexican Spotted Owl (T) *(Strix occidentalis lucida)*	Outside the PEN footprint along Ice Caves Rd. at a location approx. 1.29 miles north of PEN.
Southwestern Willow Flycatcher (E) *(Empidonax traillii extimus)*	Rio Grande corridor from Los Lunas to Socorro.
Yellow-billed Cuckoo (T) *(Coccyzus americanus)*	Rio Grande corridor from Los Lunas to Socorro.
Rio Grande Silvery Minnow (E) *(Hybognathus amarus)*	-Outside of PEN footprint along Broadway Blvd. near Isleta Pueblo at a location approx. 1.0 mile west of PEN. -Rio Grande corridor from Los Lunas to Socorro.
Zuni Bluehead Sucker (E) *(Catostomus discobolus yarrow)*	Outside of PEN footprint along Ice Caves Rd. in Grants, NM near a location approx. 0.34 miles SW of PEN.
Pecos Sunflower (T) *(Helianthus paradoxus)*	Outside of PEN footprint along McBride Rd. in Grants, NM near a location approx. 0.34 miles SW of PEN.
Zuni Fleabane (T) *(Erigeron rhizomatus)*	Wherever found in mountainous areas of western NM, particularly Grants, Ramah, and Zuni areas.
Mexican Grey Wolf (EXPN)	Wherever found in areas south of NM Interstate 40

(Canis lupus baileyi)	
Mexican Grey Wolf (E) *(Canis lupus baileyi)*	Wherever found in areas north of NM Interstate 40
Mexican Grey Wolf (E) *(Canis lupus baileyi)*	Within Sevilleta National Wildlife Refuge and El Malpais
Source: IPaC Resource List & Biological Assessment for the Santa Fe Indian School Pueblo Education Network (Middle Mile Broadband Project) – 2024	

E=Endangered, T=Threatened, EXPN=Experimental Population/Non-essential

Since the original IPaC pull, the Monarch Butterfly was proposed to be listed as threatened and the Suckley's Cuckoo Bumblee Bee was proposed to be listed as endangered under ESA. It is unknown when either of these proposed species would be formally listed under the ESA.

A Biological Assessment (BA) was prepared, with USFWS consultation, for the SFIS PEN Middle Mile Project which identifies species, habitat requirements, details on determination, and potential conservation measures for protection during the construction phase. The BA can be referenced in Appendix H.

4.5.2 Critical or Threatened/Endangered Habitat

The findings within the BA display there are no critical habitats associated with identified species within the proposed project area.

4.5.3 Bald and Golden Eagles/Migratory Birds

In addition to the Endangered Species Act, additional responsibilities under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act enacted for protection from potential project impacts. Minimal aerial installation may occur that has potential to impact migratory birds. Prohibited activity includes harming migratory birds and/or eagles, unless permitted by USFWS (50 CFR 10.12 and 16 USC 668(a)).

The IPaC report revealed several migratory birds potentially identified within the proposed project area, displayed in Table 5.

Table 4: Potential Migratory Birds within the Proposed Project Area

Migratory Bird	Breeding Season
Baird's Sparrow *(Ammodramus bairdii)*	Breeds elsewhere
Bald Eagle *(Haliaeetus leucocephalus)*	Oct 15 to Aug 31
Bendire's Thrasher *(Toxostoma bendirei)*	Mar 15 to Jul 31
Black Swift *(Cypseloides niger)*	Jun 15 to Sep 10
Black-chinned Sparrow *(Spizella atrogularis)*	Apr 15 to Jul 31
Black-throated Gray Warbler *(Dendroica nigrescens)*	May 1 to Jul 20
California Gull *(Larus californicus)*	Mar 1 to Jul 31
Cassin's Finch *(Carpodacus cassinii)*	May 15 to Jul 15
Cassin's Sparrow *(Aimophila cassinii)*	Aug 1 to Oct 10
Chestnut-collared Longspur *(Calcarius ornatus)*	Breeds elsewhere
Clark's Grebe *(Aechmophorus clarkia)*	Jun 1 to Aug 31
Clark's Nutcracker *(Nucifraga Columbiana)*	Jan 15 to Jul 15
Eastern Meadowlark *(Sturnella magna)*	Apr 25 to Aug 31
Evening Grosbeak *(Coccothraustes vespertinus)*	May 15 to Aug 10
Ferruginous Hawk *(Buteo regalis)*	Mar 15 to Aug 15
Flammulated Owl *(Otus flammeolus)*	May 10 to Aug 15
Golden Eagle *(Aquila chrysaetos)*	Jan 1 to Aug 31
Grace's Warbler *(Dendroica graciae)*	May 20 to Jul 20
Lesser Yellowlegs *(Tringa flavipes)*	Breeds elsewhere
Lewis's Woodpecker *(Melanerpes lewis)*	Apr 20 to Sep 30
Long-billed Curlew *(Numenius americanus)*	Breeds elsewhere
Long-eared Owl *(asio otus)*	Mar 1 to Jul 15

Migratory Bird	Breeding Season
Mexican Whip-poor-will *(Antrostomus arionae)*	May 1 to Aug 20
Mountain Plover *(Charadrius montanus)*	Apr 15 to Aug 15
Olive-sided Flycatcher *(Contopus cooperi)*	May 20 to Aug 31
Pectoral Sandpiper *(Calidris melanotos)*	Breeds elsewhere
Pinyon Jay *(Gymnorhinus cyanocephalus)*	Feb 15 to Jul 15
Red-faced Warbler *(Cardellina rubrifrons)*	May 10 to Jul 15
Rufous-winged Sparrow *(Aimophila carpalis)*	Jun 15 to Sep 30
Sprague's Pipit *(Anthus spragueii)*	Breeds elsewhere
Virginia's Warbler *(Vermivora virginiae)*	May 1 to Jul 31
Western Grebe *(aechmophorus occidentalis)*	Jun 1 to Aug 31
Source: IPaC Resource List & Biological Assessment for the Santa Fe Indian School Pueblo Education Network (Middle Mile Project) – 2024 (See Appendix H)	

4.5.4 Wetland Habitats

New Mexico soils support diverse groups of plant species across various ecosystems and landscapes ranging from desert, forestland, low plains, to mountainous regions. Ecosystems of the same type, quality, and environmental resources create aspects of an ecoregion. Multiple level III ecoregions are present throughout New Mexico including the southern Rockies (ecoregion identifier – 21) in the north, Chihuahuan deserts (24) in the south, High Plains (25) to the east, Arizona/New Mexico Plateau (22) regions to the west, Arizona/New Mexico mountains (23) in central NM.

As the EPA level increases, the ecoregion becomes more characterized and defined. Therefore, level IV ecoregions identified within the proposed project area are displayed in Appendix D-6 and described in Table 6.

Table 5: EPA Ecoregions (Level IV) within the Proposed Project Area

Level IV EPA Ecoregion	Ecoregion Description and Related Vegetation
22g: Rio Grande Floodplain	Bosque of cottonwood and willow with understories of coyote willow, NM olive, false indigo, and seepwillow widely replaced by invasive saltcedar and Russian olive.
22j: Semiarid Tablelands	Scattered juniper and pinyon-juniper woodland, with alkali sacaton, shadscale, fourwing saltbrush, mixed gramas, western wheatgrass, and some winterfat.
22k: Lava Malpais	Some grasses of blue grama and sideoats grama; shrubs of Apache plume and NM olive; some stunted pinyon pine, Douglas-fir, and ponderosa pine. Some plants are indicative of a "mesic island" i.e., moister than the land around it. Ferns may grow in small cracks in shady exposures.
22l: Plains of San Augustin	**In low areas:** alkali sacaton, fourwing saltbush, and greasewood. Some western wheatgrasses, blue grama, sand dropseed, vine-mesquite. **On higher slopes:** juniper and some pinyon.
22m: Albuquerque Basin	Sand scrub and desert grassland including black grama, sand dropseed, mesa dropseed, blue grama, galleta, sand sage, alkali sacaton, and threeawns.
23e: Conifer Woodlands	Pinyon-juniper woodlands with one-seed juniper, alligator juniper, Rocky Mountain juniper at higher elevations, pinyon pine, blue grama, junegrass, galleta, and

Level IV EPA Ecoregion	Ecoregion Description and Related Vegetation
and Savannas	bottlebrush squirrel tail. Some areas with Gambel oak, Utah juniper, big sagebrush (in Chuska Mtns.), ponderosa pine, mountain muhly, and Arizona fescue (at highest elevations). Lower and drier sites are areas of yucca and opuntia.
24a: Chihuahuan Basins and Playas	**Saline flats and alkaline playa margins:** fourwing saltbush, seepweed, pickleweed, and alkali sacaton. **Gypsum land:** gyp grama, gyp mentzelia, and Torrey ephedra. **Desert shrub land:** creosote bush, tarbush, yuccas, sand sage, viscid acacia, tasajillo, lechuguilla, mesquite, and ceniza.
24b: Chihuahuan Desert Grasslands	**Low elevations:** black, blue, and side oats grama, dropseeds, and bush muhly, with scattered creosotebush, acacias, beargrass, and cacti. **Ancient lakebeds and alluvial areas:** some black grama grass, tobosa grass, tarbush. **Mountain grassland:** side oats grama, silver bluestem, threeawns, scattered yuccas, lechuguilla, sotol, and junipers.
24f: Rio Grande Floodplain	Cottonwood-willow, velvet ash, screwbean mesquite, seep willow, alkali sacaton, skunk bush, creosote bush, and invasive salt cedar.
Source: ecologicalregions.info	

Natural vegetation within the identified ecoregions of the proposed project area must be preserved and protected from threats. BMPs are implemented in these areas, especially in locations where floodplains are present.

4.6 HISTORIC AND CULTURAL RESOURCES

The proposed project traverses through multiple municipalities and tribal communities, including areas of historic significance. Since time immemorial tribal communities ecologically stewarded American Southwest region. In each instance and interaction, the tribes have developed complex Indigenous governance systems and communities that utilize various cultural resources. Proper engagement with tribal communities has served as a cornerstone in this project to ensure acknowledgement of each tribe's connection and input is incorporated into the proposed project. Small historic towns, national monuments, national conservation areas, scenic trails, and historic trails scatter the state of New Mexico. This section examines the historic and cultural resources within the proposed project area.

NTIA will fulfill its obligation to take into account the effects of the undertaking on historic properties through the implementation of a Programmatic Agreement (PA). This PA has been developed by NTIA, in consultation with the New Mexico State Historic Preservation Office, Pueblo of Zuni, Pueblo of Isleta, Pueblo of Acoma, Navajo Nation, Advisory Council on Historic Preservation and other stakeholders, to allow for a phased process to identify, evaluate, assess, and avoid, and/or mitigate project effects on historic properties. The primary purpose of the PA is to phase Section 106 review of the project due to the proposed fiber route traversing multiple federal and state land jurisdictions. The PA stipulates a process whereby the fiber route is divided into seven phases, by land jurisdiction, and the following must be completed prior to construction:

- Each identified phase of construction shall be reviewed under a process that complies with 36 CFR 800.4 to 800.6.

- No construction of a project phase will commence until review is concluded under the terms of the PA, including the mitigation of any adverse effects to historic properties.
- Work activities associated with the project will be subject to cultural and ceremonial event schedules that will be prescribed in the work planning and installation contractor phases of the project.

Prior to the initiation for the Section 106 process and development of the PA, public outreach and general project updates have been communicated by SFIS to numerous stakeholders within the region. On February 7, 2025, letters were sent to stakeholders initiating consultation under Section 106 of the National Historic Preservation Act.

On February 10, 2025, a draft PA was sent to all consulting parties for their review and input. Comments from consulting parties were received and integrated into a revised draft PA. All consulting parties were invited to a PA meeting wherein comments and revisions to the PA were discussed. A second revision and comment period with a finalized draft PA was initiated on March 21, 2025.

The Area of Potential Effect (APE) for the SFIS fiber optic cable route includes all locations of project related ground disturbing activities and is defined as the width of the construction ROW plus any additional areas for staging or access.

As stipulated in the PA, SFIS shall conduct a Records Check of the APE to identify areas that have been previously surveyed and any previously identified historic properties within a quarter mile buffer of the APE. Special consideration is given to consult with tribal leaders and the Tribal Historic Preservation Office (THPO) for identification efforts on tribal lands as defined in 36 CFR 800.16(x) as well as the identification of Traditional Cultural Places (TCPs) and Properties of Religious and Cultural Importance throughout the entirety of the APE.

Based on the results of the Records Check, and in consultation with identified consulting parties, SFIS shall undertake additional identification measures that may include pedestrian and/or field survey. Should historic properties be identified within the APE, the Signatories to the PA have agreed on a process to apply avoidance measures to avoid adverse effects. If avoidance measures are not adequate, the PA stipulates the development of a treatment plan with proposed minimization and mitigation measures.

SFIS conducted early outreach and formal consultation with the Pueblos and their respective leadership and designed the project route in a way that best avoids culturally sensitive areas. SFIS proposes to construct fiber primarily via directional drilling, a construction method that results in minimal ground disturbance and, as such, has a low potential to affect historic properties. However, should NRHP properties be present in the APE, the PA identifies a process whereby historic properties, Traditional Cultural Places, and Properties of Religious and Cultural Importance are identified and avoided through measures that may include diverting fiber away from a cultural resource, employing aerial fiber on existing poles to avoid ground disturbance, or directionally drilling to depth that avoids archaeological deposits. .

SFIS's proposed fiber route includes tribal lands of the Pueblo of Acoma, Pueblo of Isleta, Navajo Nation, and Pueblo of Zuni. NTIA and SFIS engaged the THPOs and other formally consulted tribal leaders to determine how best to identify tribal cultural resources. Cultural resources (sites, objects, landscape, or structures) are not typically documented among tribal communities. In the event a cultural resource is identified during the implementation of the PA, NTIA will consult with the appropriate tribal authority on avoidance or mitigation measures.

As stipulated in the PA, and as a condition to the NTIA grant award, SFIS will be subject to an inadvertent discovery plan during all construction. In the event cultural resources are discovered during construction, the plan directs the construction project manager to immediately identify appropriate law enforcement authorities, NTIA, ACHP, appropriate SHPO/THPO, and federal land managing agency, if applicable, within 48 hours of the discovery.

A Class I archaeological literature review identified 164 archaeological resources in or directly adjacent to the proposed fiber alignment. This report, along with recommendations for avoidance measures and additional identification, will be consulted on by multiple parties, including the New Mexico State Historic Preservation Office (SHPO), Tribal Historic Preservation Offices (THPO), and federal and state land managing agencies. Consultation will address avoidance measures and may include additional survey or monitoring of construction.

4.6.1 Archeological Resources

Cultural preservation through formal tribal consultation and engagement and continued communication has been integrated throughout the proposed PEN project from planning through construction. Formal joint federal agency consultation meetings have occurred with the Pueblos of Acoma, Zuni and Isleta Tribal Councils and Governors in June and November 2023 as well as May 2024. Conversations will continue with Pueblo leadership throughout this project. In consideration of the previous conditions and Tribal monitoring, it is anticipated that there will not be significant impacts to cultural resources.

The NHPA of 1966 seeks to protect historic properties through a collective partnership of federal, state, local, and tribal governments. As amended through December 16, 2016, and codified in Title 54 of the United States Code, the NHPA directs federal agencies to consider the effects of any undertaking on historic properties.

A Class I archaeological literature review identified 164 archaeological resources in or directly adjacent to the proposed fiber alignment [Appendix I]. This report, along with recommendations for avoidance measures and additional identification, will be consulted on by multiple parties, including the New Mexico State Historic Preservation Office (SHPO), Tribal Historic Preservation Offices (THPO), and federal and state land managing agencies. Consultation will address avoidance measures and may include additional survey or monitoring of construction.

4.6.2 National Register of Historic Places

Established as part of the NHPA and managed by NPS, the National Register of Historic Places (NRHP) is an official collection of the nation's buildings, districts, sites, and structures of historic significance. Table 7 describes seven (7) registered historic places near or within the proposed project area, also displayed in Appendix D-7.

Table 6: Historic Properties Listed on the National Register of Historic Places within the Proposed Project Area

National Archives Catalog ID	NRHP Property Name	Listed Date	Resource Type
78001804	Huning Highlands Historic District	11-17-1978	District
75001162	Isleta Pueblo	09-05-1975	District
82003337	Salome Store	08-02-1982	Building
66000500	Acoma – National Historic Landmark (NHL)	10-15-1966	District
97001398	Route 66, State Maintained from McCarty's to Grants	11-19-1997	Structure
77847735	El Morro National Monument	10-1966	District
75002066	Halona Pueblo – Zuni	02-10-1975	District
Source: National Archives Catalog			

NOTE: Photographs included for each NRHP listing were by individuals other than NPS staff, therefore may be subject to copyright restrictions. Therefore, NRHP documents are NOT included as an Appendix item. Refer to the National Archives Catalog.

There are several identified cultural resources in or adjacent to the proposed project area that have not been evaluated for inclusion in the NRHP. A process for evaluating and determining NRHP eligibility through consultation amongst State Historic Preservation Officer (SHPO) and respective Tribal Historic Preservation Officers (THPOs) is stipulated in the PA and will be implemented prior to any construction. Should consultation result in the identification of NRHP eligible properties in the proposed project area, the PA stipulates a process for determining adverse effects and mitigating those effects, should they be determined.

4.6.3 Native American Traditional, Cultural, or Religious Resources

The significance of place, culture and lifestyle amongst the participating Pueblos remains a crucial subject of the proposed project. journey before migrating into their present-day homelands of today's Pueblos. The descendants of the Pueblos still maintain deep connections to the historic districts which they occupy encompassing historic structures, trails, cultural resources and important blessing places still utilized in the present context of preserving their cultures through story, song, pilgrimage, prayer, and traditional use. Although the project is within pre-disturbed areas, per 36 CFR Part 800, formal engagements amongst participating Tribes, federal agencies, and other cooperating agencies has been ongoing and necessary for protecting culturally significant artifacts and places, via the Section 106 process.

Throughout the Section 106 Process, THPOs and SHPO will engage in the correspondence and identification of historic and cultural properties near or within the proposed project area. Each participating Tribe (Isleta, Acoma, and Zuni) possess their respective THPO. Ensuring that the proposed route within tribal lands reflects the cultural, historical, and future uses of the tribe has served as a corner stone in the proposed project installation as well as regeneration site identification and installation. In the event a historic or cultural resource is located within the path of the proposed project, construction activities will halt and will only resume after clearance is granted by the THPO and/or SHPO, depending on location. See Section 5.6 and refer to Appendix I for Section 106 documentation and further information. The proposed project includes *tribal lands,* as defined by 36 CFR 800.16(x) of the Pueblo of Acoma, Pueblo of Isleta, Ramah Chapter

of the Navajo Nation, and Pueblo of Zuni. THPOs and other tribal leaders have been consulted on how best to identify tribal cultural resources. Cultural resources (sites, objects, landscape, or structures) are not typically documented among tribal communities. In the event a cultural resource is identified during the implementation of the PA, there will be consultation with the appropriate tribal authority on avoidance or mitigation measures.

Altering fiber construction methods or monitoring by tribal archaeologists may be employed in areas of tribal sensitivity. In addition, an inadvertent discovery plan will halt ground disturbing activities should any cultural resources be discovered during construction. The inadvertent discovery plan immediately halts construction until the appropriate parties review and consult on the findings,

4.7 AESTHETIC AND VISUAL RESOURCES

4.7.1 National Monuments and Conservation Areas

The mission of the National Park Service includes the preservation of natural and cultural resources for the enjoyment, education, and inspiration of the present and future generations. The proposed project area intersects two National Monument areas managed by the National Park Service: El Malpais and El Morro.

El Malpais National Monument – The proposed project area along Hwy. 53 (Ice Caves Rd.), southwest of Grants, intercepts the boundary for approximately 6.27 miles. The anticipated right of way through this location is 6.27 miles long and 40 feet total width. Actual disturbance occurs at a width of 10 feet of the 40-foot total width.

El Morro National Monument – The proposed project area along Hwy. 53 (Ice Caves Rd.), east of Ramah, NM, intercepts the boundary for approximately 1.51 miles. The anticipated right of way through this location is 1.51 miles long and 40 feet total width. Actual disturbance occurs at a width of 10 feet of the 40-foot total width.

Appendix F displays maps of these national monuments with respect to the proposed project. The proposed project installation involves directional drilling, trenching, and vibratory plowing, depending on site conditions. The directional drilling method causes minimal ground disturbances and allows the surrounding environment to remain unaltered in most cases. Trenching occurs in more difficult areas involving rock. To construct along long paths, vibratory plowing is the preferred method along areas of little to no geologic formations offering the quickest installation method. With proper execution of this installation method, with additional conservation measures, both El Malpais and El Morro national monuments will remain unaffected. Coordination efforts with the National Park Service will occur before and during construction activities.

4.7.2 National Scenic and Historic Trails

The National Trails System Act of 1968, as amended, establishes trails to ‘promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air,

outdoor areas and historic resources of the Nation.'[18] Through the US Congress, trails are identified within scenic areas and alongside historic travel routes.

Utilization of publicly available BLM mapping data, one National Scenic Trail (NST) and one National Historic Trail (NHT) intersect various points along the proposed project area.

4.7.2.1 Continental Divide NST

The Continental Divide NST, designated in 1978, spans approximately 3,100 miles through various ecoregions and terrain. Two (2) locations of this NST are in the vicinity of the proposed project area:

Location 1 – There are two points of intersection that occur along Ice Caves Rd. between Ramah and Grants, NM. These points occur at the following: Point 1 (approx. 34.99358, -108.037265) and Point 2 (approx. 35.006586, -108.058606). Additionally, the NST parallels the proposed project area for approximately 3.73 miles along Ice Caves Rd.

Location 2 – There is one point of intersection that occurs on the corner of E. Santa Fe Ave. and N. 1st St. (approx. 35.150353, -107.849152). Additionally, the NST parallels the proposed project area for approximately 6.6 miles along E. Santa Fe Ave. and Hwy. 117.

Directional boring and vibratory plowing are construction methodologies anticipated for these locations.

4.7.2.2 El Camino Real de Tierra Adentro National Historic Trail (NLCS 000541)

The El Camino Real de Tierra Adentro NHT (or "Royal Road of the Interior"), designated in 2000, spans approximately 404 miles and includes areas along the Rio Grande. Along the proposed project area, there are twelve (12) points of intersection. The proposed project area loosely parallels the NHT along Interstate 25 (for approx. 77 miles) from Albuquerque to Socorro, NM.

Another trail south of New Mexico named the "Magdalena Stock Driveway" was a stock trail designated in 1918[19]. This stock trail was five to ten miles wide to accommodate the feeding of large herds along the 125-mile route passing Springerville AZ, Quemado, Pie Town, Datil, and Magdalena. This trail remained one of the prominent trailing herds for livestock up until its final closure in November 1971.

Along all points of intersection for both NST and NHT, the proposed project does not intend to disrupt the natural environment, nor any businesses or operations associated with the national scenic or historic trails. The proposed project installation occurs approximately 36 inches below the surface via directional drilling method.

4.8 LAND USE

The proposed project spans across various lands from federal agencies, state agencies, local municipalities, and tribal communities. The land usages vary extensively and require prior

[18] The National Trails System Act (P.L. 90-543, as amended through P.L. 116-9, March 12, 2019)
[19] BLM/NM/GI-07-01-1220

authorization for construction on these lands. Table 2 identifies the federal cooperating agencies and respective authorizations prior to the proposed project construction.

Table 7: Federal Cooperating Agencies and Respective Authorizations

Federal Cooperating Agency	Authorization(s)
US Fish and Wildlife, DOI	**ESA Consultation:** Threatened/endangered species and migratory birds – proceeding construction clearance through known species' habitat.
US Army Corps of Engineers	**Clean Water Act (Permit):** It was determined that no Waters of the US would be impacted by the project. A Section 408 authorization will be required for crossing federally authorized levees.
Bureau of Land Management, DOI	**Right-of-way:** Authorization to perform work within the boundary of Rio Puerco and Socorro Field Offices
National Park Service, DOI	**Right-of-way:** Authorization to perform work within the boundaries of EL Morro and El Malpais National Monument
Bureau of Indian Affairs (Southern Pueblos Agency)	**Right-of-way:** Authorization to perform work within the boundaries of Southern Pueblos Agency due to utilization of BIA roads (Pueblo of Acoma and Isleta Pueblo, specifically)
Bureau of Indian Affairs (Zuni Agency)	**Right-of-way:** Authorization to perform work within the boundaries of Zuni Pueblo due to utilization of BIA roads
Bureau of Indian Affairs (Ramah Navajo Agency)	**Right-of-way:** Authorization to perform work within the boundaries of Ramah, NM. ROW requirement due to presence of various Indian trust land and allotment types in Ramah.
Federal Highway Administration (FHWA) & New Mexico Department of Transportation (NMDOT)	23 CFR 1.23 (b): Use of Highway Purposes 23 CFR 1.23 (c): Other Use or Occupancy

Upon approval of authorizations, certain phases of construction of the proposed project will commence. All coordination among federal, state, local entities and Tribes will continue throughout the duration of the proposed project. The proposed project path's ROW land crossings are provided below:

- BLM (Total Miles = approx. 11.52)
  - Socorro Field Office ~ 5.69 mi.
  - Rio Puerco Field Office ~ 5.83 mi.
- National Park Service (Total Miles = approx. 8.28)
  - El Malpais ~ 6.27 mi.
  - El Morro ~ 2.01 mi.
- BIA (Total Miles = approx. 106.89)
  - Ramah Navajo Agency ~ 4.03 mi.
  - Zuni Agency ~ 23.13 mi.
  - Southern Pueblos Agency ~ 79.73 mi.
    - Acoma Lands: 68.66 mi.
    - Isleta Lands: 11.07 mi.
- All State Lands (Total Miles = 19.60)
  - State Game and Fish ~ 0.42 mi.

  - State Lands ~ 12.55 mi.
  - Sevilleta Wildlife Refuge ~ 6.63 mi.
- Private Lands (Total Miles = 161.30)

Respective NMDOT, BIA and Pueblo owned roads will all require road ROWs to be obtained. For a listing of these roads within Pueblo boundaries, refer to Appendix L.

Appendix F includes all maps for each agency (in the order presented here).

4.9 INFRASTRUCTURE

All construction activities involved with the proposed project will occur within the corridor of existing NMDOT rights-of-way (ROW), tribal lands, federal lands, and private lands—all of which have been previously disturbed. In some locations, disturbance extends to or beyond the 36-inch depth due to prior utility installations. Site preparation activities may include limited leveling, vegetation removal, and subsurface clearing to accommodate project components.

The primary components of the proposed project include the installation of buried broadband fiber optic cable, fiber optic regeneration sites, and equipment cabinets. Three prefabricated regeneration buildings, each estimated at approximately 50 feet by 50 feet in total area, will be installed at strategic intervals along the fiber path to optimize signal strength, reliability, and network performance (see Figure 2).Additionally, fiber optic equipment cabinets—approximately 25 feet by 25 feet in area—will be installed along the route to support localized power and signal management needs. All sites have been sited within appropriate jurisdictional boundaries and are subject to applicable permitting and environmental/cultural reviews prior to construction.

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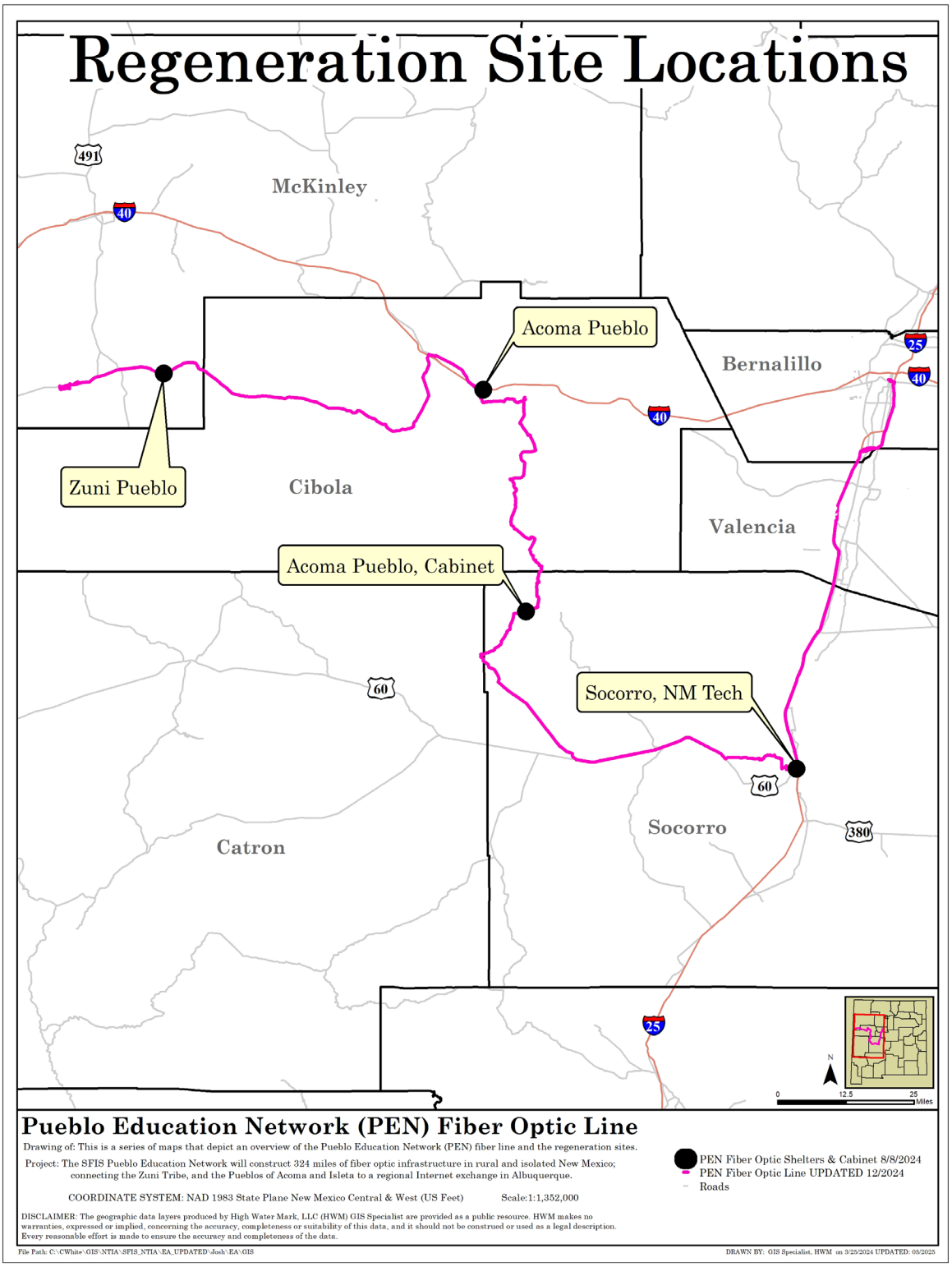

Figure 2: Regeneration Site Locations Along Proposed Project Area

To achieve proper efficiency and redundancy of the internet services, the fiber network requires regeneration of the fiber optic signal at a maximum of 120 km. (approx. 74.5 miles) between each

regeneration site. Therefore, strategically placed regeneration site locations are within tribal lands at Isleta Pueblo (near Los Lunas), Pueblo of Acoma, and Zuni Pueblo. The fourth location will be at an existing site in Socorro at the Grad Site building (which is an anchor institution within a municipality).

The installation of "hand-holes" will occur at locations every 1,750 feet along the proposed project path to provide access points for maintenance, inspection, and overall management of the fiber network. This equates to approximately 1,150 total handhole locations. These handholes are underground enclosures for the fiber optic cable, installed at the same time as boring, vibratory plowing, or trenching activities.

These components of the proposed project and respective footprint will not interrupt existing services of any community infrastructure (i.e., small-scale structures, technical facilities, or community networks) in the proximity. Coordination amongst federal and state entities and tribal communities along the proposed project area will continue throughout the timeline of the project.

4.10 SOCIOECONOMIC RESOURCES

4.10.1 Employment and Income

Currently, areas within the vicinity of the proposed project area create a cash flow for their respective economies. Job opportunities exist in the urban areas of the proposed project area in towns such as: Albuquerque, Pueblo of Isleta, Belen, Los Lunas, Socorro, Magdalena, Pueblo of Acoma, Grants, Ramah, and the Pueblo of Zuni. Appendix J-1 displays the US Census Bureau employment and income data for the proposed project area.

The proposed project is a non-profit endeavor with the sole purpose of providing internet services to underserved tribal and rural communities for educational and research purposes. Though there are areas in proximity to the proposed project area creating cash flow for their respective business or operations, it will not affect the project.

4.10.2 Demographic Trends

Within the past decade, New Mexico experienced a steady increase in population. Per a study conducted by the University of New Mexico (UNM) Geospatial and Population Studies Department, the overall population will peak in 2035 and will steadily decline[20], as displayed in Figure 3.

[20] NM Legislative Finance Committee: Spotlight (April 2021)

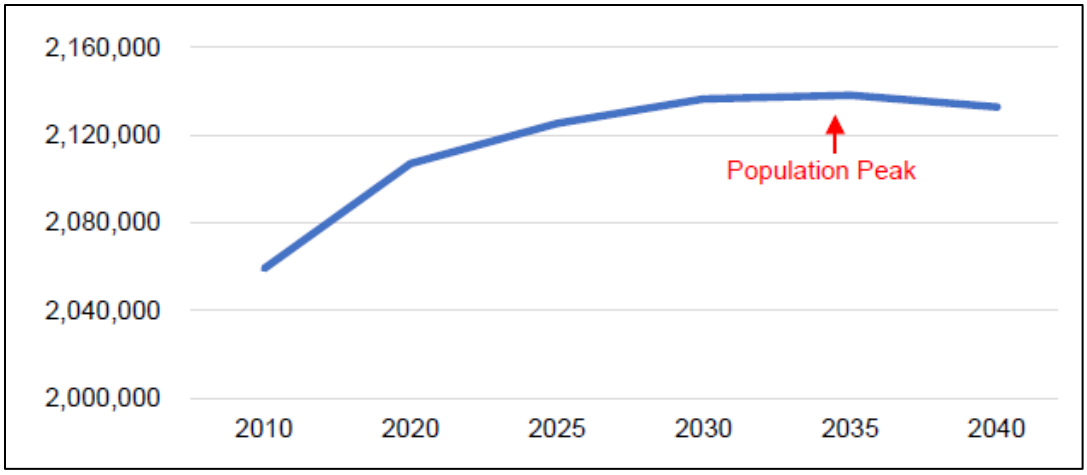

Figure 3: NM Project Population, 2010 to 2040 (UNM-Geospatial and Population Studies Department)

Potential causes for the overall plateau and subsequent decline include the number of births declining and out-migration outnumbering in-migration. While the overall population seems to plateau, the projected amount of diversity is increasing across the state. Table 8 displays this phenomenon.

Table 8: NM Population Demographics, 2010 to 2019 (UNM-Geospatial and Population Studies Department)

Demographic	2010	2019	Population Change (+/-)
African American	49,273	54,772	+ 5,499
Native American and Alaska Native	209,590	229,794	+20,207
Asian American	31,464	37,550	+ 6,086
Native Hawaiian and Other Pacific Islander	3,143	3,341	+ 198
Source: UNM, Geospatial and Population Studies Department/US Census Bureau			

Appendix J-2 displays US Census Bureau population demographic data for specific tribal communities and local municipalities along the proposed project area.

4.11 Human Health and Safety

The EPA oversees the National Priorities List (NPL), which are a list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants. Section 105(a)(8)(B) of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, requires the Hazard Ranking System (HRS) to prepare the list of national priorities, but not necessarily a determinant for priority of funding EPA remedial response actions. Two NPL sites were identified within the vicinity of the proposed project, shown in Table 9.

Table 9: EPA (Region 6) National Priorities List Sites near but not within the Proposed Project Area

National Priorities List Site	Location (Lat/Long)	Site EPA ID	Hazard Ranking System (HRS)	Status
Cal West Metals (USSBA)	34.163331, -106.920100	NMD097960272	59.37	Deleted NPL Site (deleted on 12/5/96)
Eagle Picher Carefree Battery	34.099517, -106.901239	NMD001829506	50.00	NPL Site
Source: EPA National Priorities List (NPL) Sites – by State (New Mexico)				

The installation method and location of the proposed project incorporates directional drilling, vibratory plowing, and trenching (when necessary) in areas within the existing NMDOT ROW. The proposed project area does not interfere with the outer boundary of either NPL sites listed in Table 9, nor any anticipated mitigation activities occurring at these sites. The construction activities posed by the proposed project do not introduce any factors that would negatively affect Human Health and Safety.

5 ANALYSIS OF ENVIRONMENTAL IMPACTS

This section analyzes all Alternatives (A – Proposed Action, B – Alternative Action, and C – No Action) for environmental, biological, cultural, and historic resources and potential effects within their respective pathways.

5.1 NOISE

A. Proposed Action

During installation of the proposed project, there will be an average level of construction sound from the various heavy equipment utilized for directional boring, vibratory plowing, and trenching activities. Construction sounds will only occur during regular hours of the day at a maximum of 1 to 2 days in a specific area, depending on site conditions. Residents within the following tribal communities and local municipalities will be temporarily affected: the City of Albuquerque, Pueblo of Isleta, Village of Los Lunas, City of Belen, City of Socorro, Village of Magdalena, Pueblo of Acoma, City of Grants, and the Pueblo of Zuni.

Ongoing coordination efforts throughout the construction of the project between SFIS PEN, tribal communities, and local municipalities will ensure community members are aware of the project and its potential noise disruptions. No significant impacts are anticipated.

(see also, NMDOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.14.6: Noise Abatement)

B. Alternative Action

The alternative PEN path travels through nine (9) locations such as, Zuni Pueblo, City of Grants, Acoma Pueblo, Laguna Pueblo, City of Albuquerque, Pueblo of Isleta, Los Lunas, Belen, and

Socorro. Additional coordination efforts and approvals are necessary for implementing the alternative PEN.

Potential effects on these environmental resources and considerable cooperation amongst many federal agencies, state agencies, local municipalities, and tribal communities, to which is not feasible at this point due to time constraints and funding timeline of the project. The installation of fiber optic along the alternative path poses more disruptions to environmental (water, land, and farmland), cultural, and historic resources. As a result, Alternative A better represents the overall goal and ideal timeline of the PEN installation.

C. No Action Alternative

The No Action Alternative would have no impact on noise production.

5.2 AIR QUALITY

A. Proposed Action

During the installation of the proposed project, minimal air quality impacts are anticipated. Within the proposed project area, exhaust from heavy equipment and various construction vehicles are anticipated. The following BMPs seek to preserve (as close to) normal air quality within the specific construction area along the proposed path on any given day:

- Stabilization of all active construction areas (including on-site haul roads and contractor use areas) occurs by applying water, chemical suppressants, and/or other reasonable measures to reduce dust emissions.
- The contractor would not be permitted to dispose of construction materials by burning.
- The contractor would not operate equipment and vehicles that display excessive exhaust emissions while operating, until corrective repairs/adjustments are made to reduce such emissions to acceptable levels. Unnecessary idling of diesel-powered construction equipment would be minimized.

Continued coordination amongst these local municipalities and tribal communities will occur to ensure residents are aware of the project and potential air quality issues. No significant impacts are anticipated.

(see also, NMDOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.14.5: Air Quality Requirements and Dust Abatement)

B. Alternative Action

The alternative PEN path travels through nine (9) locations such as Zuni Pueblo, City of Grants, Acoma Pueblo, Laguna Pueblo, City of Albuquerque, Pueblo of Isleta, Los Lunas, Belen, and Socorro. Additional coordination efforts and approvals are necessary for implementing the alternative PEN.

Alternative B would pose longer timeframe and distances, creating the potential for greater impacts to the environment than the preferred alternative, therefore this alternative was not selected.

C. No Action Alternative

The No Action Alternative would have no impact on the surrounding air quality.

5.3 GEOLOGY AND SOILS

A. Proposed Action

The Proposed Action will cross approximately 4,179 acres of mapped soil types within the 40-foot-wide Area of Potential Effect (APE) along the 324-mile route. This acreage reflects the full area over which potential temporary or indirect impacts could occur due to proximity to construction activities. However, the direct construction footprint will be limited to approximately 10 feet in width. Within this area, 23.1 acres of soil are classified as Prime or Important Farmland according to the USDA Web Soil Survey (WSS) and may be temporarily disturbed during installation. The project has been designed to minimize disturbance across all soil types through the use of best management practices (BMPs), avoidance of steep slopes, and restoration and reseeding upon completion of work:

- Potential land disturbances would be limited to areas identified for construction.
- Identify and avoid areas with visibly unstable slopes and local areas with potentially unstable slopes. Consider environmental factors (i.e., groundwater conditions, precipitation, slope angles, and geologic structure) that can cause overall slope instability.
- Minimize the amount of land disturbance to the best ability. If site conditions allow directional drilling, perform this method. Minimize vegetation removal when possible.
- When directional drilling occurs, properly dispose of any excess soil at an approved disposal site.
- To protect farmland areas, the implementation of silt fences and/or straw waddles in the possible event of leakage from construction equipment.
- Upon completion of construction activity, the project area site will be replanted and stabilized with approved vegetation and reseeding state and federal standards.
- Use construction BMPs properly to minimize soil erosion. BMPs depend on site-specific conditions. Appropriate BMPs for soil erosion and sediment control will be determined based on the needs of each site location.
- See Appendix K for the Weather and Climate Hazards Assessment and Mitigation Plan for SFIS PEN by 10G Consulting.
- Adoption of Invasive/Noxious Weed Management[21]
    - All surface disturbing equipment should be inspected and cleaned prior to coming onto public lands.
    - Construction sites should be monitored for the life of the project for the presence of invasive/noxious weeds. If found, the nearest BLM Field Office will be notified and determine the best method for the control of the invasive species.
    - All seeds shall be certified noxious weed free. Areas will be monitored to determine the success of revegetation, the presence of invasive/noxious weeds, and will be reseeded if necessary.

[21] BLM-NM-PL-10-03-1617. Socorro Field Office Resource Management Plan (Sep. 2010) Appendix C, Pg. 100.

B. Alternative Action

Approximately 1,179.2 acres of land would be within the 40-foot APE for a 243.24-mile Alternative Action. While the anticipated farmlands are anticipated to be a smaller footprint the Pueblo of Laguna's leaves the Alternative Action unfeasible at this time to meet grant timelines.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding land resources or any land usages.

5.4 WATER RESOURCES

A. Proposed Action

Water Resources and respective water infrastructure (identified in Appendices D-3, D-4, and D-5) within the boundaries of the proposed project will not be altered during construction. Before construction occurs, the CWA Section 408 permit from USACE will be obtained for the crossing of major waterways levees and related infrastructure. Upon approval, the construction will proceed with the utilization of BMPs and other methods as required by USACE or tribal communities. The goals of the BMPs are to protect water resources from spillage and potential contamination from construction equipment or other means. Based on the evaluation of water resources within the proposed project area, immediate BMPs identified to reduce impacts on water resources include:

- Stockpiling of construction materials will not occur in areas where they can be washed away by stormwater volumes and discharges.
- Flagging of wetland boundaries.
- Construction material should be used to backfill trenches or dispose of in a manner that will not impact waterways.
- Any spills occurring from heavy equipment or other vehicles within the identified construction zone will be cleaned up immediately and disposed of at an approved nearby facility.
- The proposed construction occurring in floodplain areas will be designed via directional boring or trenching to minimize adverse effects on all water sources (above and below ground). The project design will adhere to all federal, state, or tribal jurisdiction installation standards and BMPs to preserve water resources.
- Continued monitoring and photo documentation will be collected before, during, and after construction has occurred.
- All areas disturbed by construction are replanted and stabilized with approved vegetation through seeding, mulching, and other effective means upon completion of construction activity. Coordination on revegetation activities will occur with property/landowners.

Additionally, the proposed project does not include altering, diverting, or withdrawing water from surface or ground water sources. There would be no potential effects to water quality in the immediate vicinity, nor contributions to degradation of downstream waterbodies. In areas along the proposed project area where water is present, proper construction techniques are utilized so natural drainage patterns remain unaffected. Trenching or plowing in water features (identified

freshwater emergent wetlands, freshwater ponds, and riverine areas) is not an option; therefore, directional drilling with additional depth below the waterbed is the primary construction method in these areas. As a result, there will be no impacts to Waters of the US from the project. Depending on the location of PODs, construction methods may vary, but boring directional activities will occur at these locations. Utilization of BMPs seeks to reduce any potential effects to adjacent channels. No significant impacts are anticipated.

B. Alternative Action

The alternative path potentially poses similar disturbances on water resources when compared to the proposed path. There are 24 PODs identified within Alternative A path and similar PODS for Alternative B path, but coordination with additional tribal ROW would delay installation and risk grant funding.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding water resources.

5.5 BIOLOGICAL RESOURCES

A. Proposed Action

According to the BA prepared for the proposed project, threatened and endangered species exist within the proposed project area. Table 10 displays the effect determinations of each species, as per consultation with USFWS.

Table 10: Effect Determinations of Threatened, Endangered Species within Proposed Project Area

Species	Determination	Reasoning
New Mexico Meadow Jumping Mouse (E) *(Zapus hudsonius luteus)*	*Not likely to adversely affect*	This species' habitat occurs along rivers and streams. Directional boring will occur under the Rio Grande and will not cause disturbances to the above ground vegetation where this waterway occurs. For additional protection, construction activities will occur outside of this species' breeding season. Directional boring at the Rio Grande will occur at a location between 220 to 390 feet from the water's edge, at a depth of approximately 27 feet (below the riverbed) depending on site conditions. This is out of range of the mice burrowing hibernation location.
Mexican Spotted Owl (T) *(Strix occidentalis lucida)*	*Not likely to adversely affect*	Prior to project implementation, forest areas (if any) will be identified. If there is no presence of dense old story conifer forest areas (nesting habitat) identified within the proposed action area, there is no nesting habitat of the Mexican Spotted Owl present. Construction activities (and related noise) in known owl locations will only occur during daylight hours.
Southwestern Willow Flycatcher (E) *(Empidonax traillii extimus)*	*Not likely to adversely affect*	To prevent potential effects on this species, conservation measures and timing restrictions will occur. Construction activities and related noise will occur outside of breeding season.
Yellow-billed Cuckoo (T)	*Not likely to adversely affect*	This species' habitat occurs in wooded areas where water is present nearby. Directional boring will occur under the Rio Grande and will

Species	Determination	Reasoning
(Coccyzus americanus)		not cause disturbances to the above ground vegetation or nests where this waterway occurs. For additional protection, construction activities (and related noise) will occur outside of this species' breeding season.
Rio Grande Silvery Minnow (E) *(Hybognathus amarus)*	*Not likely to adversely affect*	Directional boring will occur under the Rio Grande. However, boring activities will occur outside of April 5 to September 1 to avoid potential impacts to the Rio Grande Silvery Minnow's spawning activities and to sensitive life stages. Nor will boring activities cause any sedimentation issues that will harm this species' habitat. Implementation of sediment control devices (such as silt fencing) to combat potential silt issues will occur.
Zuni Bluehead Sucker (E) *(Catostomus discobolus yarrow)*	*Not likely to adversely affect*	Directional boring will occur under the Zuni River. This method will not cause influxes in water velocities and conservation measures will ensure the avoidance of any sedimentation issues that will harm this species' habitat.
Pecos Sunflower (T) *(Helianthus paradoxus)*	*Not likely to adversely affect*	Identification of potential habitats (via species-specific surveys) within the proposed action area will trigger implementation of appropriate conservation measures. Specifically, directional boring techniques to avoid direct or indirect impacts to this species and/or suitable habitat will occur. Additional surveys may be necessary when the sunflower is in bloom.
Zuni Fleabane (T) *(Erigeron rhizomatus)*	*Not likely to adversely affect*	Identification of potential habitats (via species-specific surveys) within the proposed action area will trigger implementation of appropriate conservation measures. Specifically, directional boring techniques to avoid direct or indirect impacts to this species and/or suitable habitat will occur.
Mexican Grey Wolf (EXPN) *(Canis lupus baileyi)*	*Not likely to jeopardize*	The road avoidance characteristic of this species allows the proposed action to continue. Special considerations for work performed during breeding season (February to March) will occur. Construction activities occur strictly within the ROW boundary.
Source: Biological Assessment for the Santa Fe Indian School Pueblo Education Network (Middle Mile Broadband Project) – 2024		

A Letter of Concurrence from the New Mexico Ecological Field Offices was received on May 20, 2024 (Official species list updated June 2025, Appendix H) as part of official USFWS consultation. The proposed action abides by rules and regulations set forth by the USFWS, including the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. If a bald or golden eagle is encountered, any effort to move or approach it is prohibited. Additionally, the proposed project does not interfere within known critical habitat locations. No significant impacts are anticipated.

Proposed Action A includes plans for a river crossing by boring approximately 1,274 feet on the lands of Isleta Pueblo, crossing the Rio Grande. The bore depth will be between 20-30ft and will run parallel to the Interstate 25 bridge crossing on the south side. The method necessitates the use of two bore pits (approximately 5'x5'x5'). The bore pits, along with the bore entry and exit points, will be constructed in pre-disturbed areas near Hwy 147. Per USFWS IPaC planning consultation, this location does not have the potential to significantly impact wildlife, especially endangered or

threatened species and migratory birds. Analyzing two separate 5mi^2 polygons to the north and south of the original route in Proposed Action, we found no additional endangered species not previously accounted for by the USFWS in the May 20, 2024 consultation Letter of Concurrence. Appendix H includes the USFWS Letter of Concurrence, Biological Assessment, and IPaC report updated June 2025.

In the event that either the Monarch Butterfly or Suckley's Cuckoo Bumble Bee are formally listed during project construction, the NITA Environmental Program Officer made an ESA effect determination for both species. The NTIA Environmental Program Officer made a no effect determination for the Monarch Butterfly since little to no milkweed populations would exist in the more arid New Mexico road ROW. A no effect determination was also made for the Suckley's Cuckoo Bumble Bee since no known population of this bumble bee has been observed in New Mexico for multiple years.

According to the Information for Planning and Consultation (IPaC) report collected for the proposed action, the period of February through September is not ideal for general construction activities as most migratory birds in the proposed action area are breeding. Long-distant migratory species that utilize the Rio Grande valley as a movement corridor begin arriving in the early spring. They would thus be susceptible to disturbance if the riparian zones and flood plains they use as refueling habitat were to be under active construction. Similarly, bird species that breed in the bosque would fail to establish, or abandon, breeding territory adjacent to active construction sites. The limited disturbance of habitat is only during the active construction phases, and built infrastructure will not have long-term impacts on habitat quality.

With properly executed conservation measures described in the BA, there will be no effects to the species nor respective habitats. Some immediate conservation measures during the construction phase of the proposed project include:

- All work within the specific construction area along the proposed path on any given day would cease if any federally listed species were observed by the Contractor within the project boundary. Depending on the location where the species was observed, the USFWS and/or tribal officials would be notified immediately.
- Application of conservation measures identified in the BA for migratory birds and threatened and endangered species would be followed and appended to construction documents.
- Contractors would be instructed not to disturb or disrupt wildlife species and their respective habitats. There will be continued monitoring by the contractor for federally listed species and habitats surrounding the construction site will occur.
- Contractors would be instructed to exercise respect and care for the surrounding environment. The operations will not create unnecessary destruction, scarring, or defacing of natural surroundings of the construction site.
- Implementation of erosion and sediment control measures for protection of species during construction activities.

- SFIS will work with NPS to broadcast an NPS specific seed mix for revegetation purposes across El Malpais and El Morro National Monuments.

B. Alternative Action

An IPaC report was collected for the alternative path. This report displayed similar species and migratory birds identified in the proposed project:

- Five (5) additional threatened/endangered species are found in the alternative path:
  - Penasco Least Chipmunk (*Tamias minimus atristriatus*)
  - Rio Grande Cutthroat Trout (*Oncorhynchus clarkia virginalis*)
  - Chupadera Springsnail (*Pyrgulopsis chupaderae*)
  - Socorro Springsnail (*Pyrgulopsis Neomexicana*)
  - Kuenzler Hedgehog Cactus (*Echinocereus fendleri var. kuenzleri*).
- Two (2) additional migratory birds are found in the alternative path:
  - Black Rosy-finch (*Leucosticte atrata*)
  - Brown-capped Rosy-finch (*Leucosticte australis*)
- The alternative path does NOT include two (2) fish and one (1) bird identified in the proposed project:
  - Loach Minnow (*Tiaroga cobitis*)
  - Spikedace (*Meda fulgida*).
  - Red faced Warbler (*Cardellina rubrifrons*).

More importantly, the alternative path intersects known critical habitats for three (3) species (Rio Grande Silvery Minnow, Southwestern Willow Flycatcher, and Yellow-billed Cuckoo) at similar locations as Alternative A, along the Rio Grande.

This alternative path poses similar disturbances to endangered species AND critical habitats, when compared to Alternative A. However, engagement with Laguna Pueblo requires consent and may cause delays to funding timelines. Therefore, this is not a feasible option currently for the SFIS PEN.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding biological resources.

5.6 HISTORIC AND CULTURAL RESOURCES

A. Proposed Action

The proposed project anticipates traveling through multiple federal, state, local municipalities, and tribal communities. After review, there are six (6) NRHP locations (4 districts, 1 building, 1 structure) within the proposed project area. The installation of buried fiber in road ROW will not affect these above-ground NRHP locations. Consultation with tribes served by the proposed project began early in the design process. The proposed fiber alignment was designed in consultation with tribal leaders within each Pueblo to best avoid historic and cultural resources.

Additional cultural resources consultation and identification will be undertaken on the entirety of the proposed project through a process stipulated in a Programmatic Agreement (Appendix I). A Programmatic Agreement (PA) was considered appropriate for the proposed project as the fiber route includes multiple land jurisdictions and permitting complexities and effects on historic properties could not be fully determined prior to approval of the proposed project. A Class I survey has identified historic properties and cultural resources that may be eligible or are unevaluated for the NRHP in or directly adjacent to the fiber alignment. A process is in place, through the PA, to evaluate the resources and avoid them, should they be considered historic properties that may be affected by the proposed project. Effects to historic properties and cultural resources will be avoided through project redesign or other mitigating measures. In the event a cultural resource is discovered during construction, an Inadvertent Discovery Plan (IDP) is triggered and the THPO and/or SHPO (depending on where resource was identified) will be notified. After the notification, the THPO/SHPO will determine the effects the project will have on the cultural resource. IDPs will meet the process and standards of federal land managing agencies, should an inadvertent discovery take place on federally managed lands. *(see also, NMDOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.14: Contractor's Responsibility for Environmental and Cultural Resource Protection)*

B. Alternative Action

After analysis, Alternative B would follow similar stipulations as delineated in the Programmatic Agreement, and fiber installation measures would be like the Proposed Action but receiving consent by the Pueblo of Laguna to adhere to grant period of performance and delay installation.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding historic or cultural resources.

5.7 AESTHETIC AND VISUAL RESOURCES

A. Proposed Action

Within the path of the proposed project, there are two (2) national monuments and (2) national scenic/historic trails. The construction methodology (directional drilling) and installation of the proposed project will not cause significant impacts to the operations of these park services. This proposed project area length is 324-miles with a width of 20-feet from the centerline of the broadband fiber line (40-feet total width). Anticipated potential disturbance occurs within 10 feet of the 40-feet total width.

The proposed project introduces immediate, short-term impacts to the environment, depending on construction methodologies. This is mitigated through revegetation processes according to NMDOT standards and regulations. Class C (Hydroseeding) will be the process during revegetation. The proposed project area crosses the following NMDOT Revegetation Zones: 1 (NM Plateaus and Mesas) and 5 (Southern Desertic Basins, Plains, and Mountains).[22] These zones dictate the seed mixes utilized for revegetation. This revegetation process will occur after the installation of the PEN (both conduit and fiber line) and will continue throughout the rest of the

[22] NM Department of Transportation. *Revegetation Zones - Feature Layer*. 2021

project timeline (approximately 2 years). Immediately after the land has been disturbed for conduit installation, there is a period where the soil is visibly disturbed. However, after both the conduit and fiber line are installed, the revegetation process will occur immediately to mitigate any visual resources. In areas where boring occurs, scarring (if any) will be minimal and only at the bore pit locations. Areas of trenching and plowing, it is anticipated the revegetation process will heal any scarring on the lands. All construction activities are confined to the defined boundaries (40-feet total width and 324-mile length). Ongoing monitoring will occur to identify if any visual resources are affected throughout the project timeline[23].

It is understood there are traditional activities that occur during specific times of the year. The construction of the proposed project will take this into account and work outside of these traditional activities.

(see also, NMDOT Standard Specifications for Highway and Bridge Construction (2019) – Section 632: Revegetation)

B. Alternative Action

There are no national monuments nor national scenic and historic trails within this alternative path. Therefore, no aesthetic and visual resources will be affected.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding aesthetic and visual resources.

5.8 LAND USE

A. Proposed Action

For areas within Federal Cooperating Agency (FWS, BLM, BIA and NPS) lands, prior ROW authorization will be secured prior to commencement of construction. All coordination among federal, state, local entities, and tribal communities will continue throughout the duration of the proposed project. At the time of federal NEPA review, it is unknown the actual duration of the ROW lease per jurisdiction, but would be anywhere from 10-30 years. Negotiations will occur with respective land management agencies on the ROW lease duration during permitting. No significant impacts are anticipated.

B. Alternative Action

The Alternative Action B requires the proposed long-haul fiber optic cable and related hand holds to be installed within Highway 53 to reach Zuni Pueblo, a major participating Indian Tribe supporting the project. Alternative Action B will be installed within the NMDOT ROW easement that bisects NPS boundaries in El Morro and El Malpais national monuments with similar impacts to the Proposed Action. Moreover, outreach to Laguna Pueblo would prove to be costly and extend project installation as they are not willing participants in the project. The additional ROW approvals for tribal communities like Pueblo of Laguna reduces the consideration of this alternative.

[23] BLM-NM-PL-10-03-1617. Socorro Field Office Resource Management Plan (Sep. 2010) Appendix D, Pg. 115.

C. No Action Alternative

The No Action Alternative would have no impact on surrounding land use.

5.9 INFRASTRUCTURE

A. Proposed Action

The proposed project (which includes the broadband fiber network cable and associated infrastructure) will provide high-speed internet services to primarily underserved tribal and rural communities. The associated infrastructure includes fiber optic regeneration sites, cabinet sites and hand-holes.

There will be three (3) fiber optic regeneration sites, and one (1) cabinet site locations located along the length of the proposed project, at a maximum distance of approximately 120 km. (~74.5 miles). Two regeneration and one cabinet locations require a new building for housing all the cables and electrical network components. The Pueblo of Acoma will have one regen site and one cabinet site, and Zuni Pueblo will have one regeneration site. These new buildings will be within the proposed project area footprint. The third regeneration site location will be housed in an existing building in Socorro, NM (New Mexico Tech Grad Site).

Hand-holes will be placed at every 1,750 feet (approx.) along the length of the proposed project, depending on the site characteristics. These hand-holes provide access points for maintenance and inspection purposes. The installation requires minimal excavation for the dimensions of the hand-hole, within the boundaries of the proposed project area footprint.

The installation of the proposed project (broadband fiber network cable and associated infrastructure) would not create any hazardous waste that could affect surrounding communities or natural resources. The outcome of the installation is to provide a more effective, efficient, and reliable internet service for underserved tribal communities.

B. Alternative Action

Regeneration site locations are to be determined for the alternative path. Engagements, agreements, and potential payment to landowners of the regeneration site location are necessary prior to construction. The fiber optic signal maximum distance of 120 km. (~74.5 miles) will remain the same to retain the efficiency and performance of the internet provided. Additionally, the hand-hole distance will remain the same at 1,750 feet depending on site conditions.

Determining prospective regeneration site locations and engaging and potentially providing compensation to landowners for use of land likely requires more time and funding to an already strict project timeline and funding source. There is a possibility that costs associated with installation of regeneration sites and handholes will be higher than costs of Alternative A. Due to these reasons, this alternative is not feasible at this time.

C. No Action Alternative

The No Action Alternative would have no impact on any existing or proposed infrastructure resources of tribal communities and local municipalities.

5.10 SOCIOECONOMIC RESOURCES

A. Proposed Action

The proposed project would create positive effects from the introduction of high-speed broadband internet to disadvantaged and underserved tribal communities and anchor institutions along the proposed project area. It is anticipated this proposed project will provide high-speed internet services to support projected population increases and employment growth in the long-term. In the short term, the proposed project will stimulate local and tribal economies with projected potential benefits:

- Provide employment research, training, and opportunities at the educational facilities connected to the SFIS PEN.
- Education opportunities for community members.

The accessibility to the proposed high-speed internet services within the identified underserved tribal communities would assist job creation and long-term economic growth and future opportunities for tribal members.

B. Alternative Action

There are potential positive effects to the tribal communities and anchor institutions along the alternative path. Longer time periods to achieve permitting would prevent installation. The goal of the PEN is to provide as many underserved tribal communities accessibility to high-speed broadband internet services by grant timelines.

C. No Action Alternative

The No Action Alternative would have a negative impact on the socioeconomic resources of tribal communities and local municipalities due to the lack of educational opportunities. Tribal community members and anchor institutions would operate as is, without high-speed internet accessibility.

5.11 HUMAN HEALTH AND SAFETY

A. Proposed Action

From Table 9, there are two NPL sites (one deleted NPL site) identified near but not within the proposed project area. According to the EPA, the Cal West (deleted) NPL site possesses no unacceptable human exposure pathways and was determined the site is under control for human exposure.[24] Additionally, the Eagle Picher Carefree Battery NPL site possesses no unacceptable human exposure pathways and was determined the site is under control for human exposure.[25] Therefore, alternative would have no impact on human health and public safety.

There are no hazardous substances or any factors that would generate adverse health issues for community members within the proposed project area. During construction, factors such as falling, tripping, construction equipment failure, or natural wildlife predators will temporarily pose an

[24] U.S. Environmental Protection Agency. *Superfund Site: Cal West Metals (USSBA) - Health & Environment.*
[25] U.S. Environmental Protection Agency. *Superfund Site: Eagle Picher Carefree Battery Socorro, NM - Health & Environment.*

issue for workers within the proposed project area. After construction is completed, there will be no threats or potential residual effects to human health and safety. Traffic management plans will be implemented, as needed, to ensure worker and pedestrian safety. Additionally, the contractor will coordinate with the New Mexico 811 system to determine if existing utilities are within the proposed project area.

(see also, NMDOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.11: Environmental and Cultural Resources Approval, Hazardous Materials)

B. Alternative Action

The alternative path would be within existing NMDOT ROW areas but additional outreach and coordination with tribes for ROW permits would are necessary for the safety of the public and the construction workers involved.

C. No Action Alternative

The No Action Alternative would result in negative impacts to human health and safety of tribal communities and local municipalities due to lack of telehealth and emergency service opportunities.

5.12 CUMULATIVE IMPACTS

Upon careful review and evaluation there are no significant impacts on the following resources: land surface, vegetation, wildlife, surface water, groundwater, wetlands, air quality, soils, and cultural resources will be addressed in the Programmatic Agreement.

There are anticipated positive impacts on socioeconomic conditions and health and safety for the tribal communities and local municipalities because of the proposed action.

Potential foreseeable impacts to the proposed project include the unexpected discoveries of culturally or historically significant resources along the project path during construction activities. Overall, there are no major impacts anticipated that affect the natural resources and surrounding environment. To minimize any potential impacts to the resources mentioned, mitigation measures are suggested and summarized in Table 11.

Table 11: Potential Mitigation Measures for Proposed Project

Resource	Mitigation Measure
Noise	Construction activities will occur during (normal) peak hours of the day. BMPs mandated by federal, state, local, or tribal regulations will be followed. If construction noise becomes an issue to community members, the contractor would seek other means to perform the work with minimal noise production by implementing portable acoustic barriers, turn off equipment not being used, or locate any stationary construction equipment far from noise-sensitive properties.
Air Quality	Use of dust abatement techniques on active construction areas (primarily areas that are unpaved and unvegetated) will occur by use of water, chemical suppressants, and/or reasonable measures during the construction phase. The contractor will not operate equipment and vehicles that show excessive exhaust emissions until corrective repairs or adjustments are made to reduce emissions to acceptable levels. The contractor or authorized personnel may not dispose of construction materials by burning. Unnecessary idling of construction equipment is minimized.
Land Resources	BMPs mandated by federal, state, local, or tribal regulations will be followed. Areas with unstable slopes and other site conditions causing slope instability will be identified and avoided, if possible. Potential land and soil disturbances would be limited to areas identified for construction. For protection of farmland areas, implementation of silt fences and/or straw waddles are necessary in the possible event of construction equipment leakage.
Water Resources	Implementation of erosion control measures (straw waddles, silt fences, etc.) during construction activities. Any spills occurring from construction equipment during construction activities will be immediately cleaned up with spoils disposed of at an approved facility. Wetland boundaries will be flagged, as appropriate.
Biological Resources	During the construction phase, there will be consistent monitoring of wildlife and vegetation by the Contractor to ensure threatened/endangered species are not harmed. All work in the immediate work area would cease if any federally listed species were observed; the USFWS and/or tribal officials would be immediately notified. Once USFWS and/or tribal officials clear the area, construction will ensue. All areas visibly disturbed by construction activities shall be replanted and stabilized with an approved seeding mix.
Historic and Cultural Resources	During construction within NPS lands (national monument and conservation areas), BLM lands (scenic and historic trails), and near NRHPs, continued communication among various agencies, contractors, and project leads are crucial for successful implementation of the proposed project and preservation of historic and cultural resources. If a cultural resource is identified within the work area, the corresponding land-management agency and either the THPO or SHPO will be notified (depending on the location the cultural resource was found) and construction activities will halt. Once cleared by the land-management agency, THPO, SHPO, or both, construction will proceed. Refer to Section 106 documentation in Appendix I. If an inadvertent discovery of a cultural resource occurs, depending on location discovered, construction activities will halt until the cultural monitor can review the resource. Work commences after being cleared by the cultural monitor.

Resource	Mitigation Measure
Aesthetic and Visual Resources	During construction activities, the roadways and work areas will remain clean and clear of trash material. Work conducted within NPS areas will be coordinated ahead of time to avoid business operations to the best possible extent. Ongoing monitoring will be occurring to identify if any visual resources are affected.
Infrastructure	During installation of regeneration sites and hand-holes, the proposed sites will always be maintained and clear of debris and trash material. If necessary, revegetation activities will occur after installation, if land disturbances are clearly visible.
Socioeconomic Resources	The proposed project seeks to minimize the number of businesses affected during construction activities. Businesses will be notified (to the earliest extent) possible of construction activities occurring in their area.
Human Health and Safety	There will be no release of fuels, paints, oils, hydraulic fluids, or other hazardous materials onto soils or nearby water sources. Additionally, the proposed project will adhere to relevant OSHA regulations cited in the NMDOT Standard Specifications for Highway and Bridge Construction (2019).

6 APPLICABLE ENVIRONMENTAL PERMITS AND REGULATORY REQUIREMENTS

This EA is prepared pursuant to NEPA (1969). Additionally, the proposed project is "covered" under Title 41 of the Fixing America's Surface Transportation (FAST) Act (FAST-41). FAST-41 improves the timeliness, predictability, and transparency of the federal environmental review process and is tracked on the federal permitting dashboard. Table 12 lists all federal, state, and local regulatory requirements for the proposed PEN project. As described in Section 3.2, project phasing to meet NHPA Section 106 and ROW requirements can be identified in Appendix A-1.

Table 12: Potential Applicable Statutory, Regulatory, and Other Requirements

Potentially Applicable Requirement	Relevant Project Information
All Resources	
National Environmental Policy Act (1969) 42 USC § 4321 et seq.	The National Environmental Policy Act of 1969 requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. The proposed project is undergoing review under NEPA; this Environmental Assessment seeks to fulfill the NEPA requirements.
Vegetation, Wildlife, and Fish	
Endangered Species Act (1973) 16 USC § 1531 et seq.	The Endangered Species Act provides a program for the conservation of threatened and endangered wildlife, plants, and habitats. Particularly, Section 7 of the ESA, any federal agency that authorizes, funds, or conducts an action must ensure that the action is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat.
Bald Eagle and Golden Eagle Protection Act (1940) 16 USC § 668-668d	The Bald and Golden Eagle Protection Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport export or import, at any time or any manner, any bald eagle … [or any golden eagle], alive or dead, or any part (including feathers), nest, or egg thereof."
Migratory Bird Treaty Act (1918) 16 USC § 703-712	The Migratory Bird Treaty Act prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by USFWS.
DOI Secretarial Order 3206 (1977): American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act	Federal departments will carry out their responsibilities under the Act in a manner that harmonizes the Federal trust responsibility to tribes, tribal sovereignty, and statutory missions of the Departments, and that strives to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species, to avoid or minimize the potential for conflict and confrontation.
Waters, Wetlands, and Floodplain Protection	
Clean Water Act (1972) 33 USC § 1251 et seq.	Establishes the framework for regulating discharges of pollutants into the WOTUS and regulating quality standards for surface waters unless a permit is obtained. Section 401: Issuance of a permit to conduct activity that may result in discharge to WOTUS. Section 404: Issuance of a permit to discharge dredge or fill material into the WOTUS, including wetlands.
Section 14 of the Rivers and Harbors Act of 1899, which has since been amended several times, and is codified at 33 U.S.C. 408	The US Army Corps of Engineers (USACE) Section 408 program allows another party, such as a local government, company, or individual, to alter a USACE Civil Works project. The Section 408 program verifies that changes to authorized USACE Civil Works projects will not be injurious to the public interest and will not impair the usefulness of the project.
Floodplain Management Executive Order 11988 (1977)	This Executive Order directs federal agencies to 1) assert leadership in reducing flood losses and losses to environmental values via floodplains, 2) avoid actions located in or adversely affecting floodplains, 3) take action to mitigate losses, and 4) establish a process for flood hazard evaluation based upon the 100-year base flood standard of the NFIP.

Potentially Applicable Requirement	Relevant Project Information
Protection of Wetlands Executive Order (1977) 11990	This Executive Order includes the following policy directives: 1) avoid long and short-term adverse impacts associated with the destruction or modification of wetlands, 2) avoid direct/indirect support of new construction in wetlands, 3) minimize the destruction/loss/degradation of wetlands, 4) preserve and enhance the natural and beneficial values served by wetlands, and 5) involve the public throughout the wetlands protection decision-making process.
Air Quality and Greenhouse Gases	
Clean Air Act (1990) 42 USC § 4701	A comprehensive federal law regulating air emissions from stationary and mobile sources. The CAA authorizes the EPA to establish the National Ambient Air Quality Standards (NAAQS) for protecting public health and welfare through regulating emissions of hazardous air pollutants.
Executive Order 13990 (2021)	This Executive Order includes provisions designed to reverse federal actions performed by the previous administration and to recommit the US in combatting climate change. Applicable provisions include 1) directing federal agencies to review and, if necessary, revise or suspend regulations and policies that may hinder environmental protection, or public health, 2) establishing a review process to identify actions that may disproportionately affect disadvantaged communities, and 3) directing federal agencies to ensure that their actions are based on the best available science and data.
Cultural and Historic Resources	
National Historic Preservation Act (1966), inclusive of Section 106 54 USC § 306108 et seq.	The National Historic Preservation Act establishes a partnership between the federal government and state, tribal, and local governments that is supported by federal funding for preservation activities. The Act also created the Advisory Council on Historic Preservation to (ACHP) address historic preservation issues. Section 106 of the NHPA requires federal agencies to consider the impact of their actions on historic properties and provide the ACHP with an opportunity to comment on projects before implementation.
Noise, Public Health, and Safety	
Noise Control Act (1972) 42 USC § 4901 et seq.	The Noise Control Act of 1972 establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Act also serves to 1) establish a means for effective coordination of Federal research and activities for noise control, 2) authorize establishment of Federal noise emissions standards for products distributed in commerce, and 3) provide information to the public respecting the noise emission and noise reduction characteristics of such products.
Spill Prevention Control and Countermeasures Rule (1973) 40 CFR 112	Under the authority of the Clean Water Act, the SPCC Rule sets forth requirements for: the prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities. The goal of the SPCC Rule is to prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil through SPCC planning and establishment of procedures, methods, and equipment requirements.
Comprehensive Environmental Response, Compensation, and Liability Act (1980) 42 USC § 9601 et seq.	The Act provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Through CERCLA, EPA was given the authority to seek out the parties responsible for any release and assure their cooperation in the cleanup.

Potentially Applicable Requirement	Relevant Project Information
Resource Conservation and Recovery Act (1976) 42 USC § 6901 et seq.	The Act gives the EPA authority to control hazardous waste from "cradle to grave," including generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA sets the framework for the management of non-hazardous waste as well. Most of the compliance monitoring responsibility is delegated to the states and local authorities.
Environmental Justice	
Environmental Justice Executive Order (1994) 12898	This Executive Order established the responsibility of federal agencies to identify and focus efforts on the environmental and human health effects of federal actions on minority and low-income populations.

7 CONSULTATION/ENGAGEMENT

Table 13 below describes the necessary consultations/engagements during the planning phase of the SFIS PEN Middle Mile project.

Table 13: Federal Entity Consultation and Tribal Engagement

Agency and Name	Consultation
Department of Interior Federal Bureaus (BLM, FWS, NPS, BIA)	Bi-weekly update meetings from 2023 – 2025
US Fish & Wildlife Service – NM Ecological Services	Section 7 Consultation
US Fish & Wildlife Services – Sevilleta National Wildlife Refuge	Permitting no longer needed due to NMDOT Right-of-way authority
Bureau of Land Management	Permitting Needs Discussion
National Park Service	Pre-Application meeting/Permitting Needs Discussion
BIA (Zuni Agency, Southern Pueblos, Ramah Navajo)	Initial Tribal Consultations with Ramah Navajo were declined. In compliance with NHPA Section 106 PA, engagements occurred in 2025. Additional ROW engagements and Authorization needed.
NTIA & Federal Agencies Consultation with Pueblo of Acoma	Tribal consultation with the Pueblo of Acoma discussing project overview and respective permitting. Tribal Engagements occurring June 2023, November 2023, and May 2024.
NTIA & Federal Agencies Consultation with Pueblo of Isleta	Tribal consultation with the Pueblo of Isleta discussing project overview and respective permitting. Tribal Engagements occurring June 2023, November 2023, and May 2024.
NTIA & Federal Agencies Consultation with Pueblo of Zuni	Tribal consultation with the Pueblo of Zuni discussing project overview and respective permitting. Tribal Engagements occurring June 2023, November 2023, and May 2024.

8 PUBLIC COMMENT

NTIA, BLM, BIA Zuni, Southern Pueblos and Navajo Ramah Agencies, FWS, NPS, USACE, FHWA and EPA conducted a 30-day public comment period for the draft EA in accordance with applicable federal guidance in 2024. Public notice was placed in the Albuquerque Journal, a local newspaper of general circulation. The notice of the proposal and EA was also posted on NTIA's website for national exposure. The notice described the proposed project and comment process and provided guidance on where to view the document and federal points of contact. The comment period began on June 15, 2024, and concluded on July 14, 2024. No public comments were received by the NTIA, BLM, BIA Zuni, Southern Pueblos and Navajo Ramah Agencies, FWS, NPS, USACE, FHWA and EPA.

9 REFERENCES/FOOTNOTES

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10 APPENDICES

A: Proposed Action and Alternatives (Maps)
- A-1: Alternative A – Proposed Action & Phasing Matrix
- A-2: Alternative B – Alternative Considered

B: Other Service Provider and Service Area for Zuni, Ramah, and Grants
C: Proposed Project Area via Public Land Survey System (PLSS)
D: Compiled Maps and Data of Various Resources within Proposed Project Area
- D-1: Geologic Features within the Proposed Project Area
- D-2: USFWS NWI Wetlands within the Proposed Project Area
- D-3: NM OSE POD Locations within the Proposed Project Area
- D-4: 100-Year Floodplains within the Proposed Project Area
- D-5: EPA Level IV Ecoregions Identified within the Proposed Project Area
- D-6: National Register of Historic Places (NRHP) within the Proposed Project Area

E: Custom Soil Resource Report via NRCS Web Soil Survey
F: Federal Cooperating Agency (NPS, BLM, BIA) Maps
G: Flood Insurance Rate Map Data within the Proposed Project Area via FEMA National Flood Hazard Layer
H: USFWS Section 7 Consultation, Biological Assessment for SFIS Pueblo Education Network, IPaC Report
I: Section 106 – Programmatic Agreement
J: US Census Bureau Information for the Proposed Project Area
- J-1: Employment and Income
- J-2: Demographics

K: Weather and Climate Hazards Assessment and Mitigation Plan for SFIS PEN by 10G Consulting
L: Right-of-Way and Permitting Applications