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Environmental Assessment

Santa Fe Indian School Pueblo Education Network

Middle Mile Project – New Mexico

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

Participating Agencies:
Bureau of Indian Education
New Mexico Department of Transportation
Pueblo of Acoma
Pueblo of Isleta
Pueblo of Zuni

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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
NAAQS	National Ambient Air Quality Standards
NAID	National Archives Identifier
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMCRIS	New Mexico Cultural Resources Information System
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
PLSS	Public Land Survey System
SFIS	Santa Fe Indian School
SHPO	State Historic Preservation Officer
SSA	Sole Source Aquifer
SWAP	State Wildlife Action Plan
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 have been completed by the Government Accountability Office (GAO-18-630, GAO-18-682, GAO-19-134T, and GAO-22-104421) relating to tribal broadband. 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 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) construct a Middle Mile Fiber Optic Network, and 2) connect 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 estimated $75,800,042.00 ($44.42 per foot – with contingency), comprised of construction costs, performance bonds, project engineering, relevant permits, and environmental assessments/reviews. Although, 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!

As described throughout this Environmental Assessment (EA), no significant impacts on air quality, land, water, biological, human health and safety, and historic/cultural resources are identified. 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 (Bureau of Land Management (BLM), US Fish and Wildlife Service (USFWS), National Park Service (NPS), Bureau of Indian Affairs (BIA). US Army Corps of Engineers (USACE), New Mexico Department of Transportation (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 Santa Fe Indian School (SFIS) Pueblo Education Network (PEN) Middle Mile Project proposes to:

- Connect NM tribal communities using cost-effective regional approach.
- Increase tribal participation in 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.
- 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 connect 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 line with appropriate infrastructure (regeneration sites 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.

The Proposed Action pathway will encompass a 'buffer zone' for protection of various natural, environmental, historical and cultural resources. This proposed project area is defined as: the total length of the PEN (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. This EA reviews and evaluates the entirety of the proposed project area, shown in Appendix A-1.

The proposed project area utilizes New Mexico Department of Transportation (NMDOT) right-of-way (ROW) within BLM lands, USFWS lands, state highways, El Morro and El Malpais National Monuments, BIA Southern Pueblo Agency, BIA Ramah Navajo Agency, and BIA Zuni Agency. Consultations and required permitting are obtained during the planning processes and before construction occurs. 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 be confined to the proposed project area (40 ft total width and 324 miles long).

Four (4) regeneration sites are proposed within the project area footprint at the following locations: 1) location near the southern border of Isleta Pueblo near Los Lunas, 2) New Mexico Tech Grad site location (already established – fiber installation required but no building structure necessary), 3) location within Acoma Pueblo on the corner of Anzac Rd. and Airport Rd., and 4) location in Zuni Pueblo along Hwy 53 across BIA-12. Regeneration sites are locations that seek to boost or amplify fiber signals to maintain data transmission quality. These sites include a 10'x12' prefabricated building made of concrete that provides a location for fiber optic electronics. Consultations and approvals will be obtained for these proposed regeneration site locations.

The purpose of fiber optic regeneration sites are broadband shelters that provide efficiency, performance, and enhance data signals of the proposed project where two ends of the fiber optic line are spliced together. The regeneration sites have an approximate footprint of 50 feet (length)

by 50 feet (width) and sit on a concrete foundation, connected to local electricity and are enclosed with a chain link fence. Construction of a regeneration site requires site preparation including removal of vegetation, grading, tamping, trenching, and concrete slab installation adhering to NM DOT and FHWA specifications dependent on rights-of-way jurisdiction. These sites allow for regeneration of fiber optic signals along the full length of the proposed project. The selection of regeneration sites was selected on pre-disturbed municipal areas and authorized development areas on tribal lands with minimal vegetation and geological issues.

Additionally, connection points called 'hand-holes' are placed every 1,750 feet (approximately), which allow access for maintenance of the fiber optic and storage for future potential cable damage and repair efforts.

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

The implementation of an inadvertent discovery plan and cultural monitors are precautions implemented while performing the above-mentioned installation methods near known cultural resources and historic structures. It is understood little vibration and/or seismic activity may affect the core and veneer and adobe structures near historic and archaeological resources. At this point, special precautions such as beginning the vibratory plow at the slowest speed possible to gage the ground and soil conditions; increase speeds if conditions permit. Additionally, directional drilling beneath water features (Rio Grande River and Zuni River) and roadways may not affect surrounding biological resources (species and habitats) and will remain unaffected. Refer to Section 5 for full environmental analysis.

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 Gallup, City of Grants, Laguna Pueblo, City of Albuquerque, Moriarty, Corona, Mountainair, Carrizozo, San Antonio, Socorro, Alamo Navajo Indian Reservation, and Magdalena. 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:

- Various tribal communities along the alternative PEN path already possessed internet services for their respective educational facilities.
- Additional full environmental analysis is required for alternative routes and impacts to soil resources, wetlands, points of diversion, mineral resources, and biological resources. Substantial mitigation measures are necessary for their protection.
- More National Register of Historic Place locations (NAID: 97001397, 97001398, 93001466, 97001396, 86002414, 93001222, 930021217, 1000770, 77845925, 91000032, 82003332, 92003336, and 92003328) are present along the alternative PEN.
- Increased costs of additional fiber, conduit, labor, etc. due to additional increase in length

- The alternative PEN path intersects a major waterway (the Rio Grande River) in four locations, when compared to Alternative A where it intersects in one location.
- Early engagements amongst the SFIS PEN team and Navajo Nation revealed the Navajo Nation possesses a sole source internet provider and would not require the services and benefits posed by the PEN project.
- Installation of fiber optic line would exceed federal grant funding timelines.

Installation of the broadband fiber line for this alternative incorporates the same methods described in Alternative A. Additionally, aerial co-location on existing power lines and power poles remained a possibility. However, the additional weight of the actual fiber line would increase the load on existing power poles, therefore, co-location would not be feasible and require upgraded pole installation. Ideally, the application of this co-location 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, 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.

3.4 ALTERNATIVE C – NO ACTION

Alternative C describes the neutrality of the proposed project. This alternative provides a benchmark of comparison for the evaluation of the other alternatives considered. No construction activities will 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, promote environmental justice, 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 state the purpose of the proposed project is to provide essential internet services to areas other service providers may lack such as anchor institutions. For context, Appendix B includes this optional service provider and areas with respect to the proposed project.

The No Action Alternative is not recommended as the alternative since minimal environmental impacts from Alternative A greatly outweigh the benefits put forth by Alternative C.

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. Subsection 4.3.3 describes the Federal cooperating agencies (BLM, FWS, USACE, BIA, EPA, and NPS), their respective lands, and

authorizations. The proposed project lies within the NMDOT ROW, tribal lands, private lands, and federal lands.

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, 45, 317), BIA tribal roads (35, 41, 43, 37, 33, 40, 61, 60, 54, 64, and 65), and other residential streets through Isleta Pueblo. While in Isleta Pueblo, the fiber path will be bored 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, 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. 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.

The following subsections review and evaluate the current, existing environmental, biological, cultural, and historical resources within the proposed project area.

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 stationary 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 a 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.

[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.

Additionally, Executive Order (EO) 13990 solidified the recommitment of the US in combating climate change. Two provisions that assist the environmental review of the PEN include: 1) establishing a review process to identify actions that may disproportionately affect disadvantaged communities and 2) directing federal agencies to ensure their actions are based on the best available science and data.

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].

4.3 LAND RESOURCES

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.

[5] NM DOT Standard Specifications for Highway and Bridge Construction (2019) – Section 107.14.5
[6] National Park Service. NPS.gov. Fossils and Paleontology. *Fossil Parks Master List*

4.3.2.1 El Morro National Monument

Based on the Geologic Resources Inventory Report for El Morro[7], no fossil discoveries have been reported 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 occur to ensure potential paleontological resources are handled appropriately.

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. After review, these geologic units do not exist within the proposed project pathway.

4.3.3 Soils

The utilization of a Web Soil Survey (WSS), operated by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), provides mapping tools and access to the largest natural resource information system in the world. Appendix D-2 displays the soils identified within the proposed project area via WSS.

The results display 137-soil types located within the proposed project area. Full results are shown via the Custom Soil Resource Report, attached as 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,

[7] NPS/NRSS/GRD/NRR-2012/588
[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

fertilizer, pesticides, and labor input. Soil erosion is not present in this category. It may include lands 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.

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, 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	Acres in Proposed Project Area
Cibola County Area; parts of Cibola, McKinley, and Valencia Counties			
75	Hickman Sandy Clay Loam	Prime farmland if irrigated	0.8
McKinley County Area; McKinley, parts of Cibola, and San Juan Counties			
42	Suwanee Clay Loam	Farmland of local importance	1.8
47	Conchovar Clay Loam	Farmland of local importance	0.0
49	Concho Clay Loam	Farmland of local importance	1.1
53	Hawaikuh Clay Loam	Farmland of local importance	0.9
60	Redpen Sandy Clay Loam	Farmland of local importance	3.5
310	Parkelei Sandy Loam	Farmland of local importance	2.4
335	Venadito Clay	Farmland of local importance	0.2
352	Zia Sandy Loam	Farmland of local importance	2.3
575	Ramah-Pescado Association	Farmland of local importance	1.3
Socorro County Area			
421	Glenberg-Riverwash Association	Prime farmland if irrigated	1.7
Valencia County; Eastern Part			
Bm	Bluepoint Loamy Fine Sand	Farmland of statewide importance	5.6
Bn	Bluepoint Loamy Fine Sand	Farmland of statewide importance	0.2
Br	Bluepoint Sandy Clay Loam	Farmland of statewide importance	0.6
Gd	Gila Loam	Farmland of statewide importance	0.1
Gk	Gila Clay Loam	Farmland of statewide importance	0.1
Vd	Vinton Loamy Fine Sand	Farmland of statewide importance	0.3
Vg	Vinton Loam	Farmland of statewide importance	0.2
Source: Prime and Other Important Farmlands (via USDA/NRCS Web Soil Survey)			

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.

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

Table 2: 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 Fish and Wildlife (Sevilleta National Wildlife Refuge - NWR)	**Right-of-way:** Authorization to perform work within NMDOT ROW that is adjacent to Sevilleta National Wildlife Refuge. Applications for permits, easements, and other related documents will be acquired during retrieval of the right-of-way.
US Army Corps of Engineers (Regulatory)	**Clean Water Act (Permit):** Review of wetlands identified in EA. Authorization to perform work in wetlands via Pre-Construction Notification and ENG Form 4345 for CWA Authorization.
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 (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
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 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 all authorizations, the construction of the proposed project will commence. All coordination amongst federal, state, local entities and Tribes will continue throughout the duration of the proposed project. The proposed project area mileage was totaled for each Federal Cooperating Agency, as follows:

- USFWS – Sevilleta NWR (Total Miles = approx. 6.63)
  - Sevilleta NWR ~ 6.63 mi.
- 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. 7.78)
  - El Malpais ~ 6.27 mi.
  - El Morro ~ 1.51 mi.

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

4.4 WATER RESOURCES

The definition of the Waters of the United States (WOTUS) remains ever changing. With the recent Sackett v. EPA (2022)[11], the definition undergoes another change. 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[12].

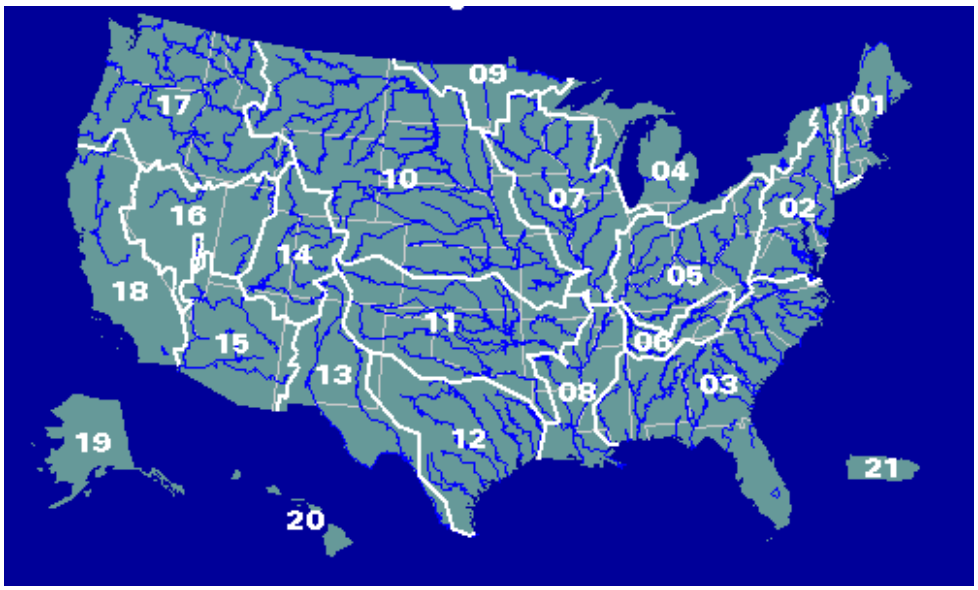

Figure 1: USGS Nationwide Hydrologic Unit Map

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.*[13]

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.*[14]

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

> **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 directional boring under the water source at approximately 27 feet depth occurs. Related construction activities will not affect the natural environmental resources nor any biological resources in the vicinity due to the implementation of proper conservation measures, found in Section 5.4. 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

[15] 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.

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[16]. 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 occurs in any given year (referred to as the base flood). The floodplains identified within the proposed project area are attached as Appendix D-5.

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.

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

Table 3: 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. Table 4 identifies the species, status, potential habitat location, and determination.

Table 4: 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) *(Canis lupus baileyi)*	Wherever found in areas south of NM Interstate 40
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: Biological Assessment for the Santa Fe Indian School Pueblo Education Network (Middle Mile Broadband Project) – 2024 & IPaC Resource List	

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

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

Table 5: 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
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: Biological Assessment for the Santa Fe Indian School Pueblo Education Network (Middle Mile Project) – 2024 & IPaC Resource List	

The 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. Subsequently, a USFWS Letter of Concurrence was issued for the SFIS PEN in May 2024. The USFWS Letter of Concurrence, Biological Assessment, and IPaC report are attached as Appendix H.

4.5.2 Critical or Threatened/Endangered Habitat

According to the BA, 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)).

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 6: 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 and Savannas	Pinyon-juniper woodlands with one-seed juniper, alligator juniper, Rocky Mountain juniper at higher elevations, pinyon pine, blue grama, junegrass, galleta, and 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.

Level IV EPA Ecoregion	Ecoregion Description and Related Vegetation
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 each tribe's connection and interaction is acknowledged 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.

4.6.1 Archaeological 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.

Currently, a subcontractor is conducting a Section 106 – Class III Archaeological Survey. Results of this survey will be included as Appendix I.

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 7: 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 taken 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.

Consultation amongst State Historic Preservation Officer (SHPO), multiple Tribal Historic Preservation Officers (THPOs) and potentially the Advisory Council on Historic Preservation (ACHP) are critical for identifying historic properties potentially eligible for nomination to the National Register. Additionally, consultations by the aforementioned entities will be essential to determining adverse effects (if any) and potential mitigation measures to protect historic properties and cultural resources associated with these historic or culturally significant places.

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.

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 within 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 within the 40-foot total width.

Maps of these national monuments with respect to the proposed project are included in Appendix F. 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.'[17] 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:

[17] The National Trails System Act (P.L. 90-543, as amended through P.L. 116-9, March 12, 2019)

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 methodologies are 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[18]. This stock trail was approximately 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 INFRASTRUCTURE

All construction activities involved with the proposed project remain within the corridor of the existing NMDOT ROW, tribal lands, federal lands, and private lands, all of which have been previously disturbed that included site preparation including, leveling, vegetation and geology removal. The components of the proposed project include the installation of the broadband fiber cable and the fiber optic "regeneration" sites. Prefabricated fiber optic regeneration sites (buildings) at 50 x 50 feet total area are installed at four identified locations along the length of the proposed project to ensure efficiency, longevity, and performance to the internet services provided. These locations are shown in Figure 2.

[18] BLM/NM/GI-07-01-1220

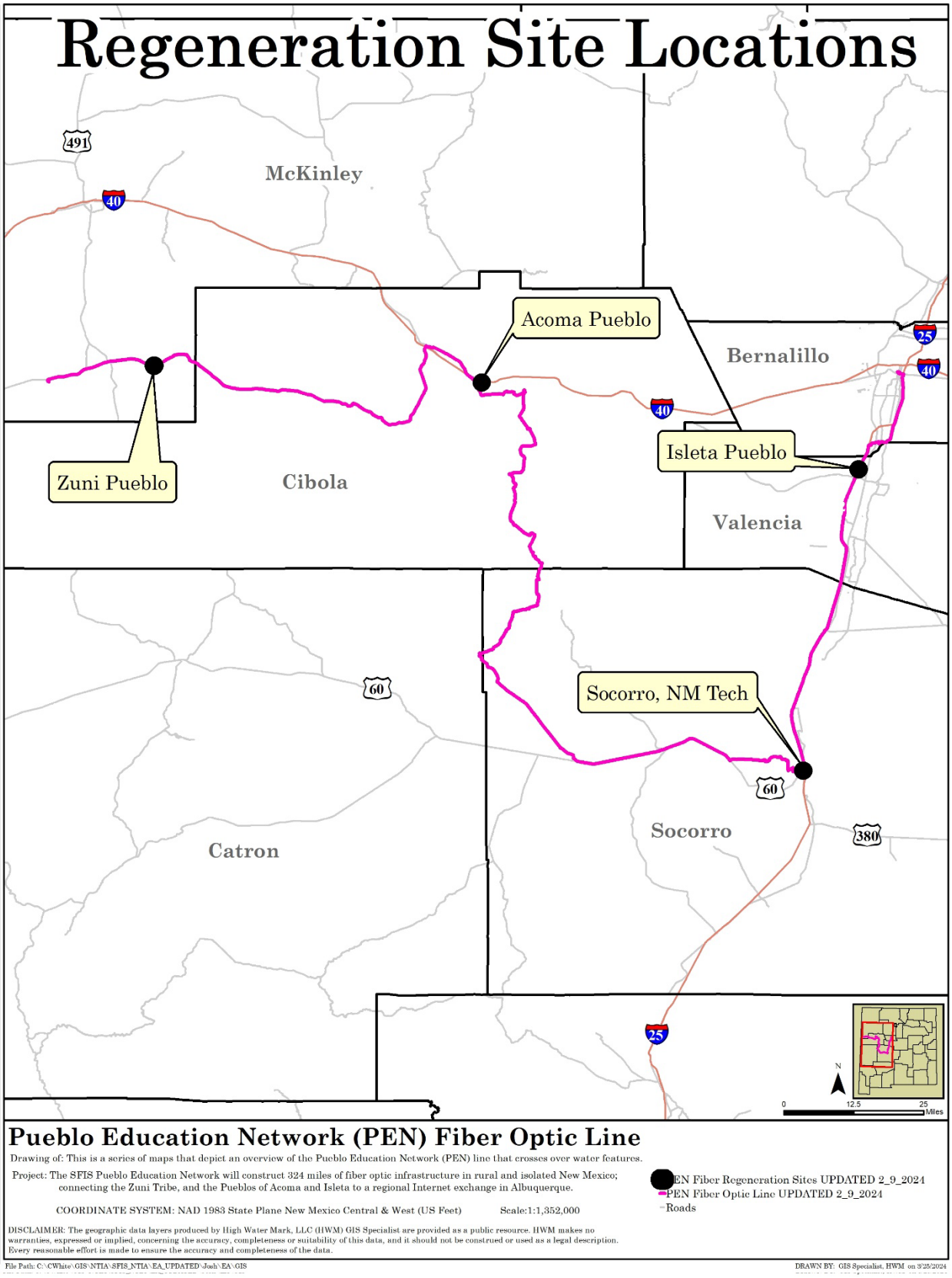

Figure 2: Regeneration Site Locations Along Proposed Project Area

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).

To provide access points for maintenance, inspection, and overall management of the fiber network, "handholes" will be installed along the length of the proposed project at locations every 1,750 feet, which equates to approximately 1,150 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.

4.9 SOCIOECONOMIC RESOURCES

4.9.1 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. US Census Bureau employment and income data for the proposed project area is shown in Appendix J-1.

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.

4.9.2 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[19], as displayed in Figure 3.

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

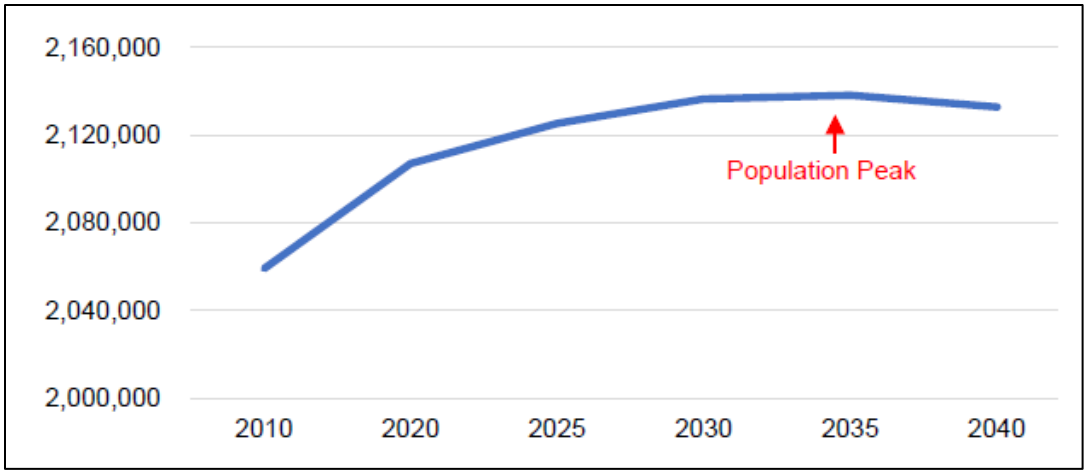

Figure 3: NM Project Population, 2010 to 2040 (UNM-Geospatial and Population Studies Department)

From Figure 3, the projections were made utilizing 2010 Census data. 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			

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

4.9.3 Environmental Justice

In 1994, President Clinton signed Executive Order (EO) 12898, which requires each federal agency to address Environmental Justice in Minority Populations and Low-Income Populations. The goal of this action is to achieve environmental justice by identifying and providing action, as appropriate, for disproportionately high and adverse human health of environmental effects of its programs, policies, and activities on minority populations and low-income populations. The EPA identified two fundamental principles of environmental justice:

- The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
- Achievement of environmental justice occurs when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work.

The correlation between internet accessibility and socio-economic development amongst communities parallel one another. For example, the lack of internet services tends to not give communities (mostly rural) the proper recognition from state and federal entities, which could potentially lead to lack of funding opportunities for its economic development and well-being. The proposed project seeks to mitigate these issues and ensure these communities benefit, thrive, and are well represented.

4.10 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) be used 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
Eagle Picher Carefree Battery	(34.099517, -106.901239)	NMD001829506	50.00	NPL Site
Source: EPA National Priorities List (NPL) Sites – by State				

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. For biological resources (especially ones with noise sensitivities), appropriate conservation measures are implemented to avoid direct or indirect impacts to surrounding species and habitats.

(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) additional locations such as Gallup, Grants, Laguna Pueblo, Moriarty, Corona, Mountainair, Carrizozo, San Antonio, and Alamo Navajo Indian Reservation. 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. To preserve (as close to) normal air quality within the specific construction area along the proposed path on any given day, the following BMPs are implemented:

- All active construction areas (including on-site haul roads and contractor use areas) would be effectively stabilized 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) additional locations such as Gallup, Grants, Laguna Pueblo, Moriarty, Corona, Mountainair, Carrizozo, San Antonio, and Alamo Navajo Indian Reservation. Additional coordination efforts and approvals are necessary for implementing the alternative PEN. Potential air quality issues are anticipated for more locations when compared to the proposed project.

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 surrounding air quality.

5.3 LAND RESOURCES

A. Proposed Action

During the installation of the proposed project, minimal effects to land resources are anticipated. According to the WSS results, 23.1 acres are classified as Prime or other important Farmland and will potentially be affected. To ensure the smallest footprint is affected and natural environmental resources are preserved, the following BMPs are recommended during the construction phase:

- 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 for 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, implementation of silt fences and/or straw waddles are implemented in the possible event of leakage from construction equipment.
- All areas disturbed by construction shall be replanted and stabilized with approved vegetation through seeding, hydro mulching, and other effective means immediately upon completion of construction activity.
- 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 Santa Fe Indian School Pueblo Education Network by 10G Consulting.
- Adoption of Invasive/Noxious Weed Management[20]
    - 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 particular weed species.
    - All seed 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.

For areas within Federal Cooperating Agency (FWS, BLM, and NPS) lands, prior authorizations and ROW are secured before the proposed project proceeds. All coordination among federal, state, local entities, and tribal communities will continue throughout the duration of the proposed project. No significant impacts are anticipated.

B. Alternative Action

After analysis, this alternative path is estimated to disturb approximately 5,780.2 acres of soil, which is almost quadruple the amount of soil identified in Alternative A. Additionally, more soil identified as 'farmland' will be disturbed, which is estimated at 647.5 acres which is approximately eight times the amount identified in Alternative A.

Furthermore, outreach to additional federal agencies, local municipalities, and Tribal Communities such as Navajo Eastern Agency communities north of Zuni, Department of Defense (Ft. Wingate and White Sands Missile Range), Laguna Pueblo, Town of Moriarity, USFWS (Bosque del Apache), and NPS (Sierra Ladrones Wilderness) must occur before finalizing this alternative path.

The amount of soil disturbed (when compared to Alternative A) and the additional ROW approvals for the above-mentioned agencies, municipalities, and tribal communities eliminate the consideration of this alternative.

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

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 in any way during construction. Before construction occurs, the federal cooperating agency, USACE, will be notified and related permitting (CWA Section 404) will be obtained for crossing major waterways. Upon approval, the construction will proceed with the utilization of BMPs and other methods, if necessary or requested 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, some immediate BMPs can be identified to reduce impacts on water resources:

- Flagging of wetland boundaries.
- Construction materials would not be stockpiled in areas where they can be washed away by stormwater volumes and discharges.
- Construction material should be used to backfill trenches or disposed 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 strategically designed to minimize adverse effects on all water sources (above and below ground).
- Continued monitoring and photo documentation will be collected before, during, and after construction has occurred.
- All areas disturbed by construction shall be 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. Depending on the location of PODs, construction methods may vary, but ultimately directional boring 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 more disturbances on water resources when compared to the proposed path. There are a greater number of riverine waterways throughout the alternative path as well as more crossings along the Rio Grande in areas south of Albuquerque, East of Bernardo, northern Socorro, and southern Socorro. The potential for causing disturbances to surrounding wildlife and natural vegetation in these areas is far greater. Additionally, the alternative route through Edgewood and Moriarty contains high volumes of POD locations due to the amount of farmland in the area. There are 24 PODs identified within Alternative A path. After further evaluation, there are 94 PODs identified within the Alternative B path. The potential for disruptions or damage to the PODs is greater than that of the proposed project.

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 IPaC report gathered for the proposed project, threatened, and endangered species exist within the proposed project area. The effect determinations of each of these species are found in Table 10.

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 likely 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) *(Coccyzus americanus)*	*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 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.

Species	Determination	Reasoning
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.
Mexican Grey Wolf (E) *(Canis lupus baileyi)*	*Not likely to adversely affect*	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.
Mexican Grey Wolf (E) *(Canis lupus baileyi)*	*Not likely to adversely affect*	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 was received by FWS – New Mexico Ecological Field Offices on May 20, 2024. The proposed action abides by rules and regulations set forth by the USFWS, including the 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 discouraged. Additionally, the proposed project does not interfere within known critical habitat locations. No significant impacts are anticipated.

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.
- Contractors would be instructed to not collect, disturb, or disrupt wildlife species and respective habitats. Continued monitoring for 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.

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 an estimated ten (10) locations along the Rio Grande.

This alternative path poses disturbances on a greater number of species AND critical habitats, when compared to Alternative A. Therefore, this is not a feasible option for the 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. With the construction methods utilized in the proposed project (directional drilling), there are minimal effects anticipated to these NRHP locations. At this point, special precautions such as beginning the vibratory plow at the slowest speed possible to gage the ground and soil conditions; increase speeds if conditions permit.

The proposed path is within the most appropriate, non-disturbing path that does not adversely affect any cultural or historical areas, as confirmed in ongoing engagements with the participating Pueblos. Cultural resources (sites, objects, landscape, or structures) are not typically documented among tribal communities. But in the event a cultural resource is discovered during construction, 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. During the planning phase of this project, THPOs from Isleta Pueblo, Acoma Pueblo, and Zuni Pueblo were engaged. Additionally, the BIA Archaeologist will be consulted as part of the planning phase. Based on these engagements and subsequent site visits, adjustments were made to the proposed path to avoid known cultural resources. While construction occurs within Pueblo boundaries, the respective THPO will provide monitoring (depending on if the construction activity occurs near a known cultural site). Generally, 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 cleared by the cultural monitor. On BLM lands, the protocol[21] between BLM and SHPO will be acknowledged and implemented in the event of unanticipated discoveries.

As outlined in Section 106 of the NHPA, cultural preservation through tribal engagements and the land managing agency consultations through continued communication and respective analysis is integrated throughout the proposed PEN project.

(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, there are an additional twelve (12) NRHPs within the boundary of this alternative path. The alternative path poses potential disturbances to a greater number of historic places when compared to the proposed project.

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.

[21] State Protocol Between the New Mexico Bureau of Land Management and the New Mexico State Historic Preservation Officer (2014): Appendix F – Standard Discovery Plan

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 process will occur after the installation of the PEN and will continue throughout the rest of the project timeline (approximately 2 years). Additionally, 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.

[22] NM Department of Transportation. *Revegetation Zones - Feature Layer*. 2021
[23] BLM-NM-PL-10-03-1617. Socorro Field Office Resource Management Plan (Sep. 2010) Appendix D, Pg. 115.

5.8 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 and hand-holes.

There will be four (4) fiber optic regeneration site locations located along the length of the proposed project, at a maximum distance of approximately 120 km. (~74.5 miles). Three of these locations require a new building for housing all the cables and electrical network components, with anticipated locations in Los Lunas, Pueblo of Acoma, and Zuni Pueblo. These new buildings will be within the proposed project area footprint. The fourth 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 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 landowner 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 hand-holes 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.

5.9 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. Although, along the alternative path, there are less tribal communities that will benefit from this installation when compared to the proposed project. The goal of the PEN is to provide as many underserved tribal communities accessibility to high-speed broadband internet services.

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.

5.10 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.

[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*.

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 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 travels through more municipalities rather than tribal communities. The construction through these municipalities may affect more community members than that of the proposed project. More effort and caution are necessary for the safety of the public and the construction workers involved.

C. No Action Alternative

The No Action Alternative would have no impact on the human health and safety of tribal communities and local municipalities.

5.11 CUMULATIVE IMPACTS

Upon careful review and evaluation, as indicated in this document, there are no significant impacts on the following resources: land surface, vegetation, wildlife, surface water, groundwater, wetlands, air quality, soils, and cultural resources. There are anticipated positive impacts on environmental justice and socioeconomic conditions for the tribal communities and local municipalities because of the proposed action. The acquisition of a right-of-way along the length of the 324-mile proposed pathway is fully anticipated. The width of this right-of-way is approximately 40 feet, with actual disturbance occurring within 10-feet. Construction activities are confined within this right-of-way.

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. The proposed project will always abide by USACE CWA permit during construction activities, when acquired. 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 amongst 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, 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 THPO, SHPO, or both, construction will proceed. Refer to Section 106 documentation in Appendix H. Generally, 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 cleared by the cultural monitor.

Resource	Mitigation Measure
Aesthetic and Visual Resources	During construction activities, the roadway 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).

Since no significant impact to the social, economic and the environment is anticipated, the project qualifies for the preparation of Finding of No Significant Impact (FONSI).

6 APPLICABLE ENVIRONMENTAL PERMITS AND REGULATORY REQUIREMENTS

The Biden-Harris Administration "Internet for All" initiative invested $65 billion to provide affordable, reliable, high-speed internet for the entire nation, through the Bipartisan Infrastructure Law. NTIA administers certain parameters of this initiative. NTIA will provide funding to SFIS for the purposes of delivering high-speed internet to tribal communities through the Tribal Broadband Connectivity Program (TBCP). Major components of the TBCP address the following: telehealth, distance learning, broadband affordability, and digital inclusion. Application of all federal, state, tribal, and local laws (from various federal agencies, the state of NM, Pueblo of Isleta, Ramah Navajo Indian Reservation, Pueblo of Acoma, and Pueblo of Zuni) to the proposed construction of the PEN will occur.

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.

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.
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.
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

Potentially Applicable Requirement	Relevant Project Information
	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.
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	

Potentially Applicable Requirement	Relevant Project Information
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 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)	Bi-weekly update meetings from 2023 – 2024
US Fish & Wildlife Service – NM Ecological Services	Section 7 Consultation
US Fish & Wildlife Services – Sevilleta National Wildlife Refuge	Permitting Needs Discussion
Bureau of Land Management	Permitting Needs Discussion
National Park Service	Pre-Application meeting/Permitting Needs Discussion
BIA (Zuni Agency, Southern Pueblos, Ramah Navajo)	ROW Authorization
NTIA & Federal Agencies Consultation with Pueblo of Acoma	Tribal engagement 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 engagement 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 engagement with the Pueblo of Zuni discussing project overview and respective permitting. Tribal Engagements occurring June 2023, November 2023, and May 2024.

8 PUBLIC COMMENT

Upon completion of this Draft EA, the Project Sponsor (SFIS) will make the document available for public inspection and comment. This comment period will be for the duration of 30 days. Multiple ways of notification of the Draft EA include advertisement in local newspapers, posting the document on the Project Sponsor's website, and making the document available on the NTIA website.

All comments will be reviewed and considered. Careful consideration of public comments will be made by the Project Sponsor and working team to determine a response and the best way to advance the project.

9 REFERENCES

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U.S. Geologic Service. *1987 USGS Water Supply Paper 2294*. water.usgs.gov/GIS/huc_name.html#Region15.

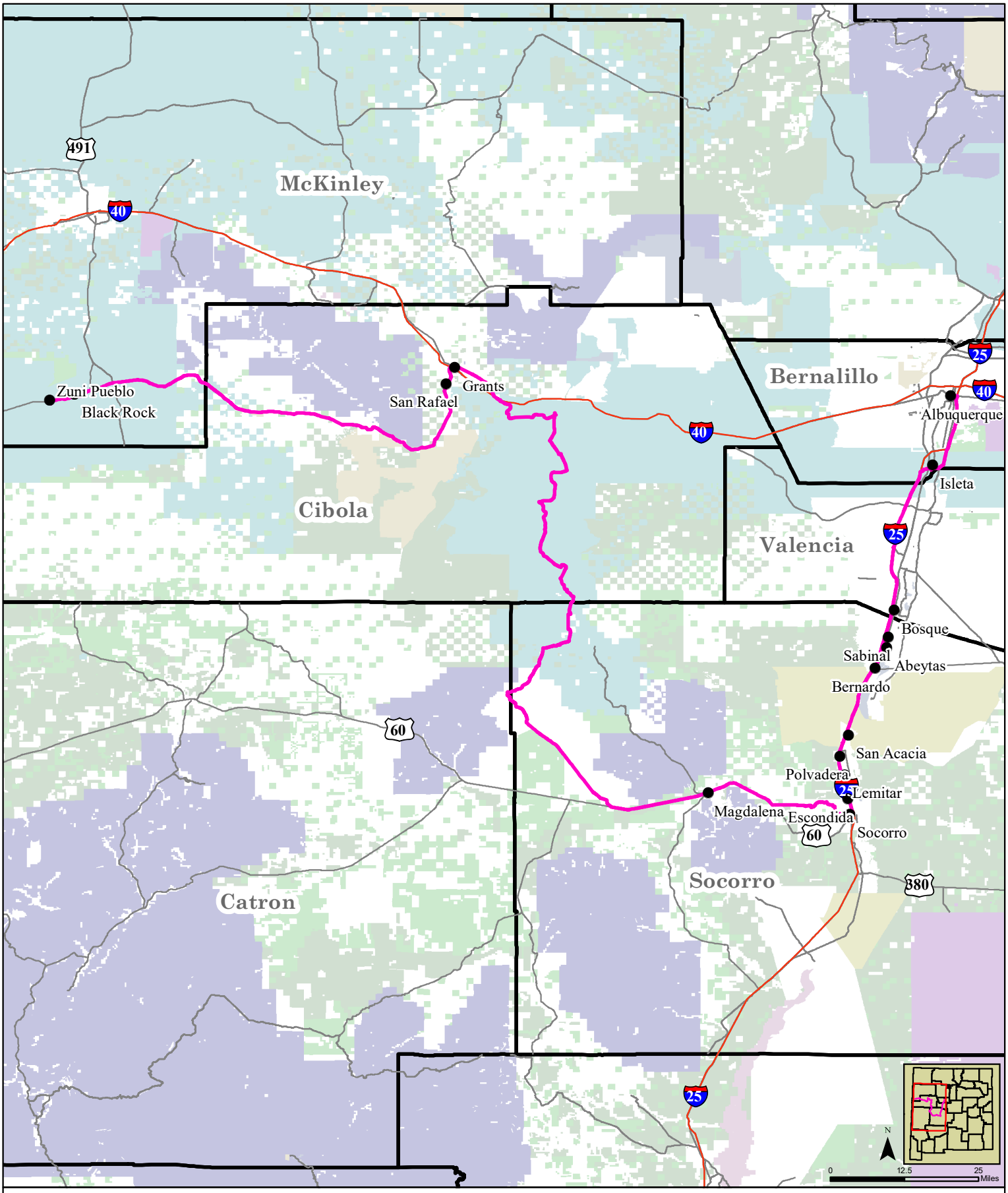
10 APPENDICES

A: Proposed Action and Alternatives (Maps)
  A-1: Alternative A – Proposed Action
  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: Soil Features within the Proposed Project Area
  D-3: USFWS NWI Wetlands within the Proposed Project Area
  D-4: NM OSE POD Locations within the Proposed Project Area
  D-5: 100-Year Floodplains within the Proposed Project Area
  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 (FWS, 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 – Class III Archaeological Survey for the Proposed Project Area
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

Appendix A

Maps for Proposed Action and Alternative Paths

[Appendix A-1: Alternative A – Proposed Action]



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- PEN Fiber Optic Line 12_19_2023
- Roads
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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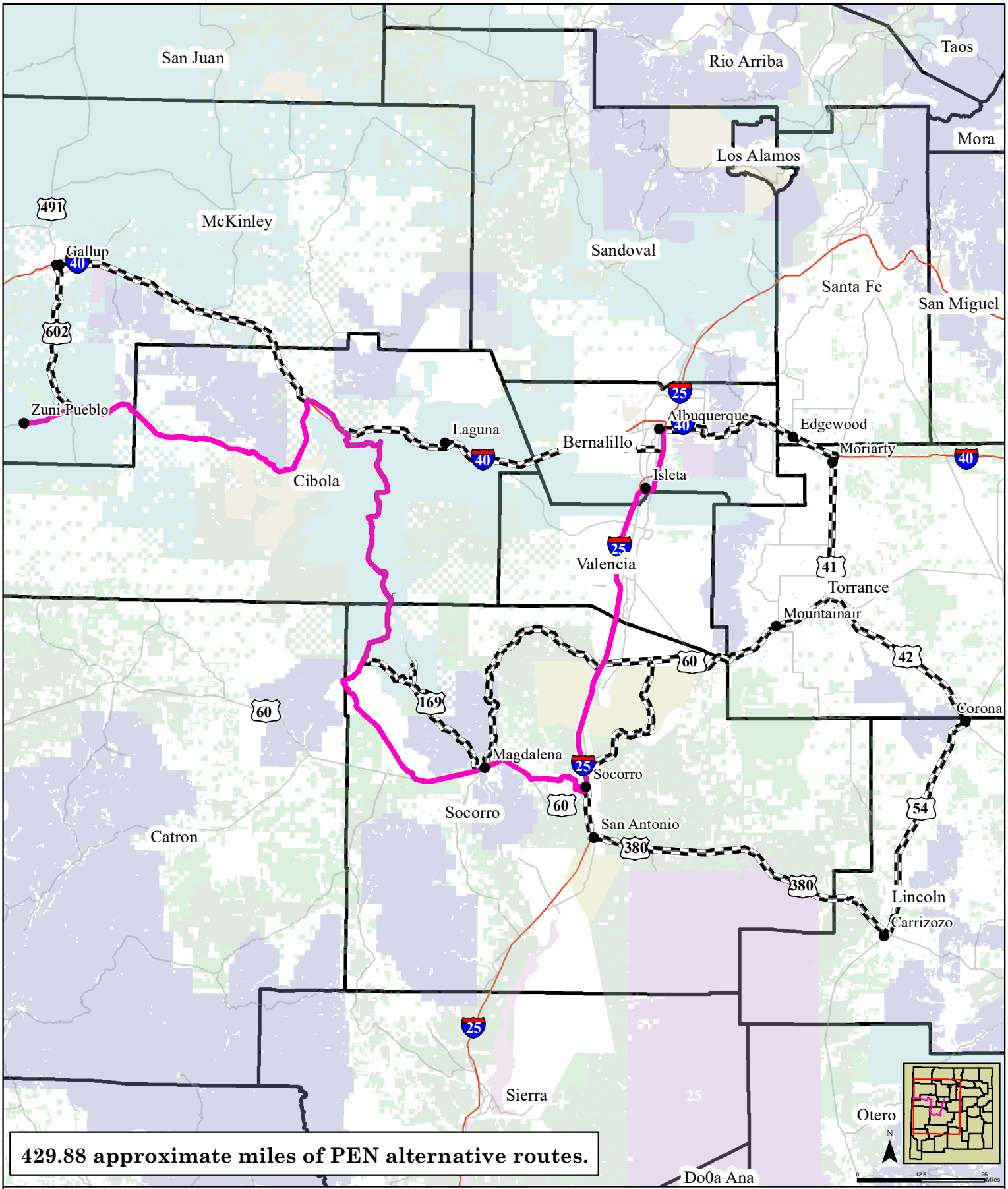
DRAWN BY: GIS Specialist, HWM on 1/19/2024

[Appendix A-2: Alternative B – Alternative Considered]



Pueblo Education Network (PEN) Fiber Optic Line with Alternative Routes

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,574,000

- PEN Fiber Regeneration Sites
- PEN Fiber Optic Line UPDATED 2/9/2024
- 'AlternativeRoutes03_29_2024USE

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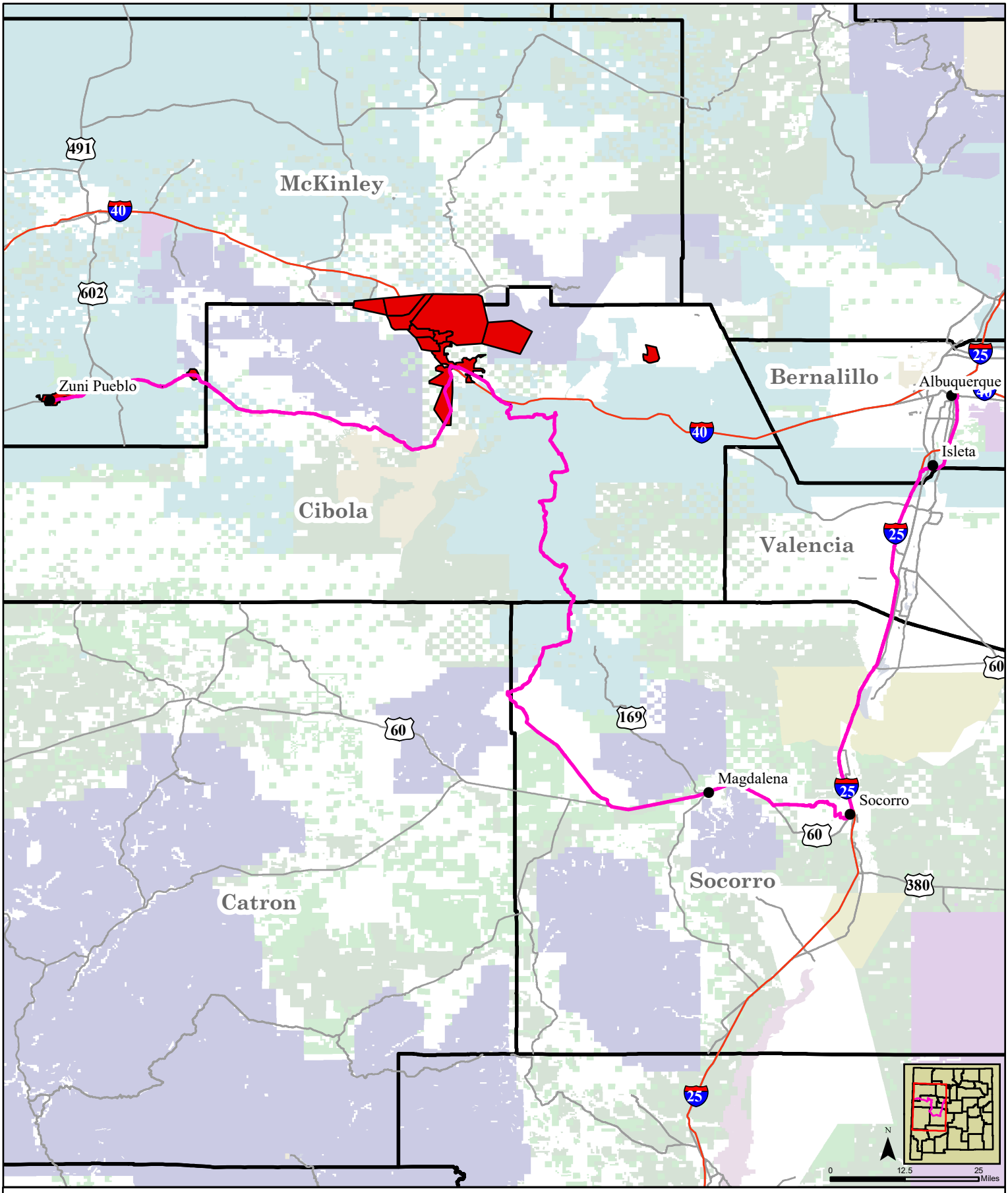
DRAWN BY: GIS Specialist, HWM on 1/19/2024

Appendix B

Other Service Provider and Service Area for Zuni, Ramah, and Grants



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line with Red Bolt broadband service areas.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

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- Cities/Towns
- Interstate
- Roads
- PEN Fiber Optic Line UPDATED 2/9/2024
- Counties
- Red Bolt
- PEN Fiber Regeneration Sites
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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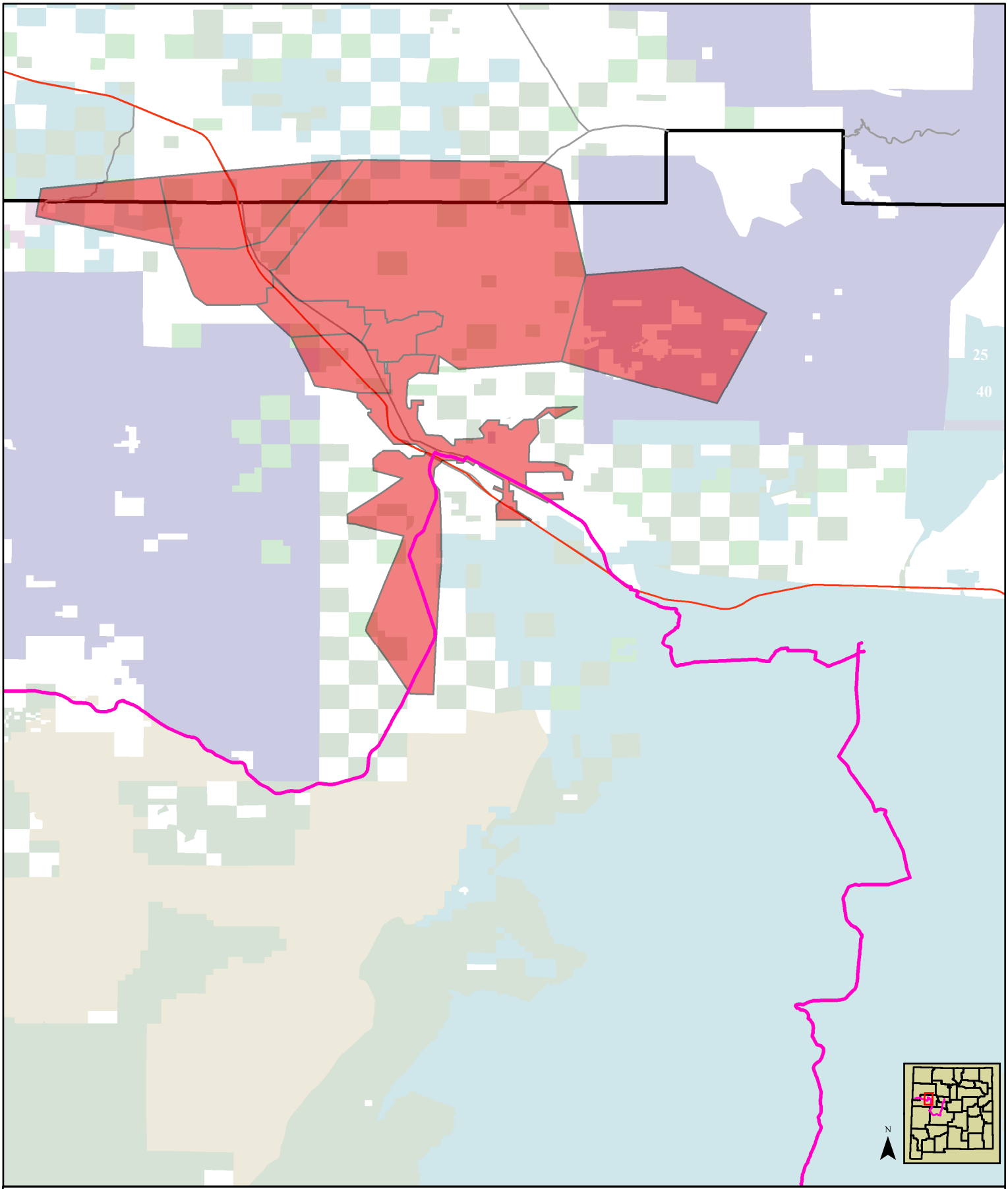
DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line with Red Bolt broadband service area in Pueblo of Acoma and Grants area.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:332,000

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- Cities/Towns
- Interstate
- Roads
- PEN Fiber Optic Line UPDATED 2/9/2024
- Counties
- Red Bolt
- PEN Fiber Regeneration Sites
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
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- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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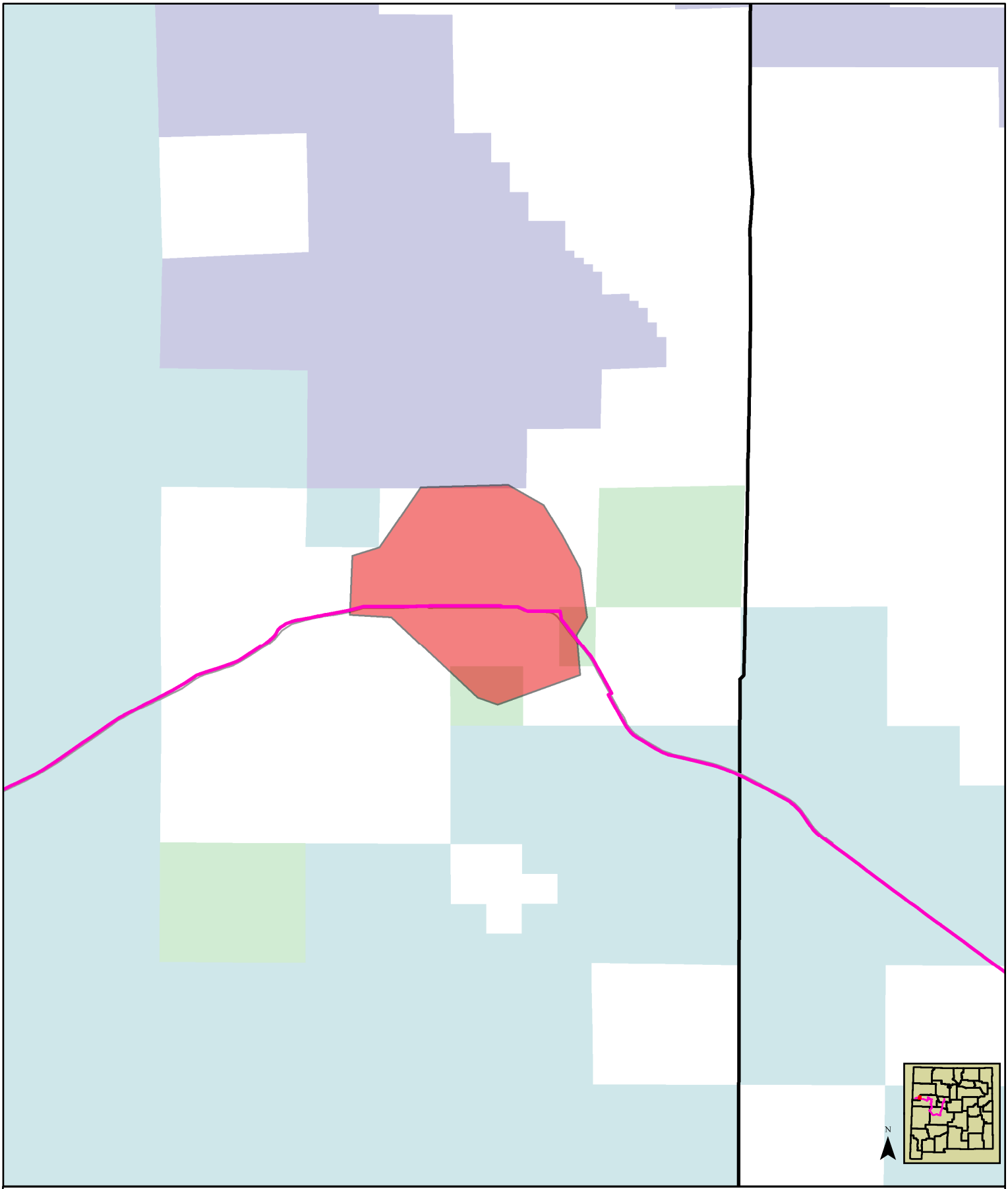
DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line with Red Bolt broadband service area in Ramah (Navajo Nation).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:67,000

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- Cities/Towns
- Interstate
- Roads
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- Counties
- Red Bolt
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- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
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- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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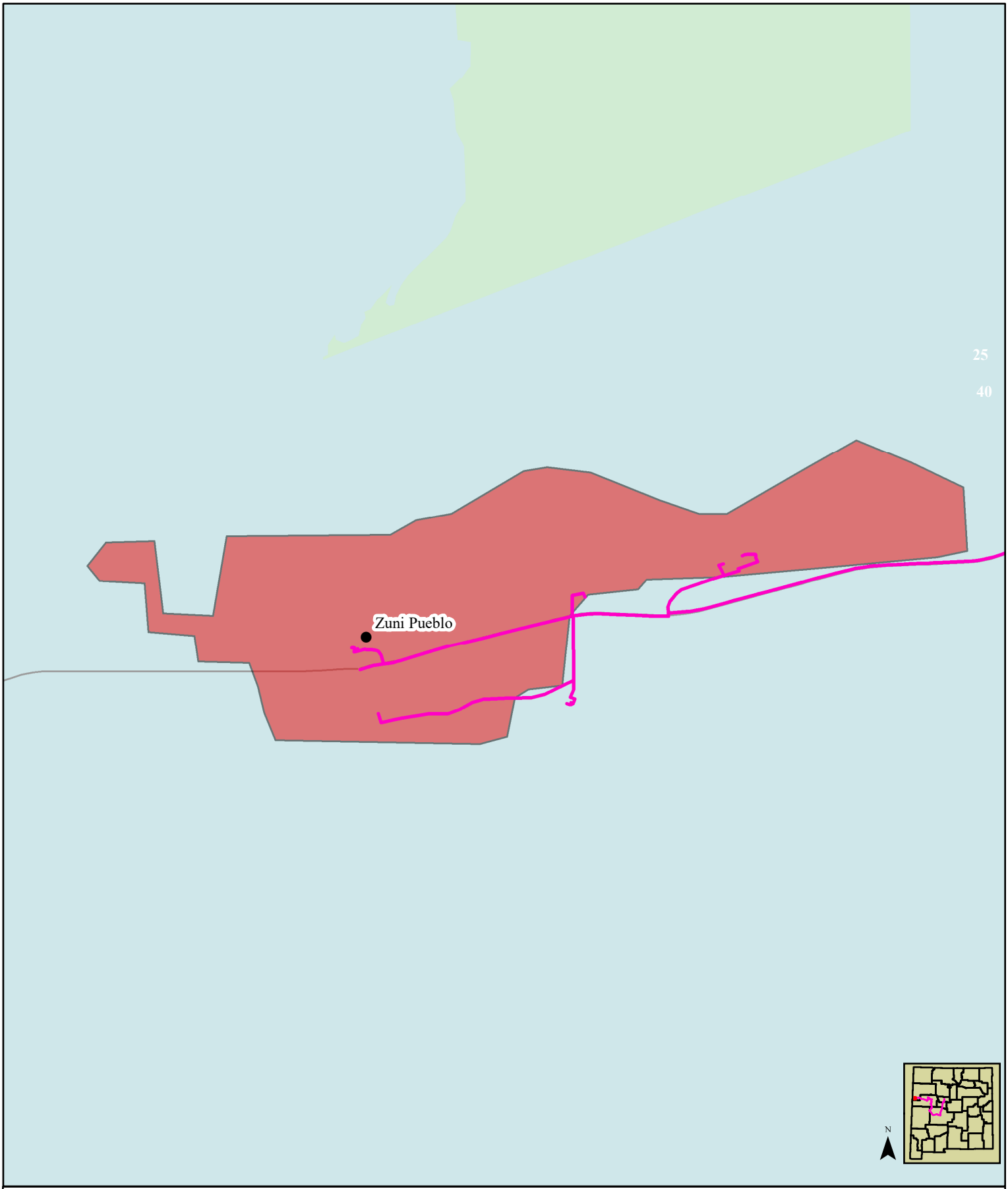
DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line with Red Bolt broadband service area in Pueblo of Zuni.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:67,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- Cities/Towns
- Interstate
- UPDATED5_2024
- Roads
- Counties
- Red Bolt
- PEN Fiber Regeneration Sites
- Bureau of Land Management (BLM)
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- NM State Park (SP)

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DRAWN BY: GIS Specialist, HWM on 1/19/2024

Appendix C

Proposed Project Area via Public Land Survey System (PLSS)

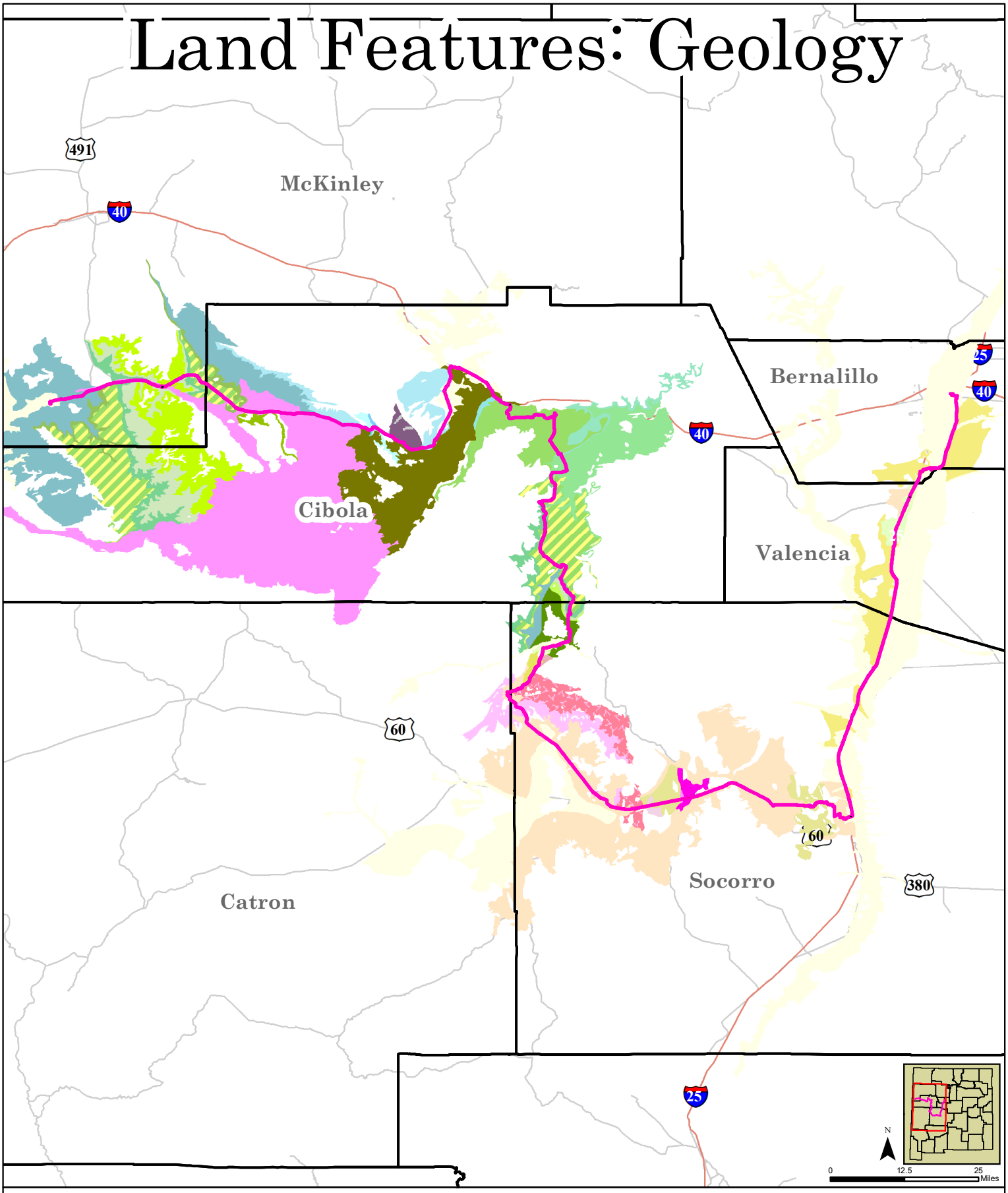
Township	Range	Section(s)
10 N	3 E	17, 20, 21, 28, 33
9 N	3 E	4, 9, 8, 17, 20, 29, 32, 31
8 N	3 E	6, 7, 18, 19
8 N	2 E	24, 23, 22, 27, 28, 33
-	-	Gutierrez/Sedillo Land Grant
-	-	San Clemente Land Grant
-	-	Belen Land Grant
-	-	Sevilleta Land Grant
1 S	1 W	14, 15, 22, 27, 34, 35
2 S	1 W	2, 11, 14, 23, 24, 25, 36, 33, 32, 31
-	-	Town of Socorro
3 S	1 W	3, 4, 6
3 S	2 W	1, 2, 3, 4, 5, 6
2 S	2 W	34, 33, 32, 31
2 S	3 W	36, 25, 26, 27, 22, 21, 16, 17, 18
2 S	4 W	13, 24, 23, 22, 27, 28, 29, 30, 31
2 S	5 W	36, 35, 34, 33, 32
3 S	5 W	5, 6
3 S	6 W	1, 2, 3, 4, 5
2 S	6 W	32, 31, 30
2 S	7 W	25, 24, 23, 14, 15, 10, 3, 4
1 S	7 W	33, 28, 29, 20, 19, 18, 7
1 S	8 W	12, 11, 2, 3
1 N	8 W	34, 33, 28, 21, 16, 17, 8, 7, 6
1 N	9 W	1
2 N	9 W	36
2 N	8 W	31, 30, 29, 20, 21, 16, 15, 10, 3
3 N	8 W	34, 35, 26, 23, 24
3 N	7 W	19, 18, 17, 16, 9, 4, 5
4 N	7 W	32, 33, 29, 28, 21, 16, 9, 3, 4, 5
5 N	7 W	34, 33, 32, 29, 20, 17, 8, 18, 7
5 N	8 W	12, 1, 2
6 N	8 W	35, 26, 23, 14, 13, 11, 12, 1, 2
7 N	8 W	35, 36, 25, 26, 23, 24, 13
7 N	7 W	18, 7, 6
8 N	8 W	36, 25
8 N	7 W	31, 30, 29, 28, 21, 20, 17, 8, 7, 6
9 N	7 W	31, 30, 19, 18, 7, 6
9 N	8 W	36, 25, 1, 12, 11, 2, 3, 10, 4, 5, 8, 7, 6
9 N	9 W	1
10 N	8 W	31, 30
10 N	9 W	36, 25, 26, 23, 22, 15, 10, 9, 4, 5
11 N	9 W	32, 31
11 N	10 W	36, 25, 26, 27, 34
10 N	10 W	3, 10, 15, 22, 27, 34
9 N	10 W	3, 10, 15, 16, 21, 28, 29, 32, 31
8 N	10 W	6
8 N	11 W	1, 2, 3
9 N	11 W	34, 33, 28, 29, 20, 19
9 N	12 W	24, 13, 23, 14, 15, 16, 17, 18, 7
9 N	13 W	12, 11, 2, 3, 4, 5, 6
9 N	14 W	1, 2, 3, 4, 5, 6
9 N	15 W	1
10	15 W	36, 35, 34, 27, 28, 21, 20, 17, 18, 7
10	16 W	12, 1, 2, 3, 4, 5, 8, 7
11	16 W	35, 34
10	17 W	12, 11, 10, 3, 4, 5, 8, 7
10	18 W	12, 11, 10, 15, 16, 17, 20, 19
10	19 W	24, 23, 26, 27, 28

Appendix D

Compiled Maps and Data of Resources within Proposed Project Area

[Appendix D-1: Geologic Features within the Proposed Project Area]

Land Features: Geology



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over land features.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

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PEN Fiber Regeneration Sites UPDATED 2_9_2024
PEN Fiber Optic Line UPDATED 2_9_2024
Roads
Geology
GeoID
J
Jm
Jsr
Jz
Jze
Kcc
Kd
Kgm
Kmd
Kmr
Kpg
Kth
Pa
Pg
Psa
Py
QTs
Qa
Qb
Qbo
Ql
Qoa
Qp
Trp
Tmb
Tpb
Tps
Taf
Tual
Turp
Tus
Tuv
Tvs
Xg
^c

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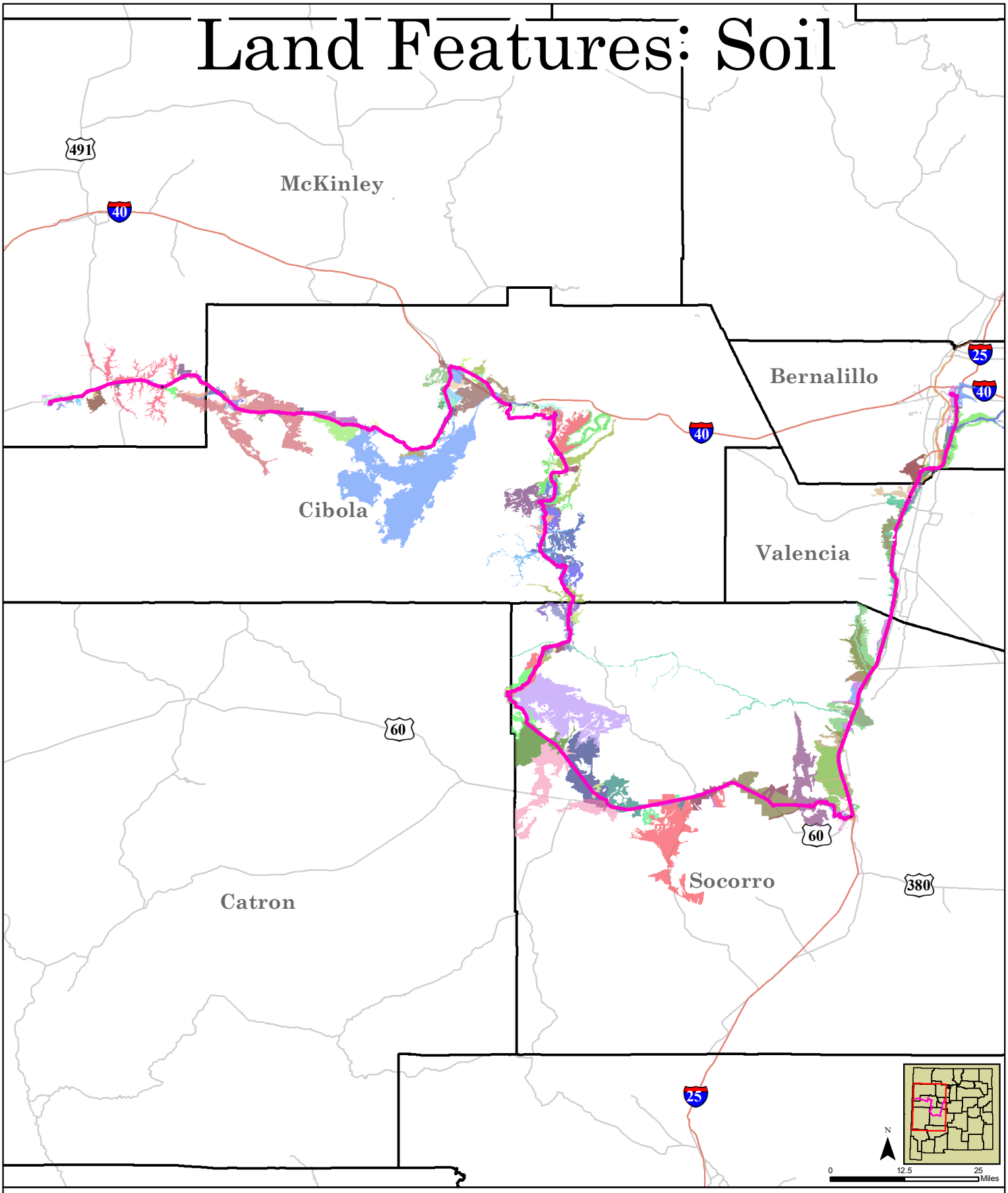
DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-2: Soil Features within the Proposed Project Area]

Land Features: Soil



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- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- PEN Fiber Optic Line UPDATED 2_9_2024
- Roads

*Legend for the soils is on the following page.

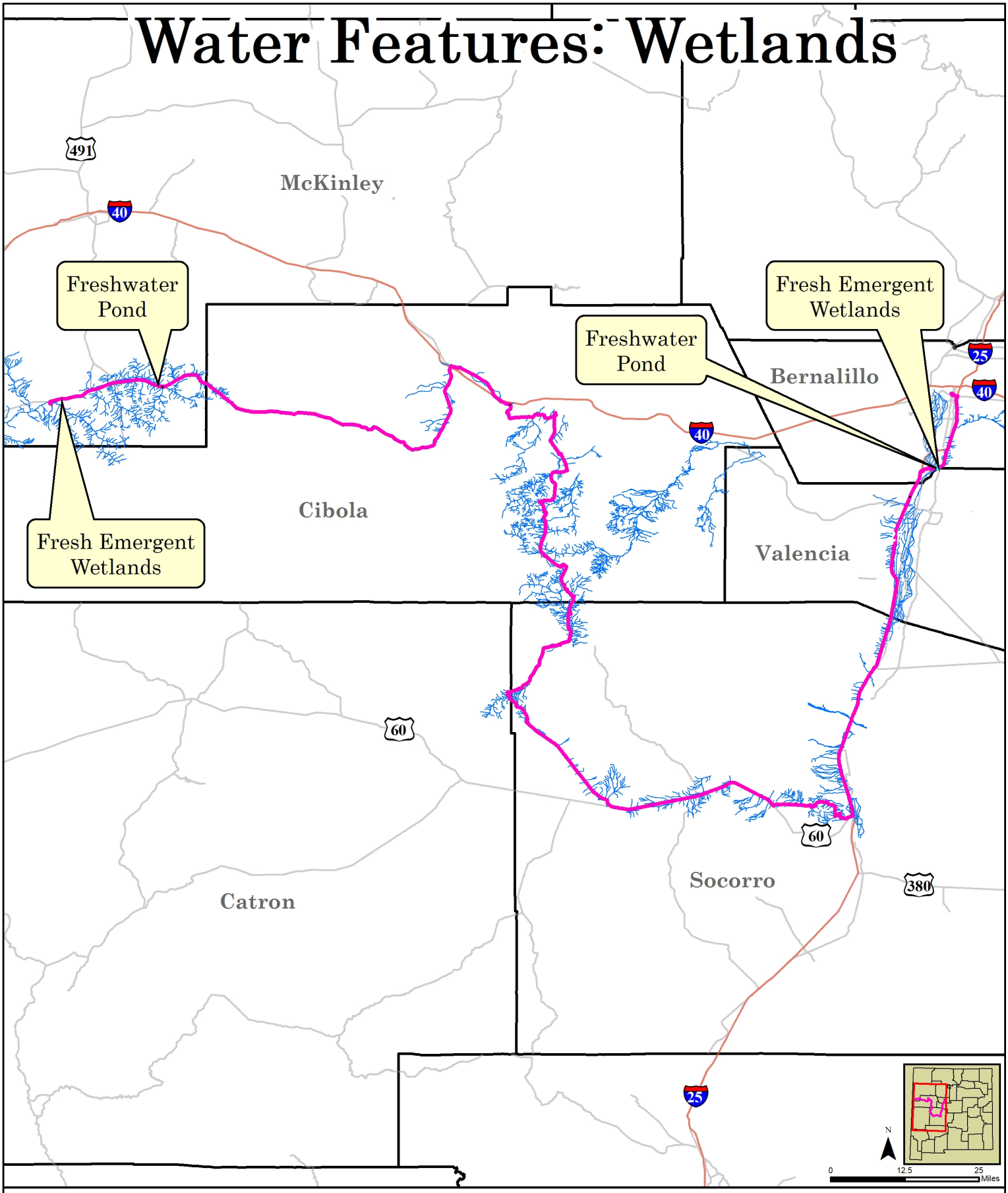
File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\EA\GIS\Land

DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-3: USFWS NWI Wetlands within Proposed Project Area]

Wetland Type	Number of Intersections w/ Proposed Project Area	Wetland Category
PEM1A	1	Freshwater Emergent Wetland
PEM1B	1	Freshwater Emergent Wetland
PEM1C	1	Freshwater Emergent Wetland
PEM1/SS1Ah	1	Freshwater Emergent Wetland
PUBF	1	Freshwater Pond
PUBHh	1	Freshwater Pond
R2UBFx	1	Riverine
R2UBHx	1	Riverine
R3UB2G	1	Riverine
R3UB3H	1	Riverine
R4SB3Ax	1	Riverine
R4SB3Cx	2	Riverine
R4SB3J	93	Riverine
R4SB3Jx	29	Riverine
R4SB4C	1	Riverine
R4SB4J	7	Riverine
R4SB7J	9	Riverine
R4SB7Jx	5	Riverine
R4SBC	43	Riverine
R4SBJ	92	Riverine
R5UBFx	1	Riverine
Source: USFWS National Wetlands Inventory		

Water Features: Wetlands



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over water features.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- PEN Fiber Optic Line UPDATED 2_9_2024

Roads

Wetland Types

Freshwater Emergent Wetland

Freshwater Pond

Riverine

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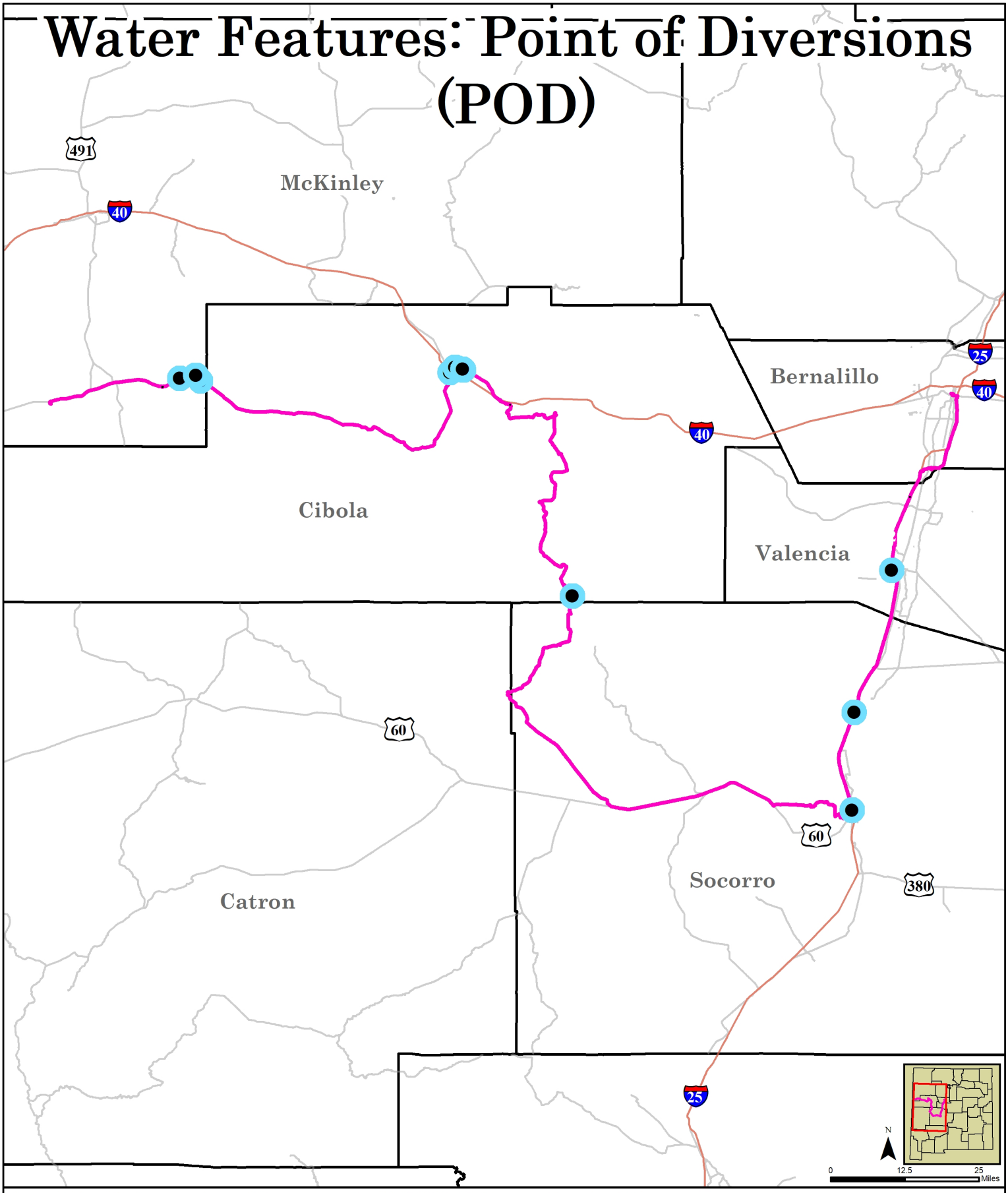
DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-4: NM OSE POD Locations within Proposed Project Area]

POD Name	Well Depth (ft)	Approx. Location (NAD83UTM (meters))		POD Use
		X	Y	
RG-A1575-POD 15	40	345898.4	3863925.8	Construction De-watering
RG-A1575-POD 7	45	345852.7	3863925.6	Construction De-watering
RG-00537 S-2	-	335360.5	3836465.8	Domestic, Industrial, Commercial
RG-95859 POD 2	20	325252.9	3771815.7	Monitoring
RG-95515 POD 6	15	325265	3771726.5	Monitoring
RG-40678 POD 1	225	263736.4	3831116.5	Livestock
B-01885 POD 4	20	241112.1	3892999	Monitoring
B-01714 POD5	15	240927.1	3893122.6	Monitoring
B-01714 POD 2	13	240881.7	3893152.4	Monitoring
B-00074	40	239721	3893522	Municipal
B-01728 POD 61	59	239254	3893746	Exploration
G-02380	650	182510.2	3891806.1	Livestock
G-03017-POD 10	50	181611.9	3893366	Monitoring
G-03017-POD 4	50	181584.4	3893368.2	Monitoring
G-03017-POD 14	41	181575.2	3893365.8	Monitoring
G-03017-POD 17	42	181572.1	3893366	Monitoring
G-03017-POD 16	50	181569.5	3893368.4	Monitoring
G-03017-POD 5	50	181560.7	3893366.9	Monitoring
G-03017-POD 3	40	181542.4	3893365.7	Monitoring
G-03017-POD 11	50	181527.9	3893362.8	Monitoring
G-03017-POD 1	38	181497.1	3893366.9	Monitoring
G-01573	225	177891	3892668	Domestic
Source: NM Office of the State Engineer – Point of Diversion (2024)				

G=Gallup Basin; B=Bluewater Basin; RG=Rio Grande Basin

Water Features: Point of Diversions (POD)



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over water features.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

PODs

PEN Fiber Regeneration Sites UPDATED 2_9_2024

PEN Fiber Optic Line UPDATED 2_9_2024

Roads

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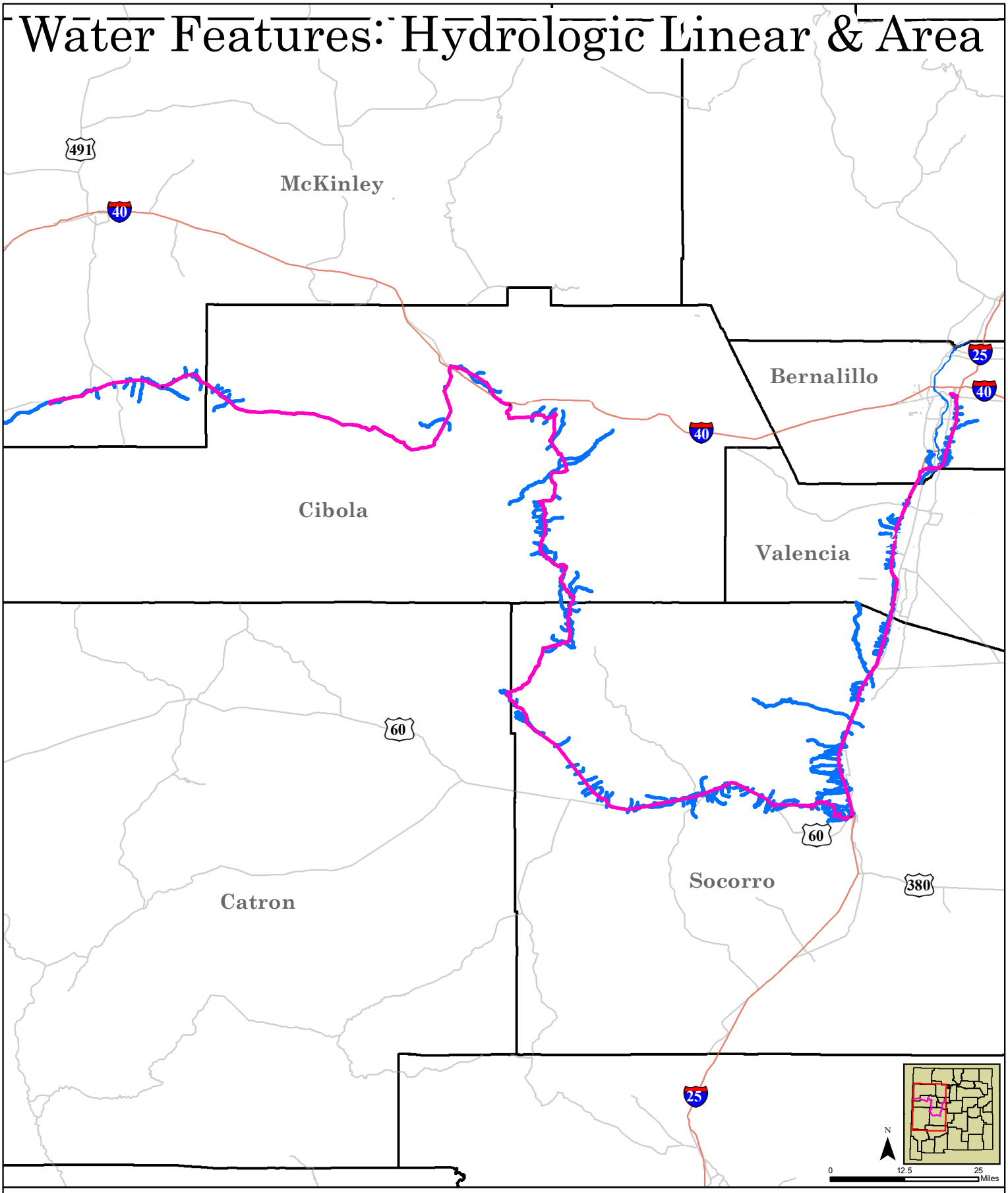
DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-5: 100-Year Floodplains within Proposed Project Area]

Water Features: Hydrologic Linear & Area



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over water features.

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COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

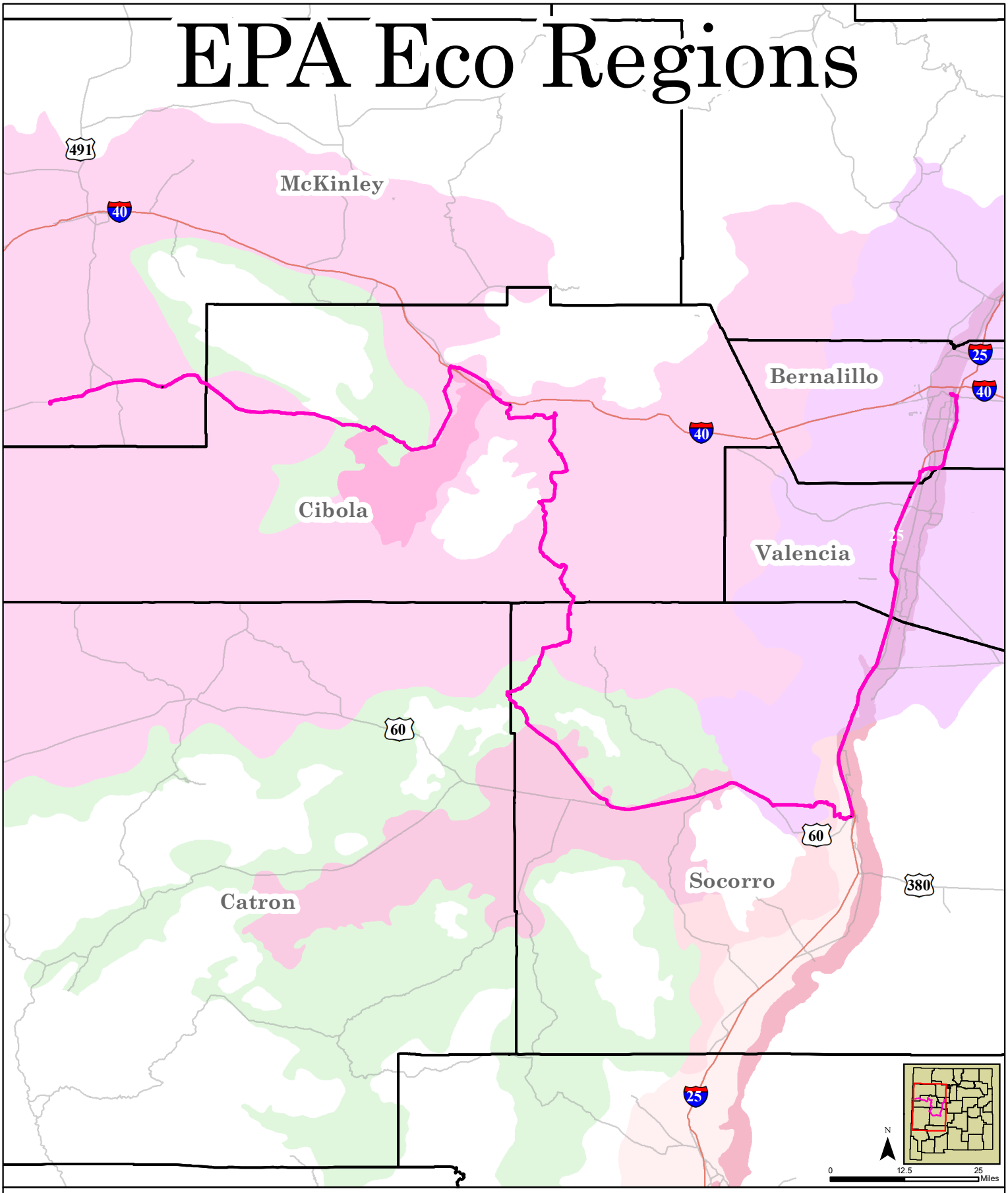
- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- PEN Fiber Optic Line UPDATED 2_9_2024
- Valencia_Area
- Bernalillo_Area
- Roads

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\EA\GIS\Water

DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-6: EPA Level IV Ecoregions Identified within the Proposed Project Area]

EPA Eco Regions



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over EPA Eco Regions.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

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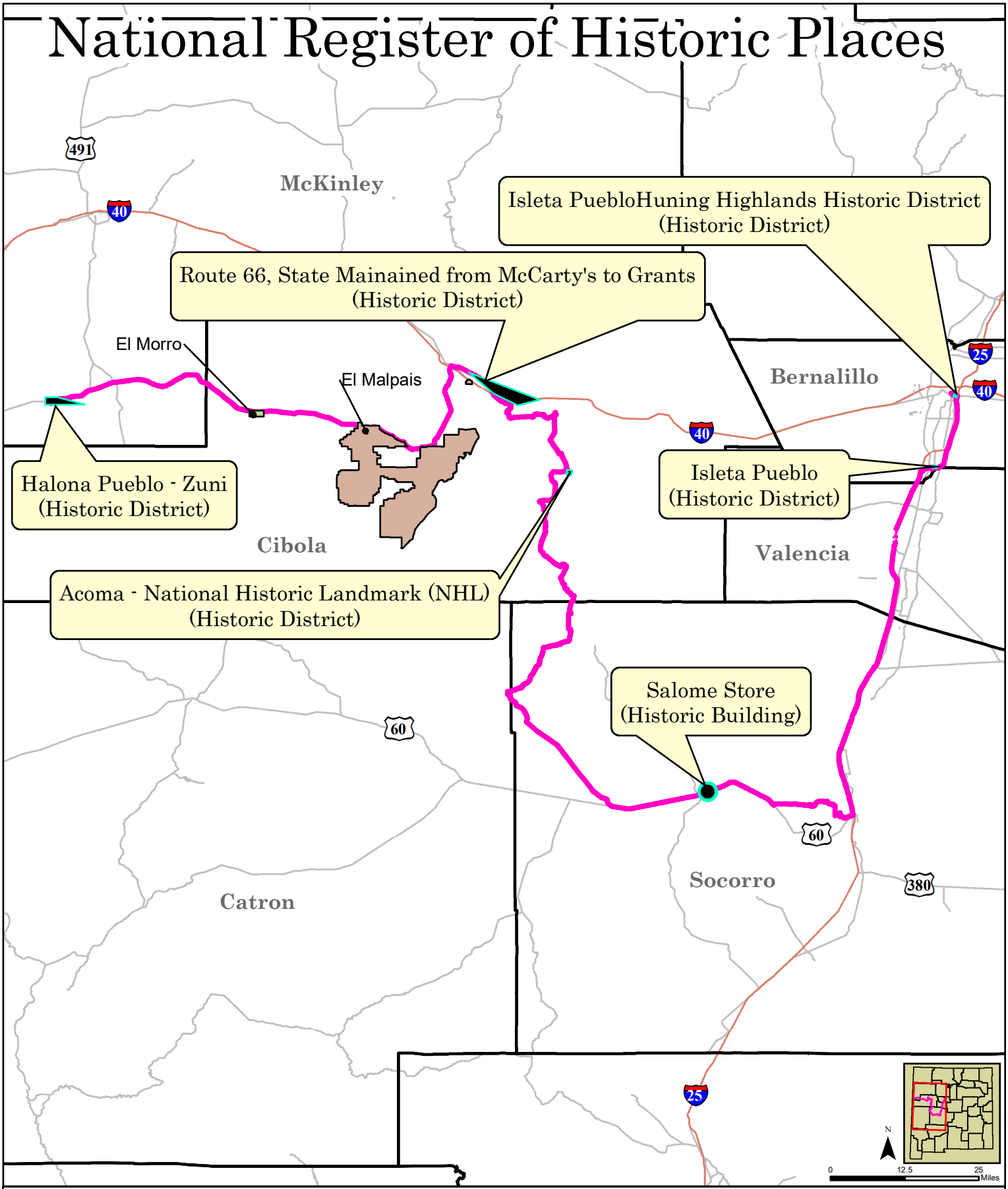
- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- PEN Fiber Optic Line UPDATED 2_9_2024
- Roads
- 22g Rio Grande Floodplain
- 22j Semiarid Tablelands
- 22k Lava Malpais
- 22l Plains of San Agustin
- 22m Albuquerque Basin
- 23e Conifer Woodlands and Savannas
- 24a Chihuahuan Basins and Playas
- 24b Chihuahuan Desert Grasslands
- 24f Rio Grande Floodplain

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\EA\GIS\Land

DRAWN BY: GIS Specialist, HWM on 3/25/2024

[Appendix D-7: National Register of Historic Places (NRHP) within the Proposed Project Area]

National Register of Historic Places



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) fiber line that crosses over National Register of Historic Places

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,352,000

PEN Fiber Optic Line UPDATED 2_9_2024

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DRAWN BY: GIS Specialist, HWM on 3/25/2024 Updated: 5/30/2024

Appendix E

Custom Soil Resource Report via NRCS Web Soil Survey

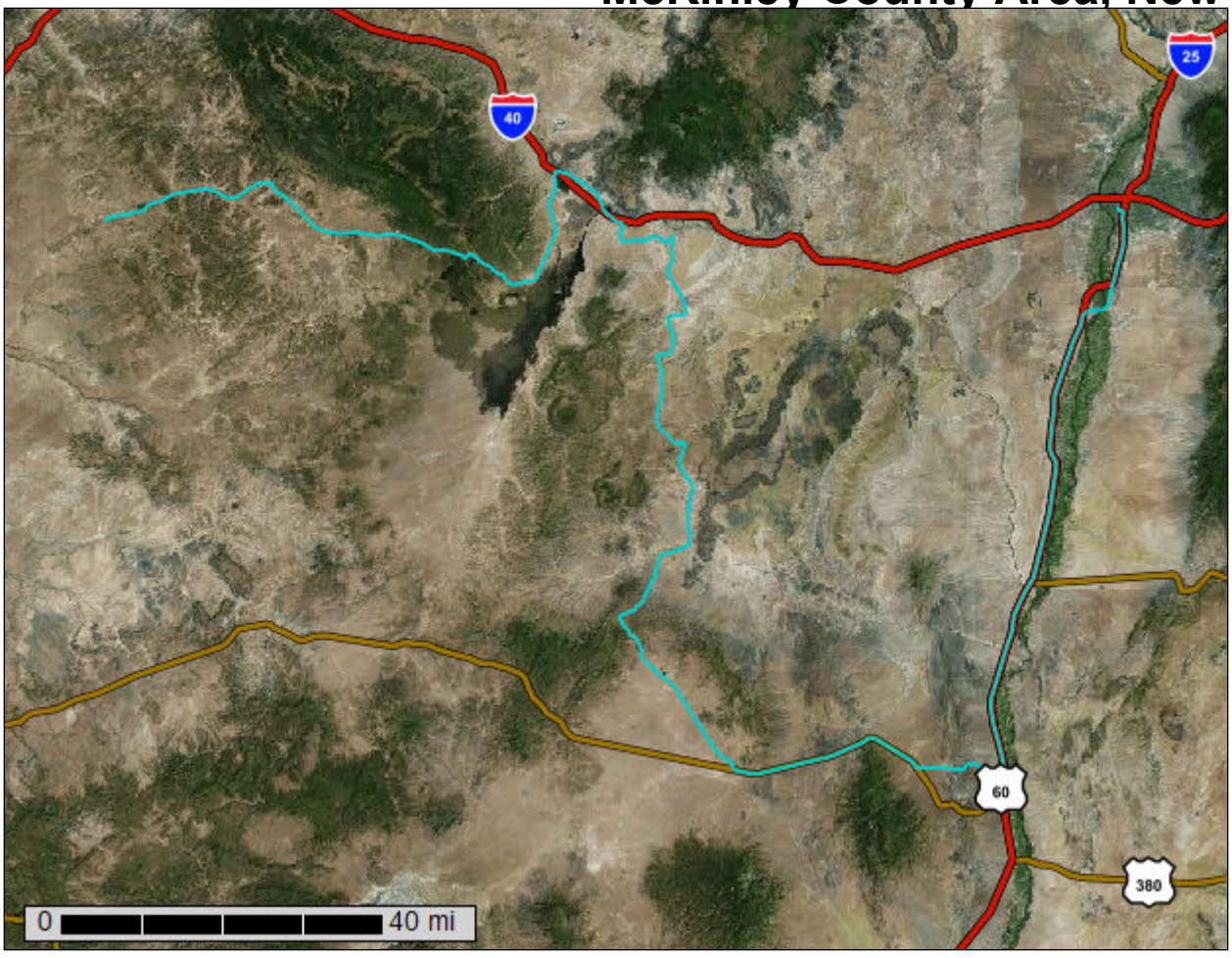
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico; Catron County, New Mexico, Northern Part; Cibola Area, New Mexico, Parts of Cibola, McKinley, and Valencia Counties; Cibola National Forest Area, New Mexico, Parts of Catron, Cibola, McKinley, Sandoval, Sierra and Socorro Counties; McKinley County Area, New



February 16, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:24,000 to 1:48,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico
Survey Area Data: Version 18, Sep 7, 2023

Soil Survey Area: Catron County, New Mexico, Northern Part
Survey Area Data: Version 18, Sep 7, 2023

Soil Survey Area: Cibola Area, New Mexico, Parts of Cibola, McKinley, and Valencia Counties
Survey Area Data: Version 19, Sep 7, 2023

Soil Survey Area: Cibola National Forest Area, New Mexico, Parts of Catron, Cibola, McKinley, Sandoval, Sierra and Socorro Counties
Survey Area Data: Version 5, Sep 7, 2023

Soil Survey Area: McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties
Survey Area Data: Version 18, Sep 7, 2023

Soil Survey Area: Socorro County Area, New Mexico
Survey Area Data: Version 19, Sep 7, 2023

MAP LEGEND

MAP INFORMATION

Soil Survey Area: Valencia County, New Mexico, Eastern Part
Survey Area Data: Version 18, Sep 7, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Af	Agua loam MLRA 42	0.6	0.0%
BCC	Bluepoint loamy fine sand, 1 to 9 percent slopes	30.0	2.0%
BKD	Bluepoint-Kokan association, hilly	32.6	2.2%
Cu	Cut and fill land	12.8	0.9%
GA	Gila fine sandy loam	1.1	0.1%
Gb	Gila loam, 0 to 1 percent slopes mlra 42-1	3.5	0.2%
Gk	Glendale loam MLRA 42	1.6	0.1%
Gm	Glendale clay loam, 0 to 1 percent slopes MLRA 42.1	1.2	0.1%
TP	Torrifluvents, frequently flooded	0.5	0.0%
VF	Vinton and Brazito soils, occasionally flooded	0.2	0.0%
WM	Wink-Madurez association	13.3	0.9%
Subtotals for Soil Survey Area		**97.5**	**6.6%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
382	Datil gravelly fine sandy loam, 1 to 6 percent slopes	8.4	0.6%
655	Majada-Lapdun very cobbly loams, 1 to 8 percent slopes	2.6	0.2%
Subtotals for Soil Survey Area		**11.0**	**0.7%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10	Lava flows	3.2	0.2%
20	Penistaja fine sandy loam, 1 to 3 percent slopes	16.9	1.1%
25	Hickman-Catman complex, 1 to 6 percent slopes	0.8	0.1%
30	Warm Springs loam, 0 to 2 percent slopes	3.9	0.3%
50	Venadito clay loam, 0 to 1 percent slopes	17.5	1.2%
51	Venadito sandy clay loam, 0 to 1 percent slopes	0.4	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
60	Sparank clay loam, 1 to 3 percent slopes	2.6	0.2%
61	Sparham clay loam, 0 to 2 percent slopes	3.8	0.3%
72	Catman variant clay loam, 1 to 3 percent slopes	3.9	0.3%
73	Catman sandy clay loam, 1 to 3 percent slopes	1.2	0.1%
75	Hickman sandy clay loam, 1 to 3 percent slopes	3.2	0.2%
100	Manzano loam, 1 to 5 percent slopes	5.0	0.3%
130	Laporte-Rock outcrop complex, 3 to 20 percent slopes	4.9	0.3%
200	Penistaja fine sandy loam, 2 to 10 percent slopes	31.2	2.1%
205	Ildefonso very gravelly sandy loam, 3 to 15 percent slopes	0.5	0.0%
218	Viuda-Penistaja-Rock outcrop complex, 1 to 10 percent slopes	12.9	0.9%
251	Skyvillage-Rock outcrop-Bond complex, 3 to 40 percent slopes	1.2	0.1%
257	Sparank-San Mateo complex, 0 to 5 percent slopes	34.9	2.4%
259	Mikim loam, 1 to 5 percent slopes	24.6	1.7%
330	Moreno loam, 1 to 10 percent slopes	0.0	0.0%
406	Poley-Rock outcrop complex, 2 to 25 percent slopes	0.4	0.0%
424	Mespun-Palma association, 1 to 12 percent slopes	5.7	0.4%
446	Harvey-Oelop association, 0 to 5 percent slopes	1.9	0.1%
485	Rock outcrop-Mion complex, 15 to 65 percent slopes	5.9	0.4%
487	Mion-Badland complex, 20 to 65 percent slopes	2.5	0.2%
505	Flugle-Goesling loamy fine sands, 1 to 8 percent slopes	57.8	3.9%
514	Raton-Rock outcrop complex, 1 to 10 percent slopes	1.5	0.1%
515	Rock outcrop-Vessilla-Mion complex, 3 to 55 percent slopes	12.9	0.9%
520	Celacy-Atarque complex, 1 to 10 percent slopes	29.4	2.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
522	Bandera association, 15 to 45 percent slopes	10.9	0.7%
523	Charo-Raton complex, 1 to 10 percent slopes	11.5	0.8%
525	Catman-Silkie association, 1 to 10 percent slopes	30.6	2.1%
535	Millpaw loam, 0 to 5 percent slopes	0.3	0.0%
536	McGaffey loam, 1 to 5 percent slopes	22.1	1.5%
550	Nogal-Galestina sandy loams, 1 to 10 percent slopes	4.5	0.3%
555	Pinitos-Ribera sandy loams, 1 to 10 percent slopes	0.0	0.0%
560	Flugle-Teco association, 1 to 8 percent slopes	35.8	2.4%
575	Teco-Atarque association, 1 to 8 percent slopes	50.0	3.4%
576	Teco sandy loam, 2 to 5 percent slopes	4.6	0.3%
577	Cabezon-Montecito-Rock outcrop association, 1 to 10 percent slopes	10.7	0.7%
581	Laporte-Vessilla complex, 3 to 15 percent slopes	7.2	0.5%
586	Venadito-Teco association, 0 to 10 percent slopes	16.2	1.1%
620	Aparejo-Venadito complex, 1 to 5 percent slopes	2.8	0.2%
625	Hagerman-Bond association, 1 to 10 percent slopes	50.5	3.4%
Subtotals for Soil Survey Area		**548.6**	**37.1%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
NOTCOM	No Digital Data Available	24.5	1.7%
Subtotals for Soil Survey Area		**24.5**	**1.7%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
30	Orlie-Tinian complex, 1 to 6 percent slopes	6.4	0.4%
42	Suwanee clay loam, 0 to 2 percent slopes	2.9	0.2%
47	Conchovar clay loam, 0 to 1 percent slopes	0.2	0.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
49	Concho clay loam, 0 to 2 percent slopes	4.4	0.3%
53	Hawaikuh clay loam, 0 to 2 percent slopes	3.7	0.3%
60	Redpen sandy clay loam, 0 to 2 percent slopes	6.0	0.4%
225	Aquima-Hawaikuh complex, 1 to 5 percent slopes	10.6	0.7%
310	Parkelei sandy loam, 1 to 8 percent slopes	11.7	0.8%
315	Flugle-Fragua complex, 1 to 10 percent slopes	6.1	0.4%
320	Parkelei-Fraguni complex, 1 to 8 percent slopes	3.2	0.2%
335	Venadito clay, 1 to 3 percent slopes	0.9	0.1%
352	Zia sandy loam, 1 to 5 percent slopes	6.9	0.5%
353	Mido loamy fine sand, 1 to 6 percent slopes	2.0	0.1%
360	Hosta-Concho association, 0 to 5 percent slopes	28.4	1.9%
575	Ramah-Pescado association, 1 to 8 percent slopes	5.6	0.4%
Subtotals for Soil Survey Area		**99.0**	**6.7%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
11	Armijo clay, 0 to 1 percent slopes	1.1	0.1%
14	Saneli clay, 0 to 1 percent slopes	1.2	0.1%
22	Glendale clay loam, 0 to 1 percent slopes	3.5	0.2%
37	Agua clay loam, 0 to 1 percent slopes	0.5	0.0%
44	Anthony sandy loam, 0 to 1 percent slopes	1.0	0.1%
48	Anthony variant sandy clay loam, 0 to 1 percent slopes	1.3	0.1%
50	Brazito fine sandy loam, 0 to 1 percent slopes	0.6	0.0%
52	Saneli clay, thin surface, 0 to 1 percent slopes	2.6	0.2%
88	Whitlock-Pajarito-Nations complex, 1 to 8 percent slopes	4.3	0.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
111	Armijo-Urban land complex, 0 to 1 percent slopes	2.5	0.2%
114	Saneli-Urban land complex, 0 to 1 percent slopes	4.1	0.3%
116	Caliza variant-Urban land complex, 1 to 5 percent slopes	10.8	0.7%
118	Arizo very stony loamy sand, 1 to 3 percent slopes	1.6	0.1%
120	Adelino variant-Caliza very stony sandy loams, 15 to 50 percent slopes	2.1	0.1%
124	Caliza very gravelly sandy loam, 1 to 7 percent slopes	1.7	0.1%
128	Turney variant gravelly sandy loam, 1 to 7 percent slopes	4.6	0.3%
214	Saneli clay, occasionally flooded, 0 to 1 percent slopes	0.2	0.0%
222	Glendale clay loam, occasionally flooded, 0 to 1 percent slopes	0.2	0.0%
244	Anthony sandy loam, occasionally flooded, 0 to 1 percent slopes	0.5	0.0%
250	Brazito fine sandy loam, occasionally flooded, 0 to 1 percent slopes	1.7	0.1%
401	Motoqua-Rock outcrop complex, 10 to 45 percent slopes	5.4	0.4%
403	Puertecito-Rock outcrop complex, 5 to 55 percent slopes	18.4	1.2%
404	Motoqua, cool-Rock outcrop complex, 15 to 50 percent slopes	1.4	0.1%
410	Clovis-Penistaja association, 1 to 10 percent slopes	29.9	2.0%
419	Navajo-Alicia association, 0 to 4 percent slopes	2.5	0.2%
421	Glenberg-Riverwash association, 0 to 5 percent slopes	7.0	0.5%
424	Manzano silt loam, 1 to 3 percent slopes	7.5	0.5%
425	Sparank silty clay loam, 0 to 2 percent slopes	6.1	0.4%
445	Millett-Sedillo complex, 1 to 15 percent slopes	60.6	4.1%
449	Cascajo very gravelly sandy loam, 15 to 30 percent slopes	1.2	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
452	Telescope-Royosa association, 1 to 3 percent slopes	7.0	0.5%
455	Datil sandy loam, 3 to 15 percent slopes	3.3	0.2%
460	Lapdun-Datil association, 5 to 30 percent slopes	59.3	4.0%
472	Abrazo-Motoqua, cool-Rock outcrop complex, 10 to 50 percent slopes	1.3	0.1%
478	Royosa-Loarc association, 1 to 5 percent slopes	38.3	2.6%
479	Augustine fine sandy loam, 1 to 6 percent slopes	34.4	2.3%
484	Mion-San Mateo-Rock outcrop association, 1 to 10 percent slopes	35.8	2.4%
491	Riverwash	2.1	0.1%
510	Guy-Dioxice-Pena association, 1 to 8 percent slopes	1.6	0.1%
530	Loarc loamy sand, 1 to 12 percent slopes	28.5	1.9%
556	Loarc-Datil-Majada association, 2 to 12 percent slopes	24.7	1.7%
585	Rock outcrop-Travessilla complex, 1 to 10 percent slopes	4.8	0.3%
620	Bluepoint loamy fine sand, 1 to 9 percent slopes	56.4	3.8%
621	Arizo-Riverwash complex, 0 to 5 percent slopes	15.8	1.1%
648	Armijo-Glendale-Bluepoint association, 0 to 3 percent slopes	13.0	0.9%
649	Nickel-Caliza very gravelly sandy loams, 1 to 30 percent slopes	35.5	2.4%
655	Nolam gravelly sandy loam, 1 to 7 percent slopes	17.9	1.2%
660	Dune land	6.6	0.4%
690	Bluepoint-Caliza complex, 1 to 30 percent slopes	11.1	0.8%
786	Rock outcrop-Badland complex, 25 to 100 percent slopes	1.7	0.1%
Subtotals for Soil Survey Area		**585.0**	**39.5%**
Totals for Area of Interest		**1,479.3**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BK	Bluepoint loamy sand, hilly	3.5	0.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Bm	Bluepoint loamy fine sand, 1 to 3 percent slopes	22.5	1.5%
Bn	Bluepoint loamy fine sand, 1 to 9 percent slopes	0.7	0.0%
BO	Bluepoint loamy fine sand, 1 to 9 percent slopes	37.1	2.5%
BP	Bluepoint loamy fine sand, hummocky	23.6	1.6%
Br	Bluepoint sandy clay loam, 1 to 3 percent slopes	2.5	0.2%
CE	Caliza-Bluepoint complex, 1 to 25 percent slopes	0.7	0.0%
Gd	Gila loam, 0 to 1 percent slopes mlra 42-1	0.3	0.0%
Gk	Gila clay loam	0.3	0.0%
MK	Madurez-Wink association, undulating	5.1	0.3%
Rv	Riverwash	0.2	0.0%
Vd	Vinton loamy fine sand	1.2	0.1%
Vg	Vinton loam	1.0	0.1%
WU	Wink-Madurez association, gently sloping	14.9	1.0%
Subtotals for Soil Survey Area		**113.7**	**7.7%**
Totals for Area of Interest		**1,479.3**	**100.0%**

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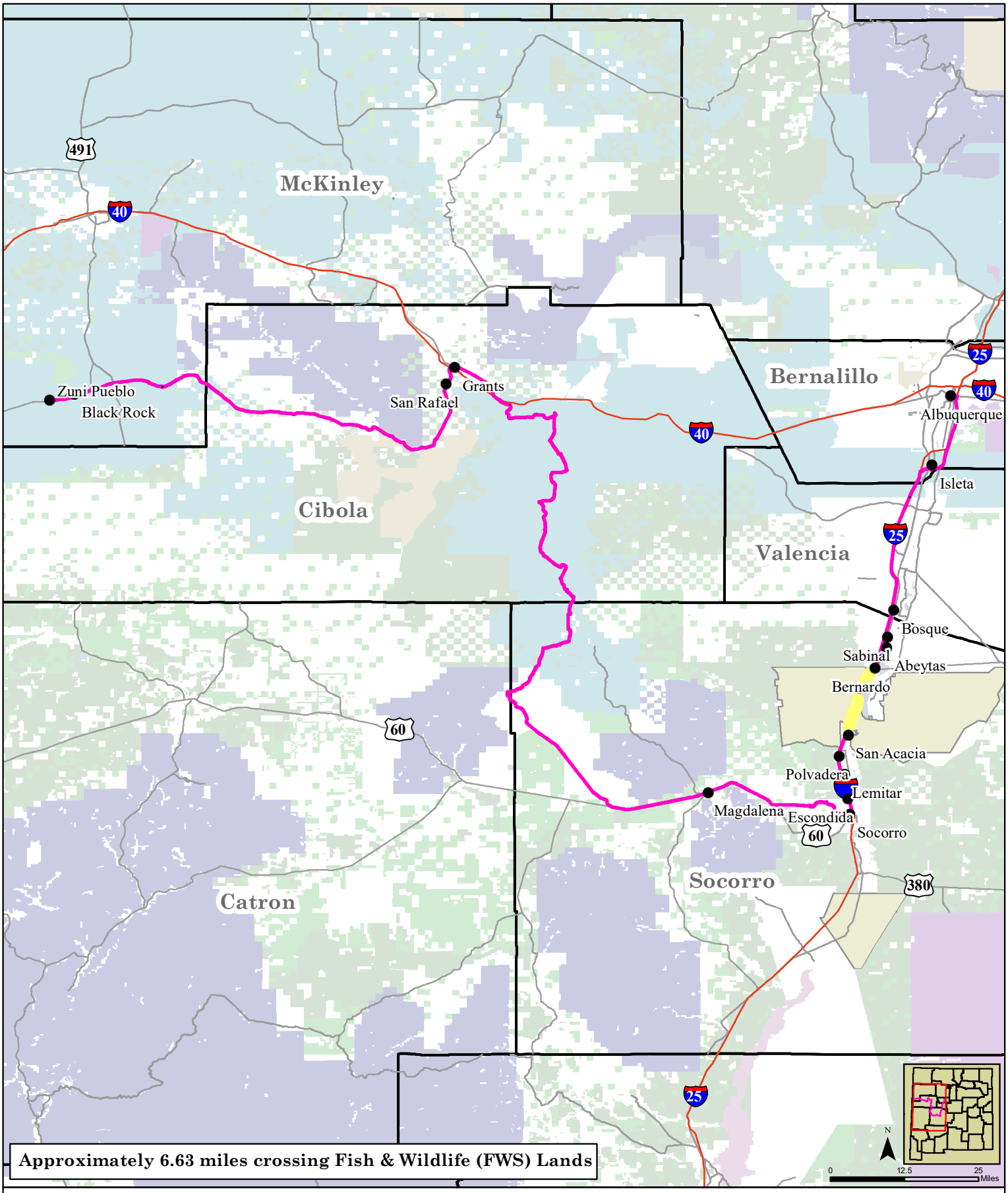
Appendix F

Federal Cooperating Agency Maps (FWS, BLM, NPS, BIA)



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over FWS lands.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

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- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- Crossing FWS Lands
- PEN Fiber Optic Line UPDATED 2_9_2024
- Roads
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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DRAWN BY: GIS Specialist, HWM on 1/19/2024

Approximately 1.84 miles total crossing a portion of the Sevilleta Refuge (Sevilleta Land Grant)

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over the Sevilleta Refuge (Sevilleta Land Grant, map 1 of 3)

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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- PEN Handholes
- BLM PLSS Township
- PLSS Sections
- FWS
- PEN Fiber Optic Line 12_19_2023
- Roads
- Fish & Wildlife Service (FWS)
- Private (P)

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DRAWN BY: GIS Specialist, HWM on 1/19/2024

Approximately 4.78 miles crossing a portion of the Sevilleta Refuge (Sevilleta Land Grant)

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over the Sevilleta Refuge (Sevilleta Land Grant, map 2 of 3).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

PEN Handholes
BLM PLSS Township
PLSS Sections
FWS
PEN Fiber Optic Line 12_19_2023
Roads
Private (P)
NM State Game & Fish (SGF)
Fish & Wildlife Service (FWS)

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DRAWN BY: GIS Specialist, HWM on 1/19/2024

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over the Sevilleta Refuge (Sevilleta Land Grant, map 3 of 3)

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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- PEN Handholes
- BLM PLSS Township
- PLSS Sections
- FWS
- PEN Fiber Optic Line 12_19_2023
- Roads
- Fish & Wildlife Service (FWS)
- Private (P)
- State (S)

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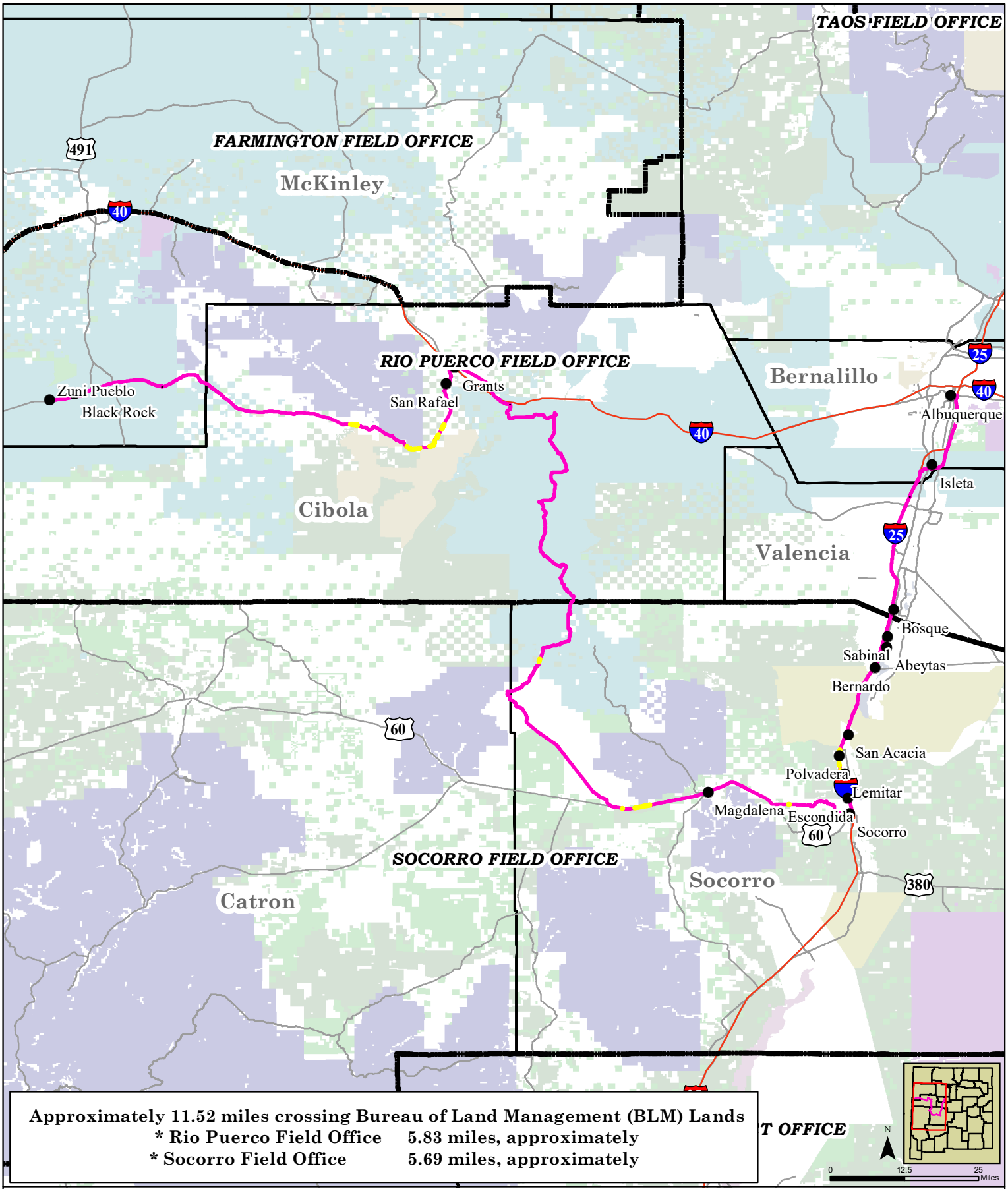
DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 11.52 miles crossing Bureau of Land Management (BLM) Lands
*** Rio Puerco Field Office 5.83 miles, approximately**
*** Socorro Field Office 5.69 miles, approximately**

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over BLM lands.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

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- PEN Fiber Regeneration Sites UPDATED 2_9_2024
- Crossing BLM Land
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- Roads
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- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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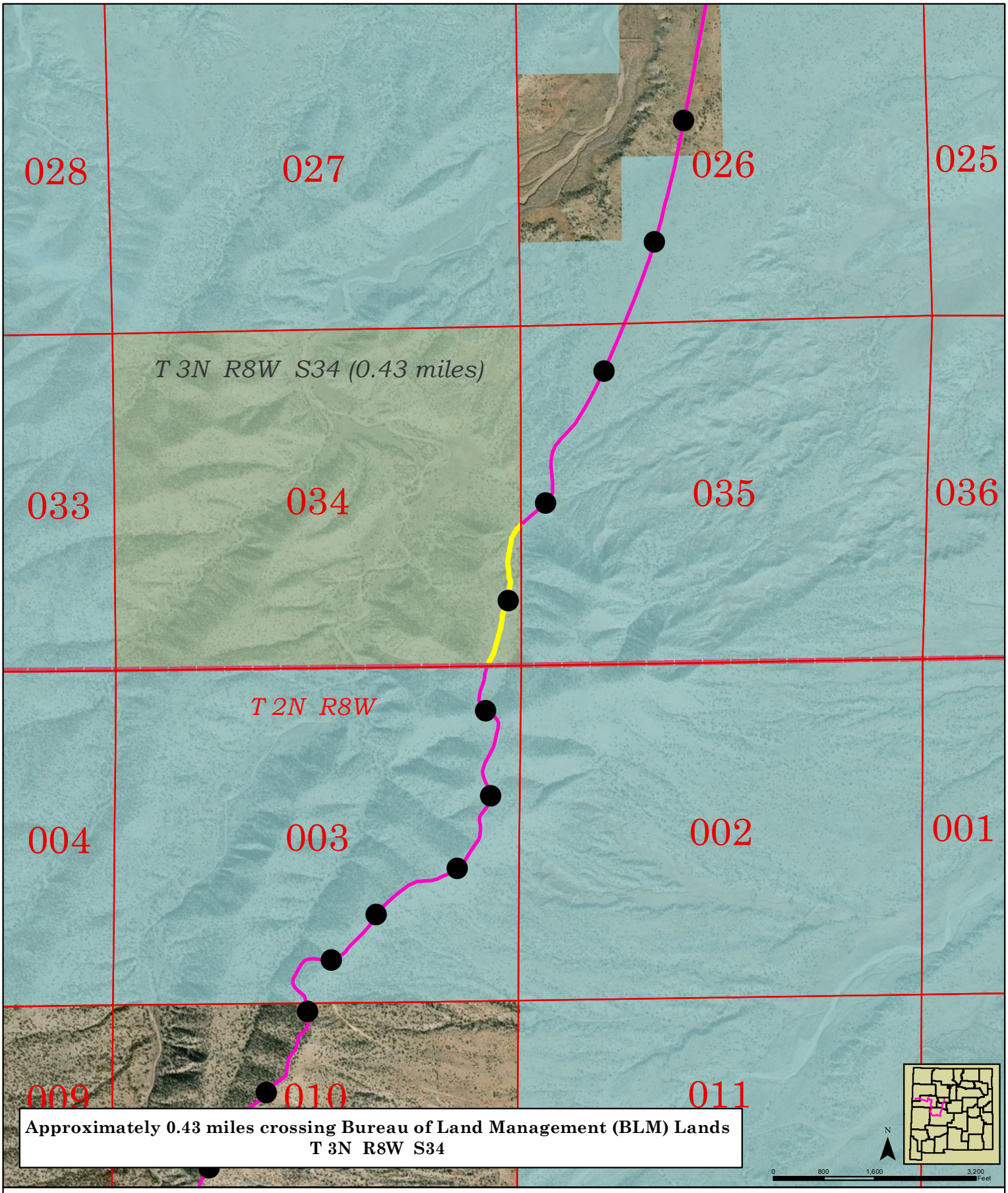
DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Socorro, map 1 of 6).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

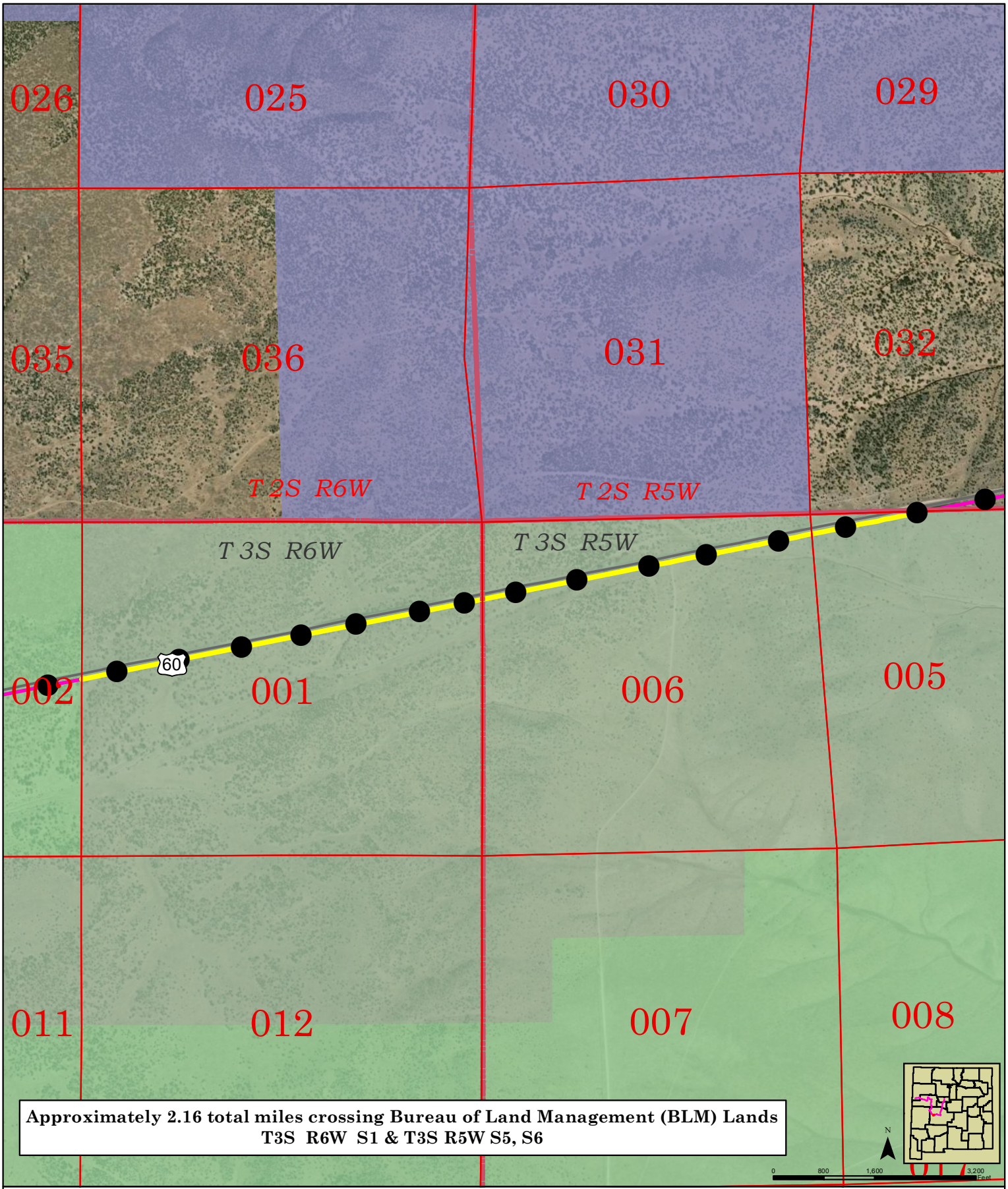
COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- PEN Handholes
- PLSS Sections
- BLM PLSS Township
- Crossing BLM Land
- PEN Fiber Optic Line 12_19_2023
- Roads
- Bureau of Land Management (BLM)
- Tribal/Indian (I)
- Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Socorro map 2 of 6).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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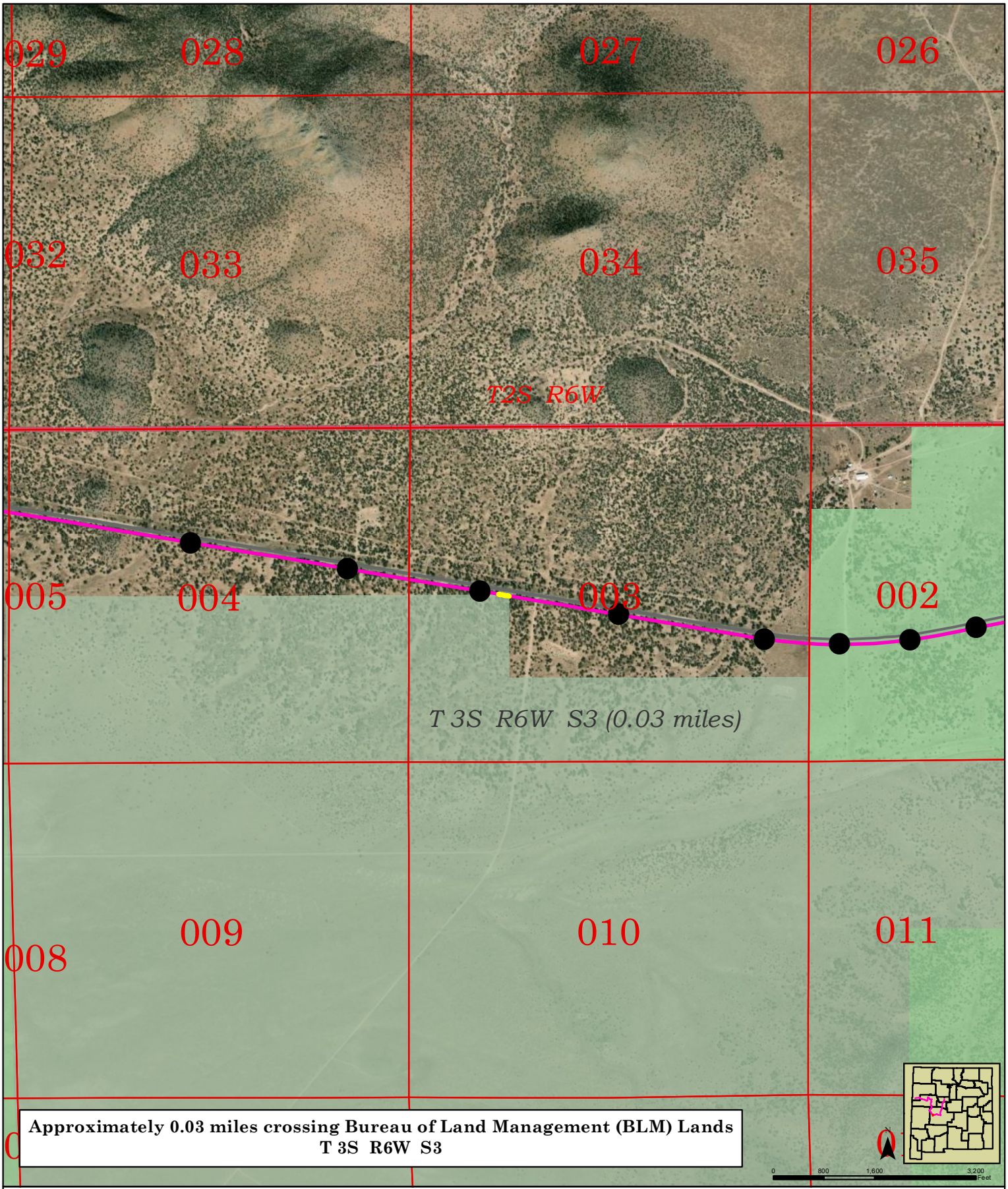
- PEN Handholes
- PLSS Sections
- BLM PLSS Township
- Crossing BLM Land
- PEN Fiber Optic Line 12_19_2023
- Roads
- Bureau of Land Management (BLM)
- Forest Service (FS)
- Private (P)
- State (S)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands. (Map 3 of 6)

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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PEN Handholes
PLSS Sections
BLM PLSS Township
Crossing BLM Land
PEN Fiber Optic Line 12_19_2023
Roads
Bureau of Land Management (BLM)
Private (P)
State (S)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

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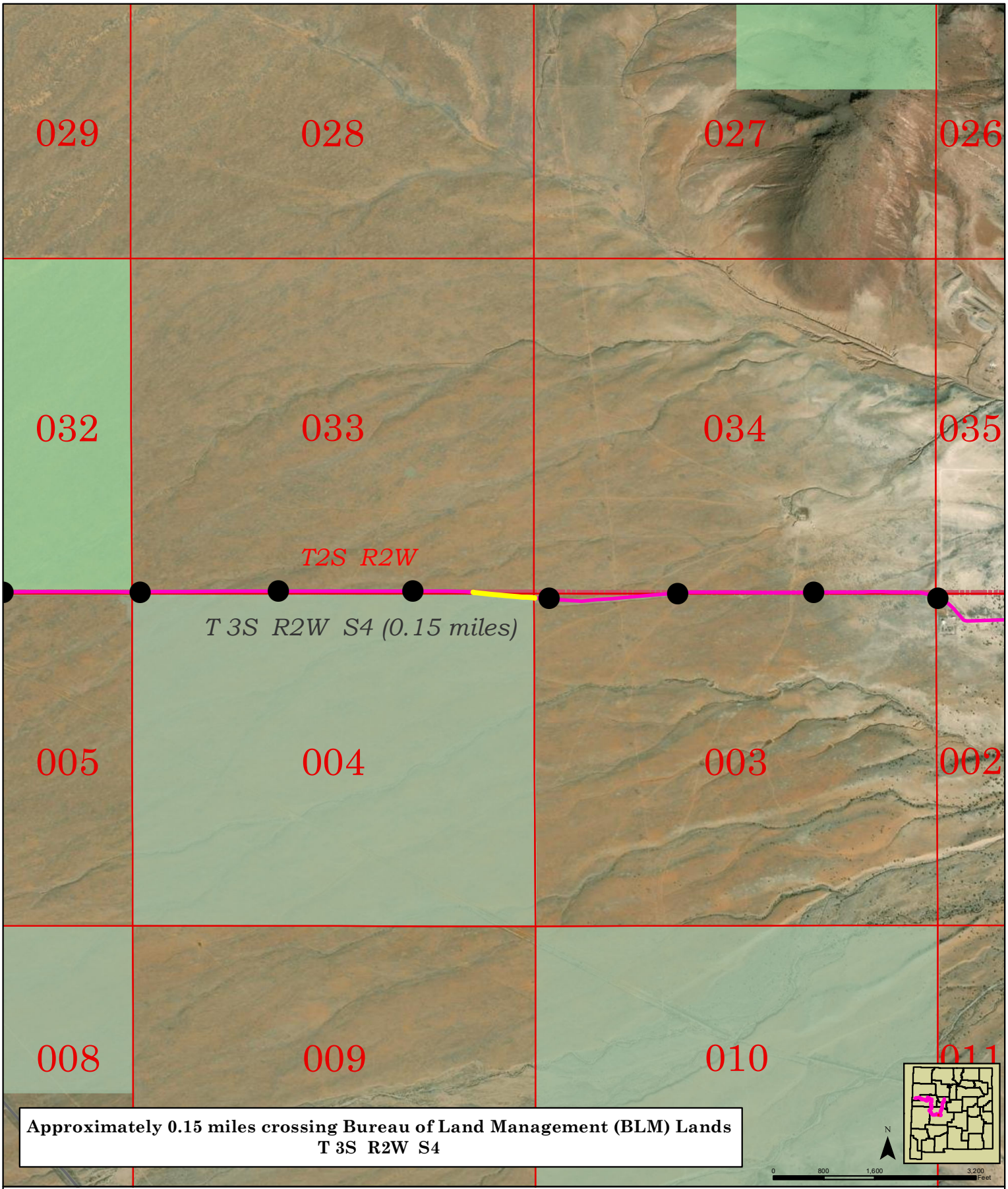

Approximately 0.15 miles crossing Bureau of Land Management (BLM) Lands
T 3S R2W S4

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands. (Map 4 of 6)

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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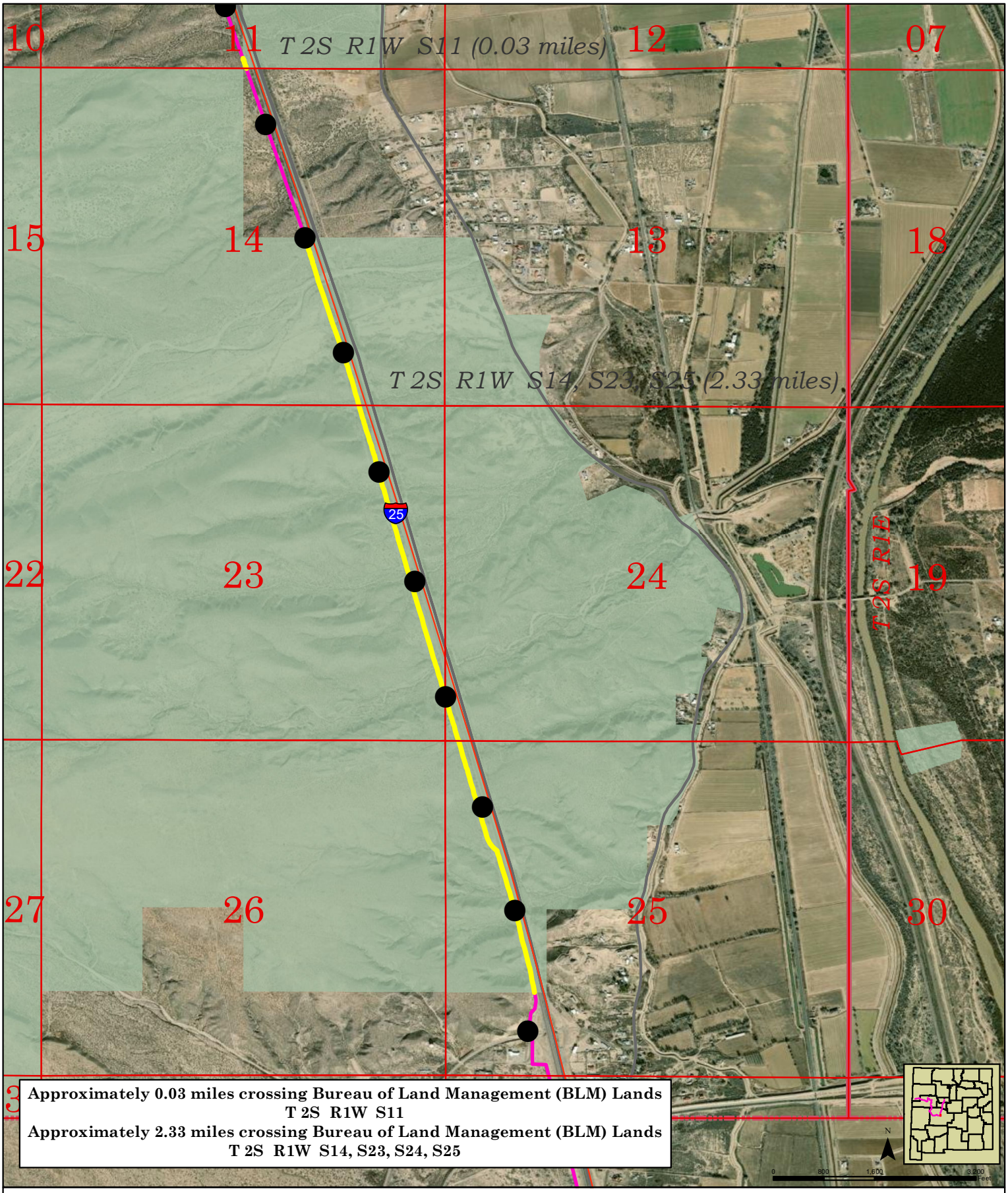
PEN Handholes
Crossing BLM Land
PEN Fiber Optic Line 12_19_2023
PLSS Sections
BLM PLSS Township
Roads
Bureau of Land Management (BLM)
Private (P)
State (S)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 0.03 miles crossing Bureau of Land Management (BLM) Lands
T 2S R1W S11
Approximately 2.33 miles crossing Bureau of Land Management (BLM) Lands
T 2S R1W S14, S23, S24, S25

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Socorro map 5 of 6).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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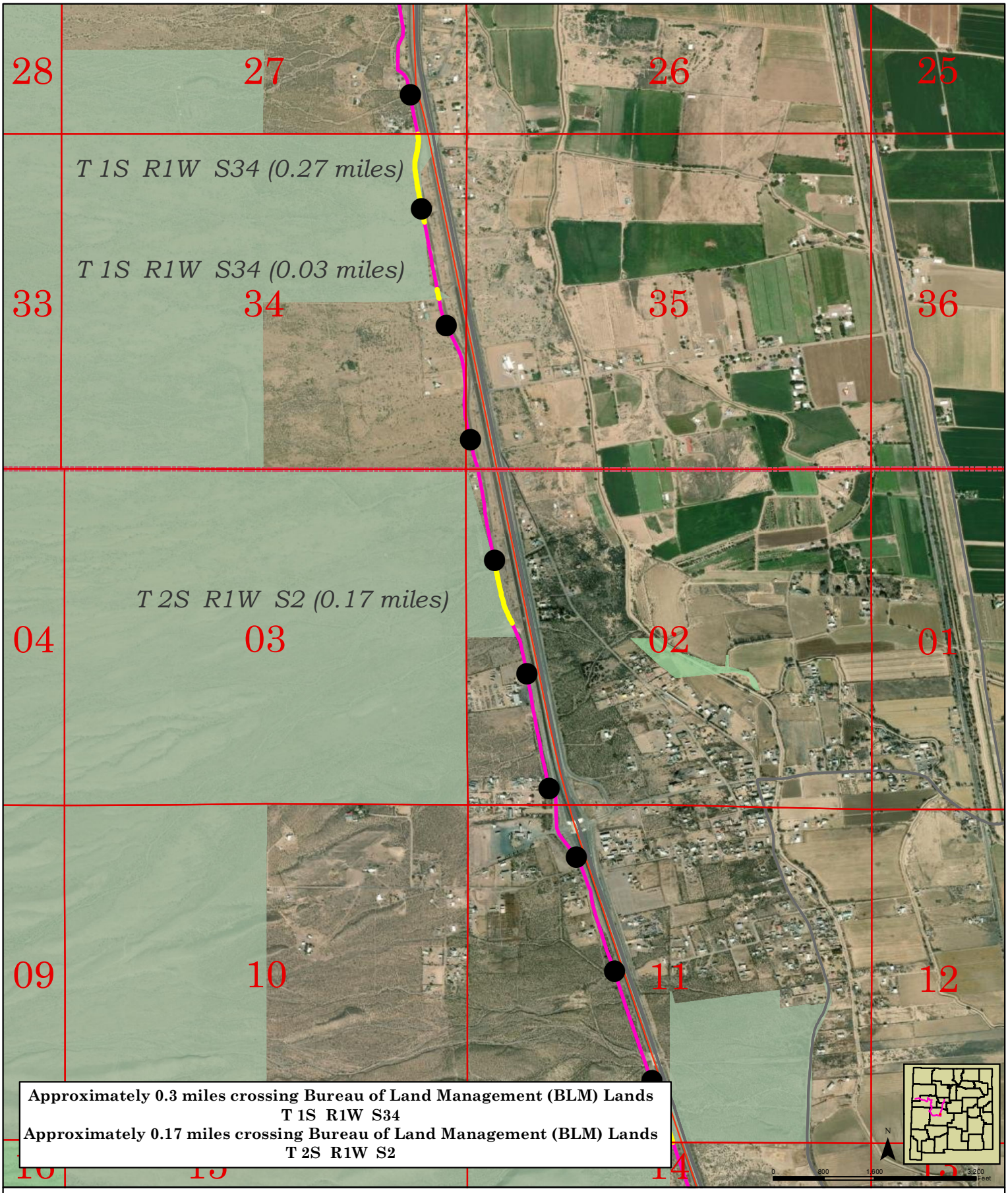
- PEN Handholes
- BLM PLSS Township
- PLSS Sections
- Crossing BLM Land
- PEN Fiber Optic Line 12_19_2023
- Roads
- Bureau of Land Management (BLM)

Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Socorro, map 6 of 6).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico East (US Feet) Scale:1:24,000

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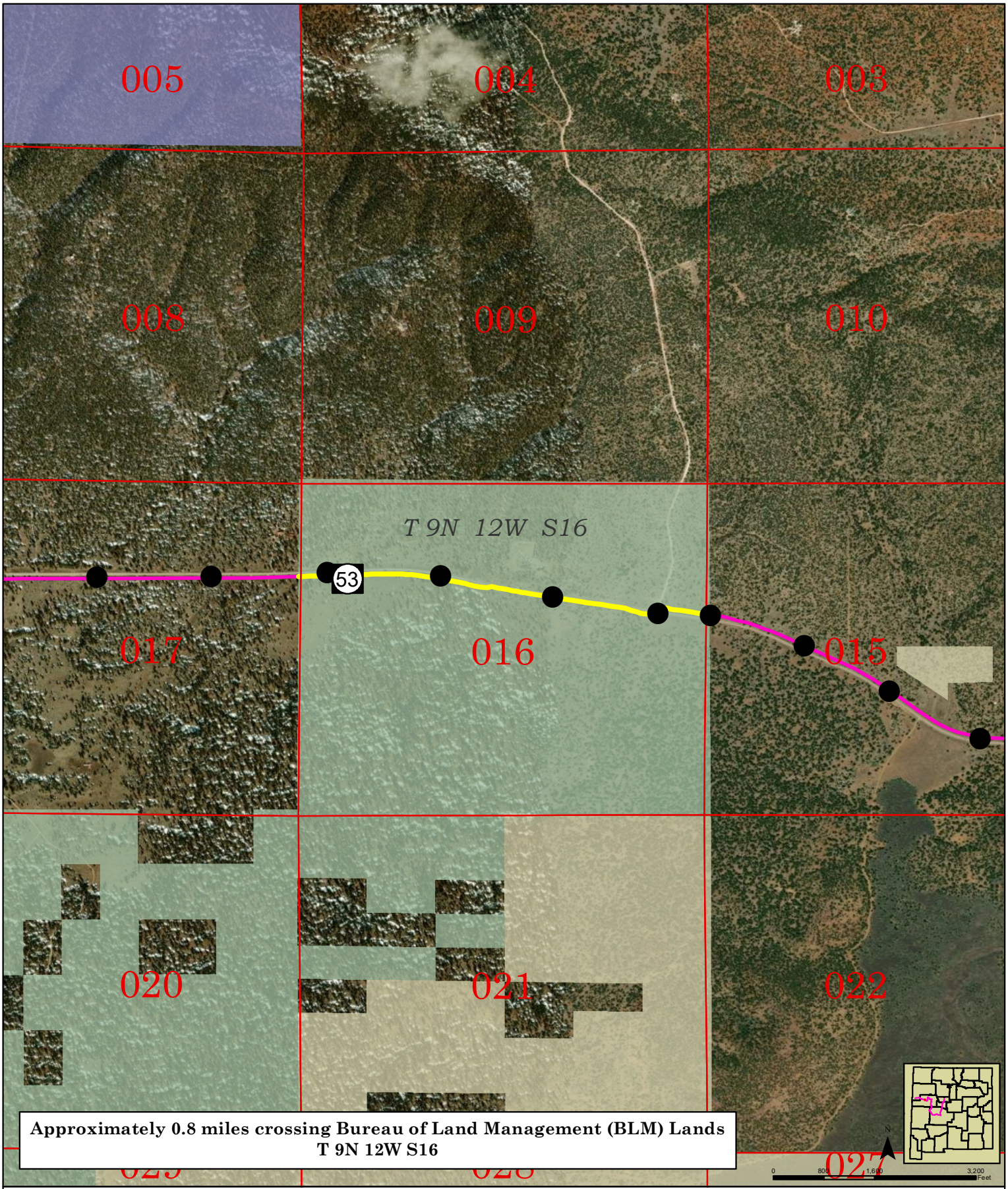
- PEN Handholes
- BLM PLSS Township
- PLSS Sections
- Crossing BLM Land
- PEN Fiber Optic Line 12_19_2023
- Roads
- Bureau of Land Management (BLM)
- Private (P)
- State (S)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 0.8 miles crossing Bureau of Land Management (BLM) Lands
T 9N 12W S16

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Rio Puero, map 1 of 4).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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- PEN Handholes
- Crossing BLM Land
- BLM PLSS Township
- PEN Fiber Optic Line 12_19_2023
- Roads
- PLSS Sections
- Bureau of Land Management (BLM)
- Forest Service (FS)
- National Park Service (NPS)
- Private (P)

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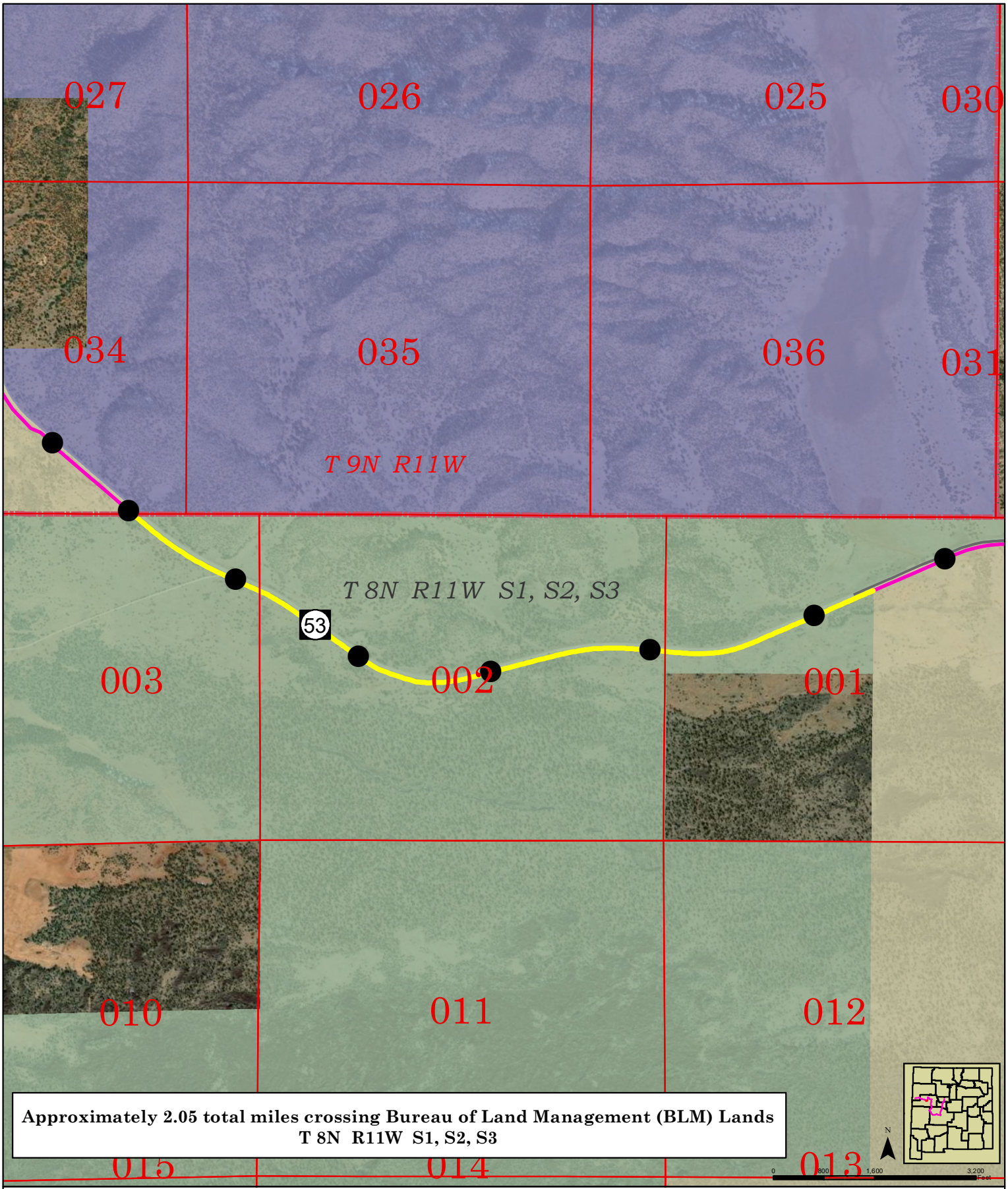

Approximately 2.05 total miles crossing Bureau of Land Management (BLM) Lands
T 8N R11W S1, S2, S3

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Rio Puero, map 2 of 4).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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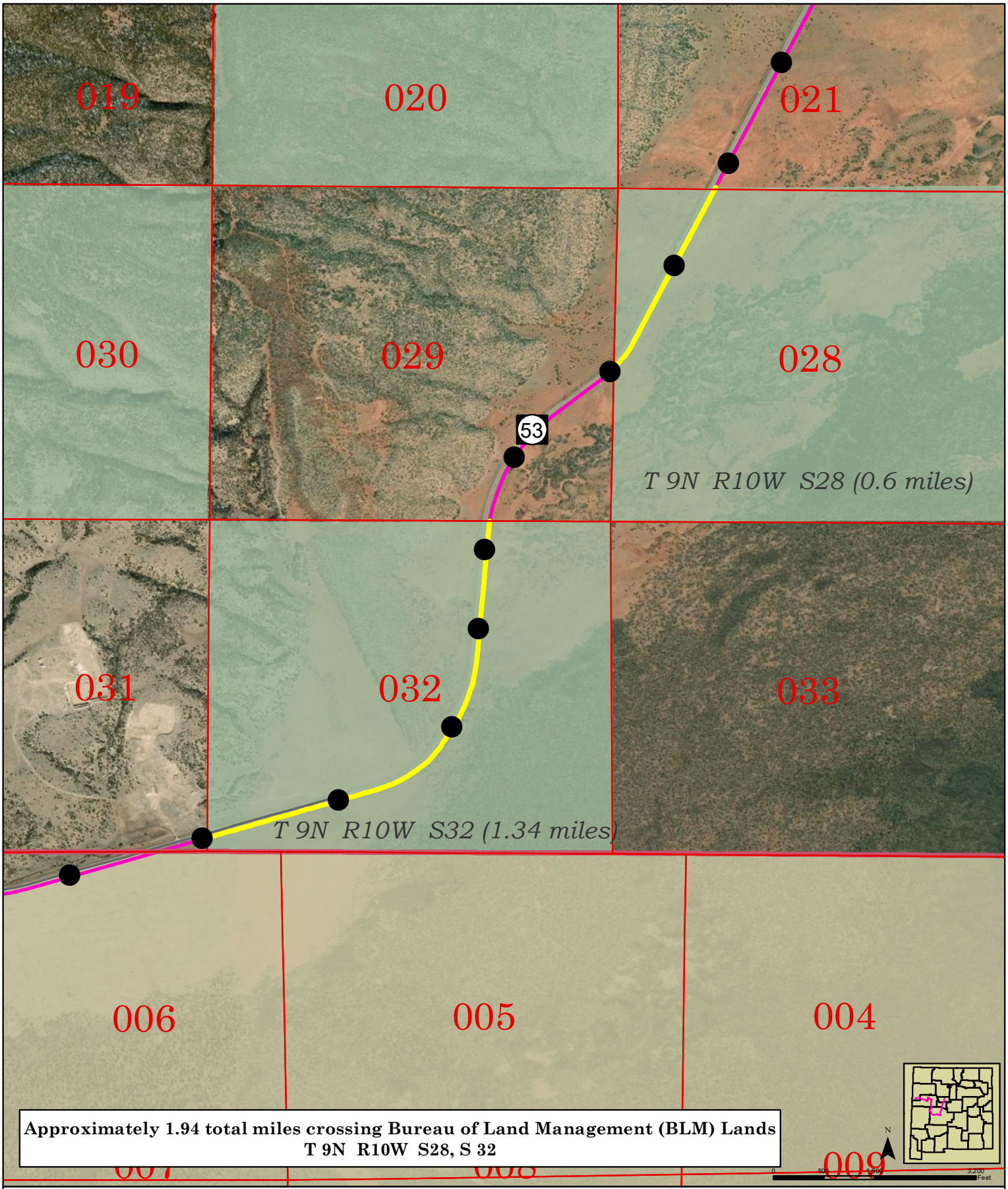
- PEN Handholes
- Crossing BLM Land
- BLM PLSS Township
- PEN Fiber Optic Line 12_19_2023
- Roads
- PLSS Sections
- Bureau of Land Management (BLM)
- Forest Service (FS)
- National Park Service (NPS)
- Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Rio Puero map 3 of 4).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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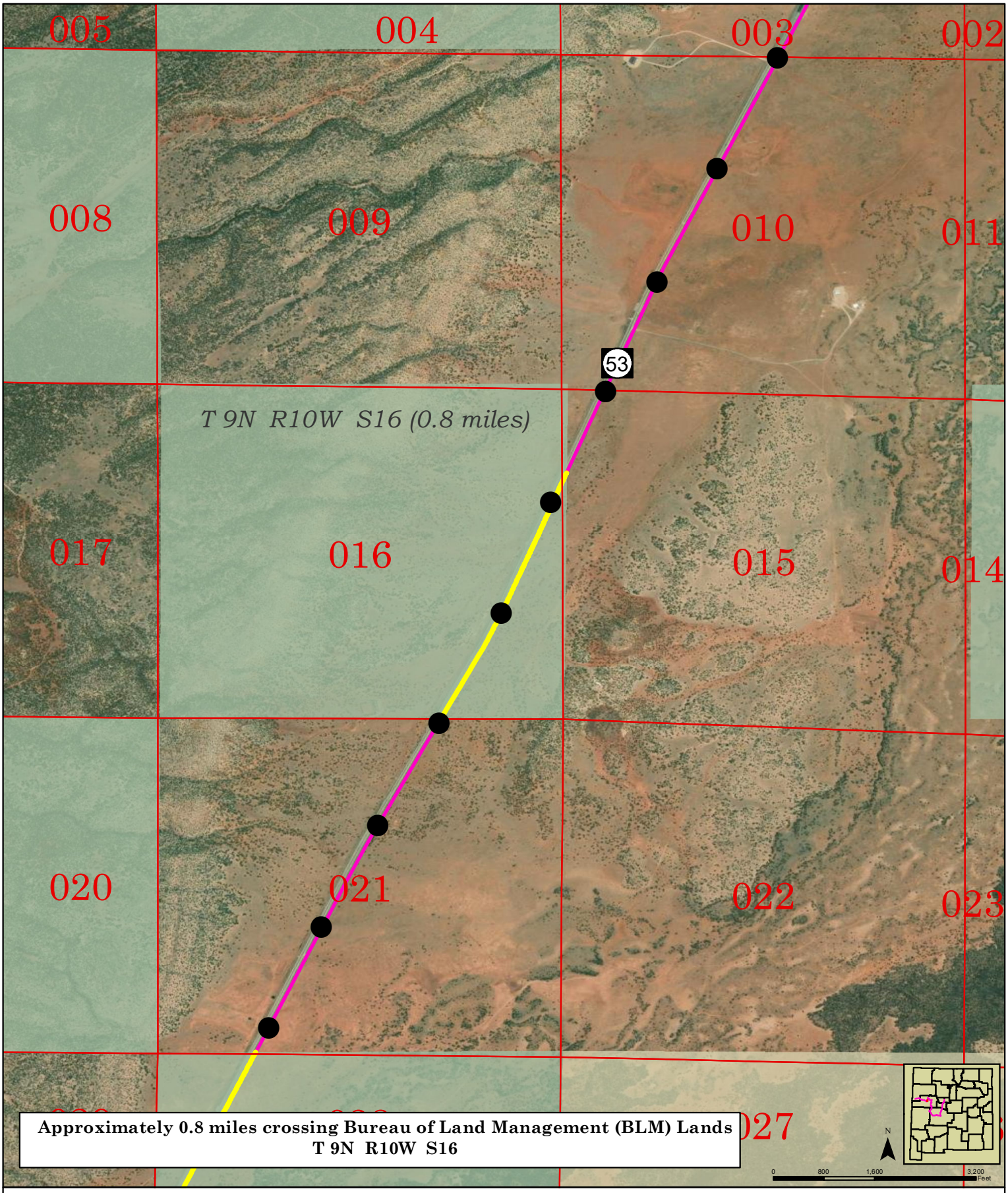
- PEN Handholes
- Crossing BLM Land
- BLM PLSS Township
- PEN Fiber Optic Line 12_19_2023
- Roads
- PLSS Sections
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 0.8 miles crossing Bureau of Land Management (BLM) Lands
T 9N R10W S16

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over BLM lands (Rio Puerco map 4 of 4).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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- PEN Handholes
- Crossing BLM Land
- BLM PLSS Township
- PEN Fiber Optic Line 12_19_2023
- Roads
- PLSS Sections
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\BLM\MXDs\11x8.5 Size

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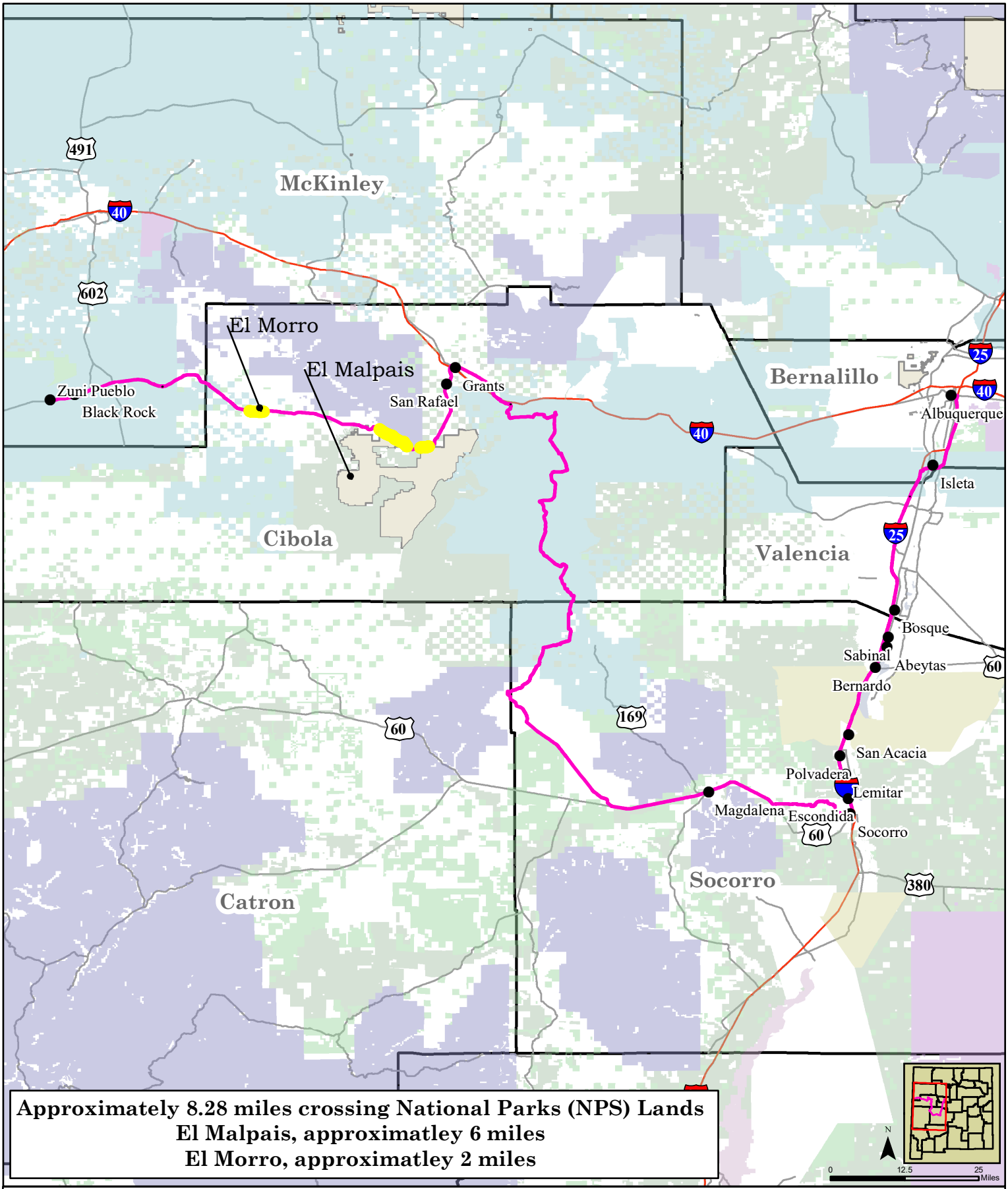

Approximately 8.28 miles crossing National Parks (NPS) Lands
El Malpais, approximatley 6 miles
El Morro, approximatley 2 miles

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict an overview of the Pueblo Education Network (PEN) line that crosses over NPS lands.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

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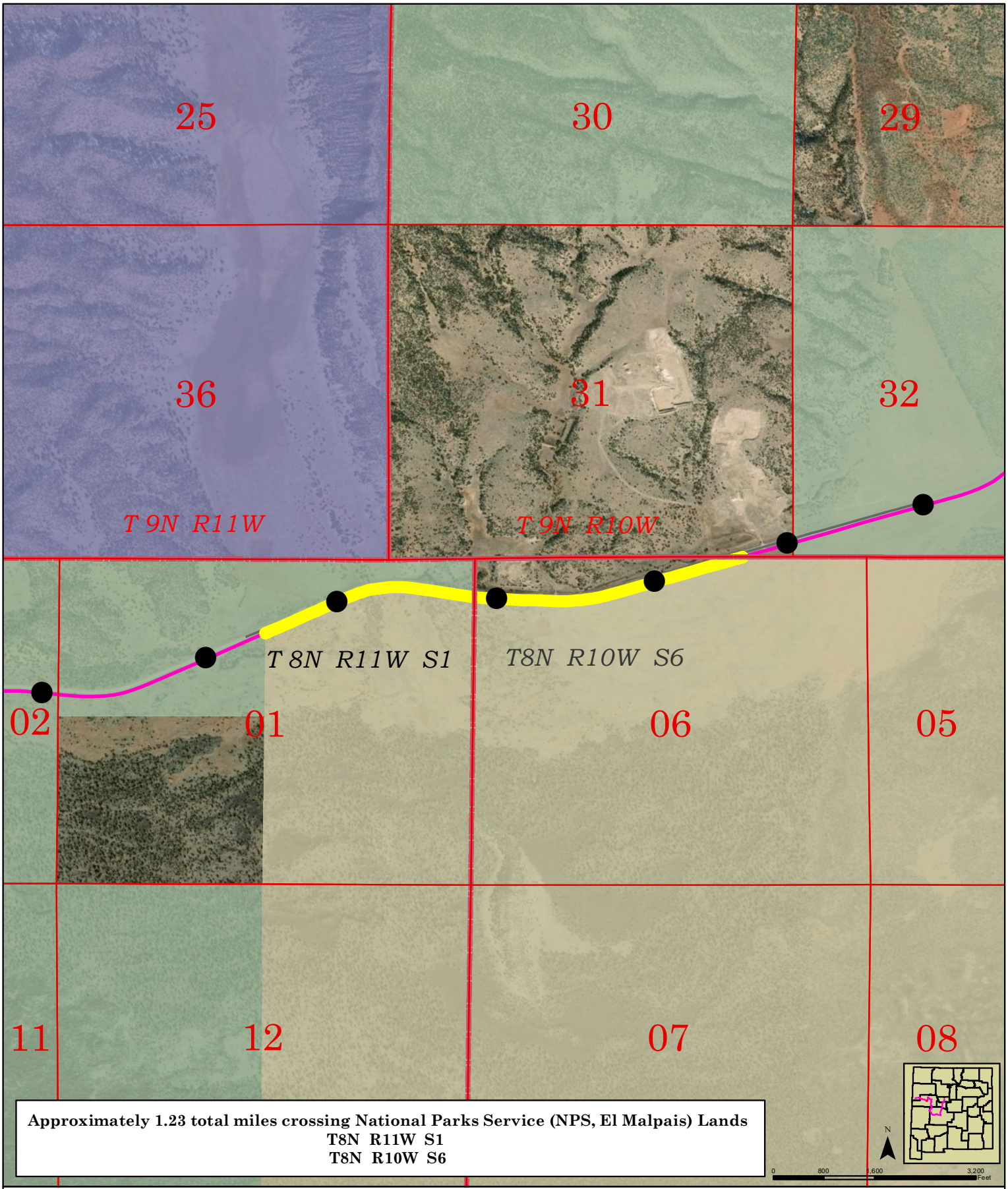
PEN Fiber Regeneration Sites UPDATED 2_9_2024
Crossing NPS lands
PEN Fiber Optic Line UPDATED 2_9_2024
Bureau of Land Management (BLM)
Bureau of Reclaimation (BOR)
Departmewnt of Agriculture (DOA)
Department of Defense (DOD)
Department of Energy (DOE)
Forest Service (FS)
Fish & Wildlife Service (FWS)
Tribal/Indian (I)
National Park Service (NPS)
Other Federal Agency (OFA)
Private (P)
State (S)
NM State Game & Fish (SGF)
NM State Park (SP)
Roads

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\FWS\MXDs\11x8.5 Size\Overall_FWS

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over NPS lands (El Malpais National Monument, Map 1 of 3).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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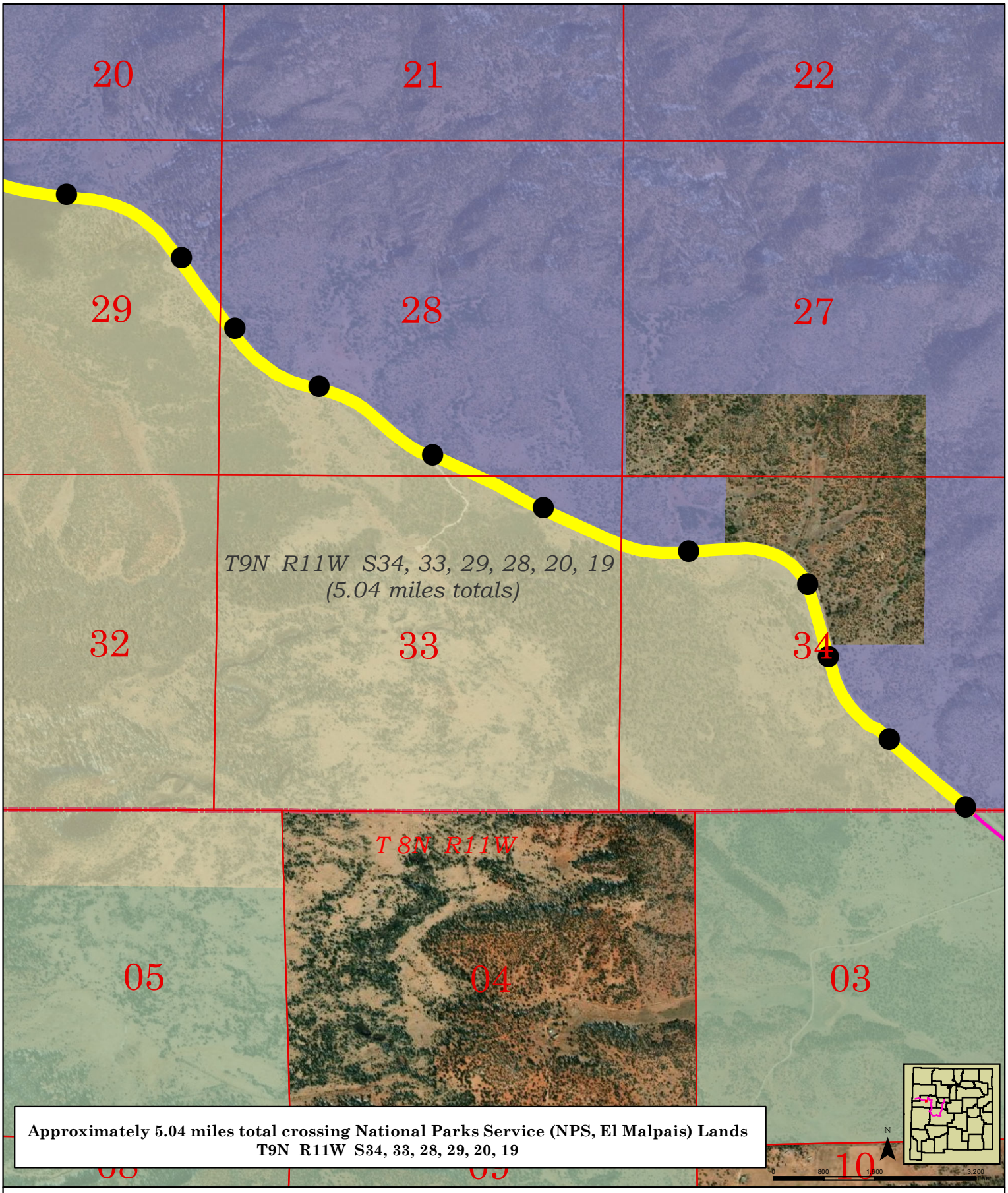
PEN Handholes
BLM PLSS Township
Crossing NPS lands
PEN Fiber Optic Line 12_19_2023
Roads
Bureau of Land Management (BLM)
Forest Service (FS)
National Park Service (NPS)
Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\NPS\MXDs\El Malpais

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 5.04 miles total crossing National Parks Service (NPS, El Malpais) Lands
T9N R11W S34, 33, 28, 29, 20, 19

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over NPS lands (El Malpais National Monument, Map 2 of 3).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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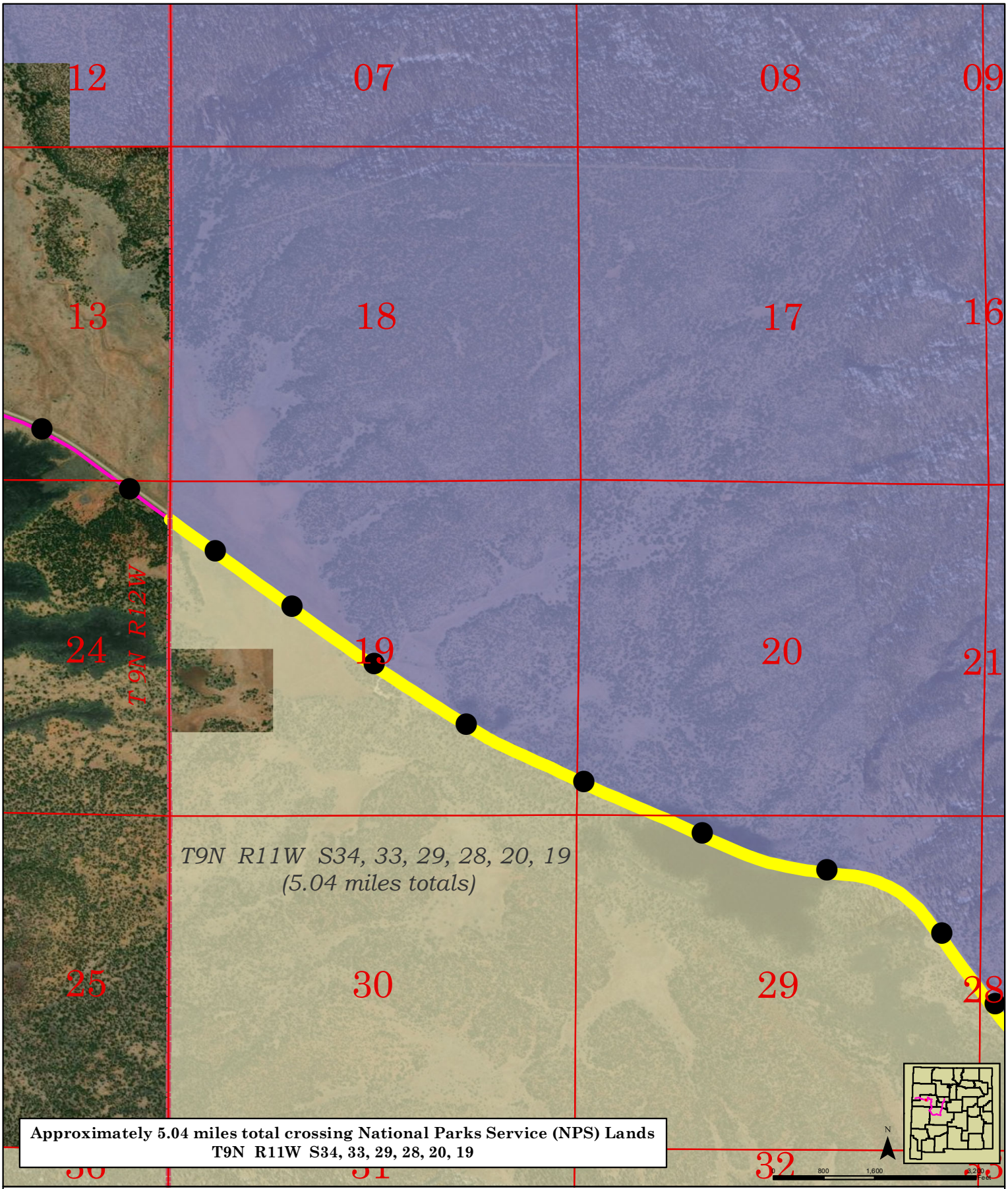
PEN Handholes
BLM PLSS Township
Crossing NPS lands
PEN Fiber Optic Line 12_19_2023
Roads
Bureau of Land Management (BLM)
Forest Service (FS)
National Park Service (NPS)
Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\NPS\MXDs\El Malpais

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over NPS lands (El Malpais National Monument, Map 3 of 3).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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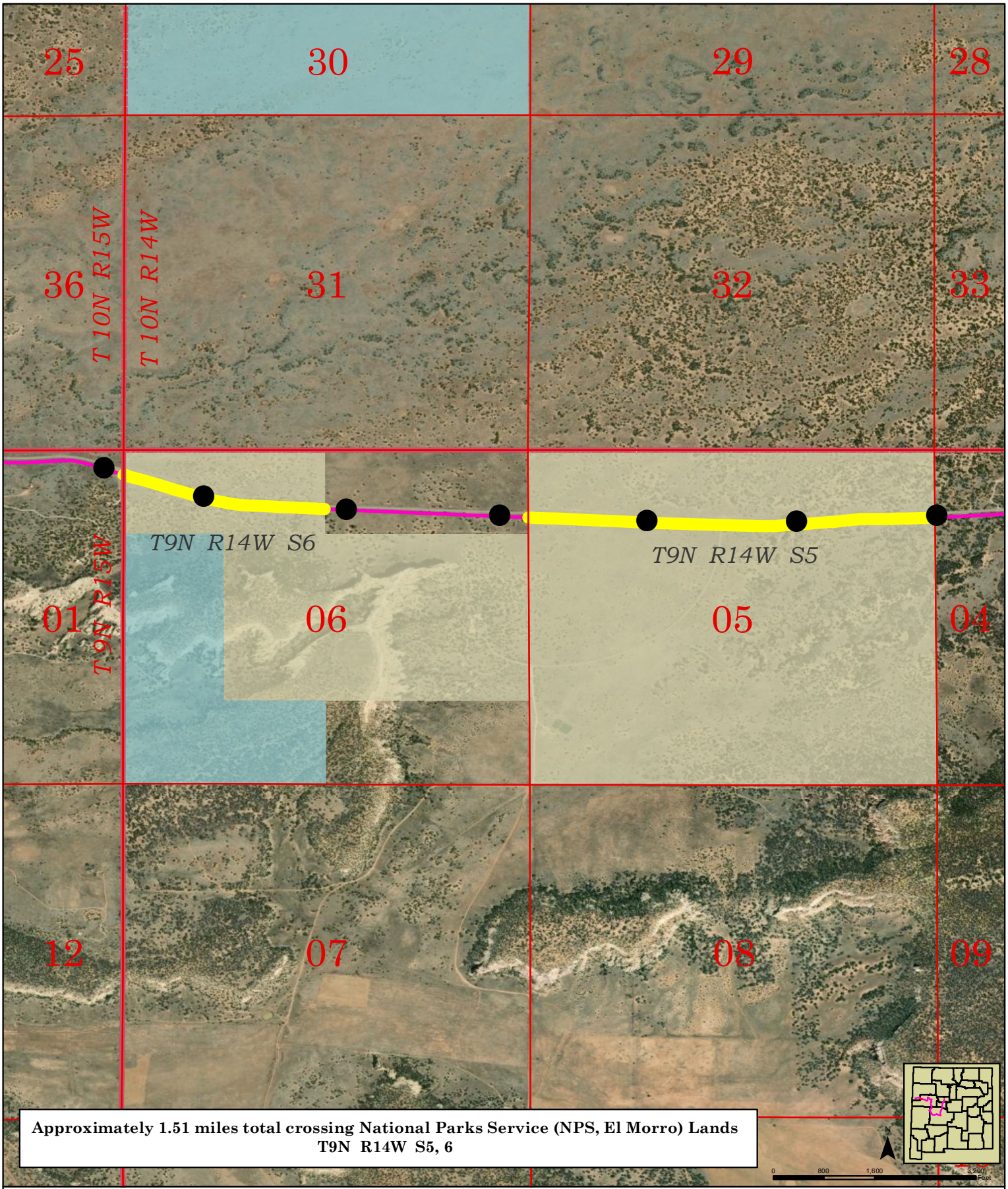
- PEN Handholes
- BLM PLSS Township
- Crossing NPS lands
- PEN Fiber Optic Line 12_19_2023
- Roads
- Forest Service (FS)
- National Park Service (NPS)
- Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\NPS\MXDs\El Malpais

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 1.51 miles total crossing National Parks Service (NPS, El Morro) Lands
T9N R14W S5, 6

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a series of maps that depict the location that the PEN fiber lines crosses over NPS lands (El Morro National Monument).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional Internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:24,000

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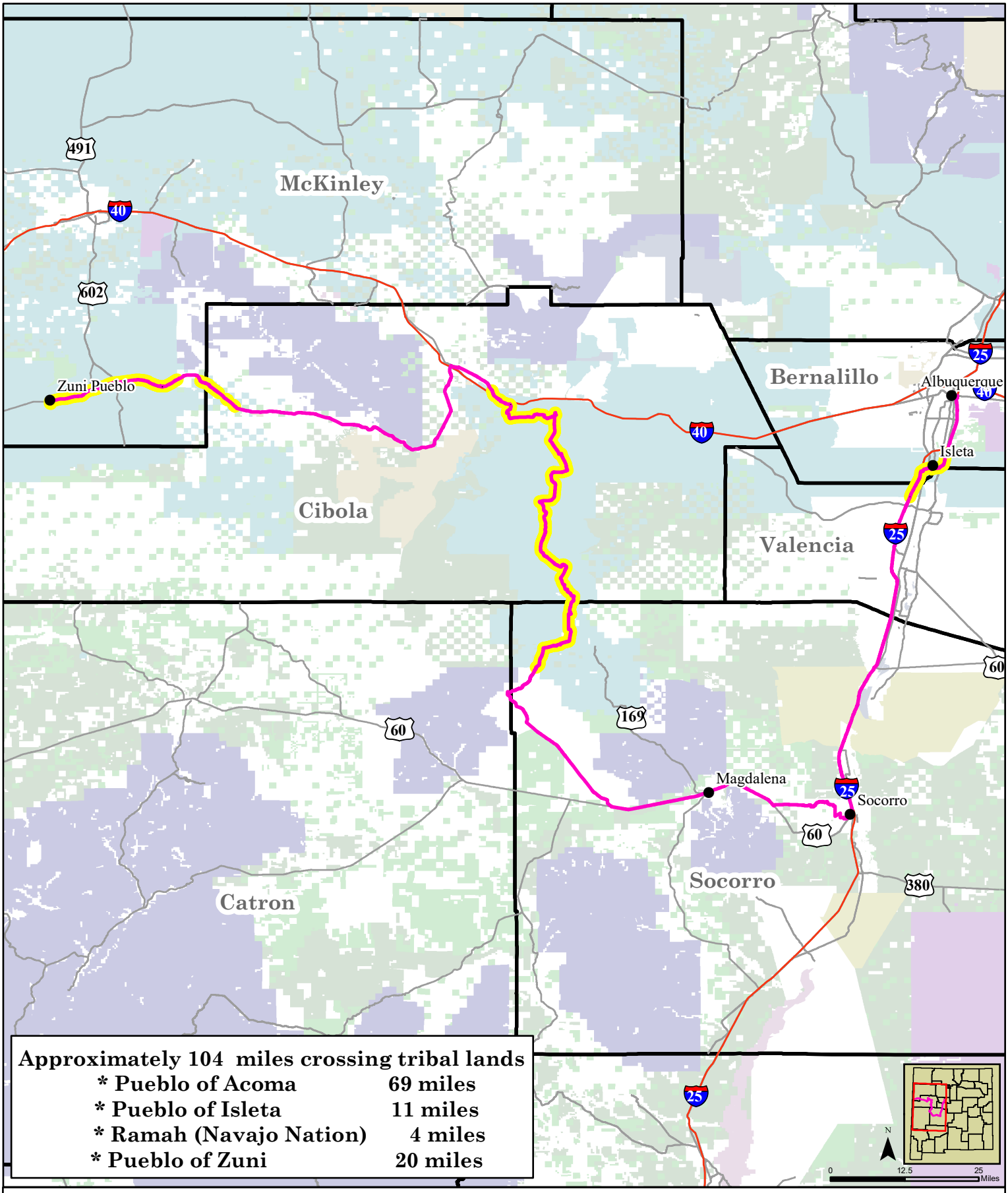
PEN Handholes
BLM PLSS Township
Crossing NPS lands
PEN Fiber Optic Line 12_19_2023
Roads
Bureau of Land Management (BLM)
Tribal/Indian (I)
National Park Service (NPS)
Private (P)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\EA_UPDATED\Josh\Federal Mapping\GIS\NPS\MXDs\El Malpais

DRAWN BY: GIS Specialist, HWM on 1/19/2024



Approximately 104 miles crossing tribal lands

* Pueblo of Acoma	69 miles
* Pueblo of Isleta	11 miles
* Ramah (Navajo Nation)	4 miles
* Pueblo of Zuni	20 miles

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line through Tribes

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:1,350,000

- Cities/Towns
- PEN Fiber Regeneration Sites
- PEN Fiber Optic Line UPDATED 2/9/2024
- Tribal Lands
- Roads
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

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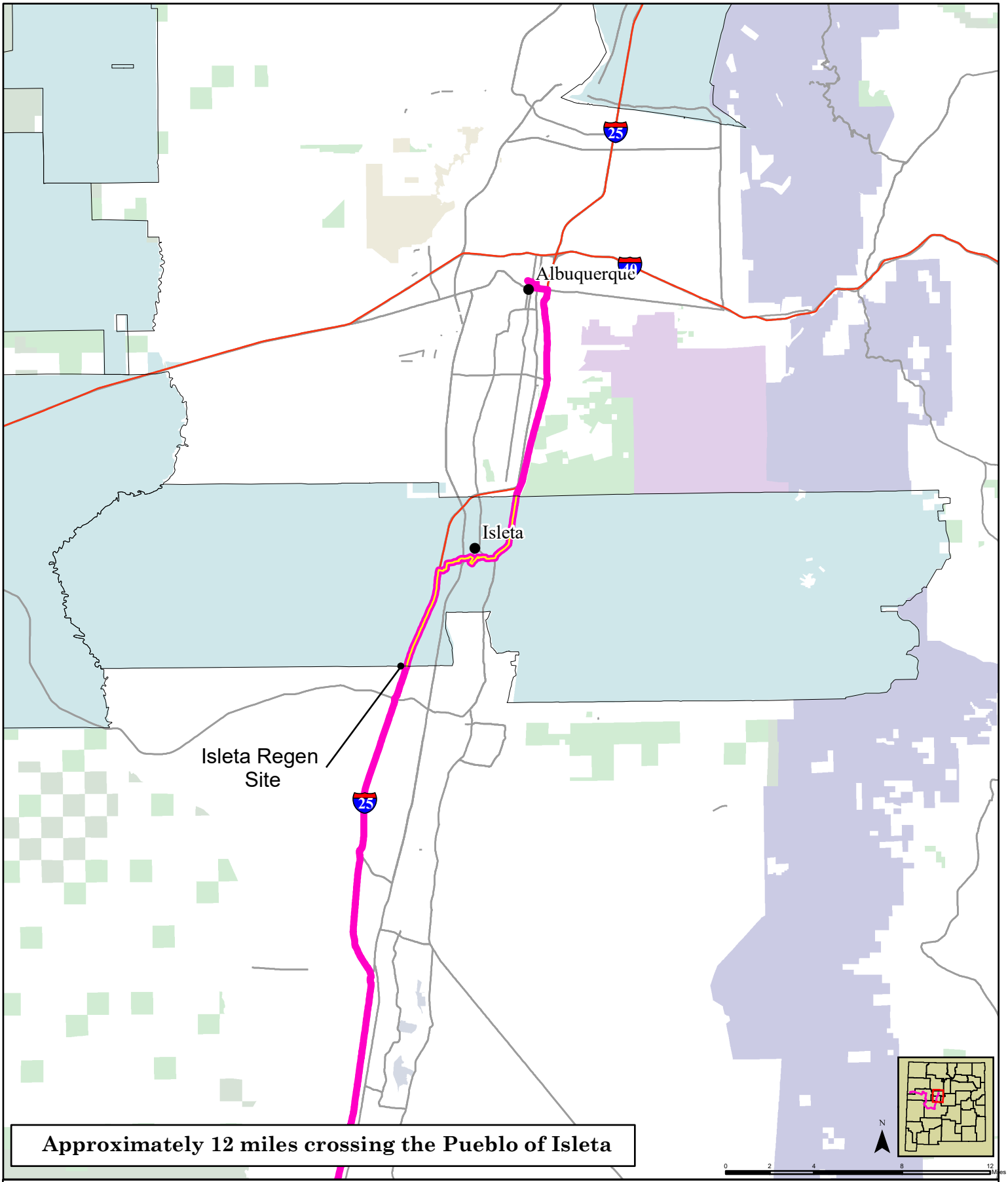
DRAWN BY: GIS Specialist, HWM on 06/2024



Approximately 12 miles crossing the Pueblo of Isleta

Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line through the Pueblo of Isleta.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

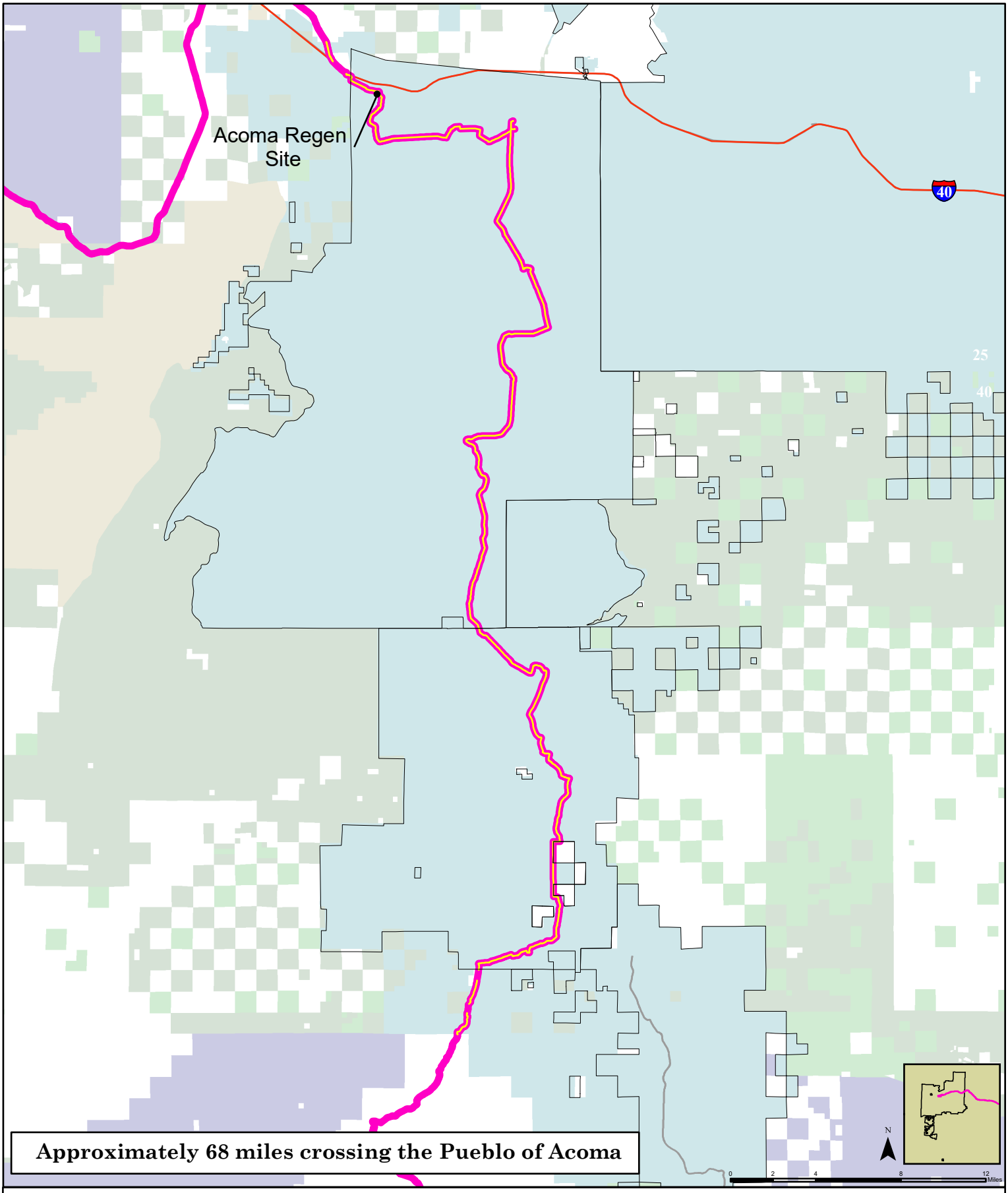
COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central (US Feet) Scale:1:362,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- Tribal Lands
- SFIS PEN Fiber Line Updated 5_2024
- Roads
- PEN Fiber Regeneration Sites
- Pueblo of Isleta
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\GIS\Tribes\BIA

DRAWN BY: GIS Specialist, HWM on 06/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line through the Pueblo of Acoma.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:377,000

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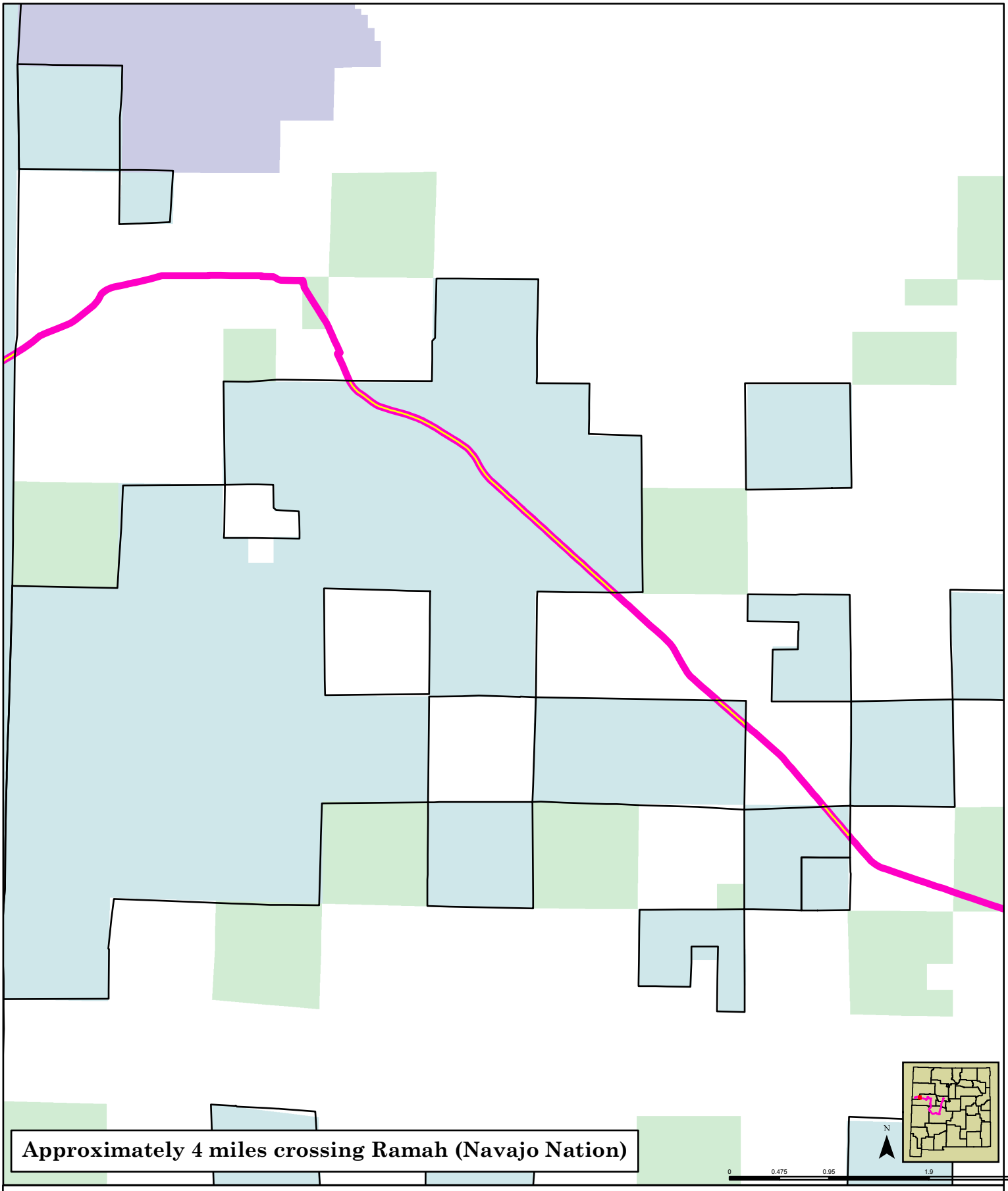
- Pueblo of Acoma
- Tribal Lands
- SFIS PEN Fiber Line Updated 5_2024
- PEN Fiber Regeneration Sites
- Roads
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\GIS\Tribes\BIA

DRAWN BY: GIS Specialist, HWM on 06/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line through Ramah (Navajo Nation).

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

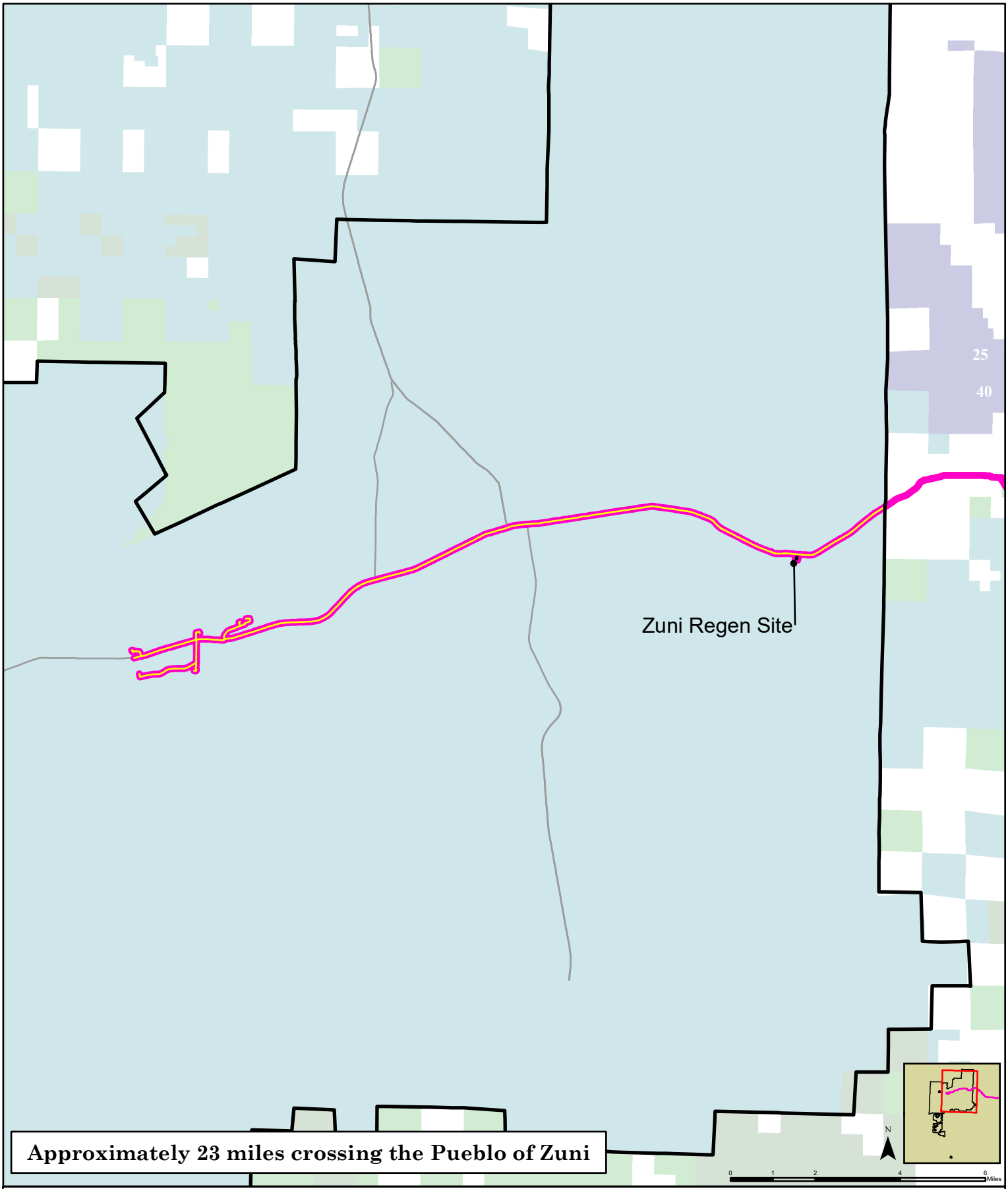
COORDINATE SYSTEM: NAD 1983 State Plane New Mexico Central & West (US Feet) Scale:1:76,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- Tribal Lands
- SFIS PEN Fiber Line Updated 5_2024
- Roads
- Ramah (Navajo Nation)
- PEN Fiber Regeneration Sites
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\GIS\Tribes\BIA

DRAWN BY: GIS Specialist, HWM on 06/2024



Pueblo Education Network (PEN) Fiber Optic Line

Drawing of: This is a map that depict an overview of the Pueblo Education Network (PEN) line through the Pueblo of Zuni.

Project: The SFIS Pueblo Education Network will construct 324 miles of fiber optic infrastructure in rural and isolated New Mexico; connecting the Zuni Tribe, and the Pueblos of Acoma and Isleta to a regional internet exchange in Albuquerque.

COORDINATE SYSTEM: NAD 1983 State Plane New Mexico West (US Feet) Scale:1:188,000

DISCLAIMER: The geographic data layers produced by High Water Mark, LLC (HWM) GIS Specialist are provided as a public resource. HWM makes no warranties, expressed or implied, concerning the accuracy, completeness or suitability of this data, and it should not be construed or used as a legal description. Every reasonable effort is made to ensure the accuracy and completeness of the data.

- Tribal Lands
- Zuni Pueblo
- PEN Fiber Regeneration Sites
- SFIS PEN Fiber Line Updated 5_2024
- Interstate
- Roads
- Bureau of Land Management (BLM)
- Bureau of Reclaimation (BOR)
- Departmewnt of Agriculture (DOA)
- Department of Defense (DOD)
- Department of Energy (DOE)
- Forest Service (FS)
- Fish & Wildlife Service (FWS)
- Tribal/Indian (I)
- National Park Service (NPS)
- Other Federal Agency (OFA)
- Private (P)
- State (S)
- NM State Game & Fish (SGF)
- NM State Park (SP)

File Path: C:\CWhite\GIS\NTIA\SFIS_NTIA\GIS\Tribes\BIA

DRAWN BY: GIS Specialist, HWM on 06/2024

Appendix G

Flood Insurance Rate Map Data within Proposed Project Area via FEMA National Flood Hazard Layer

Jurisdiction	FIRM Panel	FIRM Zone Intercepting PEN Line	Notes
City of Albuquerque	35001C0334G	AO (Depth 1)	1% Annual Chance Flood Hazard
	35001C0342G	X (shaded)	Area of minimal flood hazard
		AE (EL 5063)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5063 ft.
	35001C0344G	No intercept	No flood hazard present
Bernalillo County Unincorporated Areas	35001C0344G	X (shaded)	0.2% Annual Chance Flood Hazard
		AE *	1% Annual Chance Flood Hazard
	35001C0535G	No intercept	No flood hazard present
City of Albuquerque	35001C0535G	A (4 Locations)	1% Annual Chance Flood Hazard
	35001C0533H	No intercept	No flood hazard present
Bernalillo County Unincorporated Areas	35001C0533H	AE (EL 5023)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5023 ft.
		AE (EL 5031)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5031 ft.
City of Albuquerque	35001C0533H	AE (EL 5031)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5031 ft.
		AE (EL 5033)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5033 ft.
		AE (EL 5030)	1% Annual Chance Flood Hazard. Base flood elevation given, valued at 5030 ft.
Pueblo of Isleta	35001C0533H	No intercept	No flood hazard present
	35001C0550H	A (3 Locations)	1% Annual Chance Flood Hazard
	35061C0075E	A	1% Annual Chance Flood Hazard
	35001C0750H	No intercept	No flood hazard present
	35061C0230E	No intercept	No flood hazard present
	35061C0210E	No intercept	No flood hazard present
Valencia County	35061C0210E	No intercept	No flood hazard present
Village of Los Lunas	35061C0210E	No intercept	No flood hazard present
	35061C0220E	A	1% Annual Chance Flood Hazard
Valencia County	35061C0220E	A	1% Annual Chance Flood Hazard
		AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4919.9 ft - 4922.8 ft
		AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4915.7 ft - 4918.1 ft
	35061C0385E	AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4887.5 ft - 4897.9 ft
		AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4886.2 ft - 4889.8 ft
		AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4883.6 ft - 4888.8 ft
	35061C0395E	No intercept	No flood hazard present
City of Belen	35061C0395E	No intercept	No flood hazard present
Valencia County	35061C0395E	No intercept	No flood hazard present
	35061C0560E	No intercept	No flood hazard present
	35061C0575E	No intercept	No flood hazard present
Socorro County Unincorporated Areas	35053C0200C	A (4 Locations)	1% Annual Chance Flood Hazard
	35053C0425C	A (9 Locations)	1% Annual Chance Flood Hazard
	35053C0700C	D	Panel Not Available - Sevilleta
	35053C0675C	D	Panel Not Available - Sevilleta
	35053C1050C	A (8 Locations)	1% Annual Chance Flood Hazard
	35053C1410C	A (2 Locations)	1% Annual Chance Flood Hazard
City of Socorro	35053C1410C	X (shaded) (2 Locations) *	Area with reduced flood risk due to levee
		AE	1% Annual Chance Flood Hazard. Base flood elevation within the range 4595 ft - 4598 ft
		A	1% Annual Chance Flood Hazard
	35053C1420C	X (shaded) *	Area with reduced flood risk due to levee

Jurisdiction	FIRM Panel	FIRM Zone Intercepting PEN Line	Notes
		A (5 Locations)	1% Annual Chance Flood Hazard
Socorro County Unincorporated Areas	35053C1425C	A (2 Locations)	1% Annual Chance Flood Hazard
	35053C1400C	D	Panel Not Available - West of NMT
	35053C1000C	D	Panel Not Available - NE of Magdalena
	35053C0990C	A	1% Annual Chance Flood Hazard
Village of Magdalena	35053C0990C	A	1% Annual Chance Flood Hazard
	35053C1355C	A (3 Locations)	1% Annual Chance Flood Hazard
	35053C1335C	A (2 Locations)	1% Annual Chance Flood Hazard
Socorro County Unincorporated Areas	35053C1335C	A (4 Locations)	1% Annual Chance Flood Hazard
	35053C1350C	A (2 Locations)	1% Annual Chance Flood Hazard
	35053C1325C	D	Panel Not Available
	35053C1300C	D	Panel Not Available
	35053C0925C	D	Panel Not Available
	35053C0900C	D	Panel Not Available
	35053C0525C	D	Panel Not Available
Catron County	UNMAPPED_350004	No intercept	Panel Not Available
Socorro County Unincorporated Areas	35053C0250C	D	Panel Not Available
Pueblo of Acoma	35053C0250C	D	Panel Not Available
Socorro County Unincorporated Areas	35053C0250C	D	Panel Not Available
Pueblo of Acoma	35053C0250C	D	Panel Not Available
	35053C0275C	A (2 Locations)	
	35053C0050C	D	Panel Not Available
Acoma Indian Reservation	35006C2400C	No intercept	No flood hazard present
	35006C2000C	A	1% Annual Chance Flood Hazard
	35006C1975C	A (2 Locations)	1% Annual Chance Flood Hazard
		D	Panel Not Available
	35006C1575C	D	Panel Not Available
	35006C1600C	D	Panel Available, but not all surveyed. Categorized as "Zone D"
	35006C1150C	D	Panel Not Available
	35006C1175C	D	Panel Not Available
Cibola County Unincorporated Areas	35006C1175C	D	Panel Not Available
	35006C1150C	D	Panel Not Available
	35006C1175C	D	Panel Not Available
	35006C0750C	D	Panel Available, but not all surveyed. Categorized as "Zone D"
	35006C0725C	D	Panel Available, but not all surveyed. Categorized as "Zone D"
Acoma Indian Reservation	35006C0725C	D	Panel Available, but not all surveyed. Categorized as "Zone D"
		A	1% Annual Chance Flood Hazard
Cibola County Unincorporated Areas	35006C0700C	A (2 Locations)	1% Annual Chance Flood Hazard
	35006C0420C	A	1% Annual Chance Flood Hazard
City of Grants	35006C0414C	X (shaded) (6 Locations)	0.2% Annual Chance Flood Hazard
		AE (3 Locations) *	1% Annual Chance Flood Hazard. Base flood elevation within the range 6418.8 ft - 6426.0 ft
	35006C0413C	X (shaded) (5 Locations)	0.2% Annual Chance Flood Hazard
		AE (3 Locations) *	1% Annual Chance Flood Hazard. Base flood elevation within the range 6452.3 ft - 6482.9 ft
	35006C0395C	No intercept	No flood hazard present
Cibola County Unincorporated Areas	35006C0395C	No intercept	No flood hazard present
	35006C0413C	No intercept	No flood hazard present
	35006C0680C	No intercept	No flood hazard present
	35006C0675C	No intercept	No flood hazard present
	35006C0700C	No intercept	No flood hazard present

Jurisdiction	FIRM Panel	FIRM Zone Intercepting PEN Line	Notes
	35006C1100C	A (5 Locations)	1% Annual Chance Flood Hazard
	35006C1075C	A (5 Locations)	1% Annual Chance Flood Hazard
	35006C0650C	A (3 Locations)	1% Annual Chance Flood Hazard
	35006C0625C	No intercept	No flood hazard present
	35006C0600C	D	Panel Not Available
Ramah Navajo Indian Reservation	35006C0600C	D	Panel Not Available
	35006C0575C	D	Panel Not Available
Navajo Reservation and Trust Lands	35031C2875E	X (unshaded)	Area of minimal flood hazard
McKinley County	35031C2875E	X (unshaded)	Area of minimal flood hazard
	35031C2725E	X (unshaded)	Area of minimal flood hazard
State of New Mexico	35031C2725E	X (unshaded)	Area of minimal flood hazard
McKinley County	35031C2725E	X (unshaded)	Area of minimal flood hazard
	35031C2700E	X (unshaded)	Area of minimal flood hazard
	35031C2850E	X (unshaded)	Area of minimal flood hazard
Pueblo of Zuni	35031C2850E	A (2 Locations)	1% Annual Chance Flood Hazard
	35031C2825E	A (2 Locations)	1% Annual Chance Flood Hazard
	35031C2785E	A	1% Annual Chance Flood Hazard
	35031C2780E	AO (Depth 1)	1% Annual Chance Flood Hazard
		X (shaded)	0.2% Annual Chance Flood Hazard
		AE (2 Locations)	1% Annual Chance Flood Hazard. Base flood elevation within the range 6302.9 ft - 6308.9 ft
		AE *	1% Annual Chance Flood Hazard. Base flood elevation within the range 6302.9 ft - 6308.9 ft
		AE *	1% Annual Chance Flood Hazard. Base flood elevation within the range 6275.2 ft - 6277.5 ft
		X (shaded)	0.2% Annual Chance Flood Hazard
		AO (Depth 2)	1% Annual Chance Flood Hazard
		X (shaded)	0.2% Annual Chance Flood Hazard
Source: FEMA – National Flood Hazard Layer (NFHL) Viewer			

*Regulatory Floodway Present

FIRM Zone	Total Count	FIRM Zone Description
A	30	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 shown within these zones.
AE	18	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. The base floodplain where base flood elevations are provided.
AO (Depth 1)	2	Areas of shallow flooding with average depths between 1.0 and 1.5 feet.
AO (Depth 2)	1	Areas of shallow flooding with average depths between 1.5 and 2.5 feet.
D	28	Areas with possible, but undetermined, flood hazards. NO flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.
X (shaded)	9	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 of flooding.
X (unshaded)	7	500-year floodplain. Area with minimal flood hazard.
Source: Description from FEMA Flood Map Service Center		

Appendix H

USFWS Section 7 Consultation, Biological Assessment for SFIS Pueblo Education Network, IPaC Report

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque, New Mexico 87113
Telephone 505-346-2525 Fax 505-346-2542
www.fws.gov/southwest/es/newmexico/

May 20, 2024

Cons# 2024-0050246

Joshua Fitzpatrick
Environmental Program Officer
National Telecommunications and Information Administration
U.S. Department of Commerce
1401 Constitution Ave., N.W.
Washington, D.C. 20230

Dear Joshua Fitzpatrick:

Thank you for your letter dated March 25, 2024, requesting informal consultation with the U.S. Fish and Wildlife Service (Service) for the Santa Fe Indian School Pueblo Education Network Project occurring within McKinley, Cibola, Catron, Socorro, Valencia, and Bernalillo counties, New Mexico, pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) (Act), as amended. Your letter included a biological assessment, dated March 2024, which is incorporated by reference, that analyzed the effects of the proposed project on the endangered New Mexico meadow jumping mouse (*Zapus hudsonius luteus*; "jumping mouse"), threatened Mexican spotted owl (*Strix occidentalis lucida*; "owl"), endangered southwestern willow flycatcher (*Empidonax traillii extimus*; "flycatcher"), threatened yellow-billed cuckoo (*Coccyzus americanus*; "cuckoo"), endangered Rio Grande silvery minnow (*Hybognathus amarus*; "minnow"), endangered Zuni bluehead sucker (*Catostomus discobolus yarrowi*; "sucker"); threatened Pecos sunflower (*Helianthus paradoxus*), and threatened Zuni fleabane (*Erigeron rhizomatus*). You concluded that the implementation of the proposed project "*may affect, is not likely to adversely affect*" all the above listed species. Your biological assessment also analyzed the effects of the proposed project on the three following populations of the Mexican wolf (*Canis lupus baileyi*; "wolf"): the endangered (located north of Interstate 40 in New Mexico), non-essential experimental (located south of Interstate 40 in New Mexico on lands not managed as National Wildlife Refuges or managed by the National Park Service), and threatened (non-essential experimental population located south of Intestate 40 in New Mexico on National Wildlife Refuge and National Park Service lands). You determined that the proposed action "*may affect, is not likely to adversely affect*" the endangered and threatened

populations of the wolf and "*may affect, is not likely to jeopardize*" the non-essential experimental population.

Your biological assessment also determined that the proposed project would have "*no effect*" on the non-essential experimental population of the northern Aplomado falcon (*Falco femoralis septentrionalisi*), endangered piping plover (*Charadrius melodus*), threatened Chiricahua leopard frog (*Rana chiricahuensis*), endangered loach minnow (*Tiaroga cobitis*), endangered spikedace (*Meda flugida*), endangered Socorro isopod (*Thermosphaeroma thermophilus*), threatened Wright's marsh thistle (*Cirsium wrightii*), and threatened American Hart's-tongue fern (*Asplenium scolopendrium var. Americanum*) as these species are not known to occur in the affected area. Although the Act does not require Federal agencies to consult if the action agency determines their actions will have "*no effect*" on threatened or endangered species or critical habitat (50 CFR 402.12), we appreciate your consideration for the conservation of these species and notification of your "*no effect*" determinations.

Proposed Project

The National Telecommunications and Information Administration proposes to install a 324-mi. (521-km) long fiber optic network within rights-of-way (ROW) of various existing New Mexico Department of Transportation (NMDOT) roadways to provide broadband internet to the Zuni, Acoma, and Isleta Pueblos. The general pathway of the fiber optic network, from west to east, is as follows: from Zuni Pueblo along Highway 53 to Grants, from Grants along Interstate 40 to Highland Meadows, from Highland Meadows along Highway 169 to Magdalena, from Magdalena along Highway 60 to Socorro, from Socorro along Interstate 25 to Isleta Pueblo, from Isleta Pueblo along Highway 147, Highway 47, and Interstate 25 to Albuquerque. Project implementation is anticipated to last approximately 500 business days with approximately 0.65 mi. (1.05 km) of fiber optic cable being laid per business day.

Depending upon site conditions, the fiber optic cable will be installed using plowing, trenching, or directional boring methods using cable plows, backhoes, directional drills, a semi-sized vehicle for transporting heavy equipment, and various 1-ton sized vehicles. Project activities will occur entirely within the 40-ft. wide (12-m) ROW of existing roads while installation of the fiber optic network is anticipated to impact only 5 ft. (1.5 m) of soil on either side of the project alignment. Conduit for the fiber optic line will be installed at an average depth of 3 ft. (1 m) unless deviation is required to accommodate special circumstances (i.e., crossing waterways, avoidance of natural resources). Efforts will be taken to avoid impacts to trees and vegetation during project implementation and revegetation, according to Section 632 of the NMDOT Standard Specifications for Highway and Bridge Construction, will occur post-project implementation at locations where disturbances are visually detectable.

Where the project alignment intersects water bodies, directional boring methods will be used to install the fiber optic cable underneath the water bodies including locations at the Rio Grande (one crossing), the Zuni River (two crossings), the Rio Pescado and its various tributaries (six crossings), as well as several small, unnamed creeks and arroyos. The crossing of the Rio Grande will occur in the Pueblo of Isleta adjacent to the existing Highway 147 bridge. Boring will begin and end at locations 220-390 ft. (67-119 m) away from the water's edge and will cross under the Rio Grande at a depth of approximately 27 ft. (8 m). The Zuni River will be crossed twice, once along the existing Pia Mesa Road bridge in the central portion of Zuni Pueblo and once adjacent to the existing Highway 53 bridge

in the eastern portion of Zuni Pueblo. At the central crossing, the only water body crossing where directional boring methods will not be used for installation, the fiber optic cable conduit will be installed along the vertical handrail of the bridge. At the eastern crossing, boring will begin and end at locations 200-250 ft. (61-76 m) from the center of the water and will cross under the Zuni River at an approximate depth of 8-10 ft. (2.4-3 m). Crossings of the Rio Pescado and its tributaries as well as unnamed creeks and arroyos will be implemented in a similar manner as boring activities underneath the Zuni River at the eastern location of Zuni Pueblo. Sediment control devices (e.g., silt fencing) will be employed according to Section 604.3.6 of the NMDOT Specifications for Highway and Bridge Construction to prevent eroded soil from entering waterways.

Three regeneration sites will be built along the project alignment within the ROW (one at Isleta Pueblo, one at Acoma Pueblo, and one at Zuni Pueblo) while a fourth existing regeneration site at New Mexico Tech in Socorro will require only fiber installation. Regeneration sites consist of one-story buildings with a footprint of approximately 100 $ft.^2$ (30 m^2) used to house necessary components for the fiber optic network. Regeneration sites were chosen to minimize disturbance of existing vegetation. Underground enclosures, referred to as handholds, that will allow access to the fiber optic cable for future maintenance will be installed every 1,750 ft. (533 m) at the same time as installation of the cable. Efforts will be taken to avoid the removal of trees and vegetation within the action area and, where any disturbances are visible, revegetation using Class A seeding and respective seed mixes according to Section 632 of the NMDOT Standard Specifications for Highway and Bridge Construction will occur post-project implementation.

<u>New Mexico Meadow Jumping Mouse</u>

You determined that the proposed action "*may affect, is not likely to adversely* affect" the jumping mouse. While potentially suitable jumping mouse habitat occurs roughly adjacent to the project alignment along the Rio Grande River, the project alignment falls primarily outside of suitable upland and riparian habitat for the jumping mouse. The only intersection of the project alignment with potentially suitable jumping mouse habitat occurs at the crossing of the Rio Grande River at the Pueblo of Isleta. A single jumping mouse was detected in 2005 along the Rio Grande River within the Pueblo of Isleta. Where the project alignment intersects the Rio Grande River, a portion of the fiber optic cable (1,100 ft. [335 m] of cable at maximum) will be installed underneath the Rio Grande River using directional boring equipment at a disturbed riparian location adjacent to the existing Highway 147 bridge during the jumping mouse inactive period.

The primary disturbance from the proposed project to the jumping mouse will be in the form of vibrations and increased noise from the use of boring equipment in a riparian area that may awaken individual jumping mice hibernating underground in nearby burrows. However, jumping mouse individuals typically do not hibernate in areas that experience human disturbance and lack vegetation, such as those areas around the Highway 147 bridge. Hibernacula of the New Mexico meadow jumping mice as well as other subspecies of meadow jumping mice are generally located under vegetation. Areas upstream and downstream of the Highway 147 bridge support potentially suitable and less disturbed habitat but the area immediately around the bridge experiences vehicular disturbance and lacks appropriate habitat components for jumping mice.

We concur with your determination that the proposed project "*may affect, is not likely to adversely affect*" the jumping mouse due to the low likelihood that individuals are present in low-quality jumping mouse habitat supported at the Rio Grande River crossing and as boring activities will affect only riparian locations where jumping mouse hibernacula are highly unlikely to occur. Boring activities will begin and end at locations where little vegetation grows due to the presence of multiple vehicular paths used to access the dam structure south of the bridge and boring equipment will travel at a depth of approximately 27 ft. (8 m) below the surface far below the depth of underground jumping mice hibernacula. In the unlikely event that jumping mice do hibernate in the disturbed area near the Highway 147 bridge where the proposed project will take place, it would be even more improbable that boring activities will occur in close enough proximity to jumping mouse burrows to rouse individuals from hibernation.

Mexican Spotted Owl

You also made an effect determination for the proposed action of "*may affect, is not likely to adversely affect*" the owl. The project alignment crosses through potentially suitable forested owl habitat at various locations west of Socorro. The action area of the proposed project does not intersect with any owl Protected Activity Centers or with owl critical habitat. Only fiber optic cable installation activities will occur within potentially suitable owl habitat.

Primary disturbance to the owl will be in the form of increased human presence and the use of heavy machinery within the existing roadways' ROW, leading to increased noise disturbance that may affect individual owls present in the area. Disturbed areas, such as the ROW of roadways in which the proposed project will take place, typically do not support specific habitat components (i.e., mature forest stands with complex structure or steep canyon habitats) required for owl roosting and nesting activities. It is more likely that potential owl habitat within the action area of the proposed project only supports owl foraging and dispersal activities. Disturbance could also take the form of use of heavy machinery within the roadway's ROW could result in the removal of vegetation used by owl prey species, limiting the amount of suitable foraging habitat for owl individuals.

We concur with your determination that the proposed project "*may affect, is not likely to adversely affect*" the owl as it is unlikely that any owl habitat, other than foraging and dispersal habitat, occurs within the action area and temporary daytime noise disturbance will not inhibit foraging and dispersal activities of owls. To ensure that noise disturbance will not impact the breeding or nesting activities of individual owls, nest/roost owl habitat will be identified prior to project implementation and no work will be done in these areas during the owl breeding season (March 1-August 31). Results of habitat surveys will be provided to the New Mexico Ecological Services Field Office prior to the start of construction, and we will provide further guidance on how work is to proceed to avoid impacts to the owl if special circumstances arise. Additionally, efforts will be taken to avoid the removal of vegetation within any type of owl habitat and revegetation activities will occur post-project implementation.

Southwestern Willow Flycatcher and Yellow-Billed Cuckoo

For both the flycatcher and cuckoo, you determined that the proposed action "*may affect, is not likely to adversely affect*" the two species. Both species are known to occur within certain riparian habitats

of the Rio Grande River adjacent to the project alignment and may possibly occur within certain riparian habitats of rivers west of the Rio Grande (e.g., Zuni River and Rio Pescado). While most of the project alignment occurs outside of riparian habitat used by the two species, the fiber optic cable will be installed using directional boring methods at multiple locations to cross the Rio Grande, Zuni, and Rio Pescado rivers and, at one location at the center of Zuni Pueblo, the cable will be installed alongside an existing bridge. The action area of the proposed project does not intersect critical habitat of either species.

Primary disturbance to the flycatcher and cuckoo will be in the form of increased human presence and the use of heavy machinery in upland areas adjacent to and within suitable flycatcher and cuckoo riparian habitat, leading to increased noise disturbance that may affect individual flycatchers and cuckoos present in the area.

We concur with your determinations that the proposed project "*may affect, is not likely to adversely affect*" the flycatcher and cuckoo as all work within 0.25 mi. (0.4 km) of suitable flycatcher and cuckoo habitat will be conducted outside of both species' breeding seasons (May 1-September 1) when flycatcher and cuckoo individuals are either not present in the action area or are actively migrating. Efforts will be taken to avoid the removal of vegetation within flycatcher and cuckoo habitat and revegetation activities will occur post-project implementation. The methods chosen for installing the fiber optic cable at water crossings (i.e., within riparian areas) naturally lend themselves to avoid the disruption of vegetation thus significant disturbance of riparian plants used by the flycatcher and cuckoo is not expected.

Rio Grande Silvery Minnow

You determined that the proposed project "*may affect, is not likely to adversely affect*" the minnow. The minnow occurs within the Rio Grande River adjacent to the project alignment in certain locations. The only location where the project alignment intersects with minnow habitat is the crossing of the Rio Grande River at Isleta Pueblo near the Highway 147 bridge where directional boring equipment will be used to install the fiber optic cable underneath the river. The action area of the proposed project does not intersect minnow critical habitat.

Primary disturbance to the minnow will be caused by the use of directional boring machinery near and underneath the Rio Grande River resulting in increased noise and vibrations that may affect individual minnows.

We concur with your determination that the proposed project "*may affect, is not likely to adversely affect*" the minnow as directional boring activities under the Rio Grande River will be conducted during fall and early spring months outside of the species' spawning season and when sensitive life stages are present (April 15-September 1). Use of sediment control devices will prevent inputs of sediment resulting from the proposed action into the Rio Grande River.

Zuni Bluehead Sucker

You also made an effect determination of "*may affect, is not likely to adversely affect*" the sucker. The sucker occurs within the Zuni and Rio Pescado rivers adjacent to the project alignment in certain

locations. The project alignment crosses the Zuni River at two locations and the Rio Pescado and its various tributaries at six locations; these crossings will be accomplished primarily using a directional boring method and, at one location at the center of Zuni Pueblo, the fiber optic cable will be adhered to the side of an existing bridge. The action area of the proposed project does not intersect sucker critical habitat.

Primary disturbance to the sucker will be caused by the installation of the fiber optic line using trenching, plowing, or boring methods resulting in the creation of sediment that may wash into the Zuni and Rio Pescado rivers during precipitation events.

We concur with your determination that the proposed project "*may affect, is not likely to adversely affect*" the sucker as the following conservation measures will be enacted to avoid increased inputs of sediment to the Zuni and Rio Pescado rivers: use of sediment control devices will prevent inputs of sediment resulting from the proposed action from entering sucker habitat year-round and, if necessary, sediment-generating activities will not occur within 0.25 mi. (0.4 km) of the two rivers during the sucker's spawning season (late April-early June).

Pecos Sunflower and Zuni fleabane

For both the Pecos sunflower and Zuni fleabane, you determined that the proposed action "*may affect, is not likely to adversely affect*" the two species. The project alignment intersects potential Pecos sunflower wetland habitat at locations near Grants and near La Joya and San Geronimo. The project alignment intersects potential Zuni fleabane habitat at locations between the Pueblo of Acoma and the intersection of the alignment with Highway 60.

Primary disturbance to the both the Pecos sunflower and Zuni fleabane will be caused by the use of heavy machinery within the existing roadways' ROW when employing plowing or trenching methods to install the fiber optic cable resulting in soil disruption. Soil disrupting activities conducted within suitable Pecos sunflower or Zuni fleabane habitat where individuals of these species are present, may result in damage or the total removal of individuals.

We concur with your determinations that the proposed project "*may affect, will not adversely affect*" the Pecos sunflower and Zuni fleabane as individuals of these species will be identified and effectively avoided during project implementation according to the following conservation measures. Pre-construction habitat assessment surveys will be conducted to identify potential Pecos sunflower and Zuni fleabane habitat within the action area of the proposed project. If potential habitat for either species is identified, directional boring methods will occur at a depth where no roots are present (a minimum of 5 ft. (1.5 m)) and in a manner to avoid any surface disturbance (including direct modification of the surface, creation of structural instability, or other effects) to potential Zuni fleabane or Pecos sunflower habitat. Results of habitat surveys and species-specific surveys will be provided to the New Mexico Ecological Services Field Office prior to the start of construction, and we will provide further guidance on how work is to proceed to avoid impacts to listed species if special circumstances arise.

Mexican Wolf

For the endangered and threatened populations of the wolf, located north of Interstate 40 and south of Interstate 40 on National Wildlife Refuge and National Park Service lands respectively, you determined that the proposed project "*may affect, is not likely to adversely affect*" each population. The wolf is a wide-ranging species, occupying primarily forested habitat, but may utilize habitat types found along the entirety of the project alignment.

Primary disturbance to the wolf will be in the form of increased human presence and the use of heavy machinery within the existing roadways' ROW, leading to increased noise disturbance that may affect individual wolves present in the area. Noise disturbance may cause individual wolves to temporarily move to undisturbed areas causing individuals to expend energy.

We concur with your determinations that the proposed project "*may affect, is not likely to adversely affect*" the endangered and threatened populations of the wolf as the species is highly vagile and can easily avoid affected areas during project implementation without detriment to an individual. It is unlikely that roadside verges regularly experiencing human activity provide high-quality habitat for most wolf activities, particularly during daylight hours when the proposed project will be implemented. The ROW of well-traveled roadways are suitable primarily for only wolf dispersal while nearby, less-disturbed habitats support more stationary wolf activities.

For the nonessential experimental population of the wolf, located below Interstate 40 in New Mexico on lands not managed as National Wildlife Refuges or managed by the National Park Service, you made an effects determination of "*may affect, is not likely to jeopardize the continued existence of"* the wolf. The wolf is listed in New Mexico south of Interstate 40 as an experimental, nonessential population under section 10(j) of the Act. For section 7 consultation purposes, any nonessential experimental population located outside of a National Park or National Wildlife Refuge System is treated as a proposed species.

We concur with your determination that the proposed project "*may affect, is not likely to jeopardize the continued existence*" of the nonessential experimental population of the wolf based on the designation of the wolves in the area as nonessential to the survival of the species as well as the high vagility of the species and its ability to avoid affected areas during project implementation.

Conclusion

This concludes informal section 7 consultation with the Service for the Santa Fe Indian School Pueblo Education Network Project. Please contact our office if: 1) new information reveals changes to the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, 2) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not previously considered, or 3) a new species is listed, or critical habitat designated that may be affected by the action.

Thank you for your concern for threatened and endangered species and New Mexico's wildlife resources. If you have questions, please contact Alana Simmons of my staff, at the letterhead address or by electronic mail at alana_simmons@fws.gov.

Sincerely,

SHAWN SARTORIUS Digitally signed by SHAWN SARTORIUS Date: 2024.05.20 15:30:00 -06'00'

Shawn Sartorius

Field Supervisor

cc (electronic):
Project Manager, High Water Mark LLC, Bernalillo, New Mexico
Technical Specialist, High Water Mark LLC, Bernalillo, New Mexico
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Wildlife Biologist, Multiple Land Use and Conservation Branch, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (New Mexico meadow jumping mouse), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Mexican spotted owl), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Southwestern willow flycatcher and yellow-billed cuckoo), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Rio Grande silvery minnow), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Zuni bluehead sucker and Mexican wolf), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Pecos sunflower), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Species Lead Biologist (Zuni fleabane), Fish and Wildlife Biologist, U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque, New Mexico
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

Biological Assessment for the Santa Fe Indian School Pueblo Education Network

Middle Mile Broadband Project

May 2024

Prepared for:

U.S. Fish & Wildlife Service – NM Ecological Services Field Office
National Telecommunication and Information Administration

Prepared by:

High Water Mark, LLC
282 S. Camino del Pueblo, Suite 1E
Bernalillo, NM 87004

Project Location – PLSS

The following are the township, range, and sections which the proposed action travels through via Public Land Survey System (PLSS).

Township	Range	Section(s)
10 N	3 E	17, 20, 21, 28, 33
9 N	3 E	4, 9, 8, 17, 20, 29, 32, 31
8 N	3 E	6, 7, 18, 19
8 N	2 E	24, 23, 22, 27, 28, 33
-	-	Gutierrez/Sedillo Land Grant
-	-	San Clemente Land Grant
-	-	Belen Land Grant
-	-	Sevilleta Land Grant
1 S	1 W	14, 15, 22, 27, 34, 35
2 S	1 W	2, 11, 14, 23, 24, 25, 36, 33, 32, 31
-	-	Town of Socorro
3 S	1 W	3, 4, 6
3 S	2 W	1, 2, 3, 4, 5, 6
2 S	2 W	34, 33, 32, 31
2 S	3 W	36, 25, 26, 27, 22, 21, 16, 17, 18
2 S	4 W	13, 24, 23, 22, 27, 28, 29, 30, 31
2 S	5 W	36, 35, 34, 33, 32
3 S	5 W	5, 6
3 S	6 W	1, 2, 3, 4, 5
2 S	6 W	32, 31, 30
2 S	7 W	25, 24, 23, 14, 15, 10, 3, 4
1 S	7 W	33, 28, 29, 20, 19, 18, 7
1 S	8 W	12, 11, 2, 3
1 N	8 W	34, 33, 28, 21, 16, 17, 8, 7, 6
1 N	9 W	1
2 N	9 W	36
2 N	8 W	31, 30, 29, 20, 21, 16, 15, 10, 3
3 N	8 W	34, 35, 26, 23, 24
3 N	7 W	19, 18, 17, 16, 9, 4, 5
4 N	7 W	32, 33, 29, 28, 21, 16, 9, 3, 4, 5
5 N	7 W	34, 33, 32, 29, 20, 17, 8, 18, 7
5 N	8 W	12, 1, 2
6 N	8 W	35, 26, 23, 14, 13, 11, 12, 1, 2
7 N	8 W	35, 36, 25, 26, 23, 24, 13
7 N	7 W	18, 7, 6
8 N	8 W	36, 25
8 N	7 W	31, 30, 29, 28, 21, 20, 17, 8, 7, 6
9 N	7 W	31, 30, 19, 18, 7, 6
9 N	8 W	36, 25, 1, 12, 11, 2, 3, 10, 4, 5, 8, 7, 6
9 N	9 W	1
10 N	8 W	31, 30
10 N	9 W	36, 25, 26, 23, 22, 15, 10, 9, 4, 5
11 N	9 W	32, 31
11 N	10 W	36, 25, 26, 27, 34
10 N	10 W	3, 10, 15, 22, 27, 34
9 N	10 W	3, 10, 15, 16, 21, 28, 29, 32, 31
8 N	10 W	6
8 N	11 W	1, 2, 3
9 N	11 W	34, 33, 28, 29, 20, 19
9 N	12 W	24, 13, 23, 14, 15, 16, 17, 18, 7
9 N	13 W	12, 11, 2, 3, 4, 5, 6
9 N	14 W	1, 2, 3, 4, 5, 6
9 N	15 W	1
10	15 W	36, 35, 34, 27, 28, 21, 20, 17, 18, 7
10	16 W	12, 1, 2, 3, 4, 5, 8, 7
11	16 W	35, 34
10	17 W	12, 11, 10, 3, 4, 5, 8, 7
10	18 W	12, 11, 10, 15, 16, 17, 20, 19
10	19 W	24, 23, 26, 27, 28

Project Location – USGS (7.5 Minute Quadrangle)

The following are the 7.5 Minute Quadrangle maps which the proposed action travels through via United States Geologic Survey (USGS) topoBuilder Application v: 1.5.6.

Bernalillo County	
Albuquerque West	Los Lunas
Isleta	-
Valencia County	
Los Lunas	Belen
Dalies	Veguita
Socorro County	
Veguita	Arroyo Landavaso
Abeytas	Tres Montosas
La Joya	Arrowhead Well
San Acacia	Lion Mountain
Lemitar	Lion Mountain NW
Socorro	Dog Springs
Water Canyon	D Cross Mountain
Magdalena	Table Mountain
Granite Mountain	Pueblo Viejo Mesa
Catron County	
Dog Springs	-
Cibola County	
Broom Mountain	Grants
Mecate Meadow	Milan
Blue Mesa	San Rafael
East Mesa	Arrosa Ranch
Crow Point	Ice Caves
Acoma Pueblo	Paxton Springs
Cubero	Valle Largo
McCarty's	El Morro
Grants SE	Togeye Lake
McKinley County	
Togeye Lake	Pescado
Ramah	Horsehead Canyon
Burned Timber Canyon	Zuni

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Appendix

A. Introduction

The purpose of this biological assessment is to evaluate the impacts of the proposed action, the Santa Fe Indian School (SFIS) Pueblo Education Network (PEN) Middle Mile Broadband Project, on any surrounding threatened, endangered, proposed, or sensitive species. The proposed action involves the construction of a 324-mile broadband fiber optic network through multiple counties and tribal communities across central and west central New Mexico. This biological assessment is prepared in accordance with legal requirements set forth by Section 7 of the Endangered Species Act (16 U.S.C. 1536.c) and follows the standards established by National Telecommunications and Information Administration (NTIA), a branch within U.S. Department of Commerce, National Environmental Protection Act (NEPA) guidance.

B. Description of the Proposed Action

Two major components of the SFIS PEN (which share the same footprint) include: 1) constructing a Middle Mile Fiber Optic Network, and 2) connecting education facilities to a regional Internet exchange located in Albuquerque, NM. The Middle Mile Fiber Optic Network is composed of a 324-mile broadband line that traverse through the following tribal communities: Pueblo of Isleta, Pueblo of Acoma, Ramah Navajo Indian Reservation, and Pueblo of Zuni. Municipalities within the proposed action path include: the City of Albuquerque, Village of Los Lunas, City of Belen, City of Socorro, Village of Magdalena, and the City of Grants. This proposed broadband line serves as an addition to recently installed broadband infrastructure, including a 160-mile line in central New Mexico. The 324-mile PEN broadband line will be a Single Mode SMF-28e cable encased within a 1 ¼-inch High Density Polyethylene conduit.

The total project completion timeline is estimated to be approximately 500 business days. Factors that may extend the project's work are weather, terrain, and environmentally sensitive areas. Conduit will be placed at a minimum depth of 36 inches below ground surface with special depth adjustments to avoid existing utilities, and cross arroyos, highways, or waterways. If within the proposed action boundaries, efforts will be made to avoid vegetation removal to avoid disturbing potential species' habitat.

Depending on site conditions, construction activities for PEN installation include directional boring/drilling, and trenching. The trenching method utilizes a backhoe or mini excavator to remove soil for conduit installation. Directional drilling occurs at road/highway/waterway crossings or areas where terrain will not allow for trenching. Directional boring is a specialized installation method to install cables, pipes, and utility lines underground with minimal disturbance to the ground surface over an established distance. This technique uses a directional boring machine to drill a pilot hole with a drill head then pull the conduit through the pilot hole for installation. The directional boring method is the primary method of installation for the proposed action. Overall, this method minimizes ground disturbance and allows for mitigation or avoidance of impacts on the environment or other key features.

The proposed action crosses two major waterways:

- Directional boring at the Rio Grande will start and end at locations between 220 to 390 feet away from the water's edge to a depth of approximately 27 feet below the riverbed, depending on site conditions.
- The anticipated PEN installation location occurs on two bridge crossings (Hwy 53 east of Zuni Pueblo and County Rd. 8 in central Zuni Pueblo) of the ephemeral Zuni River: 1) on the central and 2) eastern portions of Zuni Pueblo.
    1) Hwy 53. Bridge – The PEN installation on the central bridge location occurs on the bridge infrastructure itself. Directional boring activities occur up to an existing light pole on the east side of the bridge, where the conduit will transition from underground to above ground and from plastic to steel material. The conduit will then be installed by bolting strap/clamp type attachments to the lower portion of every vertical handrail on the bridge. Although, depending on site conditions and landowners, selection of the most feasible installation method (bridge attachments or directional boring) will occur by the time of construction.
    2) County Rd. 8 Bridge – The method of directional boring occurs on the eastern bridge of the Pueblo. The locations of the boring activities occur between 200 to 250 feet away from the center of the waterway. The boring depth occurs between 8 to 10 feet. From north to south, the distance from the bridge to the boring location occurs at approximately 19 feet.

The construction equipment anticipated to be used are backhoes, directional drills, cable plows, semi-sized vehicles for transporting heavy equipment, and various 1-ton sized vehicles.

The proposed project area is within pre-disturbed lands within a combination of NM Department of Transportation Right-of-Way (ROW) areas and Tribal ROWs. One major stretch of the project area occurs from Albuquerque to Socorro along Interstate- 25. Another major stretch of the proposed project occurs from Magdalena to the Pueblo of Acoma. While many stretches of this route will be in the 'backcountry' of Acoma, installation of the fiber line will vary (based on site characteristics and heavy equipment accessibility) from the edge of the road to the edge of the ROW. Encountering wildlife within an existing ROW will be minimal. All construction activities (directional boring and/or trenching) will occur within the proposed project boundaries. NOTE: Each of these construction methods provides varying footprints for ground disturbances.

Implementation of best management practices (BMPs) during construction will occur. NMDOT Standard Specifications for Highway and Bridge Construction (2019) will govern construction activities.

- BMPs could include straw waddles, silt fences, and other temporary erosion and sediment control measures.
- Stormwater Pollution Prevention Plan (SWPPP) inspections.
- Monitoring and observation during construction activities will occur.

C. Description of Proposed Action Area

The proposed project area is defined as: the total length of the PEN (324-miles) with a width of 20-feet from the centerline of the roadway (40-feet total width). The proposed action area consists of 2 major footprints: 1) the total lineage of broadband fiber (324 miles) and 2) the foundation for a shelter for fiber optic regeneration. There will be a total of 4 Regeneration Sites along the proposed project path at the approximate locations: southern border within Isleta Pueblo boundary near Los Lunas, New Mexico Tech Grad site location (already established – no building required), within Acoma Pueblo on the corner of Anzac Rd. and Airport Rd., and Zuni Pueblo along Hwy 53 across BIA-12. Figure 1 displays the proposed action area.

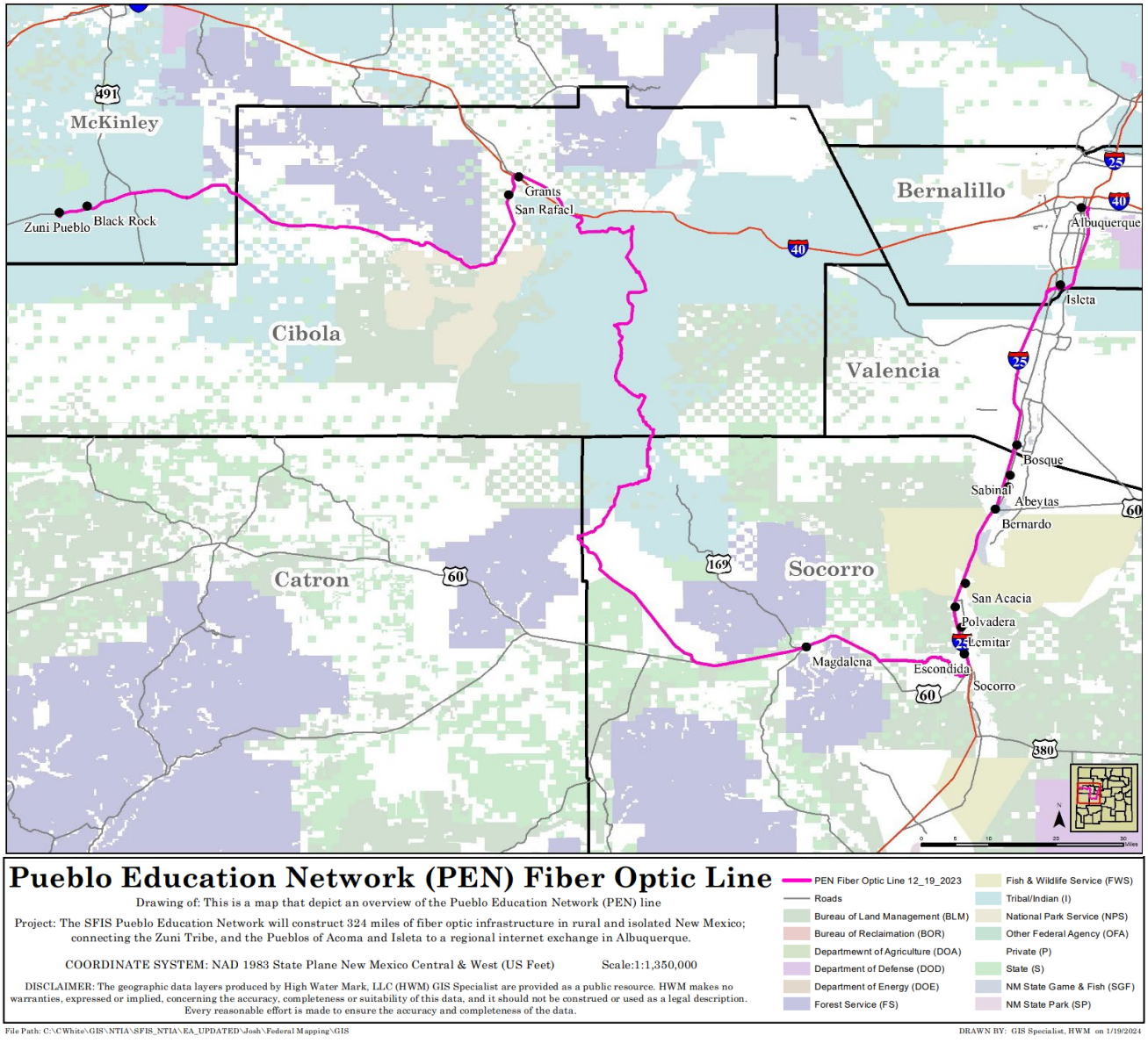

Figure 1: SFIS PEN (Proposed Action Area) and Regeneration Sites

New Mexico soils support a diverse group of plant species over various ecosystems and landscapes that range from desert, forestland, low plains, to mountainous regions. The US Environmental Protection Agency created a map layer depicting ecoregions across the nation. Ecoregions denote areas of similar ecosystems (type, quality, and quantity of environmental resources). Figure 2 displays the ecoregions within the proposed action area, with further details in Table 1.

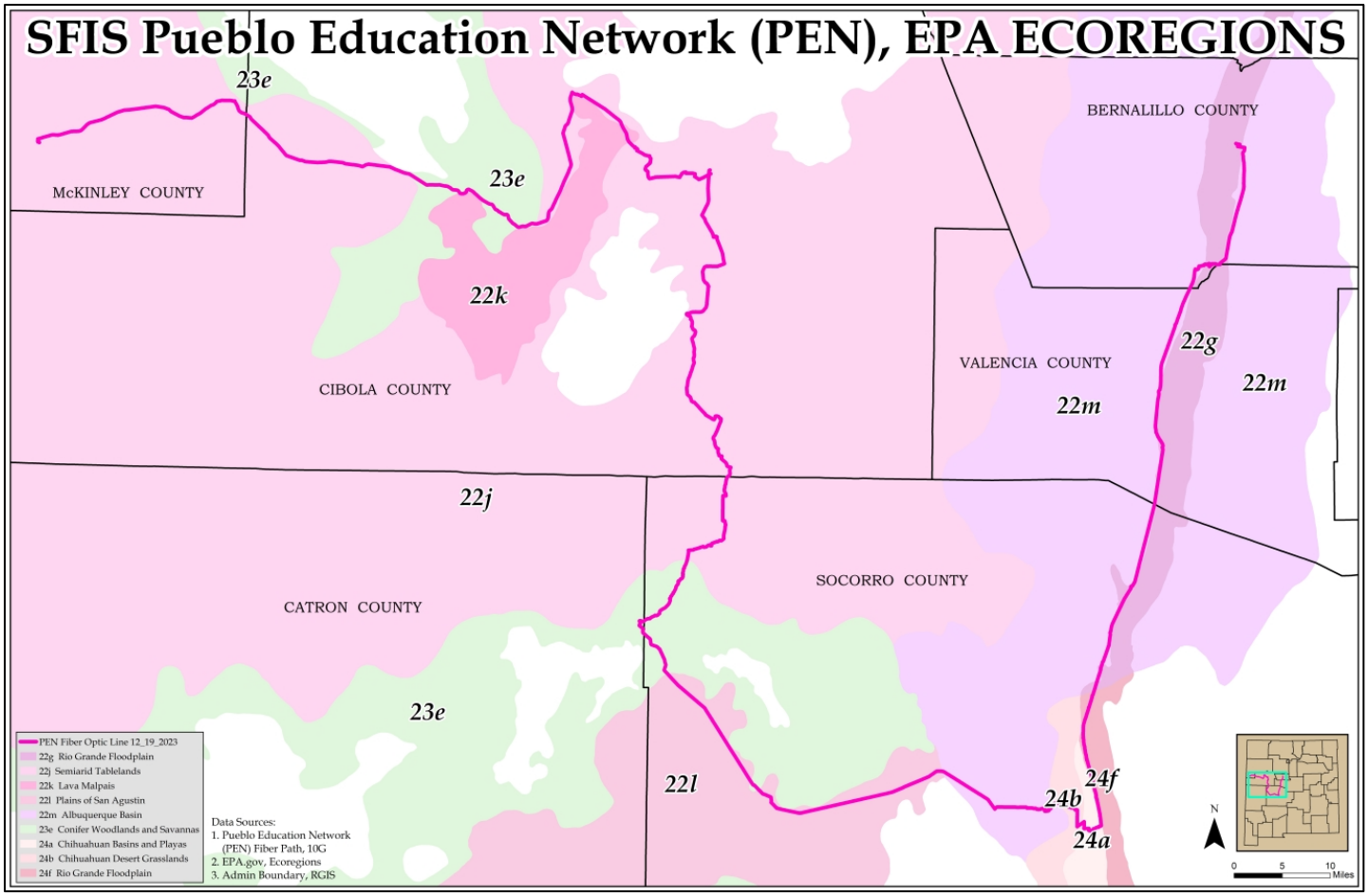

Figure 2: SFIS PEN (Proposed Action Area) overlayed with EPA Ecoregions

Table 1: EPA Ecoregions within the Proposed Action 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 and Savannas	Pinyon-juniper woodlands with one-seed juniper, alligator juniper, Rocky Mountain juniper at higher elevations, pinyon pine, blue grama, junegrass, galleta, and 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	

D. Current Management Direction

The New Mexico Department of Transportation (NMDOT) Standard Specifications for Construction of Roads and Bridges (2019) will govern the construction activities of the PEN.

E. Species (Threatened, Endangered, Candidate)

Tables 2 and 3 list the species identified from the USFWS Information for Planning and Consultation (IPaC) Resource List collected for the proposed action area. The IPaC Resource List is attached as Appendix 1. The listing status, occurrence within action area, and determination is provided for each of these species. NOTE: No further analysis provided for species with no known occurrence within the proposed action area.

Table 2: Occurrence of Species near the Proposed Action Area

Common Name	Scientific Name	Occurrence	Determination
Mexican Wolf (E)	*Canis lupus baileyi*	Known to occur in action area	See Table 5
Mexican Wolf (EXPN)	*Canis lupus baileyi*	Known to occur in action area	See Table 5
New Mexico Meadow Jumping Mouse (E)	*Zapus hudsonius luteus*	Known to occur in action area	See Table 5
Mexican Spotted Owl (T)	*Strix occidentalis lucida*	Known to occur in action area	See Table 5
Northern Aplomado Falcon (EXPN)	*Falco femoralis septentrionalis*	NO known occurrence in action area	No Effect
Piping Plover (T)	*Charadrius melodus*	NO known occurrence in action area	No Effect
Southwestern Willow Flycatcher (E)	*Empidonax traillii extimus*	Known to occur in action area	See Table 5
Yellow-billed Cuckoo (T)	*Coccyzus americanus*	Known to occur in action area	See Table 5
Chiricahua Leopard Frog (T)	*Rana chiricahuensis*	NO known occurrence in action area	No Effect
Loach Minnow (E)	*Tiaroga cobitis*	NO known occurrence in action area	No Effect
Rio Grande Silvery Minnow (E)	*Hybognathus amarus*	Known to occur in action area	See Table 5
Spikedace (E)	*Meda fulgida*	NO known occurrence in action area	No Effect
Zuni Bluehead Sucker (E)	*Catostomus discobolus yarrow*	Known to occur in action area	See Table 5
Socorro Isopod (E)	*Thermosphaeroma thermophilus*	NO known occurrence in action area	No Effect
Pecos (=puzzle, =paradox) Sunflower (T)	*Helianthus paradoxus*	Known to occur in action area	See Table 5
Wright's Marsh Thistle (T)	*Cirsium wrightii*	NO known occurrence in action area	No Effect
Zuni Fleabane (T)	*Erigeron rhizomatus*	Known to occur in action area	See Table 5
American Hart's-tongue Fern (T)	*Asplenium scolopendrium var. americanum*	NO known occurrence in action area	No Effect
Monarch Butterfly (C)	*Danaus plexippus*	NO known occurrence in action area	No Effect
Species list from IPaC Resource List – Retrieved on Feb. 15, 2024			

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

Table 3: Migratory Birds

Common Name	Scientific Name	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

Common Name	Scientific Name	Breeding Season
Chestnut-collared Longspur	*Calcarius ornatus*	Breeds elsewhere
Clark's Grebe	*Aechmophorus clarkii*	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
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
Migratory Birds from IPaC Resource List – Retrieved on Feb. 15, 2024		

According to the Information for Planning and Consultation (IPaC) report collected for the proposed action, the period of September through February is not ideal for construction activities as most migratory birds in the proposed action area are breeding. If construction requires a consistent work schedule year- round (as anticipated), continued coordination amongst USFWS, the PEN team, and contractors will occur to mitigate ecosystem disturbance, and determine which areas along the proposed action area can continue.

E.1 Critical Habitat

There are no threatened or endangered species with current "Critical Habitat" within the proposed project area, according to the USFWS IPaC report.

E.2 Bald & Golden Eagles

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

F. Accounts and Status of the Species near the Proposed Action Area

Below are accounts and respective status of federally listed species known to occur near the proposed action area.

New Mexico Meadow Jumping Mouse (*Zapus hudsonius luteus*)[1]

- Habitat Description, Location, and Biology/Ecology
  - Riparian communities along rivers and streams, springs and wetlands, or canals and ditches – that contain persistent emergent herbaceous wetlands, scrub-shrub riparian areas, flowing water, and tall/dense herbaceous riparian vegetation up to 24 inches in height.
  - Based on information from USFWS Environmental Conservation Online System (ECOS), this species will primarily occur along the Rio Grande (with a maximum distance travelled between two successive points by radio collared NM meadow jumping mice in Bosque del Apache NWR was 2,441 ft. – with daily movements were less than 328 ft.
  - This species is nocturnal, but occasionally diurnal. This species is active only during the growing seasons of grasses and forbs. During this time, the mouse accumulates fat reserves by consuming seeds. This species hibernates for about 9 months out of the year. According to ECOS, there is little information regarding this species' breeding season, but FWS estimates the beginning of July or August.
- Species Status
  - Listed as 'Endangered' on 06/10/2014 by USFWS.

Mexican Spotted Owl (*Strix occidentalis lucida*)[2]

- Habitat Description, Location, and Biology/Ecology
  - Owl foraging habitat includes a wide variety of forest conditions, canyon bottoms, cliff faces, tops of canyon rims, and riparian areas. "Forests used for roosting and nesting often contain mature or old growth stands with complex structure (USDI FWS 1995:26). Forests used by spotted owls are typically uneven-aged, are multistoried, and have high canopy cover (USDI FWS 1995:27). In these areas, nest trees are typically large (average diameter of nest trees is 61cm [24 in]), although owls roost in both large and small trees (Ganey 1988, Seamans and Gutiérrez 1995, Willey 1998b, Ganey et al. 2000, May and Gutiérrez 2002, May et al. 2004). Tree species used for nesting vary among areas and cover types, but Douglas-fir is the most common nest tree in many areas (SWCA, Inc. 1992, Willey 1998b)."[3]
  - The critical habitat identified by USFWS lies within the Cibola National Forest along the Zuni Mountains. Most adults remain in the same territory year after year. Juveniles leave

[1] https://ecos.fws.gov/ecp/species/7965
[2] https://ecos.fws.gov/ecp/species/8196
[3] U.S. Fish & Wildlife Service. 2012. Final Recovery Plan for the Mexican Spotted Owl (Strix occidentalis lucida), First Revision. U.S. Fish & Wildlife Service. Albuquerque, New Mexico, USA. 413 pp.

their natal territory in September, but typically establish themselves nearby. Mated pairs defend a breeding territory at least during the nesting season (March through August).
    - Human activity in or near nesting, roosting, or foraging sites may result in abandonment of an area, and indirectly may affect habitat parameters from trampling, vegetation removal, or increased fire risk.
- Species Status
    - Listed as 'Threatened' on 03/16/1993 by USFWS.

Southwestern Willow Flycatcher (*Empidonax trailii extimus*)[4]

- Habitat Description, Location, and Biology/Ecology
    - For nesting, dense riparian areas with microclimatic conditions dictated by the local surroundings are necessary.
    - The critical habitat identified by USFWS lies along the path of the Rio Grande. There is only one portion of the proposed PEN that crosses the Rio Grande, within Isleta Pueblo. This crossing will not cause harm to any existing riparian areas due to the fiber line installation occurring via directional drilling under the Rio Grande. Setbacks for drilling operations occur between 220 to 390 feet from the water's edge. Although to set up the directional drilling, a pit would need to be excavated for seamless operation. Since the flycatcher typically breeds in the summer months. Construction can occur the rest of the year.
    - Loss and degradation of dense riparian habitats are the primary habitat threat to this species. Human disturbances at nesting sites may result in nest abandonment.
- Species Status
    - Listed as 'Endangered' on 02/27/1995 by USFWS.

Yellow-billed Cuckoo (*Coccyzus americanus*)[5]

- Habitat Description, Location, and Biology/Ecology
    - Habitats of this species typically include wooded areas with dense cover and water nearby. In the west, nests occur along streams and rivers.
    - The critical habitat identified by USFWS lies along the path of the Rio Grande. There is only one portion of the proposed PEN that crosses the Rio Grande, within Isleta Pueblo. This crossing will not cause harm to any existing riparian areas due to the fiber line installed approximately 27 feet below the river. Although to set up the directional drilling, a pit would need to be excavated for seamless operation. Construction activities will not affect breeding season.
    - The conversion of riparian habitat to farmland and housing led to population declines in the West. As long-distance, nocturnal migrants, this species is also vulnerable to collisions with tall buildings, cell towers, radio antennas, wind turbines, and other structures.

[4] https://ecos.fws.gov/ecp/species/6749
[5] https://ecos.fws.gov/ecp/species/3911

- Species Status
  - Listed as 'Threatened' on 10/03/2014 by USFWS.

Rio Grande Silvery Minnow (*Hybognathus amarus*)[6]

- Habitat Description, Location, and Biology/Ecology
  - "In general, the species is most often found in areas of low or moderate water velocity (e.g., eddies formed by debris piles, pools, backwaters, and embayments) and is rarely found in habitats with high water velocities, such as main channel runs, which are often deep and swift (Dudley and Platania 1997, Watts et al. 2002, Remshardt 2007)."[7]
  - Currently, this species is known to occur in one portion of the middle Rio Grande (a 174 mile stretch of river from Cochiti Dam to Elephant Butte Reservoir).
  - Surface and groundwater withdrawal would affect the direct loss of habitat to any aquatic species. The proposed PEN will not cause any surface or groundwater withdrawal (via sedimentation issues potentially caused by directional drilling) that would jeopardize this species' habitat.
- Species Status
  - Listed as 'Endangered' on 07/20/1994 by USFWS.

Zuni Bluehead Sucker (*Catostomus discobolus yarrow*)[8]

- Habitat Description, Location, and Biology/Ecology
  - This species persists in small creeks that are subject to exceptionally low water velocities. Effects on the range reduction and fragmentation of this species includes discontinuous surface-water flow, introduced species, and habitat degradation from fine sediment deposition.[9]
  - This species' range includes isolated locations within the Little Colorado and San Juan River drainages in Arizona and New Mexico. Occupancy locations are mostly located on Tribal lands on the Navajo Nation and Zuni Pueblo Reservation.
  - Surface and groundwater withdrawal would affect the direct loss of habitat to any aquatic species. The proposed PEN will not cause any surface or groundwater withdrawal (via sedimentation issues) that would jeopardize this species' habitat.
- Species Status
  - Listed as 'Endangered' on 08/25/2014 by USFWS.

[6] https://ecos.fws.gov/ecp/species/1391
[7] U.S. Fish & Wildlife Service. 2010. Rio Grande Silvery Minnow (Hybognathus amarus) Recovery Plan, First Revision. Albuquerque, NM. viii + 210 pp.
[8] https://ecos.fws.gov/ecp/species/3536
[9] 76 FR 66370 66439

Pecos Sunflower (*Helianthus paradoxus*)[10]

- Habitat Description, Location, and Biology/Ecology
  - Typical species' locations include desert wetlands that contain permanently saturated root soils. The species require sites with low proportions of woody shrubs that provide enough space and light for individual and population growth.
  - The critical habitat identified from USFWS is located on the eastern side of Grants, NM where grasses such as blue grama and sideoats grama are located. These are some plants that remain moister than the areas surrounding it. Threats to the sunflower include wetland drying and groundwater depletion. The effects of the construction of the PEN will not disturb any existing groundwater nor wetlands.
  - This species commonly blooms between September through November. Flowering typically peaks in the second week of September in the northern-most portion of New Mexico. Seeds fill and mature during October and November, then require a two-to-three-month after-ripening period before germination. Some seeds will remain dormant for longer periods than others, though the precise duration of seed viability is unknown.
- Species Status
  - Listed as 'Threatened' on 10/20/1999 by USFWS.

Zuni Fleabane (*Erigeron rhizomatus*)[11]

- Habitat Description, Location, and Biology/Ecology
  - Found on outcrops in the Datil/Sawtooth Mountains in western New Mexico at elevations between 7,300 and 8,300 ft. Commonly grows on steep slopes, most commonly on north-facing slopes. Found on recently weathered detrital slopes or cliff benches with sandy soils. Substrate types include pink or white weathered soft sandstone strata and pink or red shale strata that weather into a sand-like substrate.[12]
  - Also found in the Zuni Mountains in northwestern New Mexico at elevations between 7,300 and 7,380 ft. There are only two known locations of the plant in this area. Grows on both gentle and steep slopes at all exposures. Substrate types include gray and brown sandy shale or shale that breaks down into small sandy particles, giving the soil a sandy surface texture.
  - This species flowers from mid to late May into early June. Fruiting time varies from mid-June to early July. The mature seeds fall by the end of July. The major threat to this species is primarily surface disturbance activity associated with mineral development. Many sites for this species are directly associated with historic or current mining claims for uranium.[13] As mining activities gradually decreased over time, the survival of this species increased.

[10] https://www.fws.gov/species/paradox-sunflower-helianthus-paradoxus
[11] https://ecos.fws.gov/ecp/species/5700
[12] Status Report for Zuni Fleabane on the Cibola National Forest, New Mexico, 2014.
[13] U.S. Fish & Wildlife Service. 1988. Zuni fleabane (Erigeron rhizomatus) Recovery Plan. U.S. Fish & Wildlife Service, Albuquerque, New Mexico 38 pp.

- Species Status
  - Listed as 'Threatened' on 04/26/1985 by USFWS.

Mexican wolf (*Canis lupus baileyi*)[14]

- Habitat Description, Location, and Biology/Ecology
  - Mexican wolves historically occupied montane woodland habitats ranging from foothills characterized by evergreen oaks (*Quercus* spp.), pinyon (*Pinus edulis*), and juniper (*Juniperus* spp.) to high elevation pine (*Pinus* spp.) and mixed conifer forests.
  - This species' current range includes central and southern Arizona and New Mexico in the U.S. and portions of the States of Sonora and Chihuahua in Mexico.
- Species Status[15]
  - Listed as 'Endangered' 1976 by USFWS.
  - Listed as 'Non-essential, experimental population' in 1998 by USFWS.

G. Effects

The construction of the PEN includes primarily directional boring methods and, in some areas, vibratory plow trenching at a minimum depth of 36 inches from the surface (except at river crossings), with special depth adjustment based on existing terrain and site characteristics. The directional boring procedures will occur in areas where the proposed PEN is crossing a waterway, existing roads, various existing infrastructure. Vibratory plow trenching occurs when the equipment has easy accessibility in areas less densely populated. Additionally, vegetation re-seeding will occur in areas trenched.

Direct effects are those caused by the proposed action and occur simultaneously. The direct effects of this proposed project include noise disruptions during construction, and temporary impact/loss of vegetation. Long term impacts to vegetation and wildlife are not anticipated because of the proposed action.

G.1 Noise Disruptions

Typical heavy equipment noise ranges from 80 to 90 decibels (dB). The noise disruptions from the proposed action closely resemble the noise produced during urban development. Although the proposed PEN is NOT an urban development project, the noise coming from construction equipment is similar, but also temporary. The construction equipment noise is only to occur during normal hours of the day and may last up to 1 or 2 days maximum at the location of construction within the construction area.

G.2 Temporary Loss of Habitat

Minor temporary loss of habitat may occur. The presence of construction equipment and the presence of multiple workers in a specific construction location would cause wildlife to

[14] https://ecos.fws.gov/ecp/species/3916
[15] Biological Report for Mexican Wolf (USFWS) – Nov. 2017, pg. 7

temporarily avoid the work area. Most importantly, construction activities will occur around the various breeding seasons to avoid any temporary loss of habitat.

Construction activities will temporarily impact soil and vegetation within the proposed action area. Implementation of New Mexico Department of Transportation specifications for backfill, seeding, and revegetation will occur.

G.3 Cumulative Effects (State, Tribal, and Private Actions)

The proposed PEN broadband fiber line will be located underground, so it does not permanently intrude or impede on any natural habitats and does not pose any major negative effects on surrounding wildlife and plant population.

With all construction activities, there are instances of uncertainty regarding weather, equipment failures, or leaks from heavy equipment. Construction observation and monitoring will occur to document and report (when necessary) these instances. The observer will monitor implementation of SWPPP and NMDOT regulations to mitigate any issues. The observer will also document and contact appropriate agencies and/or personnel if any of these instances of uncertainty occur.

H. Conservation Measures for Species near the Proposed Action Area

Table 4 identifies conservation measures for each species known to occur within the proposed action area.

Table 4: Proposed Conservation Measures

Species	Approximate Habitat Location(s) near the Proposed Action Area	Conservation Measure
New Mexico Meadow Jumping Mouse	• Wherever found within riparian communities along the Rio Grande.	Work within suitable habitat occurs outside of the active/breeding season. The active season of this species occurs in mid-May to late October in the lower elevations along the Rio Grande. Work within or adjacent to this species' habitat will occur outside of its active season.
Mexican Spotted Owl	• Outside of PEN footprint along Ice Caves Rd. Location approx. 1.29 miles north of PEN.	Identification of suitable forested (or canyon) nest/roost habitat for the owl will occur prior to project implementation. If nest/roost habitat identified, work within suitable nest/roost habitat will not occur during the owl's breeding season (Mar. 1 – Aug. 31), as construction noise and human presence disrupts breeding behavior. Efforts to avoid tree and/or vegetation removal within any type of potential owl habitat will occur.
Southwestern Willow Flycatcher	• Rio Grande corridor from Los Lunas to Socorro	Work within 0.25 mi. of suitable riparian habitat occurs outside of the breeding season (May 1 – Sep. 1) as construction noise disrupts breeding behavior.
Yellow-billed Cuckoo	• Rio Grande corridor from Los Lunas to Socorro	Work within 0.25 mi. of suitable riparian habitat occurs outside of the breeding season (May 1 – Sep. 1) as construction noise disrupts breeding behavior.
Rio Grande Silvery Minnow	• Outside of PEN footprint along Broadway Blvd. near Isleta Pueblo.	The construction occurring near the Rio Grande involves a directional bore approximately 8 ft. below the bed of the river, which alleviates any surface water disruptions that could harm this species habitat, breeding season, or feeding. To avoid potential impacts to the Rio Grande silvery

	Location approx. 1 mile west of PEN. • Rio Grande corridor from Los Lunas to Socorro	minnow's spawning activities and to sensitive life stages, boring activities underneath the Rio Grande will occur outside of April 15 to September 1. The use of sediment control devices (such as silt fencing) during construction will prevent eroded soil from transporting off the construction site to surrounding rivers or streams (NMDOT Specifications for Highway and Bridge Construction – 2019; Section 604.3.6).
Zuni Bluehead Sucker	• Outside of PEN footprint along Ice Caves Rd. near Ramah. Location approx. 0.84 miles NE of PEN.	The construction occurring within the range of the Zuni bluehead sucker involves crossing of multiple water bodies and directional boring approximately 8 ft. below the bed of these water bodies, which alleviates most surface water disruptions that could harm this species' habitat, breeding season, or feeding. To avoid the smothering of Zuni bluehead eggs, sediment-generating activities will not occur within 0.25 miles of the Rio Pescado and Zuni River during the species' spawning season (late April to early June) or appropriate measures (i.e., silt fences, etc.) will be taken to eliminate any potential siltation of these rivers due to project activities.
Pecos Sunflower	• Outside of PEN footprint along McBride Rd. in Grants. Location approx. 0.34 miles SW of PEN.	Pre-construction habitat assessment surveys to identify potential habitats will occur. If potential habitat identified, directional boring would occur at a depth where no roots are present (a minimum of 5 feet) to avoid the disturbance of potential Pecos sunflower habitat.
Zuni Fleabane	• Wherever found in mountainous areas of Western NM, particularly in Grants, Ramah, and Zuni areas.	Pre-construction habitat assessment surveys to identify potential habitats will occur. If potential habitat identified, directional boring would occur at a depth where no roots are present (a minimum of 5 feet) to avoid the disturbance of potential Zuni fleabane habitat.
Mexican Wolf (Experimental Population)	• Wherever found in areas south of NM Interstate 40	Work occurring within identified suitable habitats (south of I-40) within the proposed action area will occur outside of breeding season (February to March). Road avoidance behavior is a characteristic of this species. If species encountered, construction would halt until species is out of range of proposed action area.
Mexican Wolf	• Wherever found in areas north of NM Interstate 40	Work occurring within identified suitable habitats (north of I-40) within the proposed action area will occur outside of breeding season (February to March). Road avoidance behavior is a characteristic of this species. If species encountered, construction would halt until species is out of range of proposed action area.
Mexican Wolf	• Within Sevilleta National Wildlife Refuge and El Malpais	Work occurring within identified suitable habitats (within Sevilleta NWR and El Malpais) within the proposed action area will occur outside of breeding season (February to March). Road avoidance behavior is a characteristic of this species. If species encountered, construction would halt until species is out of range of proposed action area.

I. Analysis of Alternative Actions

The Alternative Paths considered for the PEN proceed through tribal communities and municipalities such as Laguna Pueblo, Alamo Navajo Indian Reservation, Gallup, Southern Albuquerque, Eastern Albuquerque, Moriarty, Corona, Mountainair, Carrizozo, San Antonio, and Magdalena. When compared to the proposed action, the alternative path involves:

- There are more resources (soil, wetlands, points of diversion, mineral resources, and biological resources) within the alternative path that have potential to be affected and impacted. Substantial mitigation measures are necessary for their protection.
- Four locations of directional boring across the Rio Grande River rather than one crossing for the proposed action

J. Tribal Engagements

As specified by *Secretarial Order 3206: Tribal Rights, Trust Responsibilities, and the Endangered Species Act*, the [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, so as to avoid or minimize the potential for conflict and confrontation][16].

> *Because of the unique government-to-government relationship between Indian tribes and the United States, the Departments and affected Indian tribes need to establish and maintain effective working relationships and mutual partnerships to promote the conservation of sensitive species (including candidate, proposed and listed species) and the health of ecosystems upon which they depend. Such relationships should focus on cooperative assistance, consultation, the sharing of information, and the creation of government-to-government partnerships to promote healthy ecosystems.*[17]

> *The Departments recognize that Indian lands, whether held in trust by the United States for the use and benefit of Indians or owned exclusively by an Indian tribe, are not subject to the controls or restrictions set forth in federal public land laws. Indian lands are not federal public lands or part of the public domain but are retained by tribes or set aside for tribal use pursuant to treaties, statutes, court orders, executive orders, judicial decisions, or agreements. Accordingly, Indian tribes manage Indian lands in accordance with tribal goals and objectives, within the framework of applicable laws.*[18]

To fulfill the goals and intentions of this order, this Biological Assessment will be forwarded to respective BIA agencies (Southern Pueblo Agency, Zuni, and Navajo) for review and interpretation, at a period between 30-45 days upon receipt. Any changes or recommendations made by these BIA agencies will be included in this BA when this engagement occurs.

K. Determination and Conclusion

Table 5 identifies each species, determinations, and determination reasoning.

[16] Secretarial Order #3206 (1997), Section 1. Purpose and Authority
[17] Secretarial Order #3206 (1997), Section 4. Background
[18] Secretarial Order #3206 (1997), Principle 2

Table 5: Proposed Species Determination

Species	Determination	Determination Reasoning
New Mexico Meadow Jumping Mouse	*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 likely out of range of the mice burrowing hibernation location.
Mexican Spotted Owl	*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	*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	*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 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	*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	*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	*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	*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.

Species	Determination	Determination Reasoning
Mexican wolf (Experimental population)	*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.
Mexican Wolf	*Not likely to adversely affect*	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.
Mexican Wolf (Sevilleta NWR and El Malpais)	*Not likely to adversely affect*	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.

The proposed SFIS PEN project is a 324-mile Middle Mile fiber optic network that seeks to provide broadband internet to the following tribes: Pueblo of Isleta, Pueblo of Acoma, and the Pueblo of Zuni. After careful analysis of various resources (including species analysis shown in this document), the proposed route for this project is the least environmentally damaging alternative. Overall, construction activities and methods utilized for this proposed action do not intend to harm any species nor surrounding habitats and vegetation.

L. Consultation to Date

October 11, 2023	DOI Bureaus and Cooperating Agencies Regular Update Meeting
November 14, 2023	DOI Bureaus and Cooperating Agencies Regular Update Meeting
November 17, 2023	Informal discussion of BA with USFWS
November 28, 2023	DOI Bureaus and Cooperating Agencies Regular Update Meeting
January 12, 2024	Informal discussion of BA with USFWS
February 6, 2024	DOI Bureaus and Cooperating Agencies Regular Update Meeting
February 20, 2024	DOI Bureaus and Cooperating Agencies Regular Update Meeting
February 21, 2024	Informal discussion of BA with USFWS
March 1, 2024	Informal discussion of PEN water crossings with USFWS
March 5, 2024	DOI Bureaus and Cooperating Agencies Regular Update Meeting
March 19, 2024	DOI Bureaus and Cooperating Agencies Regular Update Meeting

M. List of Contacts/Contributors/Preparers

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N. Resources

U.S. Fish and Wildlife Service. 2002. Southwestern Willow Flycatcher Recovery Plan. Albuquerque, New Mexico. i-ix + 210 pp., Appendices A-O.

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Appendix 1

Information for Planning and Consultation (IPaC)

Resource List for SFIS PEN

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

New Mexico

Local office

New Mexico Ecological Services Field Office

(505) 346-2525
(505) 346-2542

2105 Osuna Road Ne
Albuquerque, NM 87113-1001

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Mexican Wolf Canis lupus baileyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3916	Endangered
Mexican Wolf Canis lupus baileyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3916	EXPN
New Mexico Meadow Jumping Mouse Zapus hudsonius luteus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7965	Endangered

Birds

NAME	STATUS
Mexican Spotted Owl Strix occidentalis lucida Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8196	Threatened
Northern Aplomado Falcon Falco femoralis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1923	EXPN
Piping Plover Charadrius melodus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6039	Threatened
Southwestern Willow Flycatcher Empidonax traillii extimus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Amphibians

NAME	STATUS
Chiricahua Leopard Frog Rana chiricahuensis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1516	Threatened

Fishes

NAME	STATUS
Loach Minnow Tiaroga cobitis Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6922	Endangered
Rio Grande Silvery Minnow Hybognathus amarus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1391	Endangered
Spikedace Meda fulgida Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6493	Endangered
Zuni Bluehead Sucker Catostomus discobolus yarrowi Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3536	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Crustaceans

NAME	STATUS

Socorro Isopod Thermosphaeroma thermophilus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2470	Endangered

Flowering Plants

NAME	STATUS
Pecos (=puzzle, =paradox) Sunflower Helianthus paradoxus Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/7211	Threatened
Wright's Marsh Thistle Cirsium wrightii There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/8963	Threatened
Zuni Fleabane Erigeron rhizomatus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5700	Threatened

Ferns and Allies

NAME	STATUS
American Hart's-tongue Fern Asplenium scolopendrium var. americanum Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4232	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Oct 15 to Aug 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on

Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

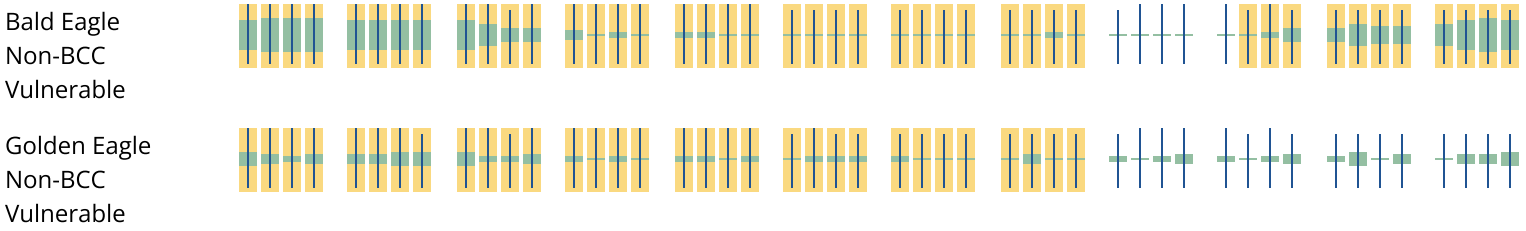
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described in the links below. Specifically, please review the "Supplemental Information on Migratory Birds and Eagles".

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the PROBABILITY OF PRESENCE SUMMARY below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Baird's Sparrow *Ammodramus bairdii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5113	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Oct 15 to Aug 31
Bendire's Thrasher *Toxostoma bendirei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31
Black Swift *Cypseloides niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8878	Breeds Jun 15 to Sep 10

Black-chinned Sparrow Spizella atrogularis — Breeds Apr 15 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9447

Black-throated Gray Warbler Dendroica nigrescens — Breeds May 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

California Gull Larus californicus — Breeds Mar 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Cassin's Sparrow Aimophila cassinii — Breeds Aug 1 to Oct 10
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9512

Chestnut-collared Longspur Calcarius ornatus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Grebe Aechmophorus clarkii — Breeds Jun 1 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Clark's Nutcracker Nucifraga columbiana — Breeds Jan 15 to Jul 15
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Eastern Meadowlark Sturnella magna — Breeds Apr 25 to Aug 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Ferruginous Hawk Buteo regalis — Breeds Mar 15 to Aug 15

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/6038

Flammulated Owl Otus flammeolus — Breeds May 10 to Aug 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/7728

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Grace's Warbler Dendroica graciae — Breeds May 20 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Long-billed Curlew Numenius americanus — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/5511

Long-eared Owl asio otus — Breeds Mar 1 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3631

Mexican Whip-poor-will Antrostomus arizonae — Breeds May 1 to Aug 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Mountain Plover Charadrius montanus — Breeds Apr 15 to Aug 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3638

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Pectoral Sandpiper Calidris melanotos — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Pinyon Jay Gymnorhinus cyanocephalus — Breeds Feb 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9420

Red-faced Warbler Cardellina rubrifrons — Breeds May 10 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rufous-winged Sparrow Aimophila carpalis — Breeds Jun 15 to Sep 30

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Sprague's Pipit Anthus spragueii — Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8964

Virginia's Warbler Vermivora virginiae — Breeds May 1 to Jul 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9441

Western Grebe aechmophorus occidentalis — Breeds Jun 1 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/6743

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

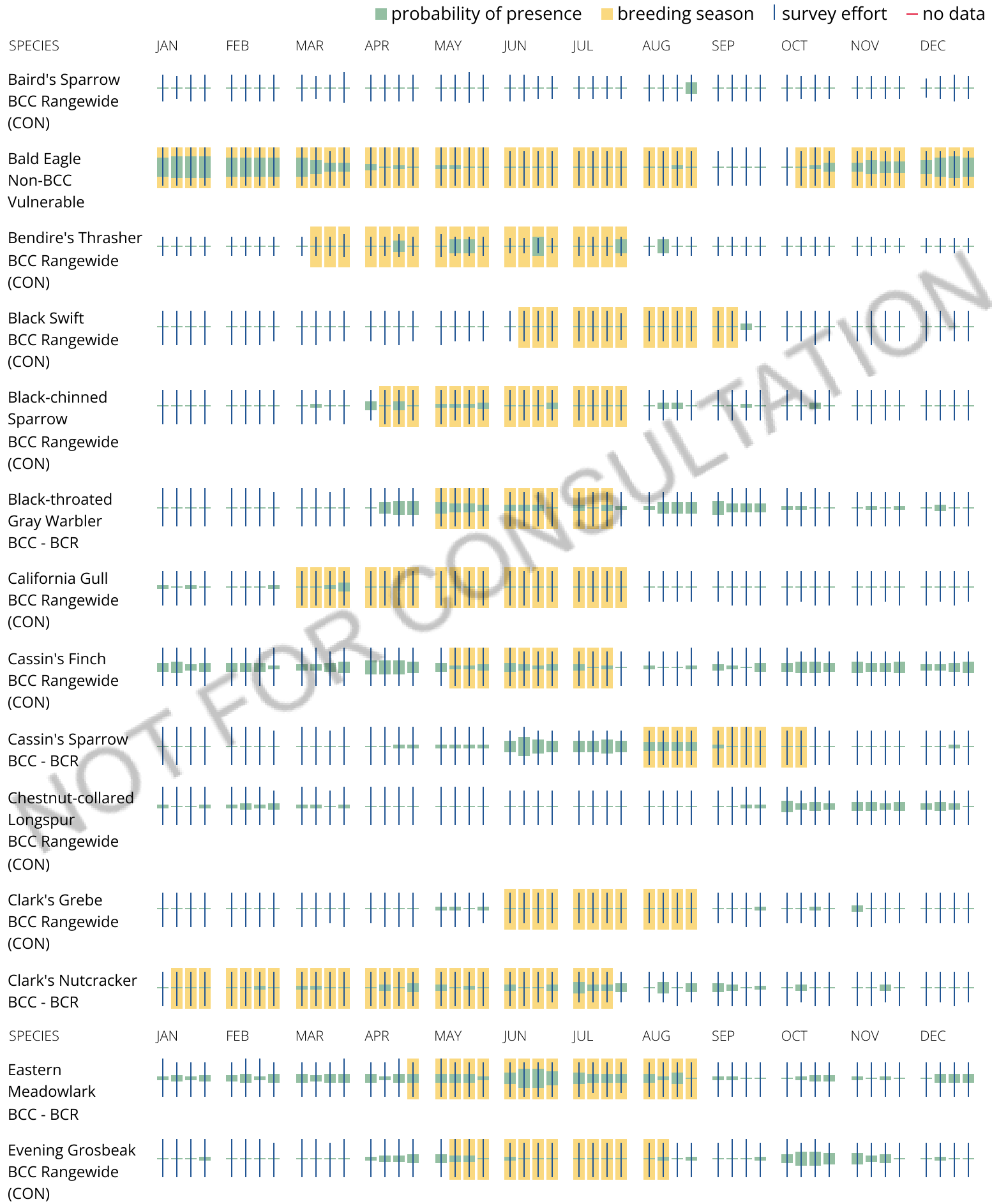
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

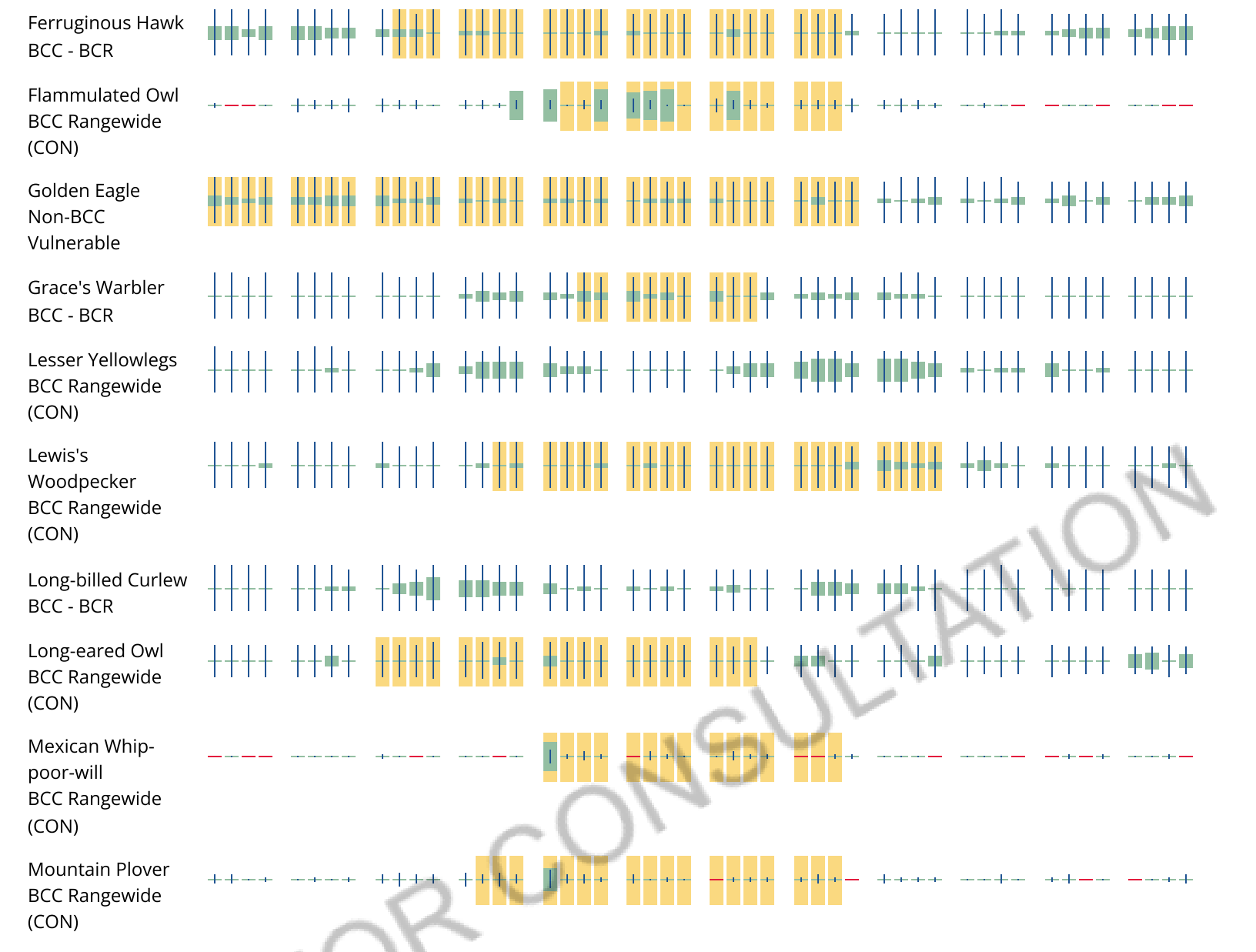
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

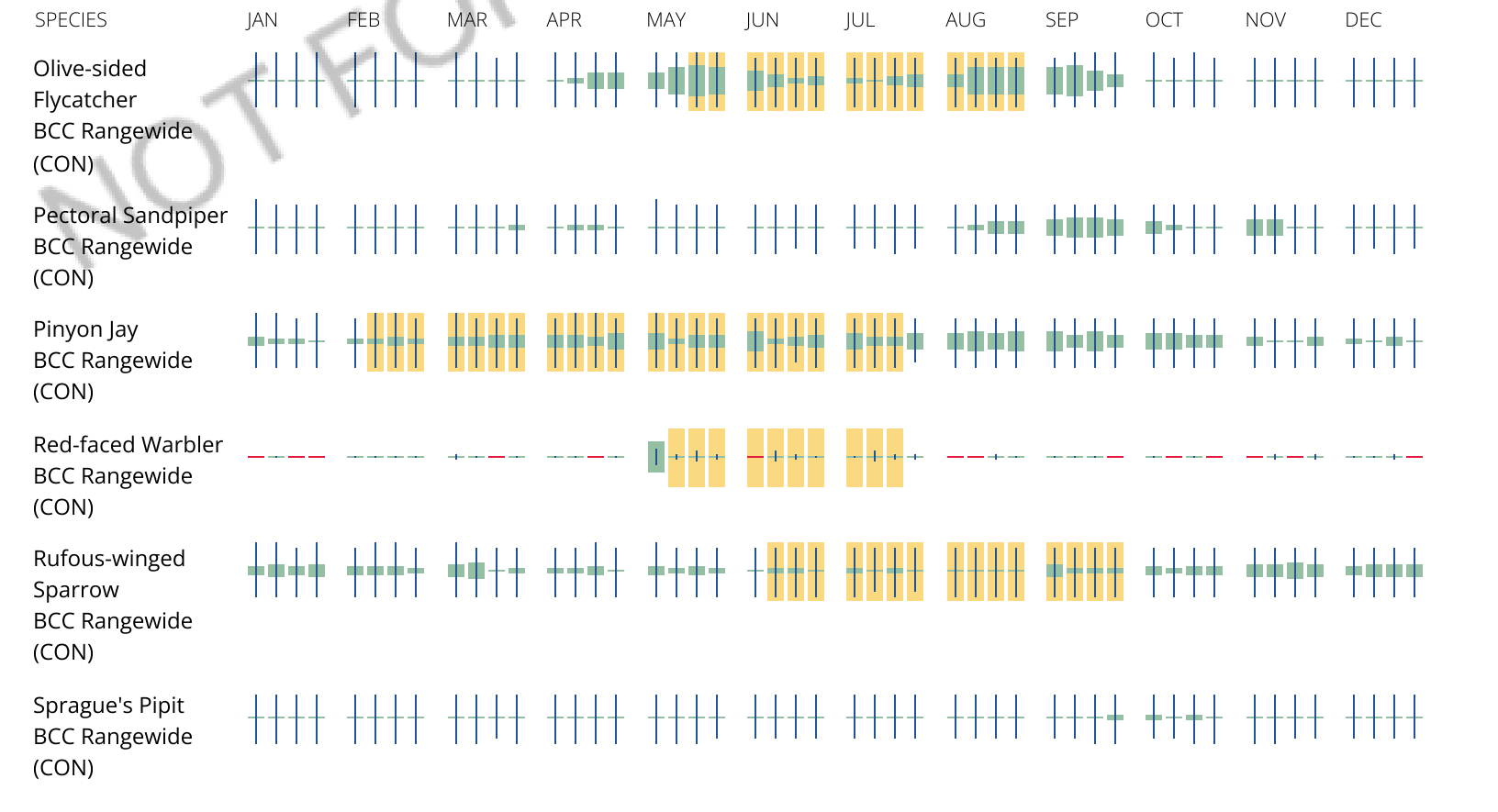
No Data (–)
A week is marked as having no data if there were no survey events for that week.

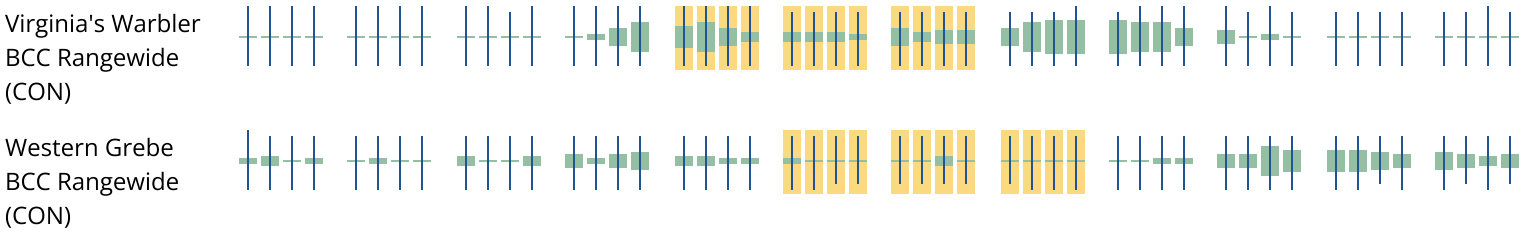
Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.









Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
SEVILLETA NATIONAL WILDLIFE REFUGE	227,850.97 acres

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1C
- PEM1B
- PEM1A
- PEM1/SS1Ah

FRESHWATER POND

- PUBHh
- PUBF

RIVERINE

- R4SBC

R4SB3J
R4SB3Cx
R4SB4J
R4SBJ
R2UBFx
R3UB2G
R4SB3Jx
R4SB4C
R5UBFx
R4SB7J
R3UB3H
R4SB7Jx
R2UBHx
R4SB3Ax

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities

involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix I

Section 106 – Class III Archaeological Survey for the Proposed Project Area

Appendix J

US Census Bureau Information for the Proposed Project Area

[Appendix J-1: Employment and Income]

		Albuquerque *	Pueblo of Isleta **	Belen *	Los Lunas *	Socorro *	Magdalena *	Pueblo of Acoma **	Grants *	Pueblo of Zuni **
Employment	In labor force	294,734	1,855	2,888	6,906	3,293	278	1,191	3,415	3,038
	Not in labor force	164,315	1,623	3,479	6,459	3,960	477	1,199	3,666	3,157
	Unemployment Rate (%)	5.5	3.6	8	5.3	3	0	2.9	4.5	13.7
	Population Estimate (16 years and over)	459,049	3,478	6,367	13,365	7,253	755	2,390	7,081	6,195
Income (in 2022 inflation – adjusted dollars)	Less than $10,000	16,927	129	335	395	166	103	34	159	233
	10,000 – 14,999	11,596	50	173	268	336	26	19	200	134
	15,000 – 24,999	20,214	115	301	697	396	0	54	379	218
	25,000 – 34,999	21,148	143	359	389	335	85	113	255	263
	35,000 – 49,999	28,886	195	399	564	238	17	124	372	143
	50,000 – 74,999	41,646	284	577	1,175	381	31	140	479	327
	75,000 – 99,999	29,931	210	354	1,107	240	17	79	394	143
	100,000 – 149,999	36,924	254	81	1,056	307	57	57	295	266
	150,000 – 199,999	16,797	43	76	495	186	10	47	344	43
	$200,000 or more	15,731	41	29	170	109	23	23	47	44
	Total Households	239,800	1,464	2,684	6,316	2,694	369	690	2,924	1,814
	Mean Household Income ($)	83,679	67,841	49,899	76,077	65,649	67,966	67,995	69,049	57,285
Source: US Census Bureau – American Community Survey 5-Year Estimates										

*US Census Bureau, 2018-2022 American Community Survey 5-Year Estimates (DP03: Selected Economic Characteristics)

**US Census Bureau (My Tribal Area), 2018-2022 American Community Survey 5-Year Estimates

Detailed information for both Navajo Indian Reservations (Alamo and Ramah) are not available. Only population information was reported in a 2019 American Community Survey 5-Year Estimate. Total populations include Alamo Chapter (1,909) and Ramah Chapter (1,530).
Source: https://navajoprofile.wind.enavajo.org/

[Appendix J-2: Demographics]

		Albuquerque *	Pueblo of Isleta **	Belen *	Los Lunas *	Socorro *	Magdalena *	Pueblo of Acoma **	Grants *	Pueblo of Zuni **
Total Population		562,551	4,466	7,367	17,452	8,605	791	2,982	9,177	8,134
Race (one race)	White	341,186	146	4,404	11,699	5,561	582	239	5,442	89
	African American	17,795	24	43	309	149	0	0	154	0
	American Indian / Alaskan Native	27,063	3,938	31	778	336	0	2,548	1,363	7,850
	Asian	17,457	0	179	176	306	0	0	56	41
	Native Hawaiian and Other Pacific Islander	564	0	0	0	0	0	20	6	0
	Other	56,414	118	1,006	1,346	613	0	27	820	47
	Two or more Races	102,071	240	1,704	3,144	1,550	209	148	1,336	107
Total Population		562,551	4,466	7,367	17,452	8,605	791	2,982	9,177	8,134
Hispanic or Latino and Race	Hispanic or Latino (of any race)	279,981	558	5,139	10,536	4,052	423	213	5,286	206
	Not Hispanic or Latino	282,570	3,908	2,228	6,916	4,553	368	2,769	3,891	7,928
Total Population		562,551	4,466	7,367	17,452	8,605	791	2,982	9,177	8,134
Source: US Census Bureau – American Community Survey 5-Year Estimates										

*US Census Bureau, 2018-2022 American Community Survey 5-Year Estimates (DP05: ACS Demographic and Housing Estimates)

**US Census Bureau (My Tribal Area), 2018-2022 American Community Survey 5-Year Estimates

Detailed information for both Navajo Indian Reservations (Alamo and Ramah) are not available. Only population information was reported in a 2019 American Community Survey 5-Year Estimate. Total populations include Alamo Chapter (1,909) and Ramah Chapter (1,530).
Source: https://navajoprofile.wind.enavajo.org/

Appendix K

Weather and Climate Hazards Assessment and Mitigation Plan for SFIS PEN by 10G Consulting

Weather and Climate Hazards Assessment and Mitigation Plan for Santa Fe Indian School Pueblo Education Network

Introduction

This document provides an overview of the weather and climate hazards that may affect the Santa Fe Indian School Pueblo Education Network. The document also outlines the mitigation strategies and actions that can be implemented to reduce the potential impacts of these hazards on the project's objectives, timeline, and budget. The document is based on the available data and information from the National Weather Service and the National Climate Assessment.

Weather and Climate Hazards

The PEN project involves the installation of fiber optic cables and equipment to provide high-speed educational connections to the Pueblos along the path The project area covers approximately 324 miles of pre-disturbed paths along highways, dirt roads and minor arterial streets. The project is expected to take approximately 2 years to complete.
The weather and climate hazards that may pose a risk to the project are summarized in the table below, along with their likelihood, severity, and potential impacts.

Hazard	Likelihood	Severity	Potential Impacts
Flash floods	High	Moderate to high	Damage to cables, equipment, and infrastructure; delays in installation and maintenance; increased costs; safety hazards for workers and residents
Drought	High	Low to moderate	Reduced water availability for construction and operation; increased fire risk; increased dust and erosion; reduced

			vegetation cover and wildlife habitat
Wildfires	Moderate	High	Damage to cables, equipment, and infrastructure; delays in installation and maintenance; increased costs; safety hazards for workers and residents; air quality degradation; loss of vegetation cover and wildlife habitat
Extreme heat	Moderate	Low to moderate	Reduced productivity and efficiency of workers and equipment; increased cooling and energy costs; health risks for workers and residents; increased evaporation and water demand
Extreme cold	Low	Low to moderate	Reduced productivity and efficiency of workers and equipment; increased heating and energy costs; health risks for workers and residents; increased freezing and bursting of pipes and cables
Severe storms	Low	Moderate to high	Damage to cables, equipment, and infrastructure; delays in installation and maintenance; increased costs; safety hazards for

			workers and residents; power outages; communication disruptions
Earthquakes	Low	High	Damage to cables, equipment, and infrastructure; delays in installation and maintenance; increased costs; safety hazards for workers and residents; power outages; communication disruptions

Mitigation Plan

The mitigation plan for the SFIS PEN project consists of the following strategies and actions, organized by the phases of the project: planning, design, construction, operation, and maintenance.

- Planning
- Conduct a site-specific risk assessment and vulnerability analysis for each project location, considering the historical and projected weather and climate data, the topography and hydrology of the area, and the existing and planned infrastructure and land use.
- Consult with the Authority Having Juridiction and the local stakeholders to identify their needs, preferences, and concerns regarding the project and its potential impacts on the Pueblo's environment, culture, and economy.
- Coordinate with the relevant federal, state, and local agencies and authorities to obtain the necessary permits, approvals, and clearances for the project and to comply with the applicable laws, regulations, and standards.
- Develop a contingency plan and an emergency response plan for the project, outlining the roles and responsibilities of the project team, the contractors, and the partners, and the procedures and protocols for dealing with potential hazards and incidents.
- Establish a monitoring and evaluation system for the project to track the progress, performance, and impacts and identify and address any issues or challenges that may arise.
- Design

- Select the appropriate materials, equipment, and technologies for the project, considering their durability, reliability, and resilience to weather and climate hazards and their environmental and social impacts.
- Design the project layout and configuration to minimize the exposure and sensitivity of the cables, equipment, and infrastructure to weather and climate hazards and maximize the system's adaptive capacity and flexibility.
- Incorporate the best practices and standards for weather and climate hazard mitigation and adaptation in the project design, such as stormwater management, erosion control, fire prevention, heat mitigation, and seismic retrofitting.
- Integrate the project design with the existing and planned infrastructure and land use of the Pueblo, to ensure the project's compatibility, complementarity, and synergy with the local context and needs.
- Incorporate the traditional knowledge, values, and practices of the Tribal community in the project design, to respect and enhance the cultural and spiritual aspects of the project and its surroundings.
- Construction
- Implement the project according to the approved design, specifications, and schedule and in compliance with the applicable laws, regulations, and standards.
- Ensure the quality and safety of the construction activities, materials, and equipment, and conduct regular inspections and tests to verify the compliance and performance of the project.
- Minimize the environmental and social impacts of construction activities, such as noise, dust, traffic, waste, and disruption, and implement the appropriate mitigation and compensation measures.
- Communicate and coordinate with the Authority Having Jurisdiction and the local stakeholders to inform them of the status, progress, and impacts of the project and to solicit their feedback and input.
- Monitor and evaluate the construction activities, report any issues, challenges, or incidents that may occur, and implement the necessary corrective and preventive actions.
- Operation
- Operate the project according to the approved plan, procedures, and protocols, and in compliance with the applicable laws, regulations, and standards.
- Ensure the quality and reliability of the service delivery, and conduct regular maintenance and repairs to prevent and address any malfunctions or damages.
- Minimize the environmental and social impacts of the operation activities, such as energy consumption, emissions, waste, and interference, and implement the appropriate mitigation and compensation measures.
- Communicate and coordinate with the Authority Having Juridiction and the local stakeholders, to inform them of the status, performance, and impacts of the project, and to solicit their feedback and input.

- Monitor and evaluate the operation activities, report any issues, challenges, or incidents that may occur, and implement the necessary corrective and preventive actions.
- Maintenance
- Maintain the project according to the approved plan, procedures, and protocols and in compliance with the applicable laws, regulations, and standards.
- Ensure the quality and safety of the maintenance activities, materials, and equipment, and conduct regular inspections and tests to verify the compliance and performance of the project.
- Minimize the environmental and social impacts of maintenance activities, such as noise, dust, traffic, waste, and disruption, and implement the appropriate mitigation and compensation measures.
- Communicate and coordinate with the Authority Having Jurisdiction and the local stakeholders to inform them of the status, progress, and impacts of the project and to solicit their feedback and input.
- Monitor and evaluate the maintenance activities, and report any issues, challenges, or incidents that may occur, and implement the necessary corrective and preventive actions.

Conclusion

The Santa Fe Indian School Pueblo Education Network is a valuable and beneficial initiative that can provide high-speed internet access to the residents and businesses of the Pueblo's, and enhance their social, economic, and educational opportunities. However, the project also faces some weather and climate hazards that may affect its objectives, timeline, and budget. Therefore, it is important to assess and mitigate these hazards, and to implement a comprehensive and adaptive plan that can ensure the resilience and sustainability of the project. This document provides such a plan, based on the available data and information, and the consultation and coordination with the relevant stakeholders. The document also provides a monitoring and evaluation system that can track the progress, performance, and impacts of the project, and identify and address any issues or challenges that may arise. By following this plan, the project can achieve its goals and deliver its benefits, while minimizing its risks and impacts, and respecting and enhancing the environment, culture, and needs of the communities.