

**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

Farmington District
Farmington Field Office
6251 N College Blvd., Ste. A
Farmington, NM 87402

DECISION RECORD

for the
Chaco 2308-31D #492H, #493H
NEPA No. DOI-BLM-NM-F010-2016-0026

(ATS-F010-15-325,326)

I. Decision

I have decided to select Alternative B for implementation as described in the Chaco 2308-31D No. 492H, 493H, Environmental Assessment (EA). Based on my review of the Environmental Assessment and project record, I have concluded that proposed action was analyzed in sufficient detail to allow me to make an informed decision. I have selected this alternative because the proposed project would allow WPX Energy Production, LLC access to their proposed drilling site in order to horizontally drill for oil and gas within their valid existing lease.

II. Conformance and Compliance

The proposed action is in conformance with the 2003 BLM-FFO Resource Management Plan (RMP). Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific Environmental Assessment (EA) tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) (BLM 2003a). The RMP was approved by the September 29, 2003 Record of Decision (ROD) (BLM 2003b), and updated in December 2003.

It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

III. Finding of No Significant Impact

I have reviewed the direct, indirect and cumulative effects of the proposed activities documented in the EA for the Chaco 2308-31D No. 492H, 493H. I have also reviewed the project record for this analysis. The effects of the proposed action and alternatives are disclosed in the Alternatives and Environmental Consequences sections of the EA. I have determined that construction of a well pad, access road and pipelines will allow WPX Energy Production, LLC reasonable access to the mineral lease in order to develop the existing lease as described in the EA will not significantly affect the quality of the human environment. Accordingly, I have determined that the preparation of an Environmental Impact Statement is not necessary.

IV. Other Alternatives Considered

Natural gas and oil wells can be drilled vertically or directionally/horizontally. Vertical drilling places a well pad directly above the bottom hole, while directional/horizontal drilling allows for flexibility in the placement of the well pad and associated surface facilities. Directional/horizontal drilling often allows for “twinning,” or drilling two or more wells from one shared well pad. Directional/horizontal drilling applications throughout the San Juan Basin have become relatively common. Generally, the use of this technology is applied when it is necessary to avoid or minimize impacts to surface resources.

Factors such as reservoir depth, angle of deviation, lateral displacement, completion technique, and risk are considered before deciding on the use of directional drilling applications. In addition, operating factors such as production efficiency; rod, pump, and tubing wear; and workover frequency is also a consideration. Generally, directional well completion and operating costs are 20 to 25 percent higher than vertical well drilling costs. The primary economic factors that determine the feasibility of directional applications include, but are not limited to, incremental drilling, completion, and operating costs; oil and gas reserves; rates of production; oil and gas prices; royalties and taxes; and return on investment.

No reasonable alternatives to the proposed action have been developed that would result in significantly fewer impacts or any clear advantages over the proposed action. The proposed access road and proposed pipeline corridors follow the most economic and direct route based on the location of existing WPX infrastructure, existing disturbance, surface resources, and terrain.

V. Rationale for the Decision

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this site-specific environmental assessment (EA) tiers to and incorporates by reference the information and analysis contained in the Farmington Proposed Resource Management Plan/Final Environmental Impact Statement [(PRMP/FEIS) BLM 2003a]. This EA is in conformance with the management goals set forth in the Resource Management Plan (RMP) for the Farmington Field Office (FFO) of the BLM, which was approved by the Record of Decision (ROD) signed September 29, 2003 (BLM 2003b). Specifically, this action is in conformance with the following: It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands (2003b, 2-2). The PRMP/FEIS, RMP, and ROD are available for review at the BLM Farmington Field Office, 6251 College Blvd., Farmington, NM, or electronically at:

The proposed action is in conformance with the 2003 BLM-FFO Resource Management Plan (RMP). Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific Environmental Assessment (EA) tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) (BLM 2003a). The RMP was approved by the September 29, 2003 Record of Decision (ROD) (BLM 2003b), and updated in December 2003.

Specifically, the proposed project supports the following BLM policy:

It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

Regulations under 43 CFR 1610.5 requires the proposed action to be in conformance with the terms and the conditions of the RMP as approved by the ROD signed September 29, 2003 (BLM 2003b) and updated in December 2003.

I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys were completed (BLM Report Number 2016 I 012F). Cultural resources not were identified within the project areas.

No TCPs are known to exist in the APE. Historic properties are being avoided with the implementation of design features such as but not limited to reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the COA in the APD/ROW as the case may be. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action will have no direct or indirect impact on historic properties (no historic properties affected). As discussed in the Cultural Resources section 3.10.1(page(s) 62 thru 64 of EA.

The BLM fulfills its responsibilities under the National Historic Preservation Act (NHPA) through a number of agreements. The National Programmatic Agreement (NPA; 2012) between the BLM, Advisory Council on Historic Preservation (ACHP), and the National Council of State Historic Preservation Officers (NCSHPO) allows the agency to fulfill its NHPA responsibilities according to the provisions of the NPA in lieu of 36 CFR 800.3 through 800.7 regulations. The NPA, which applies to all BLM activities below specified thresholds, provides among other things, regulatory relief in many instances from the requirement for case-by-case review by State Historic Preservation Officers (SHPOs) and the ACHP, in exchange for managers' maintenance of appropriate staff capability and observance of internal BLM standards as set out in the 8100 Manual series.

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and consult. Specifically, this document outlines among other things, how and when consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM FFO.

The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)). The project area is not within Threaten and Endangered habitat. The projects are located within the newly discovered Potential Brack's Cactus and Aztec Gilia habitat. The alternative project will be mitigated in accordance with the Aztec Gilia/Brack's Cactus Interim Guidance.

The project is located within the Lybrook Fossil SDA. Class 5 areas require an assessment of paleontological resources at the project level (BLM 2009). If a paleontological site is discovered during the construction phase of the proposed project, the site would be avoided by personnel, personal vehicles, and company equipment. Additional mitigation measures are discussed in Section 2.2.2 (Description of Proposed Project – Protection of Paleontological Resources) below. Therefore, no impacts to paleontological resources are anticipated as a result of the proposed project.

VI. Public Involvement

The Notice of Staking was made available for the public to review at the Farmington Field Office. No comments were received. The project was posted on the Farmington Field Office NEPA log www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_document_library/apd_ea_2015.html for a 30 day public comment period beginning on April 7, 2016 and ending on May 9, 2016. No comments were received.

An initial on-site meeting was held for the proposed project on September 30, 2015. Attendees at the on-site meeting included WPX, BLM-FFO representatives, the dirt work contractor, the project surveyor, an archeological consultant, and an environmental consultant (EIS, LLC.).

A public invitation to the on-site meeting was posted online (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html); no private citizens or groups attended. A BLM-FFO Interdisciplinary Team meeting was held on October 13, 2015, to discuss the proposed action. At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO and EIS

VII. Administrative Review and Appeal

Under BLM regulations, this Decision Record (DR) is subject to administrative review in accordance with 43 CFR 3165. Any request for administrative review of this DR, with or without oral presentation, must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, 301 Dinosaur Trail, Santa Fe, NM 87508, no later than 20 business days after this DR is received or considered to have been received.

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

This decision to authorize a right-of-way may be appealed to the Interior Board of Land Appeals (IBLA), Office of the Secretary, in accordance with the regulations contained in 43 CFR Part 4. Any appeal must be filed within 30 days of this decision. Any notice of appeal must be filed with Victoria Barr District Manager, Bureau of Land Management, Farmington Field Office, 6251 College Boulevard, Suite A, Farmington, NM 87402. The appellant shall serve a copy of the notice of appeal and any statement of reasons, written arguments, or briefs on each adverse party named in the decision, not later than 15 days after filing such document (see 43 CFR 4.413(a)). Failure to serve within the time required will subject the appeal to summary dismissal (see 43 CFR 4.413(b)). If a statement of reasons for the appeal is not included with the notice, it must be filed with the IBLA, Office of Hearings and Appeals, U. S. Department of the Interior, 801 North Quincy St., Suite 300, Arlington, VA 22203 within 30 days after the notice of appeal is filed with Richard A. Fields, Farmington Field Office Manager.

Notwithstanding the provisions of 43 CFR 4.21(a)(1), filing a notice of appeal under 43 CFR Part 4 does not automatically suspend the effect of the decision. If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal.

A petition for a stay is required to show sufficient justification based on the following standards:

- (1) The relative harm to the parties if the stay is granted or denied;
- (2) The likelihood of the appellant's success on the merits;
- (3) The likelihood of immediate and irreparable harm if the stay is not granted; and
- (4) Whether the public interest favors granting the stay.

In the event a request for stay or an appeal is filed, the person/party requesting the stay or filing the appeal must serve a copy of the appeal on the Office of the Field Solicitor: United States Dept. of the Interior, Office of the Solicitor, Southwest Regional Office, 505 Marquette Avenue NW, Suite 1800, Albuquerque, NM 87102

/s/Richard A. Fields
Richard A. Fields
Field Manager
Farmington Field Office

5/17/16
Date

**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT**

Farmington District
Farmington Field Office
6251 N College Blvd., Ste. A
Farmington, NM 87402

Finding of No Significant Impact

***WPX Energy Production, LLC's
Chaco 2308-31D Nos. 492H & 493H
NEPA No. DOI-BLM-NM-FO10-2016-0026***

(ATS-F010-15-325, 326)

FINDING OF NO SIGNIFICANT IMPACT

I have determined that the proposed action, as described in Environmental Assessment (EA) DOI-BLM-NM-FO10-2016-0026 will not have any significant impact, individually or cumulatively, on the quality of the human environment. Because there would not be any significant impact, an Environmental Impact Statement is not required.

In making this determination, I considered the following factors:

Context

The Farmington Field Office (FFO) is located in northwestern New Mexico. The field office boundaries include approximately 7,800,000 acres; 1.4 million surface acres and an additional 1 million acres of mineral estate are managed by the BLM. The distribution of BLM-managed lands is fairly well consolidated in the north and becomes increasingly mingled with Tribal lands to the south. BLM-managed lands abut the Navajo Reservation to the west and south, Jicarilla Apache Nation Reservation to the east, and the Ute Mountain Reservation and Southern Ute Indian Reservation to the north. Aztec Ruins National Monument and Chaco Culture National Historical Park, managed by the National Park Service, lie within the field office boundaries. The BLM manages approximately 18% of lands within a 10 mile radius of Chaco Culture National Historical Park.

The FFO encompasses the New Mexico portion of the San Juan Basin. The San Juan Basin and surrounding areas have been occupied by varied cultures since the Paleo Indian period (circa 10,000 BC). The San Juan Basin and Four Corners area have one of the most extensive prehistoric and protohistoric occupations in the United States. The most commonly known archaeological resources are the Anasazi structures at Chaco Culture National Historical Park, Mesa Verde National Park, and other National Park Service sites. Scattered across BLM-managed lands are similar, but smaller structures, which were probably related to these larger sites. Twenty-three Chacoan outliers are known to exist within the FFO. Each contains at least one Chacoan structure and most have associated communities, prehistoric roads, and great kivas along with features such as herraduras and special use areas. The FFO contains an extensive system of finely engineered roads radiating out from Chaco Canyon and extending a considerable distance to outlying sites through the San Juan Basin and beyond. These roads are remarkably straight and carefully constructed. The most notable is the Great North Road, which starts at Chaco Canyon and run north to the Aztec Ruins.

Located within the boundary of the FFO is much of Dinétah, the ancestral homeland to the Navajo. Here the Navajo constructed forked-stick hogans, shades, sweat lodges, and other structures over a several hundred year span. During a short period between 1680 and the mid-1700s, pueblitos were constructed,

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often associated with other structures. Although not firmly dated, extensive Navajo pictograph and petroglyph sites were painted, etched, pecked, or ground onto the sandstone cliffs of the canyons of Dinétah. Most are believed to be ceremonial art which is no longer traditionally executed in a permanent form.

Native American Traditional and Sacred Areas are known to exist across the FFO. Many are associated with narrative accounts of origin or other traditional stories. Most of the identified sacred areas are associated with the Navajo culture. These places are still important in Navajo ceremonies and daily activities.

Historic Hispanic or Spanish and Anglo sites within the San Juan Basin primarily date from the late 1800s to the present. Although there are some early Spanish land grants in the southern portion of the FFO, most historic sites located on public lands are either Hispanic or Anglo homesteads with associated structures from the late 1800s and early 1900s. Associated with many clusters of homesteads were a school house and often a church which was visited every few months by a priest.

Cultural resource inventories have been conducted throughout the FFO for project undertakings, management studies, and scientific inquiries. As of April 2014, approximately 760,000 acres of the 7,800,000 acres in the FFO boundaries have been inventoried. Over 46,000 sites have been identified ranging from small artifacts to the 800-room structures in Chaco Canyon. Many of these sites are listed on the National Register of Historic Places and Chaco Culture National Historical Park along with several of the Chacoan sites which have been placed on the World Heritage List. The FFO manages 79 Areas of Critical Environmental Concern (ACECs) for relevant and important cultural values, including five World Heritage Sites.

The San Juan Basin is an important area for mammalian and reptilian fossils. A variety of paleontological resources exist in the FFO including animal fossils, fossil leaves, palynomorphs, petrified wood, and trace fossils occurring in the Triassic, Jurassic, Cretaceous, and Tertiary rocks. Dinosaur and other fossils have made significant contribution to the scientific record have been found and excavated in the FFO. Paleontological resources are present in the Bisti De-Na-Zin Wilderness Area, Ah-Shi-Sle-Pa Wilderness Study Area, Fossil Forest Research Natural Area, and seven fossil areas identified in the 2003 Farmington Resource Management Plan.

The San Juan Basin is one of the largest natural gas fields in the nation and has been under development for more than 60 years. Oil was discovered by accident in the Seven Lakes area of McKinley County in 1911. Natural gas was discovered near Aztec, New Mexico, in 1920-1921 with oil of commercial quantity discovered near the Hogback in 1922 (Barnes 1951). Several small pipelines were built to carry the oil and gas from these discoveries to Aztec and Farmington. Development began in earnest in the late 1940s and early 1950s as the demand for natural gas increased. The FFO manages 2,765 active oil and gas leases in the San Juan Basin consisting of 2.1 million acres. Leasing began in the mid-1930s and accelerated in the late 1940s. By 1950, over 1 million acres were under lease.

In 1951, El Paso Natural Gas completed the first interstate pipeline out of the San Juan Basin to California. That same year, oil was discovered in the Mancos Shale in Dogie Canyon (Barnes 1951). Since that time, over 30,000 oil and gas wells have been drilled in the San Juan Basin with approximately 16,000 associated rights-of-way. Approximately 23,000 wells are currently producing. Since Stanolind Oil introduced hydraulic fracturing in 1949, nearly every well in the San Juan Basin has been fracture stimulated.

Intensity

1. The activities described in the proposed action do not include any significant beneficial or adverse impacts (40 CFR 1508.27(b)(1)). Per 40 CFR 1500.1(b), the EA concentrated on issues that are truly significant to the action in question, rather than amassing needless detail. Issues have a cause and effect relationship with the proposed action or alternatives; are within the scope of the analysis; have not been decided by law, regulation, or previous decision; and are amendable to scientific analysis rather than conjecture (BLM 2008, page 40). The following issues were identified related to the proposed action.

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- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact air resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact soils?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact upland vegetation?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact the establishment and distribution of noxious weeds?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact water resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact wildlife, including migratory bird species?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact the following BLM Special Status Species: Aztec gilia (*Aliciella formosa*), Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Gunnison's prairie dog (*Cynomys gunnisoni*), Bendire's thrasher (*Toxostoma bendirei*), golden eagle (*Aquila chrysaetos*), and prairie falcon (*Falco mexicanus*)?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact livestock grazing?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact cultural resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact visual resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact public health and safety?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact economic features of the community?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact transportation?

The EA includes a description of the expected environmental consequences of the proposed activities for those issues in Chapter 3.

2. The activities included in the proposed action would not significantly affect public health or safety (40 CFR 1508.27(b)(2)). The following design features have been included in the proposed action to address any impacts to public health and safety.

The proposed new access would be a new road within the area. For existing County Roads or roads that are considered collector roads, WPX will defer to the county or to the Roads Committee for maintenance determinations on collector roads. The BLM has designated Roads Committees for the maintenance of collector roads. The committees consist of all participating operators with projects along those subject roads. Roads will be maintained in the same or better condition as existed prior to the commencement of operations, and maintenance will continue until final abandonment and reclamation of the well location. Traffic impacts from routine maintenance personnel at the well sites would be ongoing throughout the production life of the well.

The proposed action would result in short-term increases in the volume of both heavy and light traffic during the construction, drilling and completion phases of the project. The action area is rural, but travelers of the area could be impacted in the short term by the construction of access roads and pads, drill-rig moves, and pipeline construction. These impacts would be reduced after well completion. It is anticipated that two to three pick-up truck would visit the proposed wellpad daily during the normal work week, resulting in road degradation, fugitive dust and equipment related noise. As discussed in Section 2.2.2 (Description of Proposed Project – Additional Design Features and BMPs), design features and BMPs

would be implemented to reduce impacts of disturbance from vehicles and to increase public safety. Impacts are likely to be low and short-term.

Air quality may affect health and safety. Air quality for San Juan County and for the State of New Mexico is described earlier in Air Resources section 3.2.1. of the EA (pages 23 thru 28). Changes to air quality from the proposed action are expected to be relatively minor, as discussed in Section 3.2 of the EA. Workers in closest proximity to the drilling activity use engineering controls and protective gear to minimize risk of effects.

The Air Resources Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (USDI BLM 2014). The Environmental Protection Agency (USEPA) conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (USEPA 2012).

The emissions calculator estimated that there could be very small direct and indirect increases in several criteria pollutants, HAPs, and greenhouse gases (GHGs) as a result of implementing the proposed alternative. The very small increase in emissions that could result would not be expected to result in exceeding the National Ambient Air Quality Standards (NAAQS) for any criteria pollutants in the analysis area.

3. The proposed activities would not significantly affect any unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas (40 CFR 1508.27(b)(3)). Unique characteristics are generally limited to those that have been identified through the land use planning process or other legislative, regulatory or planning processes (BLM 2008, page 71). The FFO does not contain any prime and unique farmlands, suitable or designated wild and scenic rivers, or designated caves.

The San Juan Basin in northwestern New Mexico is rich in paleontological resources. The BLM used the Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (Instruction Manual 2008-009) to identify areas with a high potential to produce significant fossil resources (BLM 2008d). Under this system, all lands within the BLM-FFO management area were designated as Class 5 (Very High Potential) for paleontological resources. The proposed Chaco 2308-31D project is within the Lybrook Fossil SDA.

Class 5 areas require an assessment of paleontological resources at the project level (BLM 2009). If a paleontological site is discovered during the construction phase of the proposed project, the site would be avoided by personnel, personal vehicles, and company equipment. No sites were identified along the proposed Project. Therefore, no impacts to paleontological resources are anticipated as a result of the proposed project.

Table 1 discloses the distance of the proposed activities to wetlands delineated by the Army Corps of Engineers. Table 2 discloses the distance of the proposed activities to National Park Service units and Congressionally designated areas. *The proposed action and alternatives are not located within an Area of Critical Environmental Concern.* Impacts to historic or cultural resources are described in the Cultural Resources section of the EA and discussed further under item 8.

Table 1. Distance of the Proposed Activities from Wetlands

Delineated Wetlands	Distance from Proposed Activities
Bancos	66 miles
Blanco	44 miles
Bloomfield	47miles
Cutter Canyon	42 miles

Carrizo Oxbow	38 miles
Desert Hills	48 miles
Valdez	46 miles

Table 2. Distance of the Proposed Activities from Park Lands and Ecologically Critical Areas

Park Land or Ecologically Critical Area	Distance from Proposed Activities
Ah-Shi-Sle-Pah Wilderness Study Area	10 miles
Aztec Ruins National Monument	58 miles
Bisti De-Na-Zin Wilderness Area	21 miles
Chaco Culture National Historical Park	14.8 miles
Fossil Forest Research Natural Area	23 miles

4. The activities described in the proposed action do not involve effects on the human environment that are likely to be highly controversial (40 CFR 1508.27(b)(4)). Controversy in this context means disagreement about the nature of the effects, not expressions of opposition to the proposed action or preference among the alternatives (BLM 2008, page 71). Oil and gas development has occurred in the San Juan Basin for more than 60 years. While there may be controversy over the appropriateness of oil and gas development, there is not a high level of controversy or substantial scientific dispute over the impacts of that activity. The impacts of the proposed activities are described in Chapter 3 of the EA.

5. The activities described in the proposed action do not involve effects that are highly uncertain or involve unique or unknown risks (40 CFR 1508.27(b)(5)). As described under Context, oil and gas development has occurred in the San Juan Basin since the late 1940s and early 1950s. The field office has permitted over 30,000 wells and 16,000 rights-of-way. Hydraulic fracturing has occurred on nearly every well in the San Juan Basin since the 1950s. As such, the FFO has decades of experience and is knowledgeable about the impacts and risks associated with the proposed activities.

6. My decision to implement these activities does not establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration (40 CFR 1508.27(b)(6)). Approval of these activities in no way assures approval of any future activities.

7. The effects of the proposed activities would not be significant, individually or cumulatively, when considered with the effects of other actions (40 CFR 1508.27(b)(7)). Direct, indirect, and cumulative impacts are described in Chapter 3 of the EA.

8. I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys were completed (NNHPD NO.: HPD-15-825 and BLM No. 2016(I)012F). Cultural resources were not identified within the project areas. No TCPs are known to exist in the APE.

Historic properties and cultural resources are being avoided with the implementation of design features such as but not limited to site boundary flagging, temporary fencing, rerouting associated pipelines, and site monitoring. These design features are detailed in the Cultural Resource Compliance Form, attached to the COA in the APD/ROW as the case may be. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action will have no direct or indirect impact on historic properties (no historic properties affected). As discussed in the Cultural Resources section 3.10 page(s) 44 thru 47 of EA).

The BLM fulfills its responsibilities under the National Historic Preservation Act (NHPA) through a number of agreements. The National Programmatic Agreement (NPA; 2012) between the BLM, Advisory Council on Historic Preservation (ACHP), and the National Council of State Historic Preservation Officers (NCSHPO) allows the agency to fulfill its NHPA responsibilities according to the provisions of the NPA in

lieu of 36 CFR 800.3 through 800.7 regulations. The NPA, which applies to all BLM activities below specified thresholds, provides among other things, regulatory relief in many instances from the requirement for case-by-case review by State Historic Preservation Officers (SHPOs) and the ACHP, in exchange for managers' maintenance of appropriate staff capability and observance of internal BLM standards as set out in the 8100 Manual series.

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and consult. Specifically, this document outlines among other things, how and when consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM FFO.

9. The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)).

The proposed action would affect approximately 13.39 acres of potential migratory bird habitat and result in the loss of approximately 13 juniper trees of varying ages and sizes. Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project. As discussed in Section 2.2.2 (Description of Proposed Project - Protection of Flora and Fauna, Including SSS and Livestock), if the vegetation-clearing phase of construction is scheduled to occur during migratory bird breeding season, a pre-construction migratory bird nest survey would be conducted within the associated proposed project area. Therefore, it is unlikely that nests, eggs, or young birds within the proposed project area would be directly harmed. If project activities occur during migratory bird breeding season, birds nesting outside of but near the proposed project area could abandon existing nests as a result of visual and aural disturbances.

Indirect effects associated with disturbance to foraging habitat are described in Section 3.7.1 (Wildlife - Direct and Indirect Impacts – Migratory Birds).

The project area does not contain suitable habitat for mountain plover, yellow-billed cuckoo or bald eagle.

The proposed action area is within the BLM/FFO designated potential habitat area for Brack's hardwall cactus (*Sclerocactus cloveriae* var. *brackii*) and Aztec gilia (*Aliciella formosa*).

No Aztec gilia were identified during the surveys of the proposed project area. The survey was completed outside of the blooming period (late April to mid-June) for this species. Additionally, individuals of this species are typically very small and difficult to identify outside of the blooming period. As such, it is possible that individuals could have been overlooked during the survey.

During the biological field survey, 30 Brack's hardwall cacti were identified among the badlands along the proposed well-connect pipeline. Six (6) cacti were found on BLM lands and 24 cacti were identified on NMSLO lands. No Brack's hardwall cacti were found on Navajo Indian Allotted lands. The survey was completed outside of the blooming period (late April to mid-June) for this species. Additionally, individuals of this species are typically very small and difficult to identify outside of the blooming period. As such, it is possible that individuals could have been overlooked during the survey. Under BLM-FFO guidance and following BLM-FFO protocol, if more than 30 cacti will be impacted on BLM lands the cacti would be relocated and transplanted. If there are a high number of cacti in the proposed disturbed area (i.e. >100), only a portion (~50% or less) will be relocated. Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed project on this species is not yet known.

The majority of the cacti were identified on NMSLO lands. Per the NMSLO guidance, every effort practicable will be made to avoid cacti within the well-connect pipeline ROW. Avoidance of cacti within the ROW will be achieved by realigning the pipeline trench within the 40-foot wide ROW. Identified cacti will be placed under protective caging during construction to protect against potential contact with construction

equipment or earth disturbing activities. Additional protective fencing will be installed in a perimeter around each protective cage to delineate the avoidance area and further warn off any equipment or activity within proximity to individual cacti. In the event cactus cannot be avoided, WPX would discuss and implement appropriate mitigation measures as agreed upon with the NMSLO biologist.

The proposed project would result in the disturbance of up to 13.39 acres with 4.44 acres of this being in suitable Aztec gilia/Brack's fishhook cactus habitat. Approximately 1.16 acres would remain as compacted, barren surface for the life of the proposed wells; for the long-term, this acreage does not provide suitable habitat for these species. Approximately 11.32 acres would be fully reclaimed during interim reclamation, as described in Section 3.4 (Upland Vegetation); it is possible that Aztec gilia and Brack's fishhook cacti could become established within these reclaimed areas. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation (2.07 acres). In order to fully reclaim the 0.91 acres of the proposed project area that were only reseeded during interim reclamation, WPX would need to first clear the vegetation from within these areas in order to recontour them; during this process, it is possible that Aztec gilia and/or Brack's fishhook cacti that become established or reestablished within post-interim reclamation areas could be killed.

10. The proposed activities will not threaten any violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR 1508.27(b)(10)). Sections 1.4 and 1.5 of the EA describe the relationship of the proposed activities to relevant laws, policies, regulations, and plans.

REFERENCES

Barnes, Frank C., 1951. History of development and production of oil and gas in the San Juan Basin. In *The south and west sides of the San Juan Basin, New Mexico and Arizona*, Smith, C.T.; Silver, C. ed(s), New Mexico Geological Society, Guidebook, 2nd Field Conference, pp. 155-160.

BLM. 2008. *National Environmental Policy Handbook. H-1790-1*. Bureau of Land Management. National Environmental Policy Act Program.

APPROVED:

/s/Richard A. Fields

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5/17/16

Date

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WPX Energy Production, LLC's Chaco 2308-31D Nos. 492H & 493H Oil and Natural Gas Wells Project

April 2016

Prepared for:

**Bureau of Land
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Field Office**



**Bureau of Indian Affairs
– Navajo Region**



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New Mexico • Farmington Field Office



It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

WPX Energy Production, LLC (WPX) proposes the Chaco 2308-31D Nos. 492H and 493H oil and natural gas wellpad, associated access road, and well-connect pipeline project (Project). The proposed Project is located on Navajo Indian Allotted lands, New Mexico State Land Office (NMSLO) lands, and public lands managed by the BLM-FFO within Sections 31 & 36 of Township 23 North, Range 08 West N.M.P.M. and Section 25 of Township 23 North, Range 09 West N.M.P.M. Navajo Indian allotted lands are administered by the Bureau of Indian Affairs (BIA), Navajo Regional Office Eastern Agency, and the Federal Indian Minerals Office (FIMO). The proposed wells will develop Navajo Indian Allotted minerals and Federal minerals from the Basin Mancos/Alamito Gallup Formation associated with valid existing leases NMNM130771, NO-G 1419-1982, and NO-G-1402-1893.

WPX has submitted two Applications for Permit to Drill (APDs) and has applied for two Right-of-Way (ROW) Grants to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for the proposed Chaco 2308-31D 492H and 493H Oil and Natural Gas Wells, Well-connect and Water Pipelines. The proposed #492H and #493H horizontal wells, along with well pad and access road would be authorized by an approved APD. The proposed Well-connect pipeline and waterline would be authorized under a ROW Grant.

The Project area would be located within the BLM-FFO management area in San Juan County, NM. The proposed project would be located approximately 38.67 miles south-southeast of the town of Bloomfield, New Mexico; 5.31 miles south of Nageezi, New Mexico; and 3.74 miles south-southwest of the U.S. Highway 550 and County Road 7900 intersection (see Appendix A).

1.2. Purpose and Need for Action

The purpose of the proposed action is to allow WPX reasonable access to BLM-FFO management lands and Navajo Indian allotted lands to develop their existing Federal mineral leases (NMNM130771); as well as, their Indian Allotted mineral leases, issued to the applicant by the BIA (NO-G 1419-1982 & NO-G-1402-1893) and administered by the BLM.

The need for the action is the BLM and BIA's responsibility to respond to the APD under the Mineral Leasing Act (MLA) of 1920, as amended (30 United States Code [USC] 181 et seq.), the Act of March 3, 1909 (1909 Act), and 25 Code of Federal Regulations (CFR) § 212 Leasing of Allotted Lands for Mineral Development. Per 43 Code of Federal Regulations (CFR) 3160 (Onshore Oil and Gas Operations), the BLM is required to respond to a request for an APD. Additionally, it is the BLM's responsibility under the Federal Land Policy and Management Act of 1976 (FLPMA; 43 USC 1701 et seq.) to respond to a request for a ROW Grant over BLM surface. It is the policy of the BLM, as derived from several laws, including the MLA and Federal Land Policy and Management Act of 1976 (FLPMA, 43 USC 1701 et seq.), to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

1.3. Decision to be Made

The BIA and BLM, as agents for the Secretary of the Interior, are responsible for administering the leasing and development of oil and gas resources where the mineral estate is held in trust by the federal government for the benefit of the Indian people. The BLM manages the federal mineral program and is responsible for management of oil and gas on Indian allotments (25 CFR § 212 Leasing of Allotted lands for Mineral Development). BLM regulations (43 CFR 3160) establish procedures for obtaining approval of an APD on existing onshore federal and tribal oil and gas leases. The FIMO was established by the Department of the Interior August 1991 to provide services to individual Navajo mineral owner beneficiaries regarding their mineral interests and rights. FIMO is staffed with personnel from the BIA and

the Office of Natural Resources Revenue. The staff also works in conjunction with personnel from the BLM and Office of Special Trustee for American Indians.

The BLM-FFO and BIA will decide whether or not to issue the two APDs, and if so, under what terms and conditions. The BLM-FFO will decide whether or not to issue two ROW Grants associated with the proposed project, and if so, under what terms and conditions. The BLM is mandated under the National Environmental Policy Act of 1969, as amended [42 U.S.C. §4321] which requires that environmental obligations are conducted in a manner that protects the mineral resources, other natural resources, and environmental quality. The authorized officer shall prepare an environmental record of reviews (e.g. Documentation of NEPA Adequacy [DNA]) or an environmental assessment as appropriate per [42 U.S.C. §3162.5-1(a)]. The BLM-FFO and BIA must determine based on this environmental record of reviews if there are any significant environmental impacts associated with the proposed actions, warranting further analysis in an Environmental Impact Statement (EIS). The BLM-FFO Field Manager is the authorized officer who will decide one of the following:

- To approve the APDs and ROW Grants with design features as submitted
- To approve the APDs and ROW Grants with additional mitigation added
- To analyze the effects of the proposed action in an EIS; or
- To deny the APDs and ROW Grants

1.4. Conformance with Applicable Land Use Plan(s)

The BIA and the BLM are joint lead agencies for the proposed action including Section 7 and Section 106 consultations. The proposed action is the result of oil and gas leases issued by the BIA on Allotted Indian Lands and is in conformance with the standard lease terms and conditions for Indian oil and gas leases as outlined in form AAO-81 for lease numbers NO-G 1419-1982 and NO-G-1402-1893 and the “*General Requirements for all Federal and Indian Oil and Gas leases*” administered by the BLM-FFO.

The proposed action is in conformance with the 2003 BLM-FFO Resource Management Plan (RMP). Pursuant to 40 CFR 1508.28 and 1502.21, this site-specific EA tiers into and incorporates by reference the information and analysis contained in the BLM-FFO Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS; BLM 2003a). The RMP was approved by the September 29, 2003 Record of Decision (ROD; BLM 2003b), and updated in December 2003.

Specifically, the proposed action is in conformance with the following objectives:

It is the policy of the BLM to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs, consistent with national objectives of an adequate supply of minerals at reasonable market prices. At the same time, the BLM strives to ensure that mineral development is carried out in a manner that minimizes environmental damage and provides for the rehabilitation of affected lands. (BLM 2003b, 2-2 – 2-3)

Development of energy-related ROWs, such as off-lease wellpads, pipeline ties, and access roads, is one of the primary activities of the BLM-FFO lands program. Such ROWs receive environmental review on a case-by-case basis (BLM 2003b, 2-11).

This EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS as required by NEPA. The proposed project would not be in conflict with any local, county, or state plans.

1.5. Relationship to Statutes, Regulations or Other Plans

WPX would comply with all applicable federal, tribal, state, and local laws and regulations, as well as obtain the necessary permits for the proposed action. These laws and regulations include, but are not limited to the following:

- Antiquities Act of 1906, as amended (PL 52-209; 16 USC 431-433)
- American Indian Religious Freedom Act of 1978 (PL 95-431; 92 Stat. 469; 42 USC 1996)
- Archaeological Resources Protection Act of 1979 (PL 96-95; 93 Stat. 721; 16 USC § 470aa et seq.), as amended (PL 100-555; PL 100-588)
- Bald and Golden Eagle Protection Act of 1940, as amended (PL 86-70, PL 87-884, PL 92-535, PL 95-616; USC 668-668d)
- Clean Air Act, as amended (PL 88-206; 42 USC § 7401 et seq.)
- Clean Water Act, as amended (PL 107-303; 33 USC § 1251, et seq.)
- Colorado River Salinity Control Act, as amended (PL 93-320; 7 CFR Part 702)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (PL 96-510; 42 USC § 9601; 40 CFR Part 307)
- Endangered Species Act of 1973 (PL 93-205; 16 USC § 1531 et seq.)
- Executive Order 11988 Floodplain Management
- Executive Order 11990 Protection of Wetlands
- Executive Order 12898 Environmental Justice
- Executive Order 13007 Indian Sacred Sites
- Executive Order 13112 Invasive Species
- Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds
- Migratory Bird Treaty Act of 1918, as amended (16 USC §§ 703-712; 50 CFR Part 21)
- Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 USC 3001; 43 CFR Part 10)
- New Mexico Oil and Gas Act (N.M. Stat. § 70-2-1–38) and related statutory provisions
- Paleontological Resources Preservation Act as part of the Omnibus Public Land Management Act (PL 111-011, Title VI, Subtitle D)
- Safe Drinking Water Act, as amended (PL 93-523; 42 USC 300F-300-9), 40 CFR Parts 144 and 147).
- Section 106 of the National Historic Preservation Act of 1966 (PL 89-665; 80 Stat. 915; 16 USC 470 et seq.), as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800)
- The Act of March 3, 1909 (allotted land)
- Leasing of Allotted Lands for Minerals Development (25 CFR § 212)

1.6. Scoping, Public Involvement, and Issues

1.6.1. Scoping and Public Involvement

The BLM-FFO publishes a NEPA log for public inspection. This log contains a list of proposed and approved actions within the BLM-FFO. The log is located on the BLM's New Mexico website (http://www.blm.gov/nm/st/en/prog/planning/nepa_logs.html).

An initial on-site meeting was held for the proposed project on September 29, 2015. Attendees at the on-site meeting included WPX, BLM-FFO representatives, the dirt work contractor, the project surveyor, an archeological consultant, and an environmental consultant (EIS, LLC). A public invitation to the on-site meeting was posted online (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html); no private citizens or groups attended. A BLM-FFO Interdisciplinary Team meeting was held on October 13, 2015, to discuss the proposed action. At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO.

The project was posted on the Farmington Field Office NEPA log www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_document_library/apd_ea_2016.html for a 30

day public comment period beginning on April 7, 2016 and ending on May 7, 2016. No comments were received.

Based on the size and scale, routine nature, and potential impacts associated with the proposed action, no additional external scoping was conducted. No public scoping comments were received for the proposed action.

1.6.2. Issues to be Analyzed

The following issues were identified during internal scoping as potential issues of concern for the proposed action. These issues will be addressed in this EA.

- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact air resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact soils?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact upland vegetation?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact the establishment and distribution of noxious weeds?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact water resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact wildlife, including migratory bird species?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact the following BLM Special Status Species: Aztec gilia (*Aliciella formosa*), Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Gunnison's prairie dog (*Cynomys gunnisoni*), Bendire's thrasher (*Toxostoma bendirei*), golden eagle (*Aquila chrysaetos*), and prairie falcon (*Falco mexicanus*)?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact livestock grazing?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact cultural resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact visual resources?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact public health and safety?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact economic features of the community?
- How would proposed surface-disturbing activities, drilling, completion, well operation, reclamation and all other associated project activities impact transportation?

1.6.3. Issues Considered but Not Analyzed

The following issues were identified during scoping as issues of concern that would not be impacted by the proposed action or that have been covered by prior environmental review. These issues will not be analyzed in this EA.

Areas of Critical Environmental Concern (ACECs)

The nearest Area of Critical Environmental Concern (ACEC) to the proposed action is the North Road ACEC/Chacoan Roads located 11 miles west.

U.S. Fish and Wildlife Service (USFWS)-Listed Species

As noted previously, cumulative effects of the RMP to federally listed species and their associated habitats were addressed in the PRMP/FEIS. Based on a review of species currently listed by the USFWS as occurring in Rio Arriba County (USFWS 2015), as well as the location of the proposed project area and habitat within the proposed project area, the potential does not exist for USFWS-listed species to occur within the proposed project area. Water for drilling would be obtained from the permitted Blanco Trading Post (POD No. SJ 2105) water well; no unaccounted-for water depletions within USFWS-listed fish habitat would occur. Therefore, there is no need for additional Section 7 consultation.

Native American Religious Concerns

For the proposed action, identification efforts for Native American Religious Concerns included a review of existing published and unpublished literature (e.g., Van Valkenburgh 1941, 1974; Brugge 1993; Kelly, et al. 2006), development of the site-specific Class III survey report prepared for the proposed action (Western Cultural Resource Management, Inc. [WCRM] Report No. WCRM(F)1405 [2015]), and a review by the BLM's cultural resources program regarding the presence of Traditional Cultural Properties (TCPs) identified through ongoing BLM tribal consultation efforts.

For projects on Indian Allotted lands a file search of existing information, TCPs, mission records, and other pertinent materials is conducted at the Navajo Nation Historic Preservation Department office in Window Rock, Arizona. Archaeological inventory and ethnographic interviews are completed with the residents and members of the local chapter house. Field investigations, record searches, and reporting are conducted in accordance with the Navajo Nation Historic Preservation Department Permit Package 2015 requirements.

There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001) or the Archaeological Resources Protection Act (ARPA; 16 USC 470) within the proposed project area. The proposed action would not impact any known TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or hinder the performance of traditional ceremonies and rituals pursuant to the American Indian Religious Freedom Act of 1978 (AIRFA; 42 USC 1996) or Executive Order (EO) 13007.

Paleontological Resources

The San Juan Basin in northwestern New Mexico is rich in paleontological resources. The BLM used the Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands (Instruction Manual 2008-009) to identify areas with a high potential to produce significant fossil resources (BLM 2008d). Under this system, all lands within the BLM-FFO management area were designated as Class 5 (Very High Potential) for paleontological resources. The proposed Chaco 2308-31D project is within the Lybrook Fossil SDA.

Class 5 areas require an assessment of paleontological resources at the project level (BLM 2009). If a paleontological site is discovered during the construction phase of the proposed project, the site would be avoided by personnel, personal vehicles, and company equipment. No sites were identified within the proposed project area. Therefore, no impacts to paleontological resources are anticipated as a result of the proposed project.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Alternative A: No Action

The "No-Action" alternative would deny the approval of the APDs and ROW Grants, causing the project not to take place. Aside from the "No-Action" alternative no other feasible alternatives were identified for the Project.

2.2. Alternative B: Proposed Action

The proposed action is the approval of two APDs and two ROW Grants by the BLM-FFO for the Chaco 2308-31D 492H & 493H Project. The project includes the horizontal drilling, production and final abandonment of the Chaco 2308-31D 492H & 493H oil and natural gas wells from the proposed wellpad. These wells will develop Federal and Indian Allotted minerals administered by the BLM-FFO in the Basin Mancos/Alamito Gallup Formation from a surface location positioned on Navajo Indian Allotted lands, as well as the construction, usage, and reclamation of one wellpad with associated wellpad construction zone, access road, and well-connect pipeline corridor. Construction plats associated with the Project can be found in Appendix B.

2.2.1. Location of Proposed Project Area

Maps of the proposed project area are provided in Appendix A. The proposed project area is plotted on the Lybrook Northwest, New Mexico, 7.5-minute USGS quadrangles and the 2014 National Agriculture Imagery Program (NAIP) aerial photograph.

The Project is located on Navajo Indian Allotted lands, NMSLO lands, and lands managed by the BLM-FFO in San Juan County, NM. The proposed project would be located approximately 38.67 miles south-southeast of the town of Bloomfield, New Mexico; 5.31 miles southwest of Nageezi, New Mexico; and 3.74 miles south of the U.S. Highway 550 and County Road 7900 intersection. The Project lies within the Escavada Wash watershed boundary.

The proposed well pad sits on the south side of a mesa near the toe of the south scarp face. The mesa was historically shaped and molded by Betonnie Tsosie Wash to the south. The general region surrounding the proposed project area is characterized by a variety of terrain characteristics and habitat types. South of the proposed pad and along the access road is a relatively flat landscape dominated by sagebrush shrublands that extends to the Betonnie Tsosie Wash. North of the proposed project area is characterized by badlands and clay hills that surround the base of the mesa. The proposed pipeline is braided between these features to the toe of the mesa where it ascends the slope side to the top of the mesa. Atop the mesa is characterized by relatively flat terrain that has been treated with tebuthurion (trade name “spike” targeting sage brush) to promote grassland growth advantageous to grazing. The general region surrounding the action area, has an overall south-southwest aspect. Slopes are nearly flat across the well pad, access road, and portion of the well-connect pipeline. The ascent up the mesa starts at an elevation of 6,707 feet above mean sea level (AMSL) and peaks the edge of the mesa at 6,846 feet AMSL. Along the ascent slope reaches a max of 20.8 percent and averages 2.6 percent across the entirety of the pipeline. There is one United States Geological Survey (USGS) mapped blue line the pipeline would cross approximately 3,098-feet southeast of the proposed tie-in location on the Chaco Trunk 2 Extension #9 (NMNM134001). Several other ephemeral dendritic drainages contributing to the blue line would also be crossed. The proposed well pad sits at an elevation of approximately 6,680 feet AMSL.

Legal land description of the proposed project and locations of the proposed bottom holes and surface holes (wellheads) are provided in Table 1 and **Error! Reference source not found.**, below.

Table 1. Legal Land Description for the Proposed Project

Township, Range	Section	Quarter-Quarter	Project Feature
Township 23 North, Range 8 West	31	Northwest ¼ of the Northwest ¼	Chaco 2308-31D 492H & 493H Wellpad, Access Road, Well-Connect Pipeline
Township 23 North, Range 8 West	36	North ½ of the Northeast ¼	Well-Connect Pipeline
Township 23 North, Range 9 West	25	Southeast ¼ of the Northwest ¼	Well-Connect Pipeline

Township 23 North, Range 9 West	25	South ½	Well-Connect Pipeline
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Table 2. Bottom Hole and Surface Hole Location

Project Feature	North American Datum 1983		Footages (NMPM)
	Latitude	Longitude	
492H			
Surface Hole (Wellhead)	36.190011° North	107.728546° West	225 feet from the north line, 875 feet from the west line
Bottom Hole	36.169727° North	107.729157° West	2326 feet from the north line, 697 feet from the west line
493H			
Surface Hole (Wellhead)	36.190011° North	107.728411° West	225 feet from the north line, 915 feet from the west line
Bottom Hole	36.169686° North	107.725091° West	2339 feet from the north line, 1897 feet from the west line

2.2.2. Description of Proposed Project

For a detailed description of design features and construction practices associated with the proposed action, refer to the APDs and ROW Grant Applications on file at the BLM-FFO. Construction plans associated with the proposed project provide additional details (Appendix B).

Design Features and Best Management Practices

WPX would adhere to the Conditions of Approval (COAs) attached to the approved APDs and stipulations attached to the approved ROW Grants. The following general design features and best management practices (BMPs) would occur.

Control of Waste

- Drilling of the horizontal laterals will be accomplished with water-based mud. All cuttings will be placed in roll-off bins and hauled to a commercial disposal facility or land farm. No blow pit will be used.
- The closed-loop system storage tanks will be sized to ensure confinement of all fluids and will provide sufficient freeboard to prevent uncontrolled releases.
- Drilling fluids will be stored on-site in aboveground storage tanks. Upon termination of drilling operations, the drilling fluids will be recycled and transferred to other permitted closed-loop systems or returned to the vendor for reuse, as practical. All residual fluids will be hauled to a commercial disposal facility.
- Any spills of non-freshwater fluids will be immediately cleaned up and removed to an approved disposal site.
- Portable toilets will be provided and maintained during construction, as needed.
- Garbage, trash, and other waste materials will be collected in a portable, self-contained, and fully enclosed trash container during drilling and completion operations. The accumulated trash will be

removed, as needed, and will be disposed of at an authorized sanitary landfill. No trash will be buried or burned on location.

- Immediately after removal of the drilling rig, all debris and other waste materials not contained in the trash container will be cleaned up and removed from the well location.
- No chemicals subject to reporting under the Superfund Amendments and Reauthorization Act Title III in an amount equal to or greater than 10,000 pounds will be used, produced, stored, transported, or disposed annually in association with the drilling, testing, or completing of these wells.
- No extremely hazardous substances (as defined in 40 CFR 355) in threshold planning quantities will be used, produced, stored, transported, or disposed in association with the drilling, testing, or completing of these wells.
- Berms will be constructed around all storage facilities sufficient in size to contain the storage capacity of tanks. Berm walls will be compacted with appropriate equipment to assure containment.

Protection of Paleontological Resources

- If a paleontological site is discovered, the BLM would be notified and the site would be avoided by personnel, personal vehicles, and company equipment. Workers would be informed that it is illegal to collect, damage, or disturb some such resources, and that such activities are punishable by criminal and/or administrative penalties.
- Any paleontological resource discovery by the Holder, or any person working on his behalf on public or Federal land, shall be immediately reported to the Authorized Officer. The Holder shall suspend all operations in the immediate area of such discovery until given written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the Authorized Officer to determine appropriate actions to prevent the loss of significant scientific values. The Holder will be responsible for the cost of the evaluation. The results of further investigation will dictate site specific stipulations for avoidance or salvage of any potentially significant paleontological resources. Any decision as to proper mitigation measures will be made by the Authorized Officer, after consultation with the Holder.

Protection of Cultural Resources

- All BLM/FFO cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review that is attached to the COAs in the APD and/or ROW Grant as the case may be. These stipulations may include, but are not limited to temporary or permanent fencing or other physical barriers, monitoring of earth-disturbing construction, reduction and/or specific construction avoidance zones, and employee education. All employees, contractors, and sub-contractors of the project will be informed by the project proponent that cultural sites are to be avoided by all personnel, personal vehicles, and company equipment. All employees, contractors, and sub-contractors of the project will also be informed that it is illegal to collect, damage, or disturb cultural resources and that such activities are punishable by criminal and/or administrative penalties under the provisions of the Archaeological Resources Protection Act. In the event of a discovery during construction, the project proponent will immediately stop all construction activities in the immediate vicinity of the discovery and then immediately notify the archaeological monitor, if present, or the BLM. The BLM will then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., National Register, Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act), it will be protected in place until mitigating measures can be developed and implemented according to guidelines set by the BLM.

Protection of Flora and Fauna, including Special Status Species and Livestock

- Vegetation removed during construction, including trees that measure less than 3 inches in diameter (at ground level) and slash/brush, will be chipped or mulched and incorporated into the topsoil as

additional organic matter. If trees are present, all trees 3 inches in diameter or greater (at ground level) will be cut to ground level and delimbed. Tree trunks (left whole) and cut limbs will be stacked. The subsurface portion of trees (tree stumps) will be hauled to an approved disposal facility.

- A migratory bird nest survey will be conducted if any vegetation-disturbing activities greater than 4 acres in size occur between May 15 and July 31. The survey must be conducted by a BLM-approved biologist using a survey protocol developed and provided by the BLM/FFO. If active nests are located within the proposed permitted area, project activities will not be permitted without written approval by a BLM/FFO biologist.
- During biological surveys, approximately 6 Brack's fishhook cacti (a BLM Special Status Species) were recorded on BLM lands and 24 were recorded on NMSLO lands within the proposed project area. Following BLM-FFO protocol (BLM 2013d and BLM 2013e), if more than 30 cacti will be impacted on BLM lands the cacti would be relocated and transplanted. If there are a high number of cacti in the proposed disturbed area (i.e. >100), only a portion (~50% or less) will be relocated. No cacti will be transplanted for this project.
- Per the NMSLO guidance, every effort practicable will be made to avoid cacti within the well-connect pipeline ROW. Avoidance of cacti within the ROW will be achieved by realigning the pipeline trench within the 40-foot wide ROW. Identified cacti will be placed under protective caging during construction to protect against potential contact with construction equipment or earth disturbing activities. Additional protective fencing will be installed in a perimeter around each protective cage to delineate the avoidance area and further warn off any equipment or activity within proximity to individual cacti. In the event cactus cannot be avoided, WPX would discuss and implement appropriate mitigation measures as agreed upon with the NMSLO biologist.
- Should any active raptor nests be observed within one-third mile of the proposed project area or should any Special Status Species (listed by the USFWS or BLM) be observed within the proposed project area prior to or during project implementation, construction would cease and the BLM-FFO would be immediately contacted. The BLM-FFO would then ensure evaluation of the resource. Should a discovery be evaluated as significant (protected under the ESA, etc.), it would be protected in place until mitigation could be developed and implemented according to guidelines set by the BLM.
- Wildlife hazards associated with the proposed project would be fenced, covered, and/or contained in storage tanks, as necessary.
- Grazing permittees will be notified when construction is scheduled to begin. All hazards to livestock will be fenced or contained.
- All existing improvements (such as fences, gates, and bar ditches) will be repaired to previous or better than pre-construction conditions. Cut fences will be tied to H-braces prior to cutting and openings will be protected as necessary during construction to prevent the escape of livestock. A temporary closure will be installed the same day the fence is cut. Following reclamation, the fence will be reconstructed to BLM specifications.
- Backfilling operations will be performed within a reasonable amount of time to ensure that the trenches are not left open for more than 24 hours. If a trench is left open overnight, it will be temporarily fenced or a night watchman will be utilized. The excavated soils will be returned to the trenches, atop the pipe, and compacted to prevent subsidence. The trenches will be compacted after approximately 2 feet of fill is placed over the pipe and after the ground surface has been leveled.
- Escape ramps/crossovers will be constructed every 1,320 feet. The ends of the open trench will be sloped each night with a 4:1 slope.
- Established livestock and wildlife trails will be left in place as crossovers. In areas where active grazing is taking place, escape ramps/crossovers will be placed every 500 feet. Crossovers will be a minimum of 10 feet wide and not fenced.

- The end of the pipe will be plugged to prevent animals from crawling in.
- Before the trench is closed, it will be inspected for animals. Any trapped wildlife or livestock will be promptly removed and released at least 150 yards from the trench.
- Production equipment will be placed on location in such a manner to minimize long-term disturbance and maximize interim reclamation. As practical, access will be provided by a teardrop-shaped road through the production area so that the center may be revegetated.

Protection of Topsoil

- The upper 6 inches of topsoil (if available) will be stripped following vegetation and site clearing. Topsoil will not be mixed with the underlying subsoil horizons and will be stockpiled as a berm along the perimeter of the wellpad within the construction zone, separate from subsoil or other excavated material.
- Topsoil and sub-surface soils will be replaced in the proper order, prior to final seedbed preparation. Spreading shall not be done when the ground or topsoil is wet. Vehicle/equipment traffic will not be allowed to cross topsoil stockpiles. If topsoil is stored for a length of time such that nutrients are depleted from the topsoil, amendments will be added to the topsoil as advised by the WPX environmental scientist or appropriate agent/contractor.
- During construction of the well-connect pipeline, from approximately STA 10+40 to STA 19+90, soil will be segregated, stored and replaced according to soil type and color as much as practicable.
- During construction of the well-connect pipeline, from approximately STA 10+40 to STA 19+90, water bars will be placed as needed upon final reclamation to accommodate and blend with natural hill contours.

Protection of the Public

- The hauling of equipment and materials on public roads would comply with Department of Transportation regulations. No toxic substances would be stored or used within the proposed project area. WPX would have inspectors present during construction. Any accidents involving persons or property would immediately be reported to the BLM-FFO. WPX would notify the public of potential hazards by posting signage, as necessary.

Prevention and Control of Weeds

- Prior to construction equipment entering the proposed project area, construction equipment would be inspected for noxious weeds and cleaned.
- It would be WPX's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project area throughout the life of the project. WPX's weed-control contractor would contact the BLM-FFO regarding acceptable weed-control methods. WPX would be required to submit a current Pesticide Use Proposal for the location prior to any pesticide application. WPX's weed-control contractor must carry a current pesticide applicator' license and only use pesticides authorized for use on BLM lands. The use of pesticides would comply with federal and state laws, and used in accordance with their registered use and limitations. WPX's weed-control contractor would contact the BLM-FFO prior to using these chemicals.

Protection of Air Resources

- The BLM's regulatory jurisdiction over field production operations has resulted in the development of BMPs designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures could include flaring hydrocarbons and gases at high temperatures in order to reduce emissions of incomplete combustion, requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored, ensuring that compressor

engines 300 horsepower or less have nitrogen oxide (NO_x) emissions limited to 2 grams per horsepower hour, revegetating areas not required for production facilities to reduce the amount of dust, and watering dirt roads during periods of high use in order to reduce fugitive dust emissions. Magnesium chloride, organic-based compounds, or polymer compounds could also be applied to roads or other surfaces to reduce fugitive dust. Neither petroleum-based products nor produced water would be used.

- BMPs for dust abatement and erosion control will be utilized to reduce fugitive dust for the life of the project, as necessary. Water application, using a rear-spraying truck or other suitable means, will be the primary method of dust suppression along the road.

Additional Design Features and BMPs

- The access road will be designed and constructed as a Resource Road in accordance with the BLM Gold Book Standards (BLM and USFS 2007) and BLM 9113-1 (Roads Design Handbook) and BLM 9113-2 (Roads National Inventory and Condition Assessment Guidance and Instructions Handbook). Construction will include ditching, draining, installing culverts, crowning and capping or sloping and dipping the roadbed, as necessary, to provide a well-constructed and safe road.
- A berm or barrier will be constructed across the pipeline corridor near PI 14 at top of slope, close to where the corridor parallels the powerline to prevent powerline workers from using the pipeline corridor as an access to areas downhill.
- Production facilities would be painted Juniper Green to blend with the natural color of the landscape and would be located to reasonably minimize visual impact, to the extent practical. Equipment subject to safety considerations would not be painted.
- Vehicles would be restricted to proposed disturbance areas and existing areas of surface disturbance, such as existing roads and wellpads.
- No construction or routine maintenance activities would be performed during periods when the soil is too wet to adequately support construction equipment. If equipment would create ruts deeper than six inches, the soil would be deemed too wet for construction or maintenance.
- Worker safety incidents would be reported to the BLM-FFO as required under Notice to Lessees (NTL) -3A (USGS 1979). WPX would adhere to company safety policies, Occupational Safety and Health Administration regulations, and Department of Transportation regulations.

Proposed Project Phases

Construction

The BLM-FFO would be notified at least 48 hours prior to the start of construction. The construction phase for the proposed wellpad with associated access road and well-connect pipeline is expected to be two (2) to three (3) weeks. The well-connect pipeline construction phase is expected to be three (3) to four (4) weeks.

The proposed wellpad, access road, and pipeline corridor would be cleared of vegetation and topsoil stripped, stockpiled and stored as discussed in "Design Features and Best Management Practices – Protection of Topsoil," above.

The proposed access road and wellpad would be leveled with a D-8 bulldozer to provide space and a level working surface for vehicles and equipment. Excavated materials from cuts would be used on fill as fill in order to establish a balanced surface area that utilizes native soil and materials available onsite. If sandstone is needed for surfacing, the sandstone would be retrieved from a permitted location.

The proposed access roads would be designed and maintained in accordance with *The Gold Book* (BLM and USFS 2007) standards and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e). All

construction activities and road features including clearing, cut-and-fill slopes, and drainage ditches would all take place within the 30-foot-wide corridor. Sandstone will be used as surfacing material along the road if natural occurring binding material is not present in sufficient amounts within the existing soil and subsoil. If sandstone is needed for surfacing, the sandstone would be retrieved from a permitted location. A 14-foot-wide running surface with adequate crowning and drainage on both sides would be established. Culverts (24- to 48- inches in diameter) will be placed where identified during the onsite field inspection and specified on the construction plats (Appendix B).

The proposed pipeline ties would be constructed simultaneously within the pipeline corridor. The corridor would be cleared of vegetation and the topsoil would be stored as a windrow along the pipeline trench within the permitted corridor, in the same manner as described for the proposed wellpad.

Trenching activities would be conducted using a trencher or backhoe. Within the 40-foot-wide pipeline corridor, the two pipeline trenches would be off-set from one another by 5 feet. One trench would contain an 8-inch steel natural gas/liquids line, and a 6-inch poly gas/liquids line. The second trench will have two 6-inch steel gas/liquids lines. In addition, a 6-inch poly water pipeline will be placed in either Trench 1 or 2. Where required, the pipeline trench would be 4 to 5 feet in depth. The trench would be 16 inches in width if a trencher is used or 24 inches in width if a backhoe is used.

Following trenching operations, pipe installation will include stringing, bending for horizontal or vertical angles in the alignment, welding pipe segments together, inspection, coating of joints, and lowering-into the trench using a side-boom tractor. When stringing pipe, one joint of pipe would be set back every quarter mile. Fine soil will then be sifted from the excavated subsoil to provide rock-free pipeline padding and bedding. Backfilling of soils will begin after a section of pipe has been successfully placed in the ditch and final inspection has been completed. Once the pipelines are installed, the pipeline corridor disturbances would be reclaimed to pre-construction contours, topsoil replaced and the area re-seeded.

Prior to the pipelines being placed in service, the pipes would be pressure tested.

Within 90 days of installation, aboveground structures not subject to safety requirements would be painted Juniper Green to blend with the surrounding landscape and reduce visual resource impacts.

Pipeline markers would be installed along the proposed pipeline corridor within the line of sight, without voiding safety measures.

Sediment- and/or erosion control features would be installed, as necessary. Additional resource protection design features and mitigation associated with construction are listed in "Design Features and Best Management Practices," above.

Production Facility Installation

Production facilities, including, but not limited to, tank batteries, water tanks, compressors, field gas separators, and electrical and automation equipment needed for the production of the wells will be installed on the level wellpad prior to drilling activities. All activities will take place within the wellpad and construction zones.

Drilling and Completion

Drilling operations would be conducted in compliance with Federal Oil and Gas Onshore Orders and all applicable NMOCD rules and regulations. A mobile drilling rig ("rig") and other equipment would be transported to the location, where components would be assembled and the rig derrick erected. Other facilities and equipment that would be on the drilling site include: pipe racks, catwalk, hopper, rig personnel camper trailers, closed loop mud system, and personnel vehicles.

Drilling would begin, continuing through any fresh water bearing formations, then halt. A "shoe" (i.e. a seal) would be landed at the bottom of the hole, a surface pipe ("surface casing") would be installed from the surface down to the shoe, and then cement would be circulated between the rough wall of the well bore and the casing pipe ("annulus"). The casing would be pressure-tested to ensure that a seal has been

created. Drilling would resume through several zones before reaching the target formation, or production zone. An intermediate casing would be installed and cemented in place through these zones in order to seal off any troublesome zones that may present problems in drilling deeper portions of the well. Drilling would resume, entering and continuing horizontally through the target formation to the bottom hole location. A production casing or "production liner" (shortened string of casing that suspends from the intermediate casing) will then be landed and cemented in place. Casings prevent interzonal interaction between oil and gas bearing zones and usable water zones and maintain the integrity of the bore. Drilling operations would continue 24-hours a day until complete. Drill cuttings would be hauled from the location and disposed of at an approved facility.

Following drilling, the drilling rig is typically moved off the location and a completion rig would take its place. Perforations would be shot through the production string across the zone of the target formation, to prepare for hydraulic fracturing. Fracturing materials, tanks, and pumps would also be moved to the location. The completion rig would connect to the perforated casing and begin fracturing the target formations through the perforations using pressurized water, fracturing fluids, and sand (to hold created subsurface fractures open).

After completion, the fluids (water and fracturing fluids) would be removed from the well bore and a well head would be installed. Completion fluids would be allowed to flow back to the on-site tanks. Water from fracturing would be confined to storage tanks and recycled and reused. Completion rigs are considered "daylight" rigs and operate during normal daylight hours only. Drilling and completion activities may take approximately 30 days per well depending on the well.

It is estimated that 23,000 barrels of useable water would be required to drill and complete each well. Of the 23,000 barrels, approximately 10,000 to 11,000 barrels would be recovered for reuse. Water for drilling and completion would be obtained from the San Juan Basin Water Haulers Association, who would retrieve and truck their water from a permitted water well (Blanco Trading Post well (POD No. SJ 2105)). WPX would ensure that water would be obtained legally and that all required permits would be obtained prior to obtaining water.

Interim Reclamation

If the proposed wells prove to be productive, some portions of the proposed project area would be fully reclaimed (recontoured and reseeded), some portions would only be reseeded, and remaining portions ("working areas") would remain disturbed throughout the life of the proposed wells.

The well pad will include two working areas that will not be reseeded and will total 0.81 acres. One area being an approximate 260-by-80-foot (0.48-acre) facility area located on the western end of the proposed well pad. The second area being a teardrop with a 16-foot-wide (0.33-acre) driving surface located within the center of the proposed well pad to access the wells and facilities. Approximately 0.91 acres will be reseeded but not recontoured during interim reclamation. These areas include the center of the teardrop excluding the overlapping working area (0.04 acre) and an approximately 180-by-260-foot area around the proposed wellheads for potential future activities, but would not be used on a daily basis. After accounting for the portion of this polygon that overlaps the teardrop and teardrop center, this region measures 0.91 acre. The remainder of the proposed well pad and construction zone (3.42 acres) would be fully reclaimed during interim reclamation.

A 14-foot-wide running surface and the bottoms of the bar ditches along either side of the access road (approximately 0.37 acre, total) would remain disturbed for the lifetime of the project. The remainder of the disturbed access road corridors (0.37 acre) would be reclaimed during interim reclamation.

Interim reclamation would likely be initiated on the wellpad within 120 days after the last well on that pad has been drilled. If drilling has not been initiated on the wellpad within 120 days of the wellpad being constructed, the operator will consult with the BLM to address a site-stabilization plan. The BLM-FFO would be notified at least 48 hours prior to the start of interim reclamation activities. Interim reclamation could occur simultaneously with production. Details of the interim reclamation process (including the seed mixture) are provided in the Surface Reclamation Plan (Appendix D).

During this phase, a bulldozer and a tractor with seeding capabilities would be used. Approximately four personnel would be required.

In areas that would be fully reclaimed, slopes would be re-contoured to pre-construction topographical contours, if possible. WPX would diminish the evidence of cuts, fills, and flat wellpad surfaces. In areas that are to be fully reclaimed or reseeded, stockpiled topsoil would be redistributed and the surface would be ripped and seeded. Sediment- and erosion-control features (including water diversions, silt traps, and culverts) would be installed, as necessary. The BLM-FFO Sagebrush Community Seed Mixture would be used.

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), monitoring reclaimed surfaces is required to document successful reclamation. Monitoring and reporting are discussed in the Surface Reclamation Plan (Appendix D).

Production and Operation

The production phase of wells varies; the lifetime of the proposed wells is anticipated to be 30 to 50 years.

Production facilities would be located within a 260-by-80-foot facility area on the western end of the proposed wellpad. Production equipment that would remain on the proposed wellpad could include, but is not limited to, the following: wellhead, production unit, meter run, compressor, flare stack, water tanks, and oil tanks. The tear drop for the proposed wellpad would consist of a looped, 16-foot-wide driving surface; the tear drop would be used to access the proposed wellheads and other facilities

Site security guidelines would be followed, as identified in 43 CFR 3162.7-5 and Onshore Oil and Gas Order No. 3.

During production, normal upkeep would be required to monitor production and resolve any problems. It is anticipated that two to three pick-up trucks would visit the proposed wellpad daily during a normal work week.

Occasionally, workover or recompletion of the proposed wells would be necessary to ensure that efficient production is maintained. Workovers and recompletions would be scheduled as needed to improve and maintain production of the wells. Workover activities could include repairs to the wellbore equipment (e.g., casing, tubing, rods, and pump), wellheads, or production facilities. A 260-foot-by-180-foot workover area would surround the proposed wellheads. This workover area could be used for future activities within the proposed wellpad but would not be used for daily activities.

During the operation phase of the proposed pipeline ties, WPX personnel would rarely perform routine or emergency maintenance on the proposed pipeline ties and any associated facilities.

Final Reclamation and Abandonment

If the proposed wells prove to be unproductive, or when the proposed wells are no longer commercially viable, they would be plugged and abandoned. Downhole well abandonment would be carried out under current BLM-FFO and state regulations. The bore holes would be plugged with cement and the production facilities removed. An aboveground marker would be placed over the plugged holes. The markers would each contain individual well identification information.

The final reclamation phase is anticipated to take two to three weeks per wellpad. WPX would provide the BLM-FFO with technical and environmental aspects of the final plugging, abandonment, and reclamation procedures.

Final reclamation of the proposed wellpad and access road would take place, unless the Indian Allottee considers the retention of these facilities necessary. Details of the final reclamation process (including species included in the seed mixtures) are provided in the Surface Reclamation Plan (Appendix D). The goal of final reclamation would be to return disturbed areas associated with the proposed project to as

close to pre-construction conditions as possible, by re-contouring and re-seeding to blend with the surrounding terrain. Portions of the proposed project area that were not fully reclaimed during interim reclamation would be cleared (if vegetated), re-contoured, covered with salvaged topsoil, and seeded. Sediment- and erosion-control measures would be implemented, as necessary. Water bars would be installed across the roads, and dead-end ditches and earthen barricades would be constructed at the entrance to reclaimed areas. Measures would be taken to control sedimentation and erosion, as necessary.

Final reclamation would occur within any portion of the proposed pipeline corridor (such as locations of aboveground structures) that would be disturbed to bare soil during the abandonment phase. If final abandonment activities would disturb less than or equal to 0.1 acre to bare soil, the area(s) would be expected to revegetate naturally (no reclamation or monitoring activities would be required). If final abandonment activities would disturb more than 0.1 acre to bare soil, final abandonment reclamation activities would be the same as described for interim reclamation (discussed in the Surface Reclamation Plan [Appendix D]).

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), monitoring reclaimed surfaces is required to document successful reclamation. Monitoring and reporting are discussed in the Surface Reclamation Plan (Appendix D).

2.2.3.

Surface Disturbance

The Project would result in a total of 13.39 acres of disturbance with approximately 13.25 acres of new surface disturbance. The proposed access road and pipeline for this project are placed in the most appropriate corridor with respect to existing disturbance, archeology, paleontology, geology, terrain characteristics, current/proposed WPX infrastructure, and in an effort to minimize ground/vegetative disturbance to the extent practicable. During interim reclamation, approximately 11.32 acres of the total 13.39 acres would be fully reclaimed and 0.91 acres would be reseeded (but not recontoured). The remainder (1.16) would be stabilized and used as a working surface throughout the life of the proposed project, and would be fully reclaimed during final reclamation.

Chaco 2308-31D #492H & #493H

Wellpad

The proposed well pad dimensions would be 440 feet by 315 feet (3.18 acres) with an additional 50-foot construction buffer zone surrounding all four sides (1.96 acres). The resulting area would encompass a 5.14-acre working area. The well pad would require a maximum fill of approximately 5 feet at the southeast corner and a cut of 5 feet near the middle of the north edge of the well pad. This entire area will be utilized during construction, setting of production equipment, and drilling and completion phases. Two horizontal wells are planned to be drilled from this well pad with the potential for an additional two wells in the future. Approximately 0.14 acre of this proposed activity will be on previously disturbed area. Once all drilling and completions phases are complete for the wells, the well pad will be interim reclaimed.

Access Road

The proposed access road would be 1,071.20 feet long within a 30-foot ROW (0.74 acres) from the edge of County Road #7940 to the edge of the well pad. Construction of the road would be considered all new disturbance. Approximately 55.00 feet will overlap the proposed construction zone (0.04 acre). A 14-foot-wide running surface and the bottoms of the bar ditches along either side of the road (approximately 0.37 acre, total) would remain disturbed for the lifetime of the project. The remainder of the disturbed access road corridor (0.37 acre) would be reclaimed during interim reclamation.

Well-connect Pipeline Corridor

The proposed pipeline corridor would be 7,110.00 feet from the tie-in location on the Chaco Trunk 2 Extension #9 (NMNM134001) to the edge of the proposed well pad within a 40-foot wide ROW. An additional 261.60 feet would overlap the proposed Chaco 2308-31D Nos. 492H & 493H well pad from the

edge of the well pad to the 492H well head. The route of the pipeline crosses two section lines that define the ownership boundaries between three different surface owners. From the start of the pipeline 3,680.10 feet would cross BLM lands where it would then cross into NMSLO lands at STA 36+80.1. The pipeline would continue on NMSLO lands for 2,363.80 feet where it would then enter IA lands at STA 60+43.90 and continue to the well head for 1,327.7 feet. All construction activities for the pipeline will result in new disturbance. All disturbance would be fully reclaimed during interim reclamation.

Temporary Use Areas (TUAs)

TUA's are areas where ground disturbance will take place because additional area outside the Right of Way (ROW) is needed. There will be one TUA along the Chaco 2308-31D Nos. 492H & 493H well-connect pipeline that extends from the top of the mesa down the descent following the ROW to the toe of the slope. This TUA will be 950 feet from STA 10+40.0 to STA 19+90.0 and will be 25 feet wide on each side of the proposed ROW. The proposed area may be cleared and material excavated or placed in areas to establish appropriate slopes needed to stabilize the drainage banks upon installation of the pipelines. These areas will be reclaimed upon completion of pipeline construction.

Table 3. Surface Disturbance Calculations Associated with Proposed Project

Feature	Existing/Previously Permitted Surface Disturbance	New Surface Disturbance
Chaco 2308-31D #492H & #493H Proposed Well Pad		
Existing two-track road through east side of proposed pad and edge of disturbance	427.5' long x 8' wide (0.08 acre)	-
Existing two-track road through west side of proposed pad and edge of disturbance	425' long x 6' wide (0.06 acre)	-
Well Pad & Construction Zone	-	540' long x 415' wide (4.888 acres) ^{1,2,3,4}
Subtotal	0.14 acre	4.888 acres
Access Roads		
Access Road from start to edge of well pad	-	1071.2' long x 30' wide ROW (0.74 acre)
Subtotal	-	0.74 acre
Well Connects		
Well Connect Pipeline from STA 0+00 – STA 36+80.1 on BLM lands	-	3680.1' long x 40' wide ROW (3.38 acres)
Well Connect Pipeline from STA 36+80.1 – STA 60+43.9 on NMSLO lands	-	2363.8' long x 40' wide ROW (2.17 acres)
Well Connect Pipeline from STA 60+43.9 – PI17 71+10.0 at edge of well pad on IA lands	-	1066.1' long x 40' wide ROW (0.98 acre)
Subtotal	-	6.53 acres
Temporary Use Area (TUA)		
TUA along pipeline descending mesa from STA 10+40.0 – STA 19+90.0	-	950' long x 50' wide (1.09 acres)

Feature	Existing/Previously Permitted Surface Disturbance	New Surface Disturbance
Subtotal	-	1.09 acres
Total Project Surface Disturbance	0.14 acre	13.248 acres
¹ 0.038 acres of disturbance overlaps and has been accounted for in the Access Road Corridor. ² 0.074 acres of disturbance overlaps and has been accounted for in the pipeline corridor. ³ 0.08 acres of disturbance removed for existing two-track. ⁴ 0.06 acres of disturbance removed for existing two-track.		

Table 2. Project Disturbance and Reclamation Estimates for the Chaco 2308-31D Nos. 492H & 493H

Feature	Acreage		Description of Acreage Following Post-Construction Reclamation		
	Total (acres)	New Disturbance (acres)	Fully Reclaimed (Reseeded and Recontoured) (acres)	Reseed Only (acres)	Long-term Disturbance (acres)
Chaco 2308-31D Nos. 492H & 493H					
Well Pad & Construction Zone	5.028 ^{1,2}	4.888	3.327 ^{3,4}	0.91	0.791 ⁵
Access Road Corridor	0.74	0.74	0.37	-	0.37
Well-Connect Pipeline Corridor	6.53	6.53	6.53	-	-
Temporary Use Area	1.09	1.09	1.09	-	-
Total	13.388	13.248	11.317	0.91	1.161
¹ 0.038 acre of disturbance overlaps and has been accounted for in the Access Road Corridor. ² 0.074 acre of disturbance overlaps and has been accounted for in the well-connect pipeline corridor. ³ 0.074 acre of fully reclaim area overlaps and has been accounted for in the well-connect pipeline corridor. ⁴ 0.019 acre of fully reclaim area overlaps and has been accounted for in the Access Road Corridor. ⁵ 0.019 acre of long term disturbance overlaps and has been accounted for in the Access Road Corridor.					

2.3. Alternatives Considered but Eliminated from Detailed Study

Natural gas and oil wells can be drilled vertically, directionally, or horizontally. Vertical drilling places a wellpad directly above the bottom hole, while directional and horizontal drilling allows for flexibility in the placement of the wellpad and associated surface facilities. Directional or horizontal drilling often allows for “twinning,” or drilling two or more wells from one shared wellpad. Directional and horizontal drilling applications throughout the San Juan Basin have become relatively common. Generally, the use of this technology is applied when it is necessary to avoid or minimize impacts to surface resources.

Factors such as reservoir depth, angle of deviation, lateral displacement, completion technique, and risk are considered before deciding on the use of directional drilling applications. In addition, operating factors such as production efficiency; rod, pump, and tubing wear; and workover frequency is also a consideration. Generally, directional well completion and operating costs are 20 to 25 percent higher than vertical well drilling costs. The primary economic factors that determine the feasibility of directional applications include, but are not limited to, incremental drilling, completion, and operating costs; oil and gas reserves; rates of production; oil and gas prices; royalties and taxes; and return on investment.

No reasonable alternatives to the proposed action have been developed that would result in significantly fewer impacts or any clear advantages over the proposed action. The proposed access road and proposed pipeline corridors follow the most economic and direct route based on the location of existing WPX infrastructure, existing disturbance, surface resources, and terrain.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1. Methodology

3.1.1. *Direct and Indirect Impacts*

This section describes the environment that would be affected by implementation of the alternatives described in Chapter 2. Aspects of the affected environment described in this chapter focus on the relevant major resources or issues. These items are included above in Section 1.6.2.

Under the No Action alternative, current land and resource issues within the proposed project area would continue; there would be no new impacts from oil and gas development. The No Action alternative will serve as the baseline for comparing the environmental impacts of the analyzed alternatives, and will not be further evaluated in this EA (BLM 2008b).

For the purposes of this analysis, the proposed project area is considered the area where surface disturbance would occur, that is the proposed wellpad; wellpad construction zone; access road; well-connect pipeline corridor, and associated TUA's. Impacts to the action area are based on predicted trends and typical current land uses. Impacts are defined as either being direct or indirect. The existing environments within the action area are described in detail for each resource in the following sections. Potential environmental effects are identified and evaluated for level of impact, as well as, magnitude (short-term, moderate-term, or long-term) with respect to the temporal span. Effects were analyzed assuming Design Features and Best Management Practices listed in Section 2.2.2 are implemented to mitigate impacts. The analysis area will be a defined area with either a natural or human delineated boundary. Often, the analysis area is the watershed in which the action occurs. For some issues, the analysis area may be the grazing allotment or BLM-FFO management area.

3.1.2. *Cumulative Impacts*

A Reasonably Foreseeable Development scenario (RFD) was prepared for the FFO in October 2014 (Engler, et al., 2014). The RFD identified high, moderate, and low potential regions for oil development of the Mancos-Gallup Formation. Within the high potential region, full development would include 5 wells per section, resulting in 1,600 completions. Within the moderate potential region, full development would include one well per section, resulting in 330 completions. Within the low potential region, full development would include one well per township, resulting in 30 well completions. Additionally, the RFD predicted 2,000 gas wells could be development in the northeastern corner of the FFO.

The following methods and assumptions were used to predict the potential impact of the development predicted in the RFD.

Past Oil and Gas Development

Past oil and gas wells were identified using Ongard. Following interim reclamation, the average wellpad size for past development is 0.75 acres per wellpad.

Present and Future Oil Development

Based on previous development, it was assumed that development of the high potential region would involve the twinning of wellpads. This is the placement of two or more wells on one wellpad. The assumption for the analysis is that the development of a section would include two twinned wellpads and one single wellpad, resulting in three wellpads for five wells. In the moderate and low potential regions, it was assumed that development would involve single wellpads. The proposed action is located in the high potential region.

The average wellpad size for a twinned wellpad was assumed to be 500 feet by 530 feet, or 6.08 acres. An additional 0.6 acres was added to account for any associated road or pipeline development, resulting 6.68 acres of short-term disturbance. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The average wellpad size for a single wellpad was assumed to be 500 feet by 500 feet, or 5.74 acres. Again, an additional 0.6 acres was added to account for associated road or pipeline development, resulting in 6.34 acres of short-term disturbance. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The Random Point Tool in ArcMap was used to randomly assign points representing wellpads and associated disturbance based on the RFD assumptions: five wells per section in the high potential region, one well per section in the moderate potential region, and one well per township in the low potential region. This allowed both long-term and short-term disturbance from oil development of the Mancos-Gallup Formation to be calculated for the analysis areas used in this EA.

Present and Future Gas Development

The RFD predicted 2,000 wells could be developed in the gas prone area. The average wellpad size was assumed to be 555 feet by 410 feet, or 5.22 acres. An additional 0.6 acres of disturbance was added to account for associated roads and pipelines, resulting in total disturbance of 5.82 acres. Following completion of the well, interim reclamation of the wellpad and reclamation of any pipelines would occur, resulting in 1.5 acres of long-term disturbance.

The Random Point Tool in ArcMap was used to randomly assign points representing one wellpad and associated disturbance. This allowed both long-term and short-term disturbance from gas development in the northeastern corner of the FFO to be calculated for the analysis areas used in this EA.

3.2. Air Resources

3.2.1. Affected Environment

The proposed wells are located in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the Farmington PRMP/FEIS. In addition, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions have emerged since this document was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), water vapor, and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report; (BLM, 2014a)). This document summarizes the technical information related to air resources and climate change associated with oil and gas development and the methodology and assumptions used for analysis.

The Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), sulfur dioxide (SO₂) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within

Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

The Air Resources Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, how the criteria pollutants are related to the activities involved in oil and gas development, and provides a table of current National and state standards. EPA's Green Book web page (U.S. Environmental Protection Agency, 2013) reports that all counties in the Farmington Field Office area are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. The area is also in attainment of all state air quality standards (NMAAQS). The current status of criteria pollutant levels in the Farmington Field Office are described below.

"Design Values" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design values for criteria pollutants are listed below in **Error! Reference source not found.**4. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County.

Table 5. 2012 Criteria Pollutant Monitored Values in San Juan County (U.S. Environmental Protection Agency, 2014)

Pollutant	2012 Design Concentration	Averaging Time	NAAQS	NMAAQS
O ₃	0.071 ppm	8-hour	0.075 ppm ¹	
NO ₂	13 ppb	Annual	53 ppb ²	50 ppb
NO ₂	38 ppb	1-hour	100 ppb ³	
PM _{2.5}	4.7 µg/m ³	Annual	12 µg/m ^{3,4}	60 µg/m ^{3,6}
PM _{2.5}	14 µg/m ³	24 hour	35 µg/m ^{3,3}	150 µg/m ^{3,6}
SO ₂	19 ppb	1-hour	75ppb ⁵	

Source: U.S. Environmental Protection Agency, 2014

¹ Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years

² Not to be exceeded during the year

³ 98th percentile, averaged over 3 years

⁴ Annual mean, averaged over 3 years

⁵ 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years

⁶ The NMAAQS is for Total Suspended Particulate (TSP)

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (U.S. Environmental Protection Agency, 2012). Lead emissions are not an issue in this area, and will not be discussed further.

Air quality in a given region can be measured by its Air Quality Index value. The air quality index (AQI) is reported according to a 500-point scale for each of the major criteria air pollutants, with the worst denominator determining the ranking. For example, if an area has a CO value of 132 on a given day and all other pollutants are below 50, the AQI for that day would be 132. The AQI scale breaks down into six categories: good (AQI<50), moderate (50-100), unhealthy for sensitive groups (100-150), unhealthy (>150), very unhealthy and hazardous. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

Mean AQI values for San Juan County were generally in the good range (AQI<50) in 2013 with 80% of the days in that range. The median AQI in 2013 was 42, which indicates “good” air quality. The maximum AQI in 2013 was 156, which is “unhealthy”.

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences (Table 5). On 8 days in the past decade, air quality has reached the level of “unhealthy” and on two days, air quality reached the level of “very unhealthy”. In 2009 and 2012, there were no days that were “unhealthy for sensitive groups” or worse in air quality. In 2005 and 2013, there was one day that was “unhealthy” during each year. In 2010, there were five “unhealthy” days and two “very unhealthy days.”

Table 6. Number of Days classified as “unhealthy for sensitive groups” (AQI 101-150) or worse (U.S. Environmental Protection Agency, 2013a)

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days	3	6	9	18	1	0	12	9	0	1

Hazardous Air Pollutants

The Air Resources Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (BLM, 2014a). The EPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the U.S. The purpose of the NATA is to identify areas where HAP emissions result in high health risks and further emissions reduction strategies are necessary. A review of the results of the 2005 NATA shows that cancer, neurological and respiratory risks in San Juan County are generally lower than statewide and national levels as well as those for Bernalillo County where urban sources are concentrated in the Albuquerque area (USEPA, 2012).

Climate

The analysis area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. 6 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 7. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (OF (1))	Average Maximum Temperature (OF)	Average Minimum Temperature (OF)	Average Precipitation (inches)
January	30.5	40.8	20.3	0.53
February	35.8	46.8	24.8	0.59
March	43.2	56.1	30.3	0.78
April	50.4	64.7	36.2	0.65
May	60.4	74.8	46.1	0.54
June	69.8	85.1	54.5	0.21
July	75.4	89.6	61.2	0.90
August	73.2	86.5	59.8	1.26
September	65.4	79.1	51.7	1.04
October	53.3	66.4	40.1	0.91
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50

Source: data collected at New Mexico State Agricultural Science Center - Farmington

⁽¹⁾ degrees Fahrenheit

Very recently, pioneering research using space-borne (satellite and aircraft) determination of methane concentrations have indicated anomalously large methane concentrations may occur in the Four Corners region (Kort, Frankenberg, Costigan, Lindenmaier, Dubey, & Wunch, 2014). A subsequent study (Schneising, Burrows, Dickerson, Buchwitz, Reuter, & Bovensmann, 2014) indicated larger anomalies over other oil and gas basins in the U.S. Methane is 34 times more potent at trapping greenhouse gas emissions than CO₂ when considering a time horizon of 100 years (Intergovernmental Panel on Climate Change, 2013). While space-borne studies can determine the pollutant concentration in a column of air, these studies cannot pinpoint the specific sources of air pollution. Further study is required to determine the sources responsible for methane concentrations in the Four Corners region; however, it is known that a significant amount of methane is emitted during oil and gas well completion (Howarth, Santoro, & A.Ingraffea, 2011). Methane is also emitted from process equipment, such as pneumatic controllers and liquids unloading, at oil and gas production sites. Ground-based, direct source monitoring of pneumatic controllers conducted by the Center for Energy and Environmental Resources (Allen, et al., 2014) show that methane emissions from controllers exhibit a wide range of emissions and a small subset of pneumatic controllers emitted more methane than most. Emissions measured in the study varied significantly by region of the U.S., the application of the controller and whether the controller was continuous or intermittently venting. The Center for Energy and Environmental Resources had similar findings of variability of methane emissions from liquid unloading (Allen, et al., 2014a). In October 2012, USEPA promulgated air quality regulations controlling VOC emissions at gas wells. These rules require air pollution mitigation measures that reduce the emissions of volatile organic compounds. These same mitigation measures have a co-benefit of reducing methane emissions. Future ground-based and space-borne studies planned in the Four Corners region with emerging pollutant measurement technology may help to pinpoint significant, specific sources of methane emissions in the region.

The Air Resources Technical Report summarizes information about greenhouse gas emissions from oil and gas development and their effects on national and global climate conditions. While it is difficult to determine the spatial and temporal variability and change of climatic conditions; what is known is that increasing concentrations of GHGs are likely to accelerate the rate of climate change.

3.2.2. Impacts from Alternative B (the Proposed Action)

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal oil well. The calculators give an approximation of criteria pollutant, HAP, and greenhouse gas (GHG) emissions to be compared to regional and national emissions levels. Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (BLM, 2014a).

Direct and Indirect Impacts

Criteria Pollutants

Error! Reference source not found.7 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 8 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2011 emissions inventory (U.S. Environmental Protection Agency, 2014).

Table 8. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Oil Well; Average 25 Days to Drill and Complete

Activity	NOx	CO	VOC	PM ₁₀	PM _{2.5}	SO ₂	CH ₄	CO ₂
One time operations (tons)*								
Construction	5.5	1.5	0.5	2.5	0.25	0.1	0.007	598.85
Completion	0.5	0.1	0.03	0.025	0.025	-	-	55.00
Interim	0.006	0.006	0.006	0.001	-	0.003	-	1.24

Reclamation								
Final Reclamation	0.006	0.006	0.006	0.001	-	0.004	-	1.66
Ancillary Operations (tons)								
Workover	0.129	0.04	0.01	0.01	0.01	-	-	10.59
Road Maintenance	-	-	-	-	-	-	-	0.26
Road Traffic	-	-	-	-	-	-	-	0.06
Annual operations (tons/yr)								
Oil Haul Truck and Small Truck (100 bbl/day)	0.009	0.006	0.0012	0.0009	0.0008	-	0.0001	3.88
Total	6.13	1.64	0.55	2.54	0.29	0.11	0.01	671.54

Oil storage tanks on the well location may result in venting of VOC. Oil well production is generally presented as barrels per day produced. The emissions calculator estimated that for every barrel per day produced there may be 0.12 tons of VOC vented per year.

The average horizontal oil well in the planning area produces approximately 100 barrels per day. One hundred barrels per day is estimated to result in 12 tons of VOC emissions per year. Oil storage tanks would be subject to current EPA regulations regarding the capture or flaring of VOC emissions.

Table 9. Analysis Area Emissions in Tons/Year, 2011

County	NO _x ⁽¹⁾	CO ⁽²⁾	VOC ⁽³⁾	PM ₁₀ ⁽⁴⁾	PM _{2.5} ⁽⁵⁾	SO ₂ ⁽⁶⁾
McKinley	11,952.9	17,007.8	3,891.2	70,096.4	7,645.2	1,381.1
Rio Arriba	12,012.3	27,344.6	19,149.8	33,761.2	4,130.6	60.4
San Juan	42,231.5	63,568.9	26,110.8	76,638.3	9,201.0	5,559.3
Sandoval	4,143.8	19,513.9	4,373.1	39,343.0	4,510.8	109.3
La Plata	4,838.2	17,116.3	3,740.1	2,330.0	919.6	127.9
Total	75,187.7	144,551.5	57,265.1	222,168.9	26,407.2	7,237.9

(1) NO_x – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM₁₀ – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) PM_{2.5} – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
(6) SO₂ – sulfur dioxide

Table 10 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal oil well.

Table 10. Percent Increase in Analysis Area Emissions from the Proposed Action

	NO _x ⁽¹⁾	CO ⁽²⁾	VOC ⁽³⁾	PM ₁₀ ^(4,5)	PM _{2.5} ^(5,6)	SO ₂ ^(5,7)
Total Emissions	75,187.7	144,551.5	57,265.1	222,168.9	26,407.2	7,237.9
Conventional Gas Well Emissions	6.13	1.64	12.55 ⁽⁸⁾	2.54	0.29	0.11
Percent Increase	0.008	0.001	0.02	0.001	0.001	0.002

(1) NO_x – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM₁₀ – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) Values derived from average emissions for any well drilling in the analysis area. Calculated results available upon request.

⁽⁶⁾ PM_{2.5} – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns

⁽⁷⁾ SO₂ – sulfur dioxide

⁽⁸⁾ Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over six tons of VOC emissions per year

Hazardous Air Pollutants

The formulas used for calculating HAPs in the calculators are very imprecise. For many processes it is assumed that emission of HAPs will be equivalent to 10 percent of VOC emissions. Therefore, the estimated HAP emissions of 1.25 tons/year should be considered a very gross estimate. Most of the VOC emissions estimated for one horizontal oil well result from venting from oil storage tanks. Current EPA regulations require operators to reduce VOC emissions by 95% if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95% of oil storage tank VOC emissions would reduce the estimated HAP emissions to 0.12 tons/year.

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO₂ and CH₄. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, CO₂e emissions for both CH₄ and CO₂ were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO₂e (76.2 million metric tons; (New Mexico Environment Department, 2010). The estimated CO₂e metric tons emissions from one horizontal oil well (609.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO₂ emissions.

Cumulative Impacts

The FFO manages federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley Counties. There are approximately 21,150 active oil and gas wells in the San Juan Basin. About 14,843 of the wells in these counties are federal wells. Analysis of cumulative impacts for reasonable development scenarios and RFDS of oil and gas wells on public lands in the FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of Cumulative Effects can be found in the Air Resources Technical Report (BLM, 2014a).

The primary activities that contribute to levels of air pollutant and GHG emissions in the Four Corners area are electricity generation stations, fossil fuel industries, and vehicle travel. The Air Quality Technical Report includes a description of the varied sources of national and regional emissions that are incorporated here to represent the past, present, and reasonably foreseeable impacts to air resources (BLM, 2014a). It includes a summary of emissions on the national and regional scale by industry source. Sources that are considered to have notable contributions to air quality impacts and GHG emissions include electrical generating units, fossil fuel production (nationally and regionally), and transportation.

The emissions calculator estimated that there could be very small direct and indirect increases in several criteria pollutants, HAPs, and GHGs as a result of implementing the proposed alternative. The very small increase in emissions that could result would not be expected to result in exceeding the NAAQS for any criteria pollutants in the analysis area.

The very small increase in GHG emissions that could result from implementing the proposed alternative would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum total of GHGs in the Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (BLM, 2014a) discusses the relationship of past, present, and future predicted emissions to climate change and the limitations in predicting local and regional impacts related to emissions. It is currently not feasible to know with certainty the net impacts from particular emissions associated with activities on public lands.

3.3. Soil

3.3.1. Affected Environment

The analysis area for impacts to soils is the Escavada Wash watershed (HUC10-1408010603). The Escavada Wash watershed lies within the geologic San Juan Basin. Soils in the San Juan Basin were formed primarily from two kinds of parent material: alluvial sediment and sedimentary rock. The alluvial sediment is material that was deposited in river valleys and on mesas, plateaus, and ancient river terraces. This material has been mixed and sorted in transport and has a wide range of mineralogy and particle size. The parent material of sedimentary rock consists mainly of sandstone and shale bedrock. These shale and resistant sandstone beds form prominent structural benches, buttes, and mesas bounded by cliffs.

The Natural Resources Conservation Service (NRCS) has mapped general soils in the Escavada Wash watershed. General soil map units delineate broad areas that have a distinctive pattern of soils, relieve and drainage and are a unique natural landscape. Complete soil information is available in the NRCS's *Soil Survey of San Juan County, New Mexico: Eastern Part and Soil Survey of Sandoval County Area, New Mexico, Parts of Los Alamos, Sandoval, and Rio Arriba Counties* (USDA/NRCS 2015).

Table 11. General Soils within Escavada Wash Watershed

General Soil Type	Soil Type Description
Persayo-Fruitland-Sheppard	Very shallow to deep, nearly level to very steep, well drained to excessively drained soils that formed in alluvial, residual, and eolian material; on uplands and fans.
Shiprock-Sheppard-Doak	Deep, nearly level to moderately steep, well drained to somewhat excessively drained soils that formed in alluvial and eolian material; on uplands.
Blancot-Notal	Deep, nearly level to gently sloping, well drained to somewhat excessively drained soils that formed in alluvium; on valley sides, valley bottoms, and fans.
Sheppard-Huerfano-Notal	Shallow to deep, nearly level to steep, well drained to somewhat excessively drained soils that formed in eolian material, alluvium, and residuum; on uplands, bottom lands, and fans.
Badland-Rock outcrop-Monierco	Badland, Rock outcrop, and shallow, nearly level to gently sloping, well drained soils that formed in alluvial and eolian material; on uplands.
Blancot-Badland-Councilor	Very deep, nearly level to moderately steep, well drained to moderately slowly permeable that formed in fan and stream alluvium and eolian material; on valley side slopes and stream terraces.
Menefee-Vessilla-Orlie	Shallow and very deep, nearly level to very steep, well drained to slowly permeable soils that formed in eolian slope alluvium and residuum; on cuestas and mesa side slopes and tops
Doakum-Bettonie	Very deep, well drained to moderately permeable that formed in eolian material and slope alluvium; on plateaus.

3.3.2. Impacts from Alternative B (the Proposed Action)

The soils specifically identified within the footprint of the proposed project area that will be directly disturbed are described in further detail below.

Badland

This soil is located on the side slopes of the mesa surrounding the action area. The parent material of the Badland map unit primarily consists of shale. This soil is considered a somewhat excessively drained soil, with the depth to restrictive layer (paralithic bedrock) being zero to two inches. Available water capacity for the Badland soil unit is very low (zero inches). This soil type has a low to moderate potential for water erosion and moderate potential for wind erosion. Badland soils are typically found along the side slopes of break landforms (5- to 80-percent slopes), and are commonly used for wildlife habitat (USDA/NRCS 2015). This soil type is considered potentially fragile depending on percent slope. The proposed pipeline would occur on slopes equal to or greater than 15 percent and would result in disturbance greater than

0.1 acre within this soil type. As such, this soil is considered fragile according to the Farmington Field Office (FFO) Fragile Soils Procedure. To mitigate disturbance of this fragile soil, areas of the proposed TUA would be utilized for storage of excavated soils segregated by soil layers to be returned as practicable to pre-disturbance conditions. Water bars will also be placed within disturbed areas along the slope to mitigate impacts from water erosion.

Stumble-Notal complex, gently sloping

This soil type is found along the southern half of the well-connect pipeline and the entirety of the well pad and access road. Stumble-notal complex, gently sloping soils are found on side slopes of dunes and rise of alluvial fans at 4,800 to 6,400 feet in elevation. The unit is composed of 55 percent Stumble soils (and similar soils) and 30 Notal soils (and similar soils). Stumble soils occur on slopes from 0 to 8 percent and are somewhat excessively drained. Stumble soils have a depth to restrictive layer of more than 80-inches and have a high to very high permeability of 6-20-inches per hour. Notal soils occur on slopes from 0 to 2 percent and are well drained. Notal soils have a depth to restrictive layer of more than 80-inches and have a very low to moderately low permeability of 0-0.06-inches per hour. These soils formed in eolian deposits and fan alluvium. This unit is mainly used for livestock grazing and wildlife habitat (USDA/NRCS 2015).

Doak-Sheppard-Shiprock Association, Rolling

This soil type is found atop the mesa along the pipeline for approximately 1,200-feet from the tie-in location to the edge of the mesa where it fades to badlands. Doak-Sheppard-Shiprock association, rolling soils are found on mesas, plateaus, and terraces at 5,600 to 6,400 feet in elevation. The unit is composed of 40 percent Doak soils, 30 percent Sheppard soils, and 20 percent Shiprock soils. Doak soils occur on slopes from 0 to 5 percent and are well drained. Doak soils are deep and have a moderately slow permeability. Sheppard soils occur on slopes from 0 to 15 percent and are deep, somewhat excessively drained, and rapidly permeable. Shiprock soils occur on 0 to 5 percent slopes and are deep, well drained, and have a moderately rapid permeability. They formed in eolian material and slope alluvium. Effective rooting depth for this unit is 60 inches or greater. This unit is mainly used for livestock grazing and wildlife habitat. The major limitations of this mapping unit are: (1) the hazard of soil blowing and (2) the hazard of water erosion. (USDA/NRCS 2015).

Fruitland-Persayo-Sheppard complex (hilly slopes)

This soil is located to the southeast of the proposed well location. The Fruitland-Persayo-Sheppard complex (hilly slopes) is composed of 40 percent Fruitland and similar soils, 30 percent Persayo and similar soils, and 25 percent Sheppard and similar soils. Available water capacity for this soil is very low to moderate. This soil complex has a low to moderate potential for water erosion and moderate to high potential for wind erosion. The Fruitland-Persayo-Sheppard complex (hilly slopes) is generally found within sandy, shale hills, and deep sand ecological sites (USDA/NRCS 2015).

Direct and Indirect Impacts

Under the proposed action, a maximum 13.39 acres of vegetation would be cleared, topsoil would be stripped, and surface would be altered. Approximately 1.16 acres would remain as bare, relatively flat, compacted surface for the life of the proposed project; the remainder would be recovered with topsoil and reseeded during interim reclamation.

The clearing of vegetation within the proposed project area would result in the exposure of soils to water erosion, wind erosion, and direct human disturbances. Erosion within the proposed project area would potentially increase during the short-term. The hazards and level of erosion susceptibility may vary over the life of the project depending on the project phases. Proposed project phases are outlined under Section 2.2.2 (Description of Proposed Project – Proposed Project Phases) above. The hazard of erosion would be the highest during the construction phases of the proposed Project. Construction activities would result in the mixing, displacement, and compaction of soils. The degree of erosion would be dependent upon precipitation and wind. Following construction, the compaction of soils, reclamation of

portions of the proposed project area, and implementation of erosion-control measures in accordance with the Design Features and Best Management Practices (BMPs) as outlined in Section 2.2.2. and the Surface Reclamation Plan (Appendix D) would limit soil impacts due to erosion. These BMPs include, but are not limited to; salvage and stockpiling of topsoil, recontouring and reseeding of areas not used on a regular basis; replacement of the sub-surface soils and topsoil in the proper order; incorporating mulched vegetation into topsoil; and construction of waterbars.

The proposed project would result in disturbance to fragile soils. Additional precautions as outlined in Section 2.2.2 (Description of Proposed Project – Protection of Topsoil), would take place in order to segregate and replace these soils appropriately in order to restore them back to preconstruction condition as much as practical. Additional water bars and stormwater controls will be implemented for added protection. Areas of bare soil would be reseeded and stabilized in accordance with the BLM-FFO Bare Soil Reclamation Procedures. Project specific procedures and details are provided in the Surface Reclamation Plan (Appendix D). As such, impacts are expected to be low and moderate -term.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed which may impact soils would mainly result from surface disturbance associated with oil and gas development. One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 569 acres. This disturbance would have the same impacts as described for direct and indirect impacts. These impacts would be greatest immediately following project construction and decrease over time as reclamation success progress. The Proposed Action would account for 0.93 acres of that total and represents 0.16% of the cumulative impacts to soils.

Other surface-disturbing activities in the analysis area that may also result in impacts to soils include: community development, livestock grazing, vegetation management, and recreation. Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on current community development and infrastructure. As housing and access roads are constructed and/or removed, vegetative cover and drainage patterns are altered, resulting in increased exposure of soils to wind and water erosion. Livestock grazing in the analysis area contributes to soil erosion, as well as the alteration of soil composition through the breakdown and spread of organic matter. Livestock grazing is closely managed by both land owners and land management agencies. Overstocking areas can greatly increase the rate of erosion and thus increase impacts to soils if not appropriately managed, particularly during drought years. Livestock grazing is expected to continue at the same rate and in the same manner as it currently occurs. As such, impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires that impact soils are often implemented by land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, it is not possible to predict when and to what extent with any certainty. Recreation, specifically in the form of Off-highway Vehicle (OHV) use, may likely result in soil erosion and compaction. These impacts cannot be quantified with any level of certainty, as they are highly dependent on enforcement of regulations on federal lands and vary greatly on private lands. All these land uses are likely to contribute a minor component in impacts to soil resources.

3.4. Upland Vegetation

3.4.1. Affected Environment

The analysis area for impacts to upland vegetation is the Escavada Wash watershed. The Escavada Wash watershed lies within the larger Arizona/New Mexico Plateau ecological region. This ecological region occurs primarily in Arizona, Colorado, and New Mexico; a small portion is located within Nevada. This ecological region encompasses approximately 45,870,500 acres (185,632 square kilometers), and the elevation ranges from 2,165 to 11,949 feet AMSL. The ecological region's landscapes include low mountains, hills, mesas, foothills, irregular plains, alkaline basins, some sand dunes, and wetlands. This ecological region is a large transitional region between the semiarid grasslands to the east; the drier shrublands and woodlands to the north; and the lower, hotter, less-vegetated areas to the west and south. Vegetation communities include shrublands with big sagebrush (*Artemisia tridentata*), rabbitbrush (*Ericameria nauseosa*), winterfat (*Krascheninnikovia lanata*), shadscale saltbush (*Atriplex confertifolia*), and greasewood (*Sarcobatus vermiculatus*); and grasslands of blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), and needleandthread grass (*Hesperostipa comata*). Higher elevations may support pinyon pine and juniper woodlands. This ecological region includes the urban areas of Santa Fe and Albuquerque, New Mexico. Important land uses within this ecological region include irrigated farming, recreation, rangeland, wildlife habitat, and some natural gas production (Griffith, et al. 2006). More specifically, Escavada Wash watershed encompasses approximately 147,176 acres with landscapes including hills, mesas, alkaline basins, and badlands. Vegetation communities mentioned above include shrublands dominated by big sagebrush (*Artemisia tridentata*), Pinyon-Juniper woodlands along higher elevations, and sparsely vegetated badlands along the foothills and gullies.

3.4.2. Impacts from Alternative B (the Proposed Action)

The landscape across the proposed Chaco 2308-31D Nos. 492H & 493H action area is split between two vegetative communities. The well pad and access road are dominated by sagebrush shrubland community; the cross country well-connect pipeline passes through both sagebrush shrubland community and badlands community. Of the total project disturbance estimates (13.388 acres), 8.95 acres of disturbance will be within terrain dominated by sagebrush shrubland community and 4.44 acres will be within badlands community. There are approximately 13 juniper trees located in the proposed action area of the project. The dominant species' throughout the entire project area is big sagebrush (*Artemisia tridentata*). Ground cover was visually estimated, ranging from a minimum of less than 1 percent on the steep badland areas to 35 percent in areas of dense sagebrush. No New Mexico Department of Agriculture Class A- listed species were found; however, halogeton (*Halogeton glomeratus*) a New Mexico Department of Agriculture Class B- listed species was found within the proposed action area.

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the 13.39-acre proposed project area could be cleared. During interim reclamation, approximately 11.32 acres of the proposed project area would be fully reclaimed (recontoured and reseeded). Approximately 0.91 acres would be reseeded only. The remaining 1.16 acres would remain as compacted, barren surface for the life of the proposed wells. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation. In order to fully reclaim the 0.91 acres of the proposed project area that were only reseeded during interim reclamation, WPX would need to first clear the vegetation from within these areas in order to recontour them.

During interim and final reclamation, the BLM Sagebrush Shrubland Community seed mixture would be utilized; the species included in these mixtures are listed in the Surface Reclamation Plan (Appendix D). Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixtures, as well as native species that are not deliberately planted. Following the reclamation process, the resulting vegetation community could differ from the native plant communities surrounding the proposed project area. Within reclaimed areas, it is not expected that the vegetation community would return to native conditions within 20 years (BLM 2003a, 4-18). The accumulation of fugitive dust on vegetation may impede vegetative growth and vigor. Impacts are likely to be low and moderate-term.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed, which may impact vegetative cover, growth, and change in species resulting from surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Community development
- Livestock grazing

Vegetation management

One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 568 acres. This disturbance would have the same impacts as described for direct and indirect impacts. The Proposed Action would account for 1.16 acres of that total and represents 0.20% of the total past, present and future disturbed area and 0.0007% of the total analysis area of the cumulative impacts to upland vegetation.

Indirectly, fugitive dust or deposition and introduction of invasive species associated with existing roads, and wellpads in the immediate area could impact the vegetation within the spatial analysis area, and could continue to do so throughout the life of the proposed project. The proposed project would contribute to direct vegetation disturbance and fugitive dust and/or deposition.

Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on the area's current infrastructure and rate of development. As housing and access roads are constructed and/or removed, vegetative cover and communities may be altered. Livestock grazing and level of intensity may also impact cover and species composition in the analysis area. Livestock grazing is closely managed by both land owners and land management agencies. Overstocking areas can greatly influence vegetative growth and vigor, and result in changes in communities if not appropriately managed, particularly during drought years. Livestock grazing is expected to continue at the same rate and in the same manner as it currently occurs. As such, impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires, impact vegetation and are often implemented by land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, with a mixture of land ownership it is not possible to predict when and to what extent with any certainty. All these land uses are likely to contribute a minor component in impacts to vegetation.

3.5. Noxious Weeds and Invasive Species

3.5.1. *Affected Environment*

The analysis area for impacts from noxious weeds and invasive species is the Escavada Wash watershed. The Escavada Wash watershed lies within the larger San Juan Basin. In the San Juan Basin, invasive plants are frequently found in areas that have been disturbed by surface activities. Invasive species are generally tolerant of disturbed conditions, and often times outcompete native species. These plants may displace native plant communities and lead to the degradation of wildlife habitat. A total of 212 invasive and poisonous weeds have been identified on BLM-managed land (Heil and White 2000). The New Mexico Department of Agriculture (NMDA) has designated certain plants as state-listed noxious weeds and their current management classes for each species. This statewide list is maintained by the NMDA. The BLM uses the New Mexico statewide list as the baseline document to establish their primary

noxious weed species of concern. Invasive plant species are managed on BLM lands through cooperative agreements between the BLM and the San Juan County Soil and Water Conservation District. Additionally, BLM works closely with other federal and state agencies, management groups, private landowners, and industry cooperators to address invasive plant management by incorporation prevention and control measures on projects proposed on BLM lands (BLM 2014b). During the field surveys of the proposed project areas, halogeton, a Class B- listed noxious weed species was the only noxious weed listed by the USDA, NMDA, or BLM-FFO.

3.5.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

Disturbed soils from the proposed project may provide an opportunity for the introduction and establishment of non-native invasive species. During construction and operation, noxious weed sources could be introduced to disturbed areas from vehicles, equipment, people, wind, water, or other mechanisms. There is the potential for non-native invasive weeds to establish or spread in the area. WPX would be responsible for monitoring and controlling any non-native invasive weed species within the permitted area for the life of the project. The re-vegetation of the disturbed area would reduce the potential for non-native invasive weeds to establish. Impacts are likely to be low and moderate-term.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed, which may impact the potential for introduction and establishment of noxious weed species resulting from surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Community Development
- Livestock grazing

Vegetation management

One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 568 acres. The Proposed Action would account for 1.16 acres of that total and represents 0.20% of the cumulative impacts to noxious weeds and invasive species.

Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on the area's current infrastructure and rate of development. As housing and access roads are constructed and/or removed, ground disturbance from these activities provides an opportunity for noxious weeds to become established. Livestock grazing and level of intensity may also impact establishment and spread of noxious weeds in the analysis area. Livestock grazing is closely managed by both land owners and land management agencies. Overstocking areas can greatly increase the potential for noxious weeds to establish and take over an area if not appropriately managed, particularly during drought years when noxious weeds typically have a competitive advantage. Livestock grazing is expected to continue at the same rate and in the same manner as it currently occurs. As such, impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires, impact vegetation and are often implemented by land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, with a mixture of land ownership it is not possible to predict when and to what extent with any certainty. All these land uses are likely to contribute a minor component in impacts to the establishment of noxious weeds and invasive species.

3.6. Water Resources

3.6.1. Affected Environment

Surface Water

The proposed project area is located within the Upper Colorado River Hydrologic Region, within the Escavada Wash watershed and Betonnie Tsose Wash subwatershed. Surface drainage from the area would flow south to the Betonnie Tsose Wash and then onto Escavada Wash. There is a stock pond located approximately 0.9 miles southwest of the proposed pipeline that collects water from the ephemeral drainage that runs along the mesa top where the proposed pipeline ties into the Chaco Trunk 2 Extension 9 (NMNM134001). There are no perennial surface water resources such as rivers, lakes, ponds, streams, wetlands or springs within the proposed project area. The area was evaluated for potential jurisdictional wetlands and other Waters of the U.S. Jurisdictional Waters of the U.S. are regulated by the U.S. Army Corps of Engineers (USACE). The BLM-FFO and USACE Durango Regulatory Division have determined that jurisdictional waters may include USGS watercourses (i.e., "blue lines" on USGS 1:24,000 topographic maps). There is one USGS mapped blue line the pipeline would cross approximately 3,098-feet southeast of the proposed tie-in location on the Chaco Trunk 2 Extension 9. Several other ephemeral dendritic drainages would be crossed by the pipeline and access road that may also be considered jurisdictional.

Groundwater

The primary aquifers in the BLM/FFO area are the sandstone based Uinta-Animas and the Mesaverde. A search of the New Mexico State Engineers Office-Water Administration and Technical Engineering Resource System database for the proposed project area and vicinity (1-mile radius) was performed. There is one (1) recorded water well located approximately 1,876 feet southwest of the proposed pipeline tie-in on the Chaco Trunk 2 Extension 9. This well was drilled in 1963 and is used as a source of water for livestock and wildlife. It is 550 feet deep and has a measured water depth of 173 feet from the surface.

3.6.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

Potential impacts to surface water and shallow groundwater resources could occur from stormwater runoff and the accidental spill of chemicals, produced water, or flowback fluids. The potential for these impacts would be long term for the life of the proposed action.

Impacts to Surface Water

The Chaco 2308-31D 492H & 493H well-connect pipeline would cross one (1) USGS blue line that may likely be subject to regulatory jurisdiction under the USACE. Assuming the watercourse is jurisdictional, the disturbance created by the proposed well-connect pipeline within the ordinary high water mark of this and any other waters of the U.S. would be covered under USACE Nationwide Permit #12 (Utility Line Activities). The proposed project would be designed to avoid discharge into other watercourses that are potentially USACE jurisdictional and would not result in the loss of greater than ½ acre of waters of the U.S. Any potential disturbance created by the proposed access within the ordinary high water mark of waters of the U.S. would be covered under USACE Nationwide Permit #14 (Linear Transportation Projects).

During the construction phase of the proposed project, approximately 13.39 acres of soil would be temporarily exposed and serve as a sediment source that may enter area drainage ways in the short term, and approximately 1.16 acres would remain barren and compacted on the well pad and access road after interim reclamation. Vegetation cover is generally low to moderate throughout the project area. Exposure of soils, particularly on slopes, would lead to an increase in an undetermined, but likely small amount of sediment transport, particularly during the following storm events. Slight alteration in the project area drainage patterns may also lead to an increase in sediment transport. These increases in sediment transport may persist for several years until the disturbed soils are stabilized. The potential for sediment

transport into the drainages would be minimized through the implementation of best management practices mentioned in Section 2.2.2. (Description of Proposed Project – Protection of Topsoil); as well as other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions. The proposed project would be reclaimed in accordance with the site-specific Reclamation Plan (Appendix D).

It is estimated that 23,000 barrels of useable water would be required to drill and complete each well. Of the 23,000 barrels, approximately 10,000 to 11,000 barrels would be recovered for reuse. Water for drilling and completion would be obtained from the San Juan Basin Water Haulers Association, who would retrieve and truck their water from a permitted water well (Blanco Trading Post well (POD No. SJ 2105)). Minimal amounts of chemicals (i.e., gas, diesel, etc.) would be used and stored on the well pad. There would be the potential for accidental spills or releases of these materials that could impact local water quality. The proposed wells would be drilled using a closed-loop system to contain drill cuttings and fluids. All chemicals stored on-site would be properly contained. Containment structures such as containment dikes, drip pans, or equivalent protective structures would be installed and maintained to prevent discharge to waters of the U.S. Any spills of non-freshwater fluids would be immediately cleaned up and removed to an approved disposal site in accordance with federal and state regulations. Impacts are likely to be low and moderate-term.

Impacts to Groundwater

Stimulation (i.e., hydraulic fracturing or “fracing”) is a process used to maximize the extraction of underground resources by allowing oil or natural gas to move more freely from the rock pores to production wells that bring the oil or gas to the surface. Fluids, commonly made up of water (99 percent) and chemical additives (1 percent), are pumped into a geologic formation at high pressure during hydraulic fracturing (USEPA 2004). Chemicals added to stimulation fluids may include friction reducers, surfactants, gelling agents, scale inhibitors, acids, corrosion inhibitors, antibacterial agents, and clay stabilizers. When the fracing pressure exceeds the rock strength, the fluids open or enlarge fractures that typically extend several hundred feet away from the well bore, and may occasionally extend up to 1,000 feet from the well bore. After the fractures are created, a propping agent (usually sand) is pumped into the fractures to keep them from closing when the pumping pressure is released. After fracturing is completed, a portion of the injected fracturing fluids returns to the wellbore and is recovered for future fracturing operations (USEPA 2004) or disposal. Stimulation techniques have been used in the United States since 1949 and in the San Juan Basin since the 1950s. Over the last 10 years, advances in multi-stage and multi-zone hydraulic fracturing have allowed development of gas fields that previously were uneconomic, including the San Juan Basin.

Hydraulic fracturing is a common process in the San Juan Basin and applied to nearly all wells drilled. The producing zone targeted by the proposed action is well below any underground sources of drinking water. The Mancos Shale formation is also overlain by a continuous confining layer. The geological confining layer is the Lewis Shale formation that is located above both the Mancos Shale and Mesaverde formations and provides an impermeable layer that isolates the Mancos Shale and Mesaverde formations from both identified sources of drinking water and surface water. On average, total depth of the proposed well bore would be about 5,000 feet below the ground surface. Fracturing in the Basin Mancos formation is not expected to occur above depths of 4,000 feet below the ground surface. Fracturing could possibly extend into the Mesaverde formation overlying the Basin Mancos; however, the formation has not been identified as an underground source of drinking water based on its depth and relative high levels of TDS. No impacts to surface water or freshwater-bearing groundwater aquifers are expected to occur from hydraulic fracturing of these proposed wells.

Proposed pipelines could potentially leak or rupture during operations and may result in impact to groundwater quality. The proposed pipelines would be pressure tested to ensure integrity prior to operation. Cathodic protection systems would be installed to protect the pipeline from corrosion. Impacts are likely to be low and long-term during the operation of the pipeline.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed analysis area, which may also impact the short-term impacts to surface waters from sedimentation or flow changes and/or moderate to long-term impacts from potential for spills, ruptures, or leaks from operations include the following:

- Oil and gas development, including associated roads and pipelines
- Livestock grazing
- Vegetation management
- Land development
- Recreational Activities

One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 568 acres. This disturbance would have the same impacts as described for direct and indirect impacts. The Proposed Action would account for 1.16 acres of that total and represents 0.20% of the total past, present and future disturbed area and 0.0007% of the total analysis area of the cumulative impacts to upland vegetation.

The proposed surface disturbance and increased sediment yields, along with an increase in roads that would direct sedimentation to stream crossing would occur mainly in the high development area. Other soil disturbing activities, such as Off-highway Vehicle (OHV) use, livestock grazing, and vegetation management could impact the water resources within the analysis area and could continue to do so throughout the life of the proposed project.

3.7. Wildlife

3.7.1. Affected Environment

General Wildlife

The analysis area for impacts to wildlife is the Escavada Wash watershed. The landscape across the proposed Chaco 2308-31D Nos. 492H & 493H action area is split between two vegetative communities. The well pad and access road are dominated by sagebrush shrubland community; the cross country well-connect pipeline passes through both sagebrush shrubland community and badlands community. Of the total project disturbance estimates (13.388 acres), 8.95 acres of disturbance will be within terrain dominated by sagebrush shrubland community and 4.44 acres will be within badlands community. There are approximately 13 juniper trees located in the proposed action area of the project. The dominant species' throughout the entire project area is big sagebrush (*Artemisia tridentata*). The vegetation community found within the proposed project area provides habitat for a variety of vertebrate and invertebrate species. The objectives of the BLM wildlife management program are to "ensure optimum populations and a natural abundance and diversity of fish and wildlife values by restoring, maintaining, and enhancing habitat conditions for consumptive and non-consumptive uses" (BLM 2003b, 2-24). The proposed project area receives year-long use by mule deer (*Odocoileus hemionus*) and lesser small mammals.

A discussion of wildlife identified within the proposed project area is provided in the BSR (Appendix B).

Migratory Birds

Executive Order (EO) 13186, dated January 17, 2001, calls for increased efforts to more fully implement the Migratory Bird Treaty Act of 1918. In keeping with this mandate, the BLM-FFO has issued an interim policy to minimize unintentional take, as defined by the EO, and to better optimize migratory bird efforts related to BLM-FFO activities. In keeping with this policy, a list of priority birds of conservation concern which occur in similar ecological regions similar to the proposed project area was compiled using the U.S. Fish and Wildlife Service's Information, Planning, and Conservation System (IPAC) (USFWS 2015). The U.S. Fish and Wildlife Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

The selected species have a known distribution in the BLM-FFO area and may be affected by various types of perturbations. These species and an evaluation of their potential to occur within the proposed project area are discussed in the BSR (Appendix B); a list of species identified within the proposed project area during the biological surveys is also provided.

Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the 13.39-acre proposed project area may be cleared. This would be split between the 8.95 acres of disturbance within sagebrush shrubland habitat and 4.44 acres within badlands habitat. Approximately 1.16 acres within the sagebrush shrubland would remain barren of vegetation for the long term. Reclaimed portions of the proposed project area would be converted to a reseed community following interim reclamation and final reclamation. The impacts to the vegetation communities are described in detail in Section 3.4 (Upland Vegetation). If interim and final reclamation are successful, sagebrush shrubland would become re-established within the proposed project area. However, as discussed in Section 3.4, the re-establishment of a mature, native plant community could require decades, and it is possible that the plant communities may not return to their original plant cover types within the action period of impacts considered (BLM 2003a, 4-19).

There is available, similar habitat in the surrounding area that wildlife could utilize. However, the clearing of vegetation and the transformation of the proposed project area to a reseed community would alter habitat and mosaic of the landscape currently utilized by wildlife species, including priority bird species.

It is assumed that habitat loss and fragmentation likely reduce the carrying capacity for wildlife and avian species, although the exact level of reduction cannot be quantified (BLM 2003a, 4-29). Roads are considered a greater contributor to the fragmentation of habitat, particularly for small species of wildlife, such as amphibians, reptiles and small mammals. Fragmentation would more likely result from construction within areas that are not adjacent to existing surface disturbance. Habitat fragmentation and edge effects are generally reduced where practicable by utilizing and expanding existing disturbance. In the vicinity of the proposed action area there is minimal existing ground disturbance, therefore, the proposed Chaco 2308-31D Nos. 492H & 493H access road, pipeline, and well pad are placed with respect to archeology, paleontology, geology, terrain characteristics, current/proposed WPX infrastructure, and in the effort to minimize ground/vegetative disturbance to the extent practicable. The proposed project would expand upon 0.14 acres of existing disturbance and initiate 13.25 acres of new disturbance. Resulting disturbance from the action area, would create a corridor of fragmentation between County Road #7940 and County Road #7890 (approximately 6,330-feet); contributing to existing fragmentation from a nearby existing 8-wire overhead transmission line. Upon interim reclamation of the proposed project, the entirety of the pipeline would be reseeded and recontoured in efforts to reestablish pre-disturbance conditions and would reduce impacts from the disturbance corridor. Non-reclaimed corridor would consist of the well pad and access road and would extend approximately 1,452-feet north from existing County Road #7940. Edge effects by way of noise and activity from construction (short term edge effect), drilling/completion drilling (short term edge effect), and lifetime operation of the well (long term edge effect of approximately thirty (30) plus years) could cause indirect habitat loss by deterring individuals from utilizing available

habitat adjacent to the proposed well pad area. During final abandonment of the proposed location all areas of the proposed project would be reclaimed, unless the surface owner requests otherwise.

For the long term, occasional human and vehicle presence within the vicinity of the proposed project area would increase above present levels. Additional well equipment could also cause increased noise levels in the vicinity. Audial and visual disturbances associated with the proposed project could cause indirect habitat loss by deterring wildlife from using available habitat adjacent to the proposed project area.

General Wildlife

It is possible that burrowing animals could be killed or injured during the construction phase of the proposed project, as equipment digs into the earth and rolls over the surface of the ground.

During the construction phase of the proposed pipelines, terrestrial wildlife could fall into the open pipeline trenches and be injured, stressed, or killed. The presence of open trenches could also disrupt normal wildlife movements to and from water and/or food sources. As discussed in Section 2.2.2 (Description of Proposed Project – Protection of Flora and Fauna, Including Special Status Species and Livestock), design features and BMPs would be implemented during the construction phase of the proposed pipeline ties to assist in the prevention of injury, stress, or death of wildlife.

Migratory Birds

The proposed action would affect approximately 13.39 acres of potential migratory bird habitat and result in the loss of approximately 13 juniper trees of varying ages and sizes. Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed project. As discussed in Section 2.2.2 (Description of Proposed Project - Protection of Flora and Fauna, Including Special Status Species and Livestock), if the vegetation-clearing phase of construction is scheduled to occur during migratory bird breeding season, a pre-construction migratory bird nest survey would be conducted within the associated proposed project area. Therefore, it is unlikely that nests, eggs, or young birds within the proposed project area would be directly harmed. If project activities occur during migratory bird breeding season, birds nesting outside of but near the proposed project area could abandon existing nests as a result of visual and audial disturbances.

It is difficult to predict the effects of the proposed project on migratory birds. The increased activity, noise, and disturbed vegetation associated with the proposed project could result in the increased usage of the immediate area by some migratory bird species, while decreasing usage by other species. Studies have shown mixed impacts of oil and gas development on nesting migratory birds. According to a study by Ortega and Francis (2007), the presence of oil and gas compressors affected bird species differently; however, there was no difference in overall nest density on plots with and without compressors. A study by Holmes and King (2006) found that the sage sparrow had lower nest survival in an area with ongoing gas development; however, the Brewer's sparrow had higher nest survival rates in a developed gas field when compared with populations in an undeveloped control area.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed, which may impact habitat and wildlife species resulting from surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Community Development
- Livestock grazing
- Vegetation management

One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the

Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 568 acres. The Proposed Action would account for 1.16 acres of that total and represents .20% of the cumulative impacts to wildlife habitat. The proposed project may contribute to the reduction of potential available habitat within the spatial analysis area. The intensity of indirect effects would be dependent upon the species, its life history, time of year and/or day and the type and level of human and vehicular activity occurring. This disturbance would have the same impacts as described for direct and indirect impacts.

Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on the area's current infrastructure and rate of development. As housing and access roads are constructed and/or removed, habitat may be altered. Livestock grazing and level of intensity may also impact wildlife in the analysis area. Livestock grazing is closely managed by both land owners and land management agencies. Overstocking areas can greatly influence vegetative growth and vigor, and result in increased competition for wildlife if not appropriately managed, particularly during drought years. Livestock grazing is expected to continue at the same rate and in the same manner as it currently occurs. As such, impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires, impact wildlife habitat and are often implemented by land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, with a mixture of land ownership it is not possible to predict when and to what extent with any certainty. All these land uses are likely to contribute a minor component in impacts to wildlife.

3.8. Special Status Species

3.8.1. *Affected Environment*

The BLM manages certain species which are not federally listed as threatened or endangered in order to prevent or reduce the need to list them as threatened or endangered in the future. BLM Special Status Species include BLM Sensitive Species and BLM-FFO Special Management Species (SMS).

New Mexico BLM State Directors have developed a list of BLM Sensitive Species for the State of New Mexico (BLM 2011a, BLM 2011b, BLM 2011c, BLM 2012a). In accordance with BLM Manual 6840, the BLM-FFO has prepared a list of BLM-FFO SMS to focus species management efforts toward maintaining habitats under a multiple-use mandate (BLM 2008a, BLM 2008c). BLM-FFO SMS include some BLM Sensitive Species and other species for which the BLM-FFO has determined special management is appropriate (BLM 2008c). The authority for this policy and guidance is established by the ESA; Title II of the Sikes Act, as amended (16 USC 670a-670o, 74 Stat. 1052); FLPMA; and Department of Interior Manual 235.1.1A.

3.8.2. *Impacts from Alternative B (the Proposed Action)*

Direct and Indirect Impacts

Based on known range and habitat, six (6) BLM Special Status Species have the potential to occur within the proposed project area. The Special Status Species with the potential to occur within the proposed and alternative project areas are as follows:

- Bendire's Thrasher: potential foraging and nesting habitat available
- Golden eagle (BLM SMS): potential foraging habitat available
- Prairie falcon: potential foraging habitat available
- Gunnison's prairie dog: Present in Project area

- Aztec gilia: Within mapped potential habitat
- Brack's hardwall cactus: Present in Project area

Bendire's Thrasher

Impacts to Bendire's thrashers would be similar to those described for migratory birds (Section 3.6.2 [Wildlife– Impacts from Alternative B (the Proposed Action) – Migratory Birds]).

Golden Eagle and Prairie falcon

These two BLM Special Status Species raptors could potentially utilize the proposed project area for foraging, and on the rare occasion, Prairie falcons may utilize the nearby powerpoles in the area for nesting. Due to the mobility of adult birds and the lack of available suitable nesting habitat in the immediate vicinity, it is unlikely that these raptors would be directly harmed by activities associated with the proposed project. Indirect effects associated with disturbance to foraging habitat are described in Section 3.6.2 (Wildlife - Direct and Indirect Impacts – Migratory Birds).

Brack's Hardwall Cactus and Aztec Gilia

No Aztec gilia were identified during the surveys of the proposed project area. The survey was completed outside of the blooming period (late April to mid-June) for this species. Additionally, individuals of this species are typically very small and difficult to identify outside of the blooming period. As such, it is possible that individuals could have been overlooked during the survey.

During the biological field survey, 30 Brack's hardwall cacti were identified among the badlands along the proposed well-connect pipeline. Six (6) cacti were found on BLM lands and 24 cacti were identified on NMSLO lands. No Brack's hardwall cacti were found on Navajo Indian Allotted lands. The survey was completed outside of the blooming period (late April to mid-June) for this species. Additionally, individuals of this species are typically very small and difficult to identify outside of the blooming period. As such, it is possible that individuals could have been overlooked during the survey. Under BLM-FFO guidance and following BLM-FFO protocol, if more than 30 cacti will be impacted on BLM lands the cacti would be relocated and transplanted. If there are a high number of cacti in the proposed disturbed area (i.e. >100), only a portion (~50% or less) will be relocated. Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed project on this species is not yet known.

The majority of the cacti were identified on NMSLO lands. Per the NMSLO guidance, every effort practicable will be made to avoid cacti within the well-connect pipeline ROW. Avoidance of cacti within the ROW will be achieved by realigning the pipeline trench within the 40-foot wide ROW. Identified cacti will be placed under protective caging during construction to protect against potential contact with construction equipment or earth disturbing activities. Additional protective fencing will be installed in a perimeter around each protective cage to delineate the avoidance area and further warn off any equipment or activity within proximity to individual cacti. In the event cactus cannot be avoided, WPX would discuss and implement appropriate mitigation measures as agreed upon with the NMSLO biologist.

The proposed project would result in the disturbance of up to 13.39 acres with 4.44 acres of this being in suitable Aztec gilia/Brack's fishhook cactus habitat. Approximately 1.16 acres would remain as compacted, barren surface for the life of the proposed wells; for the long-term, this acreage does not provide suitable habitat for these species. Approximately 11.32 acres would be fully reclaimed during interim reclamation, as described in Section 3.4 (Upland Vegetation); it is possible that Aztec gilia and Brack's fishhook cacti could become established within these reclaimed areas. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation (2.07 acres). In order to fully reclaim the 0.91 acres of the proposed project area that were only reseeded during interim reclamation, WPX would need to first clear the vegetation from within these areas in order to recontour them; during this process, it is possible that Aztec gilia and/or Brack's

fishhook cacti that become established or reestablished within post-interim reclamation areas could be killed.

Gunnison's prairie dog

The action area includes potential foraging and colonization habitat. The action area is not within the BLM's mapped colonies GIS layer and no colonies were identified during field surveys. There are no prairie dog colonies within close proximity, according to the BLM GIS layer. There is similar foraging and colonization habitat available in the surrounding area that the species could utilize. The proposed project would result in the disturbance and modification of up to 8.95 acres of sagebrush shrubland with 13 trees and 4.44 acres of badlands. Approximately 12.23 acreage of the disturbance would be reclaimed (reseeded only or recontoured and reseeded) during interim reclamation; these reclaimed areas could be used by individuals for foraging and colonization. 1.16 acres of disturbance would be left as a working surface for the life of the well. If interim and final reclamation are successful, native vegetation communities would become re-established within the proposed project area. Often this species is an inhabitant of disturbed areas that may provide them with advantageous habitat like grasslands/shrublands and slightly elevated areas. If interim and final reclamation are successful, native vegetation communities would become re-established within the proposed project area.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Escavada Wash watershed, which may also impact BLM Special Status Species, through direct and effective habitat loss resulting from surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Community Development
- Livestock grazing

Vegetation management

One hundred and five (105) oil and gas wells have been developed in the Escavada Wash watershed. These wells have resulted in a long-term disturbance of about 79 acres of surface disturbance. Based on the 326 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Escavada Wash watershed may result in about 2,116 acres of short-term disturbance from potential future development, with approximately 1,627 acres of that being reclaimed. This results in about 490 acres of long-term surface disturbance from potential future oil and gas development in the Escavada Wash watershed. The total long-term disturbance for existing and potential oil and gas development in the Escavada Wash watershed would be approximately 568 acres. The Proposed Action would account for 1.16 acres of that total and represents 0.20% of the cumulative impacts to BLM Special Status Species. The proposed project may contribute to the reduction of potential available habitat within the spatial analysis area. The intensity of indirect effects would be dependent upon the species, its life history, time of year and/or day and the type and level of human and vehicular activity occurring. This disturbance would have the same impacts as described for direct and indirect impacts and similar to those described for Wildlife (Section 3.7.2 [Wildlife - Impacts from Alternative A (the Proposed Action)]) and Upland Vegetation (Section 3.4.2 [Upland Vegetation - Impacts from Alternative A (the Proposed Action)]).

Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on the area's current infrastructure and rate of development. As housing and access roads are constructed and/or removed, habitat may be altered. Livestock grazing and level of intensity may also impact wildlife in the analysis area. Livestock grazing is closely managed by both land owners and land management agencies. Overstocking areas can greatly influence vegetative growth and vigor, and result competition for sensitive species if not appropriately managed, particularly during drought years. Livestock grazing is expected to continue at the same rate and in the same manner as it currently occurs. As such, impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires, impact sensitive species habitat and are often implemented by

land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, with a mixture of land ownership it is not possible to predict when and to what extent with any certainty. All these land uses are likely to contribute a minor component in impacts to sensitive species.

3.9. Livestock Grazing

3.9.1. Affected Environment

The proposed project area is within BLM-FFO Kimbeto Community (06013) grazing allotment. The Kimbeto Community grazing allotment encompasses approximately 103,498 acres. A total of 2,931 cattle, 162 horse and 3,330 sheep federal Animal Unit Months (AUMs) are provided by this allotment. An AUM is the amount of forage required to sustain a 1,000 lb cow and her calf, or five sheep, for the equivalent for one month. This allotment is permitted for 324 head of cattle, 15 horses and 1,554 head of sheep from March 1 thru February 28, annually.

3.9.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

As discussed in Section 3.4 (Vegetation), the vegetation community that would be impacted within the proposed area of disturbance is sagebrush shrubland and badlands. No permanent livestock water sources or improvements are located within the proposed project area. The 13.39-acres that would be impacted would result in very minimal reduction in total area impacted in the short term within the grazing lease and an even smaller reduction in the long term from the 1.16 acres. The proposed project includes disturbance to 4.44 acres of badlands that currently provides very little forage. The proposed project would remove livestock forage. During the construction phase of the proposed project, all vegetation within the limits of the proposed project area would be cleared; a total of approximately 13.39 acres of rangeland would be lost for the short term. Approximately 1.16 acres would remain as barren surface throughout the life of the wells for the entire project; therefore, a very minimal reduction to the total AUMs would be lost for the long term. The remaining acreage would be reclaimed during interim reclamation. Re-seed vegetation within reclaimed areas would consist of native plant species included in the BLM Sagebrush Shrubland Community Standard Seed Mixture, as well as “volunteers,” or species that are not deliberately planted. The effects of the proposed project on livestock forage would depend on the success of reclamation.

Additional short-term impacts could include displacement of permitted livestock during construction activities or exposure of livestock to hazards. After construction and interim reclamation is completed, livestock should become acclimated to the proposed well facilities and traffic associated with them. Vehicle traffic associated with the wells could pose a direct threat to livestock, considering that the areas are within open range and livestock may be found on roads in the region.

Direct impacts to livestock could occur if pits are not excluded properly. Livestock injuries could occur if these animals fell into or tried to get out of pits. As discussed in Section 2.2.2 (Description of Proposed Project – Additional Design Features and BMPs), design features and BMPs would be implemented to reduce impacts of disturbance wildlife and livestock. Any negative impacts from the proposed project are likely to be low and moderate-term.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the Kimbeto Community grazing allotment that may impact forage production and increase hazards to livestock resulting from surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Community Development

Vegetation management

Fifty seven (57) oil and gas wells have been developed in the Kimbeto Community grazing allotment. These wells have resulted in a long-term disturbance of about 43 acres of surface disturbance. Based on the 108 potential wells assumed in the RFD (Engler, et al., 2014), oil and gas development in the Kimbeto Community grazing allotment may result in about 700 acres of short-term disturbance from potential future development, with 537 acres of that being reclaimed. This results in 162 acres of long-term surface disturbance from potential future oil and gas development in the Kimbeto Community grazing allotment. The total surface disturbance from past, present, and reasonably foreseeable actions in the Kimbeto Community grazing allotment is approximately 205 acres. The Proposed Action would account for 1.16 acres of that total and represents 0.57% of the total past, present and future disturbed area and 0.001% of the total analysis area. The removal of 1.16 acres would result in a reduction of 0.03 cattle AUMs, 0.002 horse AUMs and 0.033 sheep AUMs and account for 0.001% of the total reduction of cattle AUMs, 0.001% of the total reduction of horse AUMs and 0.001% of the total reduction of sheep AUMs in the allotment from total long-term surface disturbance resulting from past, present and future oil and gas development.

Indirectly, fugitive dust or deposition and introduction of invasive species associated with existing roads, and wellpads in the immediate area could impact the vegetation and subsequently range condition within the spatial analysis area, and could continue to do so throughout the life of the proposed project. The proposed project would contribute to direct rangeland loss. This disturbance would have the same impacts as described for direct and indirect impacts.

Community development in the area is currently minimal and it is not expected to greatly increase in the reasonably foreseeable future based on the area's current infrastructure and rate of development. As housing and access roads are constructed and/or removed, livestock forage is altered. Impacts would be similar to those currently experienced and would not likely increase beyond the current state. Vegetation manipulation and management activities, such as sagebrush clearing and prescribed fires, that impact forage are often implemented by land managers. These activities are likely to occur at varying levels in the analysis area in the future, however, with a mixture of land ownership it is not possible to predict when and to what extent with any certainty. These land uses are likely to contribute a minor component in impacts to livestock grazing.

3.10. Cultural Resources

3.10.1. *Affected Environment*

The analysis area is the Betonnie Tsosie Wash subwatershed. The analysis area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the history of the San Juan Basin can be divided into five major periods: PaleoIndian (circa [ca.] 10,000 B.C. to 5,500 B.C.); Archaic (ca. 5,500 B.C. to A.D. 400); Basketmaker II-III and Pueblo I-IV (aka Anasazi; A.D. 1-1,540); and historic (A.D. 1,540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods are provided in the BLM-FFO PRMP/FEIS (BLM 2003a, 3-66 – 3-86) and will not be reiterated here. Additional information can also be found in an associated documented, the Cultural Resources Technical Report (Science Applications International Corporation 2002).

BLM Manual 8100, The Foundations for Managing Cultural Resources (2004) defines a cultural resource as "a definite location of human activity, occupation, or use identifiable through field inventory (survey), historical documentation, or oral evidence. The term includes archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups. (cf. "traditional cultural property"). Cultural resources are concrete, material places and things that are located, classified, ranked, and managed through the system of identifying, protecting, and utilizing for public benefit described in this Manual series. They may be but are not necessarily eligible for the National Register (a.k.a. "historic property"). Cultural sites vary considerably, and can include but are not

limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails.

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations (36 CFR Part 800) requires federal agencies to consider what effect their licensing, permitting, funding or otherwise authorizing an undertaking, such as an APD or ROW, may have on properties eligible for the National Register. Pursuant to 36 CFR 800.16 (i), "Effect means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." Effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Area of Potential Effect (APE) means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is typically defined as areas to be directly disturbed and areas in immediate close proximity. Cultural resources are identified through a combination of literature review and pedestrian survey consistent with guidelines set forth in the Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities (BLM 2005).

BLM Farmington Field Office compliance with Section 106 of the National Historic Preservation Act is adhered to by following the State Protocol Agreement between New Mexico BLM and New Mexico State Historic Preservation Officer (BLM-SHPO 2014), which is authorized by the National Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NPA 2012), and other applicable BLM handbooks.

On Navajo trust lands cultural resources are identified and reported through a combination of literature review and pedestrian and ethnographic survey consistent with guidelines set forth in the Navajo Nation Historic Preservation Department (NNHPD) Fieldwork and Report Standards and Guidelines (January 2010). BIA Compliance with Section 106 on Navajo trust lands is adhered to by making the final decisions and issuing final notices to proceed with undertakings based on NNHPD review and recommendations to the BIA-NRO Regional Director.

Cultural resources within the entire APE for the Proposed Action were identified by a literature review and an archaeological Class III level (100%) pedestrian survey by WCRM and a report was prepared and submitted to the BLM and NNHPD (WCRM(F)1405 [2015]; NNHPD HPD-15-825; BLM 2016(I)012F)

The Class III inventory resulted in the recording of four newly discovered archaeological sites NM-G-51-100/LA 183546, NM-G-51-102/LA 183548, NM-G-51-101/LA 183547, and LA 183549). All four sites are recommended not eligible for the National Register of Historic Places and are also not eligible for protection under the Archaeological Resources Protection Act. During the initial record search phase for the Chaco 492H and 493H well pad, WCRM received information from the BLM-FFO indicating that a burial was located approximately 300 ft east of the project area. WCRM archaeologists attempted to physically locate the burial that was indicated to be near a juniper tree on the west side of a tributary of Betonnie/Bonnie Tsosie Wash. No physical evidence of a grave, burial, human remains, or other human artifacts were noted in the area, however the tree was relocated and noted to be 315-ft from the centerline of the proposed access road. While conducting ethnographic interviews to document sacred and traditional places for the Navajo Nation HPD, WCRM interviewed six people. Four of the interviewees are lineal descendants to the buried individual and none considered the project to be a threat to the burial. These individuals further confirmed the location of the burial as stated by the BLM. In accordance with the "Navajo Nation Policy for the Protection of Jishchaa': Gravesites, human remains, and Funerary Items", 100-ft is the distance of avoidance and protection of human remains. Therefore, no further work is recommended or required for the gravesite given the distance between the project area and the grave.

3.10.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

Cultural resources tend to degrade over time from natural forces; however, many survive for hundreds or thousands of years. Any land-disturbing activity can disturb, damage, or uncover cultural resources. Direct impacts normally include alterations to the physical integrity of a historic property. If a historic property is significant for other than its information potential, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the property. A potential indirect impact from the proposed action, particularly in undeveloped areas is the increase in human activity or access to the area with an increased potential of unauthorized damage to historic properties. Direct impacts normally include alterations to the physical integrity of a cultural site. If a cultural site is significant for other than its scientific information, direct impacts may also include the introduction of audible, atmospheric, or visual elements that are out of character for the cultural site. A potential indirect impact from the proposed action is the increase in human activity or access to the area with the increased potential of unauthorized removal or other alteration to cultural sites in the area.

Historic properties are being avoided with the implementation of design features such as but not limited to reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the COA's in the APD/ROW as the case may be. The proposed action is not known to physically threaten any TCP's, prevent access to sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies/rituals. The proposed action will have no direct or indirect impact on historic properties (no historic properties affected).

Cumulative Impacts

The Cumulative Impacts Analysis Area (CIAA) is the associated watershed(s). The United States is divided and sub-divided into successively smaller hydrologic units which are classified into six levels nested within each other, from the largest geographic area (region) to the smallest geographic area (subwatershed). The boundaries are distinguished by hydrographic and topographic criteria that delineate an area of land upstream from a specific point on a river, stream or similar surface waters (USGS 2013, NRCS 2013). Hydrologic units can be viewed as a naturally defined landscape and impacts to cultural resources in one part of that landscape could, theoretically, affect a broader understanding of the interrelationships between sites in the landscape as a whole. The smallest hydrologic unit area, typically from 10 to 40 K acres (15 to 62 mi²; HUC 12) or combination thereof is used as the CIAA. The CIAA for cultural resources is the proposed project area and the Betonnie Tsosie Wash subwatershed.

The Betonnie Tsosie Wash subwatershed totals 34,130 acres. Based on New Mexico Cultural Resource Information System data (NMCRIIS; July 2015), within the subwatershed there are 189 recorded sites and approximately 21% of the subwatershed (7,249 ac) have been inventoried for cultural resources by 118 unique investigations since 1975. This inventory coverage is likely higher as not all survey data is digitally available (e.g., Navajo lands, surveys since July 2015). There are no properties listed on the National Register of Historic Places, New Mexico State Register of Cultural Properties, Chaco Protection Sites, World Heritage Sites, or National Historic Trails within the CIAA.

- What impacts would surface disturbance for the proposed action have on historic properties in the CIAA?

There will be no negative cumulative impact on known historic properties as they are being avoided by relocating the surface disturbing components of the proposed action away from the property. There will be no known negative cumulative impact on the landscape from the proposed action that would affect the seven aspects of integrity (location, design, setting, materials, workmanship, feeling, association) of known historic properties. The Proposed Action is >11 miles from Chaco Culture National Historical Park (CCNHP). Based on a GIS viewshed analysis the Proposed Action will not be visible from any KOP. A positive cumulative effect is the additional scientific information yielded by the archaeological survey both in terms of site specific information and the amount of the landscape inventoried for cultural resources.

- What impacts would the project have on unknown (buried, not visible) historic properties in the CIAA?

Risks of impacting unknown (i.e., buried) historic properties is normally negligible as cultural resources “discoveries” during surface disturbing components of a proposed action are infrequent in the FFO. Since FY2000, 28 discoveries have occurred in association with 21,290 actions (e.g. road, well, pipeline, etc.), or 1:760. During that period 153,626 ac of land were inspected for cultural resources, with an average of 7.2 ac per action and one discovery per 5,472 ac per discovery. All authorizations (e.g., APDs, R-O-Ws) have stipulations, under penalty of law, requiring the reporting of and avoidance of further disturbing cultural discoveries during a proposed action. Where the risk of discoveries can be reasonably expected (e.g., ≤ 100' of a known historic property, or in environmental settings known or suspected to be conducive to buried sites), archaeological monitoring by a qualified and permitted archaeologist during initial disturbance (e.g., blading, trenching) is normally required. If buried historic properties are discovered, collaborative steps are taken to protect them in place or recover their important information.

3.11. Visual Resource

3.11.1. Affected Environment

The BLM classifies visual resources through a Visual Resource Inventory (VRI). The VRI has three components: scenic quality, sensitivity, and distance zone. Scenic quality is a measure of the visual appeal of a tract of land. In the VRI process, BLM-managed lands are given an A, B, or C rating based on the apparent scenic quality. Scenic quality is determined by using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modification. Areas with the most visual appeal are rated A, while areas with the least visual appeal are rated C. The project area is within an area rated C for scenic quality. The area contains a band of badland landscape in the middle of a large, open complex of rolling hills and dry drainages. The low buttes and mesas of the badlands add diagonal lines to the otherwise horizontal landscape. Scattered clusters of pinyon/juniper add greens and grays to the browns, reds, whites, and yellows of the soils.

Sensitivity is a measure of the public concern for scenic quality. During the sensitivity rating, public lands are assigned high, medium, or low sensitivity by analyzing six indicators of public concern: type of user, amount of use, public interest, adjacent land uses, special areas, and other factors. The project area is within an area rated medium for sensitivity.

The distance zone analysis is conducted to determine the relative visibility from travel points or observation points. The distance zone for this area is foreground/midground meaning the area can be seen from travel routes of observation points within a distance of 3 to 5 miles. This indicates activities and development may be able to be viewed in detail.

These components resulted in the area being assigned a VRI Class IV.

Visual resources are managed by assigning a Visual Resource Management (VRM) Class. The objective for each VRM Class describes how that area should be managed. The project area is within a VRM Class III. The objective of this class is to partially retain the existing character of the landscape. The level of change to the landscape can be moderate and should repeat the basic elements found in the natural landscape. Management activities may attract attention, but should not dominate the view of the casual observer.

The proposed project is visible from a residence approximately 1,598 feet southwest, but is not visible from any designated recreation areas, or commercial areas.

Night Skies

Chaco Culture NHP has a long history of stargazing and has been the focus of substantial research in cultural astronomy. The park is the only NPS Park to have an astronomical observatory that was built in 1998 to accommodate the hundreds of thousands of visitors who have enjoyed the night sky. The modern

connection with the night sky and the study of its significance to ancient cultures is a substantial recreation interest. Sky quality in the park is very good and preserving dark night skies is an important resource goal of the park. In 1993, the park designated the night sky as a critical natural resource to be protected. Chaco Culture NHP has been designated an International Dark Sky Park by the International Dark-Sky Association (IDA) and is the fourth unit in the National Park System to earn this distinction. The proposed project is approximately 13 miles northeast of Chaco Culture NHP.

3.11.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

Visual impacts to observers in the area would vary during different phases of the Proposed Action. Construction equipment, rigs, production facilities, vegetative and minor topographic alterations would all create various levels of contrast that could draw a viewer's eye. These visual intrusions would occur and terminate over varying timeframes. Activities associated with construction and exploration would produce unavoidable short-term adverse impacts to the visual character of the area. Such activities would interrupt natural landscape forms, textures, colors and vegetation. Successful interim reclamation would be expected to temper many of these initial visual impacts by restoring natural forms and vegetation. Some topographic alterations (wellpads) and structures (production facilities) would remain for the productive lifespan of the well, until the time of plugging and final reclamation.

The proposed project would also result in the removal of 8.95 acres of sagebrush shrubland and 4.44 acres of badlands. During interim reclamation, approximately 11.32 acres of the proposed project area would be fully reclaimed (recontoured and reseeded). Approximately 0.91 acres (within portions of the proposed wellpad and access road corridors) would be reseeded only. The remaining 1.16 acres would remain as compacted, barren surface for the life of the proposed wells. During final reclamation, WPX would fully reclaim all portions of the proposed project area that were not fully reclaimed during interim reclamation (2.52 acres). The Project area is one of the more remote areas in the surrounding development area and the well pad, along with production facilities, are only visible to one residence located approximately 1,598 feet away. Additionally, it is not visible from any frequently utilized travel corridors.

Night Skies

Light sources associated with drilling an oil and gas well include a light plant or generator, a light on top of the rig, vehicle traffic, and flaring. Flaring could occur for a minimum of 2 days and a maximum of approximately 3 to 6 weeks until gas has reached a condition where it can be put to pipe for sales. In the event the well is drilled prior to pipeline infrastructure being in place, flaring may persist for a maximum amount of 90 days. All pipelines are proposed to be installed upon receipt of the permits and are expected to be in place prior to first delivery of the wells. The necessity for flaring and the duration of flaring varies widely from well to well and is difficult to predict. With the exception of a few yearly events, visitors are not allowed access to the canyon rim where the proposed action may be seen after sunset, minimizing the chance that visitors would see the direct light. While these lights could reduce the general darkness of the night sky as seen from the Chaco Cultural NHP, it is likely the impact would be imperceptible. Light impacts from the proposed project would be short-term and limited to the initial drilling, completion, and flaring operations, as well as an occasional work over rig for the duration of the life of the wells.

Cumulative Impacts

On all BLM-FFO lands, the VRM classification system provides the visual management standards for the design, development, and rehabilitation of projects. Visual design standards are incorporated into all surface-disturbing projects (BLM 2003a).

The analysis area is the proposed project area and an approximate 3 to 5-mile radius beyond the proposed project area. Past, present, and reasonably foreseeable future actions within the analysis area,

which may also impact the visual resources include rural residential buildings, oil and gas well pads, unpaved roads, and utility corridors. As urbanization and oil and gas development increase in the surrounding analysis area, it is possible that more development could occur within the viewshed in the foreseeable future. The proposed project would contribute to these cumulative visual resource impacts.

3.12. Public Health and Safety

3.12.1. Affected Environment

The proposed project would comply with the use and disposal of hazardous materials as regulated primarily under RCRA outlined above in Section 1.5.6. No extremely hazardous substances (40 CFR 355) would be used during the Proposed Action. Hazardous substances that may be found at the site may include minimal quantities of materials that may be necessary for drilling, welding, or gluing. Flammable or combustible substances such as fuels and acids/gels (corrosives) associated with vehicles and the drilling and welding processes may also be found at the site. These materials may include oil, fuel, hydraulic fluid, drilling fluids, and coolants. These chemicals are subject to reporting under the Emergency Planning and Right-to-Know Act of 1968 and may be used, produced, stored, transported or disposed of in association with the proposed project. Releases of non-freshwater fluids would be promptly handled in accordance with applicable federal and state regulations. Waste disposal would be made in accordance with applicable federal and state regulations and at permitted facilities.

Non-hazardous solid waste generated at the proposed project area would be stored in appropriate containers and disposed of at an approved facility. Human solid and liquid wastes would be generated primarily during the drilling and construction phases of the project and would be contained within portable facilities at the site.

Worker safety is regulated under the Occupational Safety and Health Act of 1970 (OSHA), as amended (29 USC 651). Safety practices in accordance with OSHA would be followed at all times during the project. Standard safety procedures for drilling and completion of the proposed project would include pipeline markers, monitoring, and inspections that are required by federal and state regulations. The BLM-FFO reviews the operator's drilling and operation plans prior to approving the APD. The reviews consider the reservoir pressures that may be encountered, compare these pressures to the operator's proposed equipment ratings, casing design, and cement program. Wells would be drilled and completed in accordance with these plans and as directed by the BLM-FFO.

The proposed project area is fairly remote and roads in the area are generally unimproved dirt roads used to access natural gas facilities and a few remote residents in the area. These roads may become hazardous or impassable during periods of inclement weather. Exposure of the public to activities associated with the Proposed Action is limited by the remoteness of the location and proximity to areas where the general public may occur. The nearest town, Bloomfield (population 7,801 [U.S. Census Bureau 2015]), is approximately 38.67 road miles to the north-northwest, and U.S. Highway 550/County Road 7900 intersection is located approximately 3.74 miles to the north. There are very few residents or recreationist in the area. There are no BLM SMA's managed for recreation located within the Escavada Wash watershed. The closest residence is approximately 0.23 miles southwest from the proposed access road, 0.18 miles southeast from the proposed pipeline, and 0.30 miles south of the proposed well pad. All WPX employees maintain a safety and emergency response plan (WPX Emergency Response One Plan) at all times. This plan provides guidance on safety procedures, how to respond to an emergency, and the required notifications, along with all pertinent contact numbers. Additionally, all WPX contractors are required to maintain a safety and emergency response plan.

3.12.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

The proposed project would affect transportation. During construction, the proposed project would result in increased traffic on area roads; some vehicles would be hauling heavy equipment. Therefore, there would be an increased potential for traffic accidents. Dust associated with construction activities or travel

on dirt access roads may result in poor visibility in the area. The increased use of dirt access roads during muddy conditions may worsen the roads' conditions. Following construction and drilling, traffic levels would be similar to current levels; long-term effects on transportation would be positive due to the reduction of truck traffic from the piping of products from the location to a gathering system.

During construction, drilling, and maintenance activities, the operation of heavy equipment poses potential safety concerns. During the operation of the proposed well-connect pipelines, facility failure (such as pipeline ruptures) could represent a potential danger to the public. Impacts are likely to be low and long-term.

Cumulative Impacts

The analysis area includes the proposed project area and the existing oil and gas field within the BLM-FFO regional management area. The general BLM-FFO region has been developed by the oil and gas industry for over six decades, which contributes to public health and safety concerns in the area. Approximately 28,870 oil and gas wells have been developed in the BLM-FFO region. Based on the RFD (Engler, et al., 2014), oil and gas development across the BLM-FFO region may result in a total of 3,590 oil and gas wells from potential future development. The total number of wells from past, present, and reasonably foreseeable actions in the BLM-FFO region is 32,460 wells. The proposed action would account for three (3) of the total wells and represents 0.009% of the cumulative impacts to public health and safety from the initial development and long term operations associated with these wells. These impacts would increase during the drilling and development stage of the oil and gas field, likely drop and level out during the production and maintenance of wells and would be additive to future activities that are reasonably certain to occur. Given the fact that the Proposed Action would be located within an existing oil and gas field, direct and indirect cumulative impacts to public health and safety as well as to worker safety would not be measurably different when compared to those from past present and reasonably predicted future activities.

3.13. Environmental Justice

3.13.1. Affected Environment

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, requires that federal agencies identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

Environmental justice refers to the fair treatment and meaningful involvement of people of all races, cultures, and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, programs, and policies. It focuses on environmental hazards and human health to avoid disproportionately high and adverse human health or environmental effects on minority and low-income populations.

Guidance on environmental justice terminology developed by the President's Council on Environmental Quality (CEQ 1997) is discussed below.

- Low-income population. A low-income population is determined based on annual statistical poverty thresholds developed by the US Census Bureau. In 2012, poverty level is based on total income of \$11,720 for an individual and \$23,283 for a family of four (US Census Bureau 2012a). A low-income community may include either a group of individuals living in geographic proximity to one another or dispersed individuals, such as migrant workers or Native Americans.
- Minority. Minorities are individuals who are members of the following population groups: American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic.
- Minority population area. A minority population area is so defined if either the aggregate population of all minority groups combined exceeds 50 percent of the total population in the area or if the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Like a low-income population, a minority

population may include either individuals living in geographic proximity to one another or dispersed individuals.

- Comparison population. For the purpose of identifying a minority population or a low-income population concentration, the comparison population used in this study is the state of New Mexico as a whole

Low-income Populations

Income and poverty data estimates for study area counties from the US Census Small Area Poverty Estimates model indicate that the percent of the population living below the poverty level in the socioeconomic study area as a whole is slightly above that of the state (21.3 percent and 20.6 percent), but it is much higher than the national average of 12.1 percent (Table 3). Poverty levels ranged from 37.7 percent in McKinley County to 13.7 percent in Sandoval County. Only that of Sandoval County was below the state average.

Table 33. Study Area County Population in Poverty (2002-2012)

	McKinley County	Rio Arriba County	Sandoval County	San Juan County	Study Area Total	New Mexico	United States
Percent of Population in Poverty 2002	21,766	7,165	19,934	22,152	71,017	421,123	34,569,951
	30.2%	17.7%	11.1%	18.2%	21.3%	20.6%	12.1%
Percent of Population in Poverty 2012	27,296	8,806	18,502	25,802	80,406	327,444	48,760,123
	37.7%	22.0%	13.7%	20.3%	21.5%	17.7%	15.9%
Median Household Income 2002	\$25,197	\$30,557	\$45,213	\$34,329	N/A	\$34,827	\$45,409
Median Household Income 2012	\$29,821	\$36,900	\$57,376	\$45,901	N/A	\$42,828	\$51,371
Classified as Low Income Population in 2012 based on CEQ guidelines?	No	No	No	No	No	NA	NA

Source: US Census Bureau 2013

Similarly, estimates from 2012 indicate that Sandoval and San Juan Counties had household median incomes (\$57,376 and \$45,901) that were above the state level of \$42,828. McKinley County (\$29,821) and Rio Arriba County (\$36,900) were below that of the state in 2012 (Table). While no area communities meet the CEQ definition of a low-income population area (50 percent or higher), the highest poverty rates were seen in Bloomfield (29 percent), Espanola (26.3 percent), and Bernalillo (24.1 percent).

Table 14. Study Area Key Community Race/Ethnicity and Poverty Data

Community	% Population Racial or Ethnic Minority	Classified as Minority Population based on CEQ?	% of Individuals Below Poverty	Classified as Low-income Population based on CEQ?
Aztec	36.4%	No	14.4%	No
Bernalillo	78.8%	Yes	24.1%	No
Bloomfield	55.8%	Yes	29.0%	No
Espanola	91.6%	Yes	26.3%	No
Farmington	48.8%	No	15.5%	No
Gallup	76.9%	Yes	20.9%	No
Rio Rancho	46.7%	No	9.8%	No

Source: US Census Bureau 2012b

Note: American Community Survey estimates are based on data collected over a 5-year time period. The estimates represent the average characteristics of populations between January 2008 and December 2012 and do not represent a single point in time.

Census Tracts are geographic regions within the United States that are defined by the US Census Bureau in order to track changes in a population over time. Census Tracts are based on population sizes and not geographic areas. The average population of a Census Tracts is about 4,000 people, so rural areas that are sparsely populated may have very large Census Tracts while densely populated urban areas may have very small Census Tracts.

When broken down by Census Tract, 3 out of 87 tracts in the socioeconomic study area have greater than 50 percent of individuals living below the poverty line: Census Tract 9440 in eastern McKinley County had an individual poverty rate of 54.6 percent; Census Tract 9405 in southwestern McKinley County had an individual poverty rate of 59.4 percent; and Census Tract 9409 in northwestern Sandoval County had an individual poverty rate of 51.9 percent (US Census Bureau 2012b). These 3 Census Tracts are all relatively large, indicating a sparsely populated, rural area.

Minority Populations

Based on 2008-2012 data, minorities made up 59.5 percent of the population in New Mexico, compared to 36.3 percent in the United States as a whole (Table 15). The proportion of minorities in the socioeconomic study area (65.3 percent) substantially exceeded the United States and is slightly higher than the state average. At the county level, the population ranged from 89.7 percent minority in McKinley County to 52.8 percent in Sandoval County. Within relevant tribal nations, Native Americans represented the vast majority of the population. The largest minority groups were Hispanics/Latinos in Rio Arriba and Sandoval Counties and Native Americans in McKinley and San Juan Counties.

Table 15. Study Area County Population by Race/Ethnicity (2008-2012)

Population	McKinley County	Rio Arriba County	Sandoval	San Juan	Study Area	New Mexico	United States	Jicarilla Apache Nation	Navaho Nation	Ute Mountain Nation
Hispanic or Latino ethnicity of any race	9,744 13.6%	28,714 71.4%	46,334 35.3%	24,496 19%	109,288 29%	952,569 46.3%	50,545,275 16.4%	382 11.6%	2,958 1.7%	99 6.0%
White alone	7,413 10.3%	5,370 28.6%	61,977 47.2%	54,218 42.2%	128,978 34.67%	831,543 40.5%	196,903,968 63.7%	74 2.3%	3,762 2.2%	47 2.9%
Black or African American alone	353 0.5%	149 0.4%	2,704 2.1%	794 0.6%	4000 1.08%	35,586 1.7%	37,786,591 12.2%	0 0%	250 0.1%	5 0.3%
American Indian or Alaskan Native alone	52,358 72.8%	5,629 14.0%	15,964 12.2%	46,676 36.3%	120,627 32.43%	176,766 8.6%	2,050,766 0.7%	2,692 82.0%	162,920 94.3%	1,429 87.0%
Asian alone	506 0.7%	173 0.4%	1,685 1.3%	464 0.4%	2828 0.76%	25,411 1.2%	14,692,794 4.8%	73 2.2%	834 0.5%	14 0.9%
Native Hawaiian and Other Pacific Islander alone	38 0.1%	7 0%	100 0.1%	72 0.1%	217 0.06%	989 <.01%	480,063 0.2%	0 0%	209 0.1%	0 0%
Some Other Race	7 <.01%	22 0.1%	437 0.3%	84 0.1%	550 0.15%	3,623 0.2%	616,191 0.2%	0 0%	102 0.1%	0 0%
Two or more Races	1,469 2.0%	137 0.3%	2,101 1.6%	1,796 1.4%	5,503 1.48%	28,800 1.4%	6,063,063 2.0%	62 1.9%	1,660 1.0%	49 3.0%
Classified	Yes	Yes	Yes	Yes		Yes	NA	Yes	Yes	Yes

Table 15. Study Area County Population by Race/Ethnicity (2008-2012)

Population	McKinley County	Rio Arriba County	Sandoval	San Juan	Study Area	New Mexico	United States	Jicarilla Apache Nation	Navaho Nation	Ute Mountain Nation
as Minority Population based on CEQ guidelines?										
Source: US Census Bureau 2012b										
Note: American Community Survey estimates are based on data collected over a 5-year time period. The estimates represent the average characteristics of populations between January 2008 and December 2012 and do not represent a single point in time										

Based on the CEQ definition of a minority population area (minority residents exceed 50 percent of all residents), Bernalillo, Bloomfield, Espanola, and Gallup all are considered minority communities.

When examined at the Census Tract level, there are 24 out of 87 tracts that have a minority population greater than 50 percent. These range from Census Tract 6.1 located just north of the city of Aztec with a minority population of 80.5 percent to Census Tract 107.17 located north of the city of Rio Rancho with a minority population of 50.2 percent (US Census Bureau 2012b). These Census Tracts are relatively small and are based around the city of Rio Rancho and the Aztec/Farmington/Bloomfield area.

Native American Populations

Data in Table 15 account for a substantial portion of the study area population in some areas, notably McKinley and San Juan Counties, where the population is 72.8 and 36.3 percent American Indian respectively. Three tribal governments have reservations within the planning area: the Jicarilla Apache Nation, the Navajo Nation, and the Ute Mountain Nation (Table). The Southern Ute Nation has lands just north of the planning area in the state of Colorado, but none within the planning area. Almost one half of the planning area is tribal lands. Each tribe maintains a general concern for protection of and access to areas of traditional and religious importance, and the welfare of plants, animals, air, landforms, and water on reservation and public lands. Policies established in 2006 by the BLM and US Forest Service, in coordination with federal tribes, ensure access by traditional native practitioners to area plants. The policy also ensures that management of these plants promotes ecosystem health for public lands. The BLM is encouraged to support and incorporate into their planning traditional native and native practitioner plant-gathering for traditional use (Boshell 2010).

Table 16. Tribal Nations in the Planning Area

Tribe	Acres in Planning Area	General Location
Jicarilla Apache Nation	739,600	The majority of the Jicarilla Apache Nation is located in western Rio Arriba County, but within the eastern portion of the planning area
Navajo Nation	860,900	A portion of the Navajo Nation extends into western San Juan County and into the western portion of the planning area
Ute Mountain Nation	103,500	A portion of the Ute Mountain Nation extends into the northern portion of San Juan County, just east of the Navajo Nation, and into the northern portion of the planning area
Unknown	196,300	Lands located in the southern portion of the planning area [Note to BLM: this is due to inconsistencies between US Census Bureau tribal areas dataset and BLM land status dataset.]
Source: BLM GIS 2014, US Census Bureau 2014		

3.13.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

As noted in the PRMP/FEIS, most activities, including oil and gas development on federal land in the San Juan Basin occur without influence of demographic or income values. They are primarily the response of various resource values and are balanced for overall public benefit. San Juan County, along with the other counties that make up the larger development area, has a high proportion of minority populations compared to the state and national percentages. San Juan County has a distinctly high percentage of American Indians, while Rio Arriba has a large Hispanic population. The poverty levels for all counties, except Sandoval County were higher than the state and national level. As such, the potential exists for minority and low-income populations to be affected by the proposed action.

Specific issues of concern outlined in the PRMP/FEIS include the potential for economic impacts (such as job losses or increases), potential for land use impacts (as outlined in previous sections), and the potential for conditions that pose a public health or safety risk. The development and production of the proposed wells would allow WPX to develop their leases and provide additional natural gas and oil for the national energy market. This would generate federal and state tax revenues as well as revenue for WPX, its contractors, and additional jobs, royalties, and revenues to local economies. The additional jobs and economic activity in the region from oil and gas development have the potential to benefit local communities and residents and is considered a positive effect. The two proposed wells would be part of an increase from the larger scale oil and gas development in the region. Potential land use impacts and public health and safety risks have been addressed in both previous sections of this document and/or the PRMP/FEIS. Project specific design features and best management practices (Section 2.2.2), as well as COAs attached to the approved APDs and stipulations in the ROW Grants, help to reduce adverse impacts to the surrounding communities as they relate to land use and public health and safety. See PRMP/FEIS for further discussion of Environmental Justice (BLM 2003a).

Cumulative Impacts

The analysis area is the BLM-FFO regional management area. The proposed action would contribute to the effects of the local economy in the form of increased natural gas production, new jobs and increased revenues. Any additional well development and production in the area would result in incremental impacts to local economy. The energy industry is subject to boom and bust cycles. However, the continued development of these resources still represents a desirable economic engine. With the development of these resources being concentrated in Rio Arriba and San Juan counties that both have disproportionately minority population, benefits from growth in resource development both federal and non-federal interests would provide jobs and therefore benefit these groups (BLM 2003a, 4-129).

3.14. Transportation and Travel

3.14.1. Affected Environment

The project area is located in the BLM-FFO regional management area. The proposed area would be accessed utilizing U. S. Highway 550. U.S. Highway 550 carries a significant amount of high-speed traffic, consisting of both light and heavy vehicles. The proposed access road begins off of County Road 7940. County Road 7940 sees little traffic, mostly from area residents, due to minimal community and/or oil and gas development in the immediate area. County Road 7940 is accessed off of County Road 7900, which sees increased traffic levels, particularly during the tourist season, as this road accesses Chaco Canyon National Monument. Once off of County Road 7900, the expected traffic is relatively light, with use by oil and gas personnel and few residents that live in the surrounding area.

3.14.2. Impacts from Alternative B (the Proposed Action)

Direct and Indirect Impacts

The proposed new access would be a new road within the area. For existing County Roads or roads that are considered collector roads, WPX will defer to the county or to the Roads Committee for maintenance determinations on collector roads. The BLM has designated Roads Committees for the maintenance of collector roads. The committees consist of all participating operators with projects along those subject roads. Roads will be maintained in the same or better condition as existed prior to the commencement of operations, and maintenance will continue until final abandonment and reclamation of the well location. Traffic impacts from routine maintenance personnel at the well sites would be ongoing throughout the production life of the well.

The proposed action would result in short-term increases in the volume of both heavy and light traffic during the construction, drilling and completion phases of the project. The action area is rural, but travelers of the area could be impacted in the short term by the construction of access roads and pads, drill-rig moves, and pipeline construction. These impacts would be reduced after well completion. It is anticipated that two to three pick-up truck would visit the proposed wellpad daily during the normal work week, resulting in road degradation, fugitive dust and equipment related noise. As discussed in Section 2.2.2 (Description of Proposed Project – Additional Design Features and BMPs), design features and BMPs would be implemented to reduce impacts of disturbance from vehicles and to increase public safety. Impacts are likely to be low and short-term.

Cumulative Impacts

The analysis area is the BLM-FFO regional management area. The cumulative impacts of oil and gas development fluctuate as abandoned wells are reclaimed and the construction of new access roads and wellpads results in new surface disturbance. The impacts of increased roadway use, including dust generation and air, water and noise pollution would be incremental to the surrounding impacts to transportation networks in the area.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Table 4 contains a list of tribes, individuals, organizations, and agencies invited to attend the on-site for the project.

Table 47. Individuals, Organizations, and Agencies Invited to the On-Site

Name	Tribe, Organization, or Agency	Attended On-Site
Colleen Cooley	Dine Care	No
Thomas Singer	Western Environmental Law Center	No
Mike Eisenfeld	San Juan Citizens Alliance	No
Sarah White	Interested Public	No
Kyle Tisdale	Western Environmental Law	No
Samantha Ruscavage-Barz	WildEarth Guardians	No
Tim Ream	WildEarth Guradians	No
Victoria Gutierrez	Interested Public	No
Pete Drokors	Earthworks	No
Jeremy Nichols	WildEarth Guardians	No
Anson Wright	Chaco Alliance	No
Bruce Baizel	Earthworks	No
Tweetie Blancett	Interested Public	No
Lori Goodman	Dine Care	No
Penny Anderson	Western Resource Advocates	No
Samuel Sage	Counselor Chapter – Navajo Nation	No

Don Schrieber	Interested Public	No
Miya King-Flaherty	Sierra Club	No
Annetta Ahill	FIMO	Yes
Bertha Spencer	BIA- NR	Yes
Harrilene Yazzie	BIA_ NEPA	Yes
Johnna Oberley	FIMO Director	No
Ron Maldonado	Navajo nation Historic Preservation	No
Melinda A Ciarco	Navajo nation Historic Preservation, TCP	No
Sam Dish wood	Navajo Nation Fish & Wildlife	No
Rita Whitehorse Larsen	Navajo Nation – EPA	No
Jerry Degroat	BIA Realty Eastern Agency, Crownpoint	No
Lenora Bates	BIA Realty Eastern Agency, Crownpoint	No

The BLM fulfills its responsibilities under the National Historic Preservation Act (NHPA) through a number of agreements. The National Programmatic Agreement (NPA 2012) between the BLM, Advisory Council on Historic Preservation (ACHP), and the National Council of State Historic Preservation Officers (NCSHPO) allows the agency to fulfill its NHPA responsibilities according to the provisions of the NPA in lieu of 36 CFR 800.3 through 800.7 regulations. The NPA, which applies to all BLM activities below specified thresholds, provides among other things, regulatory relief in many instances from the requirement for case-by-case review by State Historic Preservation Officers (SHPOs) and the ACHP, in exchange for managers' maintenance of appropriate staff capability and observance of internal BLM standards as set out in the 8100 Manual series.

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (BLM-SHPO 2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and consult. Specifically, this document outlines among other things, how and when consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM FFO.

On Navajo trust lands cultural resources are identified and reported through a combination of literature review and pedestrian and ethnographic survey consistent with guidelines set forth in the Navajo Nation Historic Preservation Department (NNHPD) Fieldwork and Report Standards and Guidelines (January 2010). BIA Compliance with Section 106 on Navajo trust lands is adhered to by making the final decisions and issuing final notices to proceed with undertakings based on NNHPD review and recommendations to the BIA-NRO Regional Director.

4.2. List of Preparers

This EA was prepared by EIS in conformance with the standards of and under the direction of the BLM-FFO. The following individuals assisted in the preparation of this EA:

- Mindy Paulek, Biologist, EIS
- Amanda Hoffman, Planning and Environmental Specialist, BLM-FFO
- Sheila Williams, District Botanist, BLM-FFO
- John Kendall, Wildlife Management Biologist, BLM-FFO
- Jim Copeland, Archaeologist, BLM-FFO
- Sherrie Landon, Paleontologist and Environmental Protection Specialist, BLM-FFO
- Esther Willetto, Tribal Program Coordinator, BLM-FFO
- Roger Herrera, Environmental Protection Specialist, BLM-FFO

4.3. References

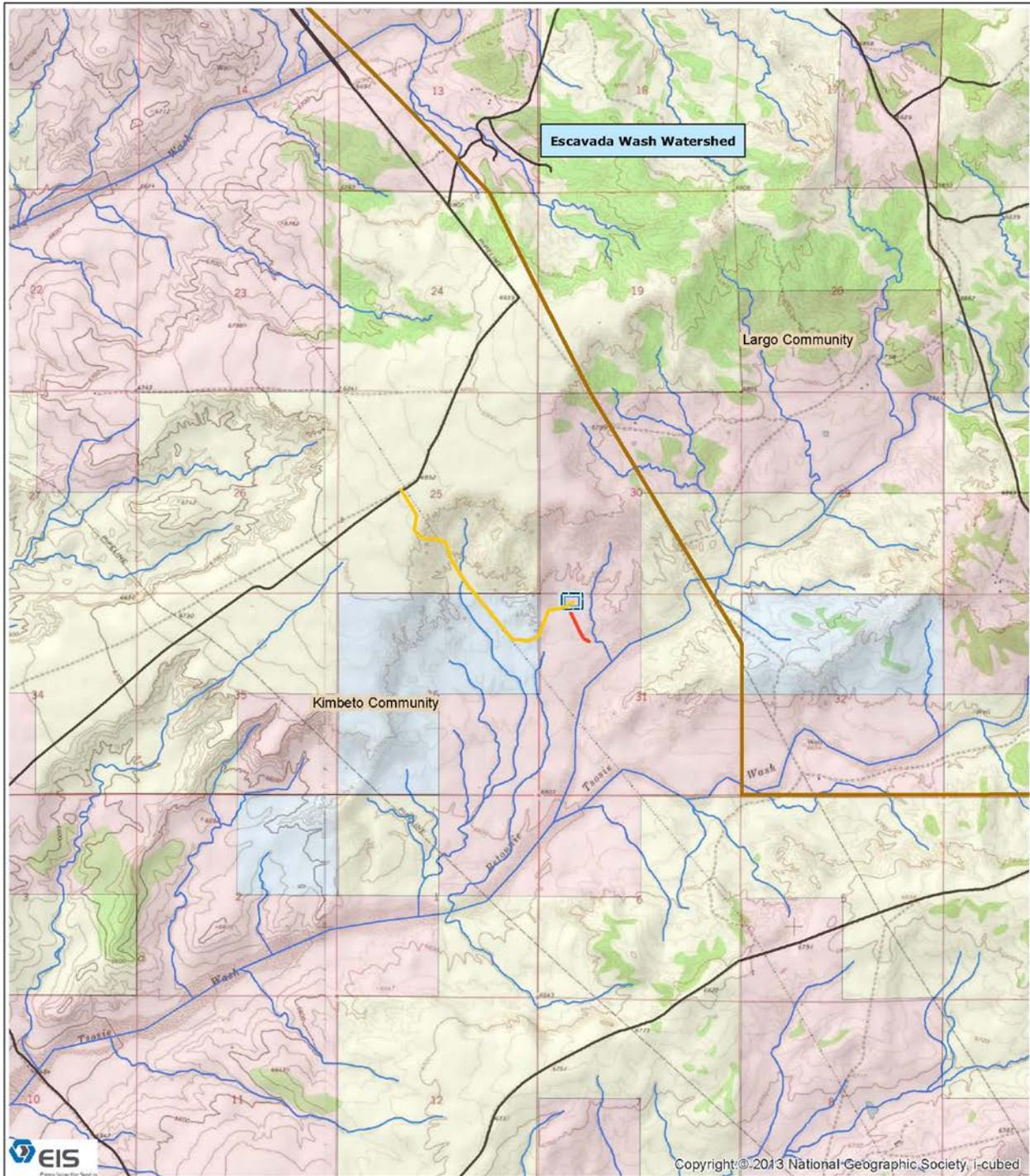
- Allen, D., Pacsi, A., Sullivan, D., Araiza, D. Z., Harrison, M., Keen, K., et al. (2014). Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Pneumatic Controllers. *Environmental Science and Technology*, es5040156.
- Allen, D., Sullivan, D., Araiza, D. Z., A.Pacsi, Harrison, M., Keen, K., et al. (2014a). Methane Emissions from Process Equipment at Natural Gas Production Sites in the United States: Liquid Unloadings. *Environmental Science and Technology*, es504015.
- BLM 2004. The Foundations for Managing Cultural Resources. BLM Manual 8100. Washington DC. http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.71969.File.dat/8100.pdf
- BLM 2005. *Procedures for Performing Cultural Resource Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities*.
http://www.blm.gov/pgdata/etc/medialib/blm/nm/programs/more/cultural_resources/cultural_docs.Par.77051.File.dat/H-8100-1_manual_final_V_8-21_.pdf
- BLM-SHPO. 2014. State Protocol Agreement between New Mexico BLM and New Mexico State Historic Preservation Officer. http://www.blm.gov/nm/st/en/prog/more/cultural_resources/need_to_know.html
- Boshell, Cynthia. 2010. Public Land Policy as a Cultural Empowerment Tool: The Federal Land Policy and Management Act of 1976 (FLPMA), with special emphasis on the California Traditional Gathering Policy. Internet Web Site: http://users.humboldt.edu/boshell/PDF/boshell_FLPMA.pdf. Accessed September 8, 2011.
- Brugge, David M. 1993. An Investigation of AIRFA [American Indian Religious Freedom Act] Concerns Relating to the Fruitland Coal Gas Development Area. Albuquerque, New Mexico: Office of Contract Archaeology, University of New Mexico. Ms. on file at BLM-FFO.
- Bureau of Land Management (BLM). 2003a. Farmington Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP/FEIS). Farmington, New Mexico: BLM-FFO.
- _____. 2003b. Farmington Resource Management Plan with Record of Decision. (RMP and ROD). Farmington, New Mexico: BLM-FFO.
- _____. 2004. Notice to Lessees and Operators on Onshore Oil and Gas Leases Within the Jurisdiction of the Farmington Field Office - Management of Sound Generated by Oil and Gas Production and Transportation (NTL 04-2 FFO). Farmington, New Mexico: BLM-FFO.
- _____. 2005. *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities*. BLM Manual Supplement H-8100-1. New Mexico, Oklahoma, and Texas.
- _____. 2008a. BLM Manual 6840: Special Status Species Management.
- _____. 2008b. BLM National Environmental Policy Act Handbook H-1790-1. Washington, D.C.: BLM National Environment Policy Act Program Office of the Assistant Director, Renewable Resources and Planning.
- _____. 2008c. Memorandum: Farmington Field Office (FFO) Special Management Species Policy 2008 Update. Farmington, New Mexico: BLM-FFO.
- _____. 2010. Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management. Report on Greenhouse Gas Emissions and Climate Change for Montana, North Dakota, and South Dakota. Technical report prepared for the Montana/Dakotas BLM by URS Corporation. URS Project 22241790.
- _____. 2011a. BLM New Mexico Sensitive Birds List. Revised August 2011.

- _____. 2011b. BLM New Mexico Sensitive Mammals List. Revised July 2011.
- _____. 2011c. BLM New Mexico Sensitive Molluscs, Crustaceans, and Arthropods List. Revised August 2011.
- _____. 2011d. Roads Design Handbook. H-9113-1
- _____. 2011e. BLM Roads National Inventory and Condition Assessment Guidance and Instructions. H-9113-2.
- _____. 2012a. BLM New Mexico Sensitive Plants List. January.
- _____. 2013a. aztec_gilia_habitat (Shapefile of the new Aztec gilia and Brack's fishhook cactus potential habitat "zone"). Provided by the BLM-FFO September 26, 2013.
- _____. 2013b. BLM-FFO Bare Soil Reclamation Procedures. Available at: http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_planning/surface_use_plan_of.html. Accessed April 2013.
- _____. 2013d. Farmington Field Office Visual Resource Management Proposed Resource Management Plan Amendment. Farmington, New Mexico: BLM-FFO.
- _____. 2014a. Air Resources Technical Report for Oil and Gas Development. Santa Fe: U.S. Department of Interior Bureau of Land Management.
- _____. 2014b. Mancos-Gallup Resource Plan Amendment and Environmental Impact Statement, Biological Baseline Report.
- Bureau of Land Management (BLM) and U.S. Forest Service (USFS). 2007. The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – 4th Edition, revised in 2007.
- CEQ (Council on Environmental Quality). 1997. Environmental Justice Guidance under the National Environmental Policy Act. December 10, 1997.
- Enquist, Carolyn and Gori, Dave. 2008. Implications of Recent Climate Change on Conservation Priorities in New Mexico. April 2008.
- Griffith, G.E., J.M. Omernik, M.M. McGraw, G.Z. Jacobi, C.M. Canavan, T.S. Schrader, D. Mercer, R. Hill, and B.C. Moran. 2006. Ecoregions of New Mexico (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia: U.S. Geological Survey (map scale 1:1,400,000).
- Holmes, A.L. and A.V. King. 2006. Vital Rates of Sagebrush Obligate Songbirds in Relation to Natural Gas Development and Weather. Abstract Oral Presentation to IV North American Ornithological Congress. Veracruz, Mexico.
- Howarth, R., Santoro, R., & A.Ingraffea. (2011). Methane and the greenhouse-gas footprint of natural gas from shale formations. *Climate Change*, 679-690.
- Independent Petroleum Association of New Mexico (IPANM). 2014. Energy New Mexico. Available at: <http://www.ipanm.org/images/library/File/Energy%20New%20Mexico%202014.pdf>
- Intergovernmental Panel on Climate Change. (2013). *Climate Change 2013: The Physical Science Basis*. Cambridge: Cambridge University Press.

- Kelly, Klara, Rena Martin, Richard Begay, Ted Neff, and Clifford Werito. 2006. We Will Help You With What We Know: Diné Traditional Cultural Places In Dinétah. Flagstaff, Arizona: Museum of Northern Arizona Environmental Solutions, Inc. Ms. on file at BLM-FFO.
- Kort, E., Frankenberg, C., Costigan, K., Lindenmaier, R., Dubey, M., & Wunch, D. (2014). Four corners: The largest US methane anomaly viewed from space. *Geophysical Research Letters*, 6898-6903.
- New Mexico Environment Department (NMED). 2010. Inventory of New Mexico Greenhouse Gas Emissions: 2000-2007. Santa Fe: New Mexico Environment Department.
- New Mexico Office of the State Engineer. 2011. GIS shapefile: ose_wells_July2011. http://www.ose.state.nm.us/water_info_data.html.
- NPA. 2012. National Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers. http://www.blm.gov/wo/st/en/prog/more/CRM/blm_preservation_board/prog_agreement.html
- NPS. 1997. How to Apply the National Register Criteria for Evaluation. National Register Bulletin 15. Washington.
- NRCS. 2013. <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/watersheds/dataset/>. Accessed July 30, 2013.
- Ortega, C.P. and C.D. Francis. 2007. Effects of Gas Well Compressor Noise on Breeding Birds in the Rattlesnake Canyon Habitat Management Area, San Juan County, New Mexico. Report to the Bureau of Land Management, Farmington Field Office. Final Report.
- Parker, Patricia L. and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Park Service, *National Register Bulletin 38*. Washington.
- Science Applications International Corporation. 2002. *Cultural Resources Technical Report: Background Information on Cultural Resources for the Farmington Draft RMP/EIS*. Ms. on file, Bureau of Land Management, Farmington, New Mexico.
- Schneising, O., Burrows, J. P., Dickerson, R. R., Buchwitz, M., Reuter, M., & Bovensmann, H. (2014). Remote sensing of fugitive methane emissions from oil and gas production in North American tight geologic formations. *Earth's Future*, 548-558. Science Applications International Corporation. 2002. *Cultural Resources Technical Report: Background Information on Cultural Resources for the Farmington Draft RMP/EIS*. Ms. on file at BLM-FFO, Farmington, New Mexico.
- U.S. Census Bureau. 2012a. Poverty threshold by size of family. Internet Web site: <http://www.census.gov/hhes/www/poverty/data/threshld/index.html>. Accessed on February 20, 2014.
- U.S. Census Bureau 2012b. American Community Survey, 2012 American Community Survey 5-Year Estimates, Tables DP-02, DP-03, DP-04, DP-05; generated by Lauren Zielinski; using American FactFinder; <http://factfinder2.census.gov>. Accessed February 17, 2014.
- U.S. Census Bureau. 2013. Small Area Estimates Branch 2002 and 2012 Poverty and Median Income Estimates - Release date December 2013. Accessed on February 20, 2014.
- U.S. Census Bureau. 201. US Census Bureau GIS data. Tiger Products. Internet Web Site: <http://quickfacts.census.gov/qfd/states/35/3507880.html> Accessed on July 2015.
- U.S. Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS). 2014. Web Soil Survey. Information for San Juan County, New Mexico, Eastern Part. Available at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed September 11, 2014.

- U.S. Environmental Protection Agency (USEPA). 2004. Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reserves. Office of Ground Water and Drinking Water (4606M). EPA 816-R-04-003.
- _____. (2012, May 21). *2005 National-Scale Air Toxics Assessment*. Retrieved February 27, 2014, from U.S. Environmental Protection Agency: <http://www.epa.gov/ttn/atw/nata2005/>
- _____. (2013, December 5). *The Green Book Nonattainment Areas for Criteria Pollutants*. Retrieved February 25, 2014, from U.S. Environmental Protection Agency: <http://www.epa.gov/airquality/greenbook/>
- _____. (2013a, November 15). *Air Quality Index Report*. Retrieved March 12, 2014, from U.S. Environmental Protection Agency: http://www.epa.gov/airdata/ad_rep_aqi.html
- _____. (2014, February 7). *Air Trends: Design Values*. Retrieved February 25, 2014, from U.S. Environmental Protection Agency: <http://www.epa.gov/airtrends/values.html>
- _____. (2014, February 3). *The 2011 National Emissions Inventory*. Retrieved February 27, 2014, from U.S. Environmental Protection Agency: <http://www.epa.gov/ttn/chief/net/2011inventory.html>
- U.S. Fish and Wildlife Service (USFWS). 2015. Threatened and Endangered Species. U.S. Fish and Wildlife Service Environmental Conservation Online System. Available at <http://ecos.fws.gov/ecos/home.action>
- U.S. Geological Survey (USGS). 1979. Notice to Lessees and Operators of Onshore Federal and Indian Oil and Gas Leases (NTL-3A). Reporting of Undesirable Events.
- USGS. 2013. <http://water.usgs.gov/GIS/huc.html>. Accessed July 30, 2013.
- Van Valkenburgh, Richard F. 1941. *Diné Bikeyah*. Window Rock, Arizona: Department of the Interior, Office of Indian Affairs, Navajo Services. Ms. on file at BLM-FFO.
- _____. 1974. *Navajo Sacred Places*. Edited by Clyde Kluckhohn. Garland American Indian Ethnohistory Series, Navajo Indians, 3 Vols. New York, New York: Garland Publishing.
- Western Cultural Resource Management, Inc. (WCRM). 2015. Cultural Resource Inventory of WPX Energy Production Proposed Chaco 2308-31D 492H and Chaco 2308-31D 493H Well Pad and Access Road and Pipeline, Nageezi Chapter, San Juan County, New Mexico. WCRM Report No. WCRM(F)1405.
- Willeto, Harry (Counselor Chapter President, Navajo Nation Counselor Chapter House (NNCCH)). Letter to: Bureau of Land Management Farmington Field Office. 2013 April 5. 1 leaf.

APPENDIX A. MAPS



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Legend

Proposed Access	BLM
Edge of Disturbance	Indian
Proposed Pipeline	Private
Proposed Wellpad	State
San Juan Basin Roads	
US Highways	
Grazing Allotment	

0 1,000 2,000 4,000 Feet



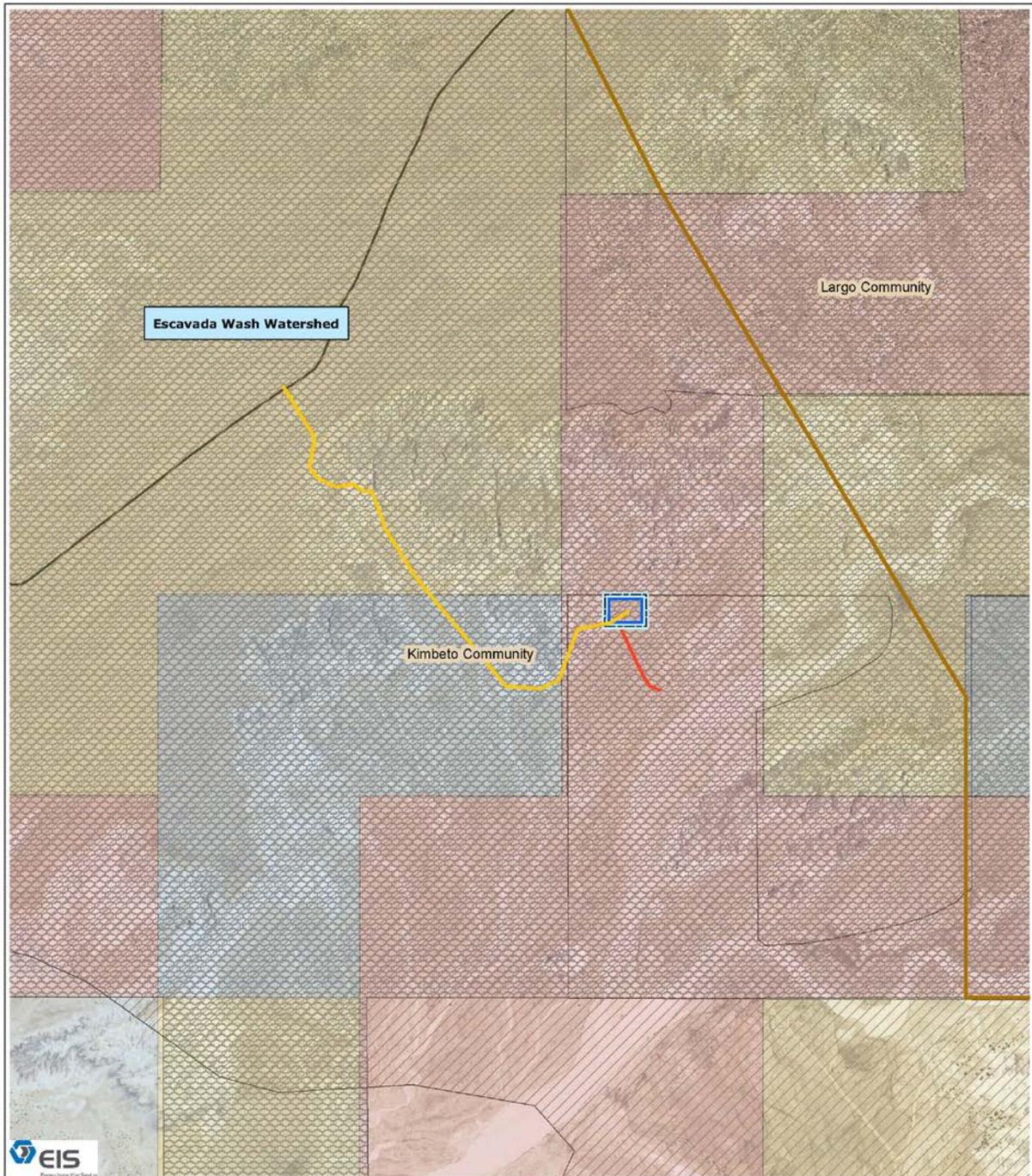
**Proposed Chaco 2308-31D 492H & 493H
Topographic Map**

Sections 31 & 36, Township 23 North, Range 8 West N.M.P.M &
Section 25, Township 23 North, Range 9 West N.M.P.M
San Juan County, New Mexico

1:40,000

NAD 1983 StatePlane New Mexico West FIPS 3003 Feet | Date: 10/21/2015 | Author: mpaulek





Legend

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> — Proposed Access — Edge of Disturbance — Proposed Pipeline — Proposed Wellpad — San Juan Basin Floods — US Highways — Archaic Sites/Habitat — Grazing Allocation | <ul style="list-style-type: none"> Ownership BLM Indian Private State | <p>Specialty Designated Areas</p> <ul style="list-style-type: none"> ■ Cultural Resource ■ Geology ■ Paleontology ■ Recreation ■ Recreation/Wildlife ■ Riparian ■ Riparian/TSE ■ T&E Species ■ Wetlands ■ Wildlife |
|---|---|--|



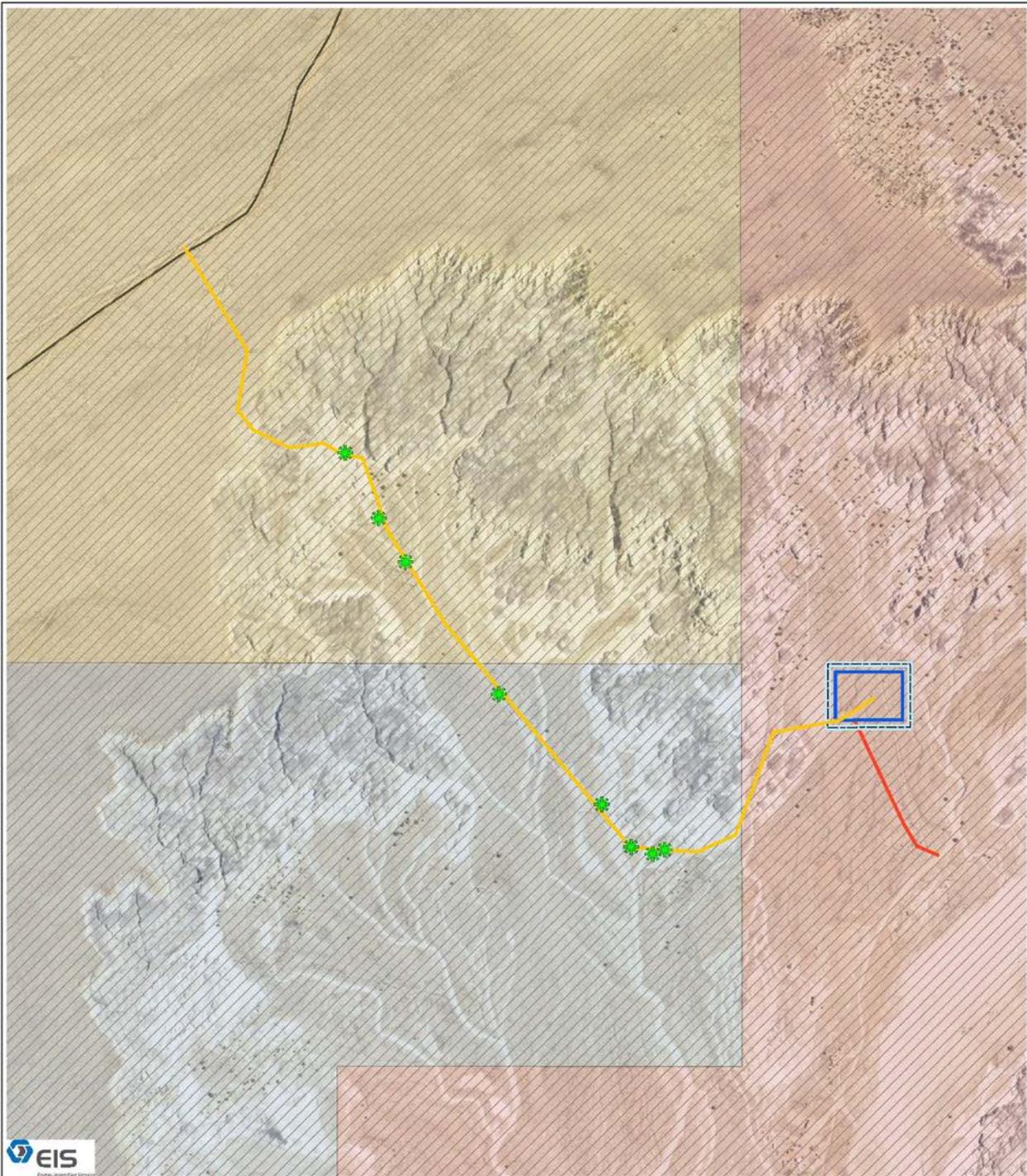
**Proposed Chaco 2308-31D 492H & 493H
Aerial Map**

Sections 31 & 36, Township 23 North, Range 8 West N.M.P.M &
Section 25, Township 23 North, Range 9 West N.M.P.M
San Juan County, New Mexico

1:24,000

NAD 1983 StatePlane New Mexico West FIPS 3003 Feet Date: 10/21/2015 Author: mpaulek





Legend

- | | |
|----------------------------|---------|
| Brack's Cactus | BLM |
| Proposed Access | Indian |
| Edge of Disturbance | Private |
| Proposed Pipeline | State |
| Proposed Wellpad | |
| San Juan Basin Roads | |
| Aztec Gila/Brack's Habitat | |



**Proposed Chaco 2308-31D 492H & 493H
Brack's Hardwall Cactus Map**

Sections 31 & 36, Township 23 North, Range 8 West N.M.P.M &
Section 25, Township 23 North, Range 9 West N.M.P.M
San Juan County, New Mexico

1:24,000

NAD 1983 StatePlane New Mexico West FIPS 3003 Feet | Date: 10/22/2015 | Author: mpaulek



APPENDIX B. PLATS

APPENDIX C. PHOTOGRAPHS



Photo Number:	1	Location:	Chaco 2308-31D Nos. 492H & 493H (corner 6)
		Photo Direction:	Northwest



Photo Number:	2	Location:	Chaco 2308-31D Nos. 492H & 493H (corner 2)
		Photo Direction:	Northeast



Photo Number:	3	Location:	Chaco 2308-31D Nos. 492H & 493H (corner 3)
		Photo Direction:	Southeast



Photo Number:	4	Location:	Chaco 2308-31D Nos. 492H & 493H (corner 5)
		Photo Direction:	Southwest



Photo Number:	5	Location:	Chaco 2308-31D Nos. 492H & 493H (center stake)
		Photo Direction:	North



Photo Number:	6	Location:	Chaco 2308-31D Nos. 492H & 493H (center stake)
		Photo Direction:	East



Photo Number:	7	Location:	Chaco 2308-31D Nos. 492H & 493H (center stake)
		Photo Direction:	South



Photo Number:	8	Location:	Chaco 2308-31D Nos. 492H & 493H (center stake)
		Photo Direction:	West



Photo Number:	9	Location:	Chaco 2308-31D Nos. 492H & 493H Access Start
		Photo Direction:	West-northwest



Photo Number:	10	Location:	Chaco 2308-31D Nos. 492H & 493H Access End
		Photo Direction:	South-southeast

APPENDIX D. SURFACE RECLAMATION PLAN
