United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NM-F010-2014-0294

(ATS—F010-14-239 & 242)

WPX Energy Production, LLC
Chaco 2308-04L Nos. 283H and 284H
Well pad, Access Road, and Pipeline

Lease Nos.
NO-G-1401-1876 and NO-G-1401-1868

October 2014

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
APD	Application for Permit to Drill
APE	area of potential effect
AQI	Air Quality Index
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practices
CDP	Central Distribution Point
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COA	Conditions of Approval
EA	Environmental Assessment
Ecosphere	Ecosphere Environmental Services, Inc.
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FFO	Farmington Field Office
FIMO	Federal Indian Minerals Office
FSL	from the south line
FWL	from the west line
GHG	greenhouse gases
HAP	hazardous air pollutants
ID	Interdisciplinary
LAC	La Plata Archaeological Consultants

MLA	Mineral Leasing Act
NAAQS	National Ambient Air Quality Standard
NATA	National Scale Air Toxics Assessments
NEPA	National Environmental Policy Act
NMAAQS	New Mexico Ambient Air Quality Standards
NMPIF	New Mexico Partners in Flight
NMPM	New Mexico Principal Meridian
NO_2	nitrogen dioxide
O_3	ozone
Pb	lead
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter between 2.5 and 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PRMP	Proposed Resource Management Plan
RFDS	reasonable foreseeable development scenario
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
SDA	specially designated areas
SO_2	sulfur dioxide
TUA	temporary use area
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WPX	WPX Energy Production, LLC
WUS	waters of the U.S.

1. PURPOSE AND NEED FOR ACTION

1.1 Background

WPX Energy Production, LLC (WPX) has filed two Applications for Permit to Drill (APD) and four right-of-way (ROW) grants with the Bureau of Land Management (BLM) Farmington Field Office (FFO) for the Chaco 2309-04L Nos. 283H and 284H (283H/284H) project. The wells would access the Nageezi Gallup and Basin Mancos Formations. The proposed project would be located on BLM-managed land and would access Indian allotted minerals administered by the BLM/FFO. The proposed action is the approval of the APDs by the BLM/FFO on behalf of the Federal Indian Minerals Office (FIMO) and approval of the four ROW grants by the BLM/FFO.

Surface disturbance activities associated with drilling the proposed wells would include construction of one well pad, an access road, a produced water line, two steel gas liquids pipelines, and two polyethylene gas/liquids pipelines. The proposed well pad would be located off lease and would be permitted through a ROW grant with the BLM/FFO. The access road and pipelines would be permitted by the BLM/FFO by approved ROW grants.

The proposed action would be located in San Juan County, New Mexico, approximately 2.6 miles east of Nageezi, New Mexico.

1.2 Purpose and Need for Action

The purpose of the proposed action is to provide WPX with reasonable access to BLM-managed lands and Indian allotted mineral leases (NO-G-1401-1876 and NO-G-1401-1868) to construct the proposed well pad, access road, and pipelines, and to drill the two proposed wells.

The need for the action is BLM's responsibility under the Mineral Leasing Act (MLA) of 1920, as amended (30 United States Code [USC] 181 et seq.) and the Indian Mineral Development Act of 1982 (25 USC 2101-2108; 25 USC 2 and 9), to respond to the APD and ROW applications. The MLA authorizes the BLM to issue oil and gas leases for the exploration of mineral resources and permit the development of those leases. The need for the action is also established by the BLM's authority under the Title V of the Federal Land Policy and Management Act, as amended (43 USC 1761-1771), and Section 28 of the MLA (43 USC 185).

1.3 Decision to be Made

The BLM manages the federal mineral program and is responsible for management of oil and gas on Tribal lands (25 Code of Federal Regulations [CFR] 225). BLM regulations (43 CFR 3160) establish procedures for obtaining approval of an APD on existing onshore federal and Tribal oil and gas leases. FIMO was established by the Department of the Interior to provide services to individual Navajo mineral owner beneficiaries regarding their mineral interests and rights. FIMO is staffed with personnel from the Bureau of Indian Affairs (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. Since the proposed project would access the Tribal mineral estate allotted to an individual, a minerals agreement between WPX and the allottee is required.

Based on the information in this Environmental Assessment (EA), the BLM/FFO will decide whether to approve the APDs and ROW grants associated with the proposed project, and if so, under what terms and conditions. In compliance with the MLA, the decision to be made is how resource development should occur. Under the National Environmental Policy Act (NEPA), as amended (Public Law [PL]. 91-90, 42 USC 4321 et seq.), the BLM/FFO must determine if there are any significant environmental impacts associated with the proposed action, warranting further analysis in an Environmental Impact Statement (EIS). The BLM/FFO Field Manager is the responsible officer who will decide one of the following:

- To approve the proposed APDs and ROW grants with design features as submitted
- To approve the proposed APDs and ROW grants with additional mitigations
- To analyze the effects of the proposal in an EIS
- To deny the APDs and ROW grants

1.4 Conformance with Applicable Land Use Plan(s)

Pursuant to 40 CFR 1508.28 and 1502.21, this EA incorporates the information and analysis contained in the 2003 Farmington Proposed Resource Management Plan (PRMP)/Final Environmental Impact Statement (FEIS) (USDI/BLM 2003a). The proposed action would be in conformance with the oil and gas leasing and development management actions in the Resource Management Plan (RMP)/Record of Decision (ROD) signed December 2003 and updated in December 2003 (USDI/BLM 2003b). The proposed action would be in conformance with the 2003 RMP/ROD that states, to the extent possible, new ROWs will be located within or parallel to existing ROWs or corridors to minimize resource impacts (USDI/BLM 2003b, page 2-11).

The PRMP/FEIS and ROD are available for review at the FFO in Farmington, New Mexico or electronically at http://www.nm.blm.gov/ffo/ffo_home.html. This project EA addresses site-specific resources and/or impacts that are not covered within the PRMP/FEIS, as required by the NEPA.

1.5 Relationship to Statutes, Regulations, or Other Plans

WPX would comply with all applicable federal, state, and local laws and regulations. Necessary permits and approvals for the project would be obtained prior to project implementation. These laws and regulations include, but are not limited to the following:

- American Indian Religious Freedom Act of 1978 (42 USC 1996)
- Antiquities Act of 1906, as amended (16 USC 431-433)
- Archaeological Resources Protection Act of 1979 (16 USC 470aa et seq.), as amended
- Bald and Golden Eagle Protection Act of 1940, as amended (USC 668-668d)
- Clean Air Act, as amended (42 USC 7401 et seq.)
- Clean Water Act, as amended (33 USC 1251 et seq.)
- Colorado River Salinity Control Act, as amended (7 CFR Part 702)
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (40 CFR Part 307)
- Endangered Species Act of 1973 (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 (50 CFR Part 21)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001; 43 CFR Part 10)
- Paleontological Resources Preservation Act as part of the Omnibus Public Land Management Act (16 USC 470aaa et seq.)
- Safe Drinking Water Act, as amended (40 CFR Parts 144 and 147)
- Section 106 of the National Historic Preservation Act of 1966 (16 USC 470 et seq.), as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800)

1.6 Scoping, Public Involvement, and Issues

The Council on Environmental Quality (CEQ) defines scoping as "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action alternative" (40 CFR 1501.7). Scoping is the process by which the BLM solicits internal and external input on the issues, impacts, and potential alternatives that will be addressed in an EIS or EA.

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 on-site meeting, attended by WPX, BLM/FFO, and an environmental consultant (Ecosphere Environmental Services, Inc. [Ecosphere]), was held at the proposed project area on May 14, 2014. The local chapter of the Navajo Nation was invited to the on-site meeting by the BLM/FFO; no members of the Navajo Nation attended the meeting. 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 the meeting. A BLM/FFO Interdisciplinary Team meeting was held in May 23, 2014 to discuss the proposed action. At the aforementioned meetings, potential issues of concern were identified by the BLM/FFO and Ecosphere.

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

1.6.2 Issues

For the purpose of BLM NEPA analysis, an "issue" is a point of disagreement, debate, or dispute with a proposed action based on some anticipated environmental effect. The following issues were identified as potential issues of concern by the Interdisciplinary Team during internal scoping:

- How would the alternatives affect air quality in the area?
- How would the alternatives affect soil resources in the area?
- How would the alternatives affect water resources?
- How would the alternatives affect upland vegetation and noxious weeds?
- How would the alternatives affect wildlife, BLM special management species, and migratory birds?
- How would the alternatives affect cultural resources?

1.6.3 Issues Considered but Not Analyzed

CEQ regulations (40 CFR 1501.7) state that the lead agency shall identify and eliminate from detailed study the issues that are not important or have been covered by prior environmental review, narrowing the discussion of these issues in the document to a brief presentation of why they would not have a significant effect on the human or natural environment, or providing a reference to their coverage elsewhere.

The Interdisciplinary (ID) Team identified the following as potential issues of concern that would not be significantly impacted or have been evaluated in previous analyses.

No federally listed species with the potential to occur in San Juan County or potential habitats for federally listed species were observed within the proposed project area. Furthermore, no designated critical habitat for any federally listed species occurs within the proposed project area. Water used for well drilling and completions would be sourced from a permitted private water well (Blanco Trading Post Point of Diversion Number SJ 2105). No new water depletions would result from the proposed action. The BLM/FFO reviewed and determined that the proposed action is in compliance with listed species management guidelines outlined in the September 2002 Biological Assessment (Cons. No. 2-22-01-I-389) (USDI/BLM 2002). No further consultation with the U.S. Fish and Wildlife Service (USFWS) is required.

For the proposed action, identification of Native American Religious Concerns was limited to reviewing existing, published, and unpublished literature (Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al 2006), the site-specific Class III survey report prepared for the proposed action, and a review by the BLM's cultural resources program regarding the presence of traditional cultural properties identified through ongoing BLM tribal consultation efforts. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001) or the Archaeological Resources Protection Act (16 USC 470) within the analysis area. The proposed action would not impact any known traditional cultural properties, 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 (42 USC 1996) or Executive Order 13007.

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

WPX is proposing development of the Chaco 2308-04L No. 283H and 284H horizontal wells to access the mineral estate administered by the BLM/FFO. The proposed action would be located in San Juan County, New Mexico, approximately 2.5 miles east of Nageezi. A vicinity map is provided as Figure 1 (see Appendix A). Figure 2 shows the proposed action on the Lybrook NW and Crow Mesa West, New Mexico U.S. Geological Survey (USGS) 7.5-minute topographic maps. Figure 3 displays the proposed action on 2010 aerial photographs (Appendix A). Photographs of the proposed action components are also provided in Appendix A.

The legal coordinates of the proposed well pad are the SW ¼ of Section 4, Township 23 North, Range 8 West, New Mexico Principal Meridian (NMPM). Two wells, the 283H and 284H, would be drilled from the proposed pad. The wells would access the Nageezi Gallup and Basin Mancos Formations. The proposed project would be located on BLM-managed land and would access Indian allotted minerals administered by the BLM/FFO.

WPX would construct a water line, two steel gas/liquids pipelines, and two polyethylene gas/liquids pipelines within the same ROW in Sections 4 and 9, Township 23 North, Range 8 West, NMPM. A proposed access road would parallel the proposed pipeline ROW. Project plats for the proposed project are provided in Appendix B.

Construction

Drilling of the proposed Chaco 2308-04L No. 283H and 284H wells would require constructing a 300-foot by 500-foot well pad, with a 50-foot-wide construction zone around the perimeter of the pad. Total disturbance from the proposed well pad would be approximately 5.5 acres. Maximum cut would be approximately 2 feet at B' and the maximum fill would be approximately 9 feet at corner 6. Excavated materials from the cuts would be used on the fill portion of the location to level the pad. Clearing and leveling is needed to provide a level surface for rig and equipment access and drilling.

To access the site, a 4,029-foot road would be constructed within a 30-foot wide ROW. The proposed well-connect pipeline ROW would be 40-feet wide and 3,858 feet in length. The proposed access road would parallel the proposed well-tie pipeline for approximately 1,919 feet. Where parallel, total construction width of the pipeline and access road would be 50 feet and would be designated as 20 feet of disturbance for the pipeline adjacent to the road and 30 feet of disturbance on the road. The proposed road and pipeline would result in 2.2 acres of disturbance. The remaining 2,110 feet of access road would result in 1.45 acres of disturbance. The remaining 1,939 feet of the pipeline would result in 1.78 acres of disturbance. Total disturbance for the road and pipeline would be approximately 5.5 acres.

Four temporary use areas (TUAs) are proposed for a drainage crossing and an existing ROW crossing. The TUAs would result in 2.0 acres of disturbance.

The existing Chaco 2-2 Central Distribution Point (CDP), well locations WPX Chaco 145H, 146H, 149H, 150H, and the approved TUA NMNM13141401-01 (TUA utilized for the installation of Chaco 149/150H pipeline) would be used as staging areas. Total surface disturbance for the proposed project would be

approximately 13.0 acres. Total new disturbance from the proposed project would be approximately 12.2 acres.

Table 2-1. Surface disturbance acreage

Feature	Acreage		Description of Acreage Following Post-Construction Reclamation		
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)	Reseed Only	Long-Term Disturbance
Access Road Corridor	2.8	2.0	-	1.4[1]	1.4
Well Pad	3.4	3.4	1.2	1.0[1]	1.2[1]
Construction Zone	2.1	2.1	2.1	-	
Well-Connect Pipeline Corridor (adjacent to road)	0.9	0.9	0.9	-	-
Well-Connect Pipeline Corridor (separate from road)	1.8	1.8	1.8	-	-
Temporary Use Area	2.0	2.0	2.0	-	-
Total	**13.0**	**12.2**	**8.0**	**2.4[1]**	**2.6[1]**

[1]These areas will be fully reclaimed when the wells are plugged.

After interim reclamation, approximately 2.6 acres (1.2 acres associated with the well pad and 1.4 acres for access) would remain in use for operation.

Drilling and Completions

After access road and well pad construction is complete, WPX would mobilize a drilling rig to drill the wells from the pad. During drilling operations, equipment on the site would include:

- Drilling rig
- Stockpiles of drill pipe and casing
- Closed-loop system and aboveground tanks for collecting cuttings and fluids
- Mud pumps and shakers to separate the cuttings from the fluid
- Generators to provide power to the drill rig
- Fuel storage
- Dog house (equipment control room)
- Construction trailers equipped with sleeping quarters for essential personnel
- Service company equipment (e.g., cement trucks, fracturing trucks and equipment, wireline trucks, etc.)

Drilling operations would be conducted in compliance with all Federal Onshore Oil and Gas Orders, all applicable federal and State of New Mexico rules and regulations, and the BLM Notice to Lessees. Drilling activities would occur continuously for approximately 4 weeks per well and would require on-

site supervision 24 hours a day. Completions activities are expected to take 4 weeks per well. Approximately 10 to 40 personnel would be on the proposed location at any time during drilling and completion. Traffic would include light-duty vehicles (cars and pick-ups) and heavy duty vehicles (water trucks, semi-trucks, bobtails).

During completions activities, the well pad would have a

- Completions rig
- Completion command center
- Steel storage tanks
- Pump trucks and transports
- Blending and mixing facilities
- Related ancillary completions equipment

Drilling fluids would be water based. Drill cuttings, drill water, and completion fluids would be placed in the closed-loop system. Surface casing would be installed to a depth necessary to penetrate past freshwater zones. The casing would be pressure-tested to ensure that a seal has been created.

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 would be sourced from a private water well located in the SW/NE ¼ of Section 32, of Township 25 North, Range 9 West, NMPM. This well is permitted by the State of New Mexico. The New Mexico Office of the State Engineer assigned the Point of Diversion Number SJ 2105 for the well. Water would be stored on-site in steel storage tanks.

Pipeline Installation

The proposed pipeline system will consist of two trenches. Trench 1 will have an 8-inch steel gas/liquids line and a 4-inch poly gas/liquids line. Trench 2 will have a 6-inch steel gas/liquids line and a 4-inch poly gas/liquids line. In addition, a 4-inch poly or steel water pipeline will be placed in either Trench 1 or 2. The trenches, which will be offset from one another by 5 feet, will both be located within the 40-foot-wide pipeline corridor ROW that is approximately 3,858 feet in length.

The trenches would be excavated and sloped in accordance with Occupational Safety and Health Administration specifications. Soils will be excavated from the well-connect pipeline trenches using a trencher or backhoe. The bottom of the trench will be dug at a depth of 4 feet, except for at road crossings, where it will be greater than 4 feet in depth. The trenches would be 16 inches in width if a trencher is used or 24 inches in width if a backhoe is used. Excavated material would be stockpiled at the edge of the workspace.

The trenching operation would be followed by pipe installation that would include stringing, bending for horizontal or vertical angles in the alignment, welding pipe segments together, inspection, coating joints to prevent corrosion, and lowering the pipeline into the trench. Backfilling would begin after a section of the pipe has been successfully placed in the trench and final inspection has been completed.

Cleanup activities would be initiated as soon as practicable after backfilling activities have been completed. The pipeline would be seeded with the seed mix and rates provided in the Reclamation Plan attached to the APDs for the well pads.

Related aboveground appurtenances that would be installed within the pipeline workspace would include cathodic protection equipment, futures, and block valves with blowdowns.

Production

The production phase of wells varies; the lifetime is anticipated to be 30 to 50 years. Installation of production equipment would take 2 to 3 weeks. Production equipment that would remain on the well pad could include the following:

- Wellhead
- Production unit
- Lease automatic custody transfer unit
- Transfer pump building
- Meter run
- Compressor
- Field gas separator
- Water, oil, and condensate tanks
- Capstone building
- Gas lift unit

Production facilities would be located within a 300-by-100-foot facility area on the proposed well pad. The access would consist of a looped (teardrop), 35-foot-wide driving surface. During production, normal maintenance would be required to monitor production and resolve any problems. It is anticipated that two- three pick-up trucks would visit the proposed well pad daily during the normal work week.

Occasionally, workover or recompletion of the proposed well 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 well. Workover activities could include repairs to the wellbore equipment (e.g., casing, tubing, rods, and pump), wellhead, or production facilities.

Interim Reclamation

If the well is productive, interim reclamation would follow the procedure detailed in the project-specific Reclamation Plan. Approximately four personnel would be required to conduct interim reclamation which would take approximately 2 to 3 weeks. As shown in Table 2-1, portions of the proposed project area would be either fully reclaimed, only reseeded, or not reclaimed during interim reclamation.

The central portion of the well pad within the anchors (workover area) would be reseeded. The remainder of the well pad including the construction zone, TUAs, and well-connect ROW would be fully reclaimed. In areas to be fully reclaimed or only reseeded, stockpiled topsoil (if available) would be redistributed and the surface would be ripped and seeded. Prior to reseeding, fully reclaimed areas would be recontoured to

pre-construction topographical contours, if possible. Sediment- and erosion-control features (including water diversions, silt traps, and culverts) would be installed, as necessary.

The area where the production facilities are located and access road would not be reclaimed until final abandonment.

Abandonment and Final Reclamation

If the well proves to be unproductive, or when the well is no longer commercially viable, it would be plugged and abandoned. The wellbore would be plugged with cement and the production facilities would be removed. An aboveground marker would be placed over the plugged hole. The marker would contain individual well identification information. Federal and State of New Mexico standards would be followed, and WPX would provide the BLM with technical and environmental aspects of the final plugging, abandonment, and reclamation procedures. The well pad and access road would be graded and recontoured to blend with adjacent natural surroundings as much as practicable, covered with salvaged topsoil material, and seeded to re-establish vegetation. Sediment and erosion control measures would be installed as necessary.

2.1.1 Design Features

All areas of proposed surface disturbance were inspected in the field to ensure that potential impacts to natural resources would be minimized by design features. For a detailed description of the design and construction practices associated with the proposed action, refer to the APD and plats in Appendix B. For the proposed action, standard and project-specific design features include but are not limited to the following:

- Best management practices (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.
- The access road will be designed and constructed as a Resource Road in accordance with the BLM Gold Book Standards (USDI/USDA 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.
- All BLM/FFO cultural resources stipulations will be followed as indicated in the Cultural Resource Records of Review that is attached to the Conditions of Approval (COA) in the APD/ROW 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.

- Prior to construction, the pipeline ROW will be staked at 100- to 200-foot intervals.
- Grazing permittees will be notified when construction is scheduled to begin. All hazards to livestock will be fenced or contained.
- All project activities would be confined to permitted areas only.
- Clearing, removal of topsoil, and grading will be limited to the minimum area required for safe and efficient construction.
- 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 placed in adjacent areas needing soil stabilization or hauled to an approved disposal facility.
- 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 well pad 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.
- 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. WPX will follow Onshore Oil and Gas Order No. 1 regarding the placement, operation, and removal of closed-loop systems. 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.
- 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.
- 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.
- All pipelines will be buried to a depth of 4 feet except at road crossings where they will be buried to a depth greater than 4 feet. In areas were the pipeline crosses an existing road, WPX will utilize the following backfill method. The pipeline trench will be backfilled with spoil halfway and compacted, then whole, intact sacks of Quikrete® will be placed side-by-side along the length of the trench across the road. The sacks will be placed with approximate 3- to 4-inch spacing between each sack. Road base will then be backfilled and compacted to the surface. This method has been shown to provide the best road stabilization and to alleviate potholes and depressions that often occur over the pipeline trench after backfill material settles over time.

- The disturbed areas will be reseeded with a BLM/FFO approved seed mix. All components of the proposed action would be reseeded with a Badland mix, as determined during the project on-site evaluation.
- It will be the operator's responsibility to monitor, control, and eradicate all noxious weed species within the permitted area throughout the life of the proposed project. The operator will contact the BLM/FFO regarding acceptable weed-control methods. If the operator does not hold a current Pesticide Use Permit, a Pesticide Use Permit will be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands will be used. The use of pesticides will comply with federal and state laws. Pesticides will be used only in accordance with their registered use and limitations. The operator will contact the BLM/FFO prior to using these chemicals.
- 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.
- 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.
- 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.
- Engines would be equipped with mufflers and barriers or other sound-proofing measures would be implemented, if needed, to meet the requirements of BLM Notice to Lessees and Operators on Onshore Oil and Gas Leases within the jurisdiction of the FFO NTL 03-1 FFO.
- A migratory bird nest survey will be conducted if any vegetation-disturbing activities 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.

Site-Specific Design Features

- Water will need to be diverted around the east side of the well pad.
- Silt traps installed as needed upon interim reclamation.
- Eliminate construction zone on east side of pad (need to consider drainage construction around three sides of pad to direct surface flow).
- No additional fill would be required to construct the pad, armor edge of pad to protect from surface flows post-construction. Reduce edge of disturbance on southern toe of pad to hold topsoil on slope.
- Eight culverts will be installed and two low water crossings constructed in the access road as follows:
  - 7+36.56 48-inch culvert
  - 16+08.85 low water crossing
  - 19+59.78 24-inch culvert

- 22+83.77 24-inch culvert
- 25+41.24 36-inch culvert
- 28+15.17 24- inch culvert
- 30+22.75 24-inch culvert
- 32+19.97 24-inch culvert
- 35+18.56 low water crossing
- 37+3457 60-inch culvert

- Based on current BLM management guidelines, the top 6 inches of topsoil in occupied Brack's cactus (*Sclerocactus cloveriae* ssp. *brackii*) areas will be scraped, stored, and respread on-site. In addition, a fence will be placed along the southwest edge of disturbance to minimize impacts to individuals in proximity to the project area.

2.2 No Action

The BLM NEPA Handbook (H-1790-1; USDI/BLM 2008) states that for EAs on externally initiated proposed actions, the no action alternative is generally to reject the proposal or deny the application. This option is provided in 43 CFR 3162.3-2 (h) (2). This alternative would deny the approval of the APDs and ROW grants, and the current land and resource uses would continue in the area. The no action alternative provides a useful baseline for comparison of environmental effects (including cumulative effects) and demonstrates the consequences of not meeting the need for the action.

2.3 Alternatives Considered but Eliminated

WPX originally proposed to place the 284H well head at 2453 feet from the south line (FSL), 455' from the west line (FWL) in Section 4 of Township 23 North Range 8 West. The location was proposed to provide access to the 284H as well as the 285H lateral; however, the location was too far north to feasibly access the 285H lateral. The 284H well head was then proposed at 2432 FSL, 431 FWL. This location provided access to the 283H and the 284H laterals, but was moved 48 feet west to minimize impacts to sensitive resources including surface water features and Brack's cactus. This location also provided a safe construction buffer in relation to the previously constructed pipeline corridor (Williams H-28). An alternate location for the access road corridor was proposed at the on-site meeting on May 14, 2014 to minimize any potential impacts to cultural, paleontological, and surface water features. No additional, feasible surface location alternatives were identified by WPX or the BLM for the proposed project.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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 section focus on the relevant major resources or issues.

Under the no action alternative, the proposed action would not be implemented. The no action alternative would result in the continuation of the current land and resource uses in the area. This alternative will not be evaluated further in this EA.

Ecosphere biologists conducted a biological survey of the proposed action on May 2, 2014. Cultural resource surveys were conducted by La Plata Archaeological Consultants, LLC (LAC) on various dates between February 2014 and May 2014. An on-site meeting was conducted on May 14, 2014 and attended by representatives from WPX, Ecosphere, LAC, and the BLM/FFO.

3.1 Air Resources

3.1.1 Affected Environment

The proposed project would be 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), including their effects on national and global climate conditions, has emerged since this document was prepared. Ongoing scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide, 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 (USDI/BLM 2014). 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 U.S. Environmental Protection Agency (USEPA) 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 (NO_2), ozone (O_3), particulate matter (PM) that includes a PM with a diameter between 2.5 and 10 micrometers (PM_{10}) and a PM with a diameter of 2.5 micrometers or less ($PM_{2.5}$), sulfur dioxide (SO_2) and lead (Pb). The USEPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. The USEPA 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 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. The USEPA 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

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. The USEPA's Green Book web page reports that all counties in the FFO planning area are in attainment of all NAAQS, as defined by the Clean Air Act (USEPA 2013a). The area is also in attainment of all New Mexico Ambient Air Quality Standards (NMAAQS*).* The current status of criteria pollutant levels in the FFO are described below. Total emissions of criteria pollutants from each source sector were calculated by adding together the emissions from the four counties that are located in FFO: San Juan, McKinley, Rio Arriba, and Sandoval.

"Design concentrations" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design concentrations of criteria pollutants are listed below in Table 3-1. There is no monitoring for CO or Pb in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM_{10} design concentrations are not available for San Juan County.

Table 3-1. Criteria pollutant-monitored values in San Juan County

Pollutant	Design Value	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	75 ppb(5)	

(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

Note: NAAQS = National Ambient Air Quality Standard Standards; NMAAQS = New Mexico Ambient Air Quality Standards; O_3 = ozone; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less; ppb = parts per billion; ppm = parts per million; SO_2 – sulfur dioxide; μg/m^3 = micrograms per cubic meter.

Source: USEPA 2014

In 2005, the USEPA estimated that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (USEPA 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 (AQI) value. The 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 (>150). 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 percent 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 3-2). On 8 days in the past decade, air quality has reached the level of "unhealthy" and on 2 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 1 day that was "unhealthy" during each year. In 2010, there were 5 "unhealthy" days and 2 "very unhealthy days".

Table 3-2. Number of days classified as "unhealthy for sensitive groups" (AQI 101-150) or worse

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

Source: USEPA 2013b

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 (USDI/BLM 2014). The USEPA conducts a periodic National Air Toxics Assessment (NATA) that quantifies HAP emissions by county in the United States (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 semi-arid 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 they have dipped below 0°F 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.

Table 3-3 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico area.

Table 3-3. Climate normals for the Farmington area, 1981-2010

Month	Average Temperature[1]	Average Maximum Temperature[1]	Average Minimum Temperature[1]	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

[1] Degrees Fahrenheit

Source: USDI/BLM 2014

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.

3.1.2 Impacts from the Proposed Action

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report (USDI/BLM 2014). 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 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 (USDI/BLM 2014).

Direct and Indirect Impacts

Table 3-4 shows estimated emissions from one proposed conventional oil well for criteria pollutants, volatile organic compounds (VOC) and GHG. For comparison, Table 3-5 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 (USEPA 2014).

Table 3-4. 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 Reclamation	0.006	0.006	0.006	0.001	-	0.003	-	1.24
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/year)								
Oil Haul Truck and Small Truck (100 bbls/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**

*Note: NO_X = nitrogen oxides; CO = carbon monoxide; VOC = volatile organic compounds; PM_{10} = particulate matter with an aerodynamic diameter equal to or less than 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter equal to or less than 2.5 microns; SO_2 = sulfur dioxide; CH_4 = methane; CO_2 = carbon dioxide, bbl = barrel.

Oil storage tanks on the well location may result in venting of VOC. Oil well production is generally presented as bbls per day produced. The emissions calculator estimated that for every bbl 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 USEPA regulations regarding the capture or flaring of VOC emissions.

Table 3-5. 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
Total	**70,340.5**	**127,435.2**	**53,525.0**	**219,838.9**	**25,487.6**	**7,110.0**

(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM_{10} – 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) SO_2 – sulfur dioxide

Table 3-6 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal oil well.

Table 3-6. Percent increase in analysis area emissions from the proposed action

	NO_X[1]	CO[2]	VOC[3, 8]	PM_{10}[4, 5]	$PM_{2.5}$[5, 6]	SO_2[5, 7]
Total Emissions	70,340.5	127,435.2	53,525.0	219,838.9	25,487.6	7,110.0
Conventional Gas Well Emissions	6.13	1.64	12.55[8]	2.54	0.29	0.11
Percent Increase	**0.009**	**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] PM_{10} – 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] SO_2 – sulfur dioxide

[8] Current USEPA regulations require operators to reduce VOC emissions by 95 percent 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 USEPA regulations require operators to reduce VOC emissions by 95 percent if their oil storage tanks emit over 6 tons of VOC emissions per year. A reduction of 95 percent 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 CO_2 and CH_4. To compare the GHG emissions from the proposed action estimated by the calculator with statewide GHG emissions, the carbon dioxide equivalent (CO_2e) emissions for both CH_4 and CO_2 were summed. The total statewide GHG emission estimate for 2007 was 76,200,000 metric tons CO_2e (76.2 million metric tons (NMED 2010). The estimated CO_2e metric tons emissions from one horizontal oil well (609.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO_2 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 foreseeable development scenarios (RFDS) 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 (USDI/BLM 2014).

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

(USDI/BLM 2014). 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 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 (USDI/BLM 2014) 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.

3.2 Soils

Surficial geology in the analysis area is composed of the Nacimiento Formation consisting of non-marine fluvial depositions created during the Paleocene in the San Juan Basin (Williamson and Lucas 1992, Green and Jones 2001). The formation is comprised mostly of shale, interbedded with medium to fine-grained sandstone and conglomeratic sandstone (McLemore et al. 1986). The Nacimiento Formation is well-known for containing a significant early Paleocene vertebrate fossil record (Williamson and Lucas 1992).

The Natural Resources Conservation Service classifies the soil-mapping units in the project area as Fruitland-Persayo-Sheppard complex, hilly, Blancot-Notal association, gently sloping, and Badland (USDA/NRCS 2014). These soils are considered to be medium to highly erosional and well drained. Soil texture at the site is loam to fine sandy loam and light tan in color. The proposed well pad is overlain with red alluvial gravels and cinders with a high enough coverage to be considered desert pavement.

The Fruitland-Persayo-Sheppard complex, hilly mapping unit is found on hills, mesas, plateaus, fans and breaks and is composed of approximately 40 percent Fruitland sandy loam, 30 percent Persayo clay loam, and 25 percent Sheppard loamy fine sand. Approximately 5 percent of the unit is composed of small areas of Farb soils. Formed from alluvium derived from sandstone and shale, Fruitland soil is deep and well drained. Permeability is moderately rapid with available water capacity moderate. Effective rooting depth is 10 to 12 inches. Runoff is rapid and the hazard of water erosion is high. The hazard of wind erosion is severe. Formed in eolian material derived from mixed sources, Sheppard soil is deep and somewhat excessively drained. Permeability is rapid with available water capacity low. Effective rooting depth is 60 inches or more. Runoff is slow and the hazard of water erosion is slight. The hazard of wind erosion is

very severe. Formed in residuum derived predominately from shale, Persayo soil is shallow and well drained. Permeability is moderately slow with available water capacity very low. Effective rooting depth is 10 to 20 inches. Runoff is rapid and the hazard of water erosion is high. The hazard of wind erosion is severe. The major limitations of this mapping unit are the hazard of soil blowing and water erosion.

The Blancot-Notal association, gently sloping mapping unit is found on fans and valleys and is composed of approximately 55 percent Blancot loam, 25 percent Notal silty clay loam, and approximately 20 percent contrasting inclusions. Formed in alluvium, Blancot soil is deep and well drained. Permeability is moderate with available water capacity high. Effective rooting depth is 60 inches or greater. Runoff is medium and the hazard of water erosion is moderate. The hazard of wind erosion is moderate. The shrink swell potential ranges from low to moderate. Notal is deep and well drained, slightly saline, with a very high available water capacity. Permeability is slow with effective rooting depth in excess of 60 inches. Runoff is medium while the hazard of water erosion is moderate. The potential of wind erosion is severe. Additionally the estimated content of exchangeable sodium is approximately 5 to 50 percent. The shrink-swell potential ranges from moderate to high for Notal soils. Blancot-Notal soils have a severe road construction rating due to the low strength and the moderate to high shrink-swell potential.

Badland consists of nonstony, barren shale uplands that are dissected by intermittent drainageways and gullies. This soil forms on uplands that are highly dissected with intermittent drainage ways. Runoff potential is high and erosion is active. Due to very slow permeability, a large amount of water runs off after a normal rain, and flash floods may follow heavy rains.

3.2.1 Impacts from the Proposed Action

Direct and Indirect Impacts

The proposed action would impact approximately 13 acres of soils that have been classified as highly erodible. Available topsoil, up to 6 inches, would be stripped and stockpiled for use in interim reclamation. Construction would result in temporary displacement, compaction, and mixing of soils. The well pad and new access road (approximately 2.6 acres) would remain bare and compacted for the life of the project (approximately 30 years) and would be subject to an undetermined amount of wind and water erosion until the pad and road are completely reclaimed. Soil compaction during construction and operation of the proposed project, coupled with implementation of design features described below, would limit impacts to soil from erosion. Soils are most susceptible to erosion during construction, when strong winds or precipitation events during soil-disturbing activities could mobilize soils. The impact on soils would be localized and short to long term.

Industry-related vehicle and pedestrian traffic would be restricted to proposed disturbance areas and existing roads. Following construction, unused areas would be reseeded with the BLM-approved Badland seed mix to stabilize soils and prevent erosion. Following construction, vehicle traffic would be restricted to existing bladed roads to prevent erosion, soil mixing, and compaction in adjacent areas. Proper soil salvage, storage, and reclamation will allow adequate infiltration and permeability rates and maintain soil moisture, which is necessary for plant growth and vigor, and minimize surface runoff.

Cumulative Impacts

The proposed action falls within the development assessed in the 2003 RMP EIS cumulative impacts analysis. The PRMP/FEIS determined that "cumulative impacts on soils in the San Juan Basin would comprise the total amount of short-term and long-term surface disturbance due to all new oil and gas development and other activities" (USDI/BLM 2003a, page 4-123). The PRMP/FEIS projected that 264 acres of initial surface disturbance would occur in the Chaco sub-watershed (USDI/BLM 2003a, page 4-7). Past, present, and future developments are expected to result in a range of short- and long-term impacts to soils including disturbance, temporary or permanent increases in erosion prior to reclamation, and reduction of soil loss to erosion where reclamation and revegetation occurs. Given 13 acres of soil would be disturbed by the proposed action and the large extent that these soil types occur in the San Juan Basin, any impact from the proposed action is not expected to contribute appreciably to cumulative impacts to soils when added to past, present, and reasonably foreseeable actions.

3.3 Water Resources/Quality – Surface and Groundwater

3.3.1 Affected Environment

Under the Clean Water Act, waters of the U.S. and other wetlands are regulated by the U.S. Army Corps of Engineers (USACE). These jurisdictional waters include those that have a "significant nexus" to traditional navigable waters. The BLM/FFO and USACE Durango Regulatory Division have determined that jurisdictional waters may include USGS watercourses (i.e., "blue line" on USGS 1:24,000 topographic maps).

The project area is located in the Upper Colorado River Hydrologic Region and is within of the Chaco sub-watershed. There are no perennial streams, springs, seeps, or wetlands within the proposed project or action area. The proposed well pad is located west of a tributary of Kimbeto Wash. The proposed access and pipeline ROW crosses Kimbeto Wash and an associated tributary and both flow west-southwest into the Chaco River.

Aquifers in the San Juan Basin are generally considered to be confined and artesian due to the overlying low hydraulic conductivity formations and the regional geologic structure. Groundwater recharge occurs along the topographic high outcrops, along the basin margins. Discharge from groundwater aquifers generally occurs in topographic low areas, such as the San Juan River in the northwestern part of the basin and the Rio Grande in the southeast. Vertical leakage across fine-grained formations is also a source of recharge and discharge due to variations in hydraulic head. Regionally vertical leakage is assumed to be low. However, fracturing, in particular around structural features in the basin, could result in higher rates of vertical permeability (Stone et al. 1983).

The primary aquifers in the BLM/FFO area are the sandstone based Uinta-Animas and the Mesaverde. Groundwater is readily available in most of the BLM/FFO area and is of fair to poor quality. A search of the New Mexico State Engineers Office—Water Administration and Technical Engineering Resource System database for the proposed analysis area and vicinity (i.e., 1-mile radius) was performed. No wells occur within 1 mile of the project area (NMOSE 2014).

3.3.2 Impacts from 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.

The proposed action would temporarily expose an estimated 13 acres of soil as a sediment source entering area drainage ways in the short term, and approximately 2.6 acres would remain exposed after interim reclamation. Vegetation cover is generally low throughout the analysis area. Exposure of soils, particularly on slopes, would lead to an increase in an undetermined but likely small amount of sediment transport, particularly during and following storm events. Slight alterations in analysis area drainage patterns may also lead to an increase in sediment transport. These increases in sediment transport would persist for several years until the disturbed areas are stabilized. The potential for sediment transport into the drainages would be minimized through the implementation of best management practices and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions.

The proposed road/pipeline crosses two USGS watercourses. The proposed road meets the requirements to be covered under the USACE Nationwide Permit # 14 (Linear Transportation Projects) and the proposed pipeline meets the requirements to be covered under Nationwide Permit #12 (Utility Line Activities). At the onsite, the construction zone was reduced on the eastern edge of the pad to eliminate any impacts to a tributary of Kimbeto Wash.

Water for drilling and completions would be sourced from a private water well that has been permitted by the State of New Mexico. The well has been assigned the POD Number SJ 2105 by the New Mexico Office of the State Engineer.

Minimal amounts of hazardous materials (i.e., gas, diesel, etc.) would be used and stored on the well pad location. There would be the potential for accidental spills or releases of these materials that could impact local water quality. The proposed well 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, containment walls, drip pans, or equivalent protective structures would be installed, maintained, and sufficiently impervious to prevent a discharge to WUS. 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.

Stimulation (i.e., hydraulic fracturing or “fracking”) 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 fracking 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 or disposal (USEPA 2004). Stimulation techniques have been used in the U.S. 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. The total depth of the proposed well bore would be approximately 5,000 to 6,000 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 total dissolved solids. No impacts to surface water or freshwater-bearing groundwater aquifers are expected to occur from hydraulic fracturing of the proposed well.

Potential impacts to groundwater resources could occur from the proposed well bores. The potential for impacts to groundwater from the well bores would be long term for the life of the well. Adherence to COAs and design features such as adequate casing, cementing, and other drilling and completion methods would minimize effects to water quality.

Casing specifications would be designed by WPX and a casing program would be submitted to the New Mexico Oil Conservation Division. The casing and cementing would stabilize the wellbore and provide protection to any overlying freshwater aquifers by isolating hydrocarbon zones from overlying freshwater aquifers. Prior to approving an APD, a BLM geologist would identify all potential subsurface formations that would be penetrated by the wellbore. This includes all groundwater aquifers and any zones that would present potential safety or health risks that may need special protection measures during drilling or that may require specific protective well construction measures.

Once the geologic analysis is completed, the BLM would review WPX’s proposed casing and cementing programs to ensure the well construction design is adequate to protect the surface and subsurface environment, including potential risks identified by the geologist and all known or anticipated zones with potential risks.

During drilling, the BLM would be notified prior to the setting of critical casing and cementing intervals. Before hydraulic fracturing takes place, all surface casings and some deeper, intermediate zones are required to be cemented from the bottom of the cased hole to the surface. The cemented well would be pressure tested to ensure there are no leaks and a cement bond log is run on certain strings of casing to ensure the cement has bonded to the casing and the formation.

During operation, the proposed pipelines could potentially leak or rupture, which could impact groundwater quality. The proposed pipelines would be tested to ensure integrity prior to operation. A

cathodic protection system would be installed to protect the pipelines from corrosion, which could affect the integrity of the pipe. Potential impacts to groundwater quality from leaks or ruptures during pipeline operation would be long term.

Cumulative Impacts

Reasonably foreseeable development within the Chaco sub-watershed may include an estimated additional 71 well sites and related facilities. Surface-disturbing activities that would be associated with these actions may affect an estimated 264 acres (USDI/BLM 2003a, page 4-7). The PRMP/FEIS determined that the primary cumulative impacts on water quality would result from surface disturbance, which would generate increased sediment yields (USDI/BLM 2003a, pages 4-123 and 4-124). Cumulative effects to water resources from the proposed action would be maximized shortly after construction begins and would decrease over time as reclamation efforts progress.

The proposed action would cumulatively contribute approximately 2.6 acres of long-term disturbance in the watershed. Cumulative impacts to surface waters would be related to short-term sedimentation or flow changes. Surface-disturbing activities other than the proposed action that may cause accelerated erosion include (but are not limited to) construction of roads, other facilities, and installation of trenches for utilities; road maintenance such as grading or ditch cleaning; public recreational activities; vegetation manipulation and management activities; prescribed and natural fires; and livestock grazing.

3.4 Upland Vegetation and Noxious Weeds

3.4.1 Affected Environment

The proposed project and action areas are located in a Great Basin desert scrub sagebrush series (Dick-Peddie 1993). Dominant species observed include big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), and broom snakeweed (*Gutierrezia sarothrae*). Ground cover was visually estimated at 0 to 20 percent; the well pad is generally devoid of vegetation. Approximately 35 to 40 scattered piñon (*Pinus edulis*) and juniper trees (*Juniperus osteosperma*) are located within the proposed project area.

3.4.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Direct impacts would include removal of vegetation during site-clearing activities. Construction of the proposed action would result in the removal and modification of approximately 12.2 acres of undisturbed vegetation including approximately 40 scattered piñon and juniper trees. Potential impacts pertain to changes in species composition and density, and an increased potential for invasive species to establish. Following reclamation, there would be long-term changes in the density and composition of the analysis area vegetation community. Trees may not re-establish in the area for several decades. Disturbed areas would be expected to re-vegetate in 2 to 5 years. There would be a long-term loss of approximately 2.6 acres of desert scrub for well access and operation.

A small patch of Russian knapweed (*Acroptilon repens*) was observed along the edge of the road. WPX will contact the BLM/FFO regarding acceptable weed-control methods. Invasive species are generally tolerant of disturbed conditions, and disturbed soils at project sites 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 would be a long-term 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 well pad and ROWs for the life of the project.

Re-vegetation of the well pad construction zone and pipeline ROW would be initiated by WPX within 120 days of well completion and pipeline construction. All vegetation removed during site-clearing activities would be mowed and incorporated into stockpiled topsoil. Trees that are 3 inches or greater in diameter would be cut and de-limbed. The area would be reseeded with a Badland seed mix.

Cumulative Impacts

Within the BLM/FFO planning area, there are approximately 435,500 acres of Great Basin desert scrub (USDI/BLM 2003a, page 3-31). Based on the acres of plant community types within the planning area and the estimated total disturbance of future activities, less than 1 percent of the Great Basin desert scrub vegetation community would be disturbed within the planning area over 20 years from reasonably foreseeable future actions (USDI/BLM 2003a, page 3-31 and 4-7). The proposed action would cumulatively contribute 2.6 acres of long-term vegetative disturbance in the planning area.

3.5 Wildlife

3.5.1 Affected Environment

The proposed action is not located within a BLM wildlife specially designated area (SDA). There are no unique habitats within the project area. American black bear (*Ursus americanus)* and coyote (*Canis latrans*) sign (scat, tracks) were observed during the biological field survey.

3.5.2 Impacts from the Proposed Action

Direct and Indirect Impacts

Two parameters are considered when evaluating habitat loss—direct habitat loss and effective habitat loss. Direct habitat loss occurs through the removal of vegetation, which reduces the extent or quality of habitat in terms of food and cover. Vegetation removal strips the affected area of its value to wildlife; therefore, direct habitat loss can be quantified by comparing the area of habitat lost to the amount retained. The amount of habitat available to wildlife is called effective habitat. The effectiveness of habitat is lost when a species reduces use or avoids an area. Loss of effective habitat area can exceed direct habitat loss. Effective habitat loss can occur from habitat fragmentation, disturbance, and interference with movement. The impacts of habitat fragmentation are related to the loss of large contiguous areas of habitat and the relative increase in habitat “edge” in smaller areas. Construction of roads and other development, as well as human and vehicular traffic on existing roads, can cause habitat fragmentation. Such disturbance can cause animals to shift their activity or alter their behavior.

The proposed action would result in the removal and modification of approximately 12.2 acres of undisturbed vegetation including removal of approximately 40 piñon and juniper trees of varying ages and sizes. Vegetation within the proposed analysis area provides forage and cover for wildlife species. Since the vegetation removed would not be replaced with the same species and because the removal of vegetation in previously undisturbed areas would result in habitat fragmentation, an alteration of available wildlife habitat and utilization is anticipated. Impacts to wildlife habitat would include long-term loss of natural vegetation and changes in composition of vegetation. The majority of direct habitat loss would be short term, as areas reclaimed would recover their value as wildlife habitat. However, there would be a long-term loss of approximately 2.6 acres for well operation and access.

Mule deer and elk have been shown to avoid natural gas wells, roads, and areas immediately surrounding them, resulting in a loss of effective habitat. Hebblewhite summarized that the average zone of influence reported in eight different studies extended about 1,000 meters (3,281 feet) from roads and wells. The nature and extent of this avoidance is dependent upon the type of vegetation—particularly the amount of cover present, topography, the volume of traffic, and whether or not vehicles stop or continue moving. However, responses varied within seasons and among species (Hebblewhite 2011). Disturbance is a primary factor in effective habitat loss, as it can alter the ways wildlife use or move through an area and could push individual animals from preferred habitat into less suitable habitat. Such displacement would likely be localized around the source of the disturbance (i.e., equipment noise, human presence, etc.). Data collected by the BLM and the New Mexico Department of Game and Fish in the Rosa Wildlife SDA between 1994 and 2012 indicate a positive correlation between the increasing number of gas wells and accompanying roads and the decline in mule deer fawn to doe ratios.

Since there is so much variability between studies, and no studies specific to the BLM/FFO have been completed, a conservative buffer of 400 meters (1,312 feet) was selected to quantify the potential effective habitat loss resulting from the proposed action. Based on a 400-meter buffer around the proposed action, indirect wildlife habitat loss would affect approximately 400 acres. Avoidance by wildlife would depend on the species, time of day, time of year, human activity level, topography, and cover type. It should also be noted that the zone of influence around roads and well pads does not imply 100 percent avoidance (Hebblewhite 2011). Impacts from effective habitat loss would be greatest during construction and drilling, and would decrease over time in correlation to human and vehicular activity levels. Once the project is completed, wildlife would likely return to the area. It is possible that small wildlife, particularly burrowing species, might be killed during construction.

Depending on each stage of the proposed action (i.e., construction, drilling, completion), traffic levels could vary widely. Typically, traffic levels would have a low and high range, given the variability of each well pad location and the wells drilled. The highest increase in daily traffic levels would occur during the completion stage, during which trucks hauling in sand, water, and other materials would be accessing the site.

During operation, the level of human and vehicular activity in the analysis area would decrease substantially. However, on average, one light-duty vehicle would continue to access the area two to three times daily. Long-term impacts from vehicle traffic on roads could include incidental mortality to wildlife. Animal/vehicle collisions are variable depending on the time of day, speed, and volume of traffic, local topography, structural features of the road, and the size and behavior of the individual

species. The proposed access road would also facilitate entry to areas not previously open to vehicular travel, potentially resulting in increases in legal and illegal hunting.

Wildlife could come into contact with chemicals or fluids stored on-site. Use of a closed-loop system would minimize potential impacts to wildlife from exposure to chemicals or fluids during drilling and completion. During operation, any open pits would be netted and vent caps placed on all open pipes to prevent bird entry and nesting. WPX maintains an emergency response plan and would promptly clean up any spills. All chemicals or fluids stored on-site would be properly contained and would have secondary containment.

Construction activities would be confined to the permitted area to avoid further disruption to wildlife. Re-vegetation would be initiated immediately following construction or at the direction of the BLM/FFO. Gaps would be made, as needed, in topsoil or subsoil stockpiles to allow for wildlife crossings and to avoid ponding or excessive diversion of natural runoff during storm events. Trenches would be inspected for wildlife prior to laying pipe and back filling; trenches would not be left open more than 24 hours. Adherence to BLM reclamation and sanitation measures would also minimize potential impacts to wildlife.

Cumulative Impacts

Reasonably foreseeable development within the Chaco sub-watershed may include an estimated additional 71 oil and gas wells and related facilities, and 6 miles of new roads. Surface-disturbing activities that would be associated with these actions may affect an estimated 264 acres of wildlife habitat (USDI/BLM 2003a, page 4-7 and 4-8). Other reasonably foreseeable actions such as continued livestock grazing, vegetation treatments, and community development would cumulatively impact wildlife through direct and effective habitat loss. The proposed action would cumulatively contribute approximately 2.6 acres of habitat loss in the long term and up to approximately 350 acres of effective wildlife habitat loss in the planning area. The proposed action would contribute to cumulative habitat fragmentation within the planning area from the construction of approximately 4,209 feet of new road.

3.6 Special Management Species

3.6.1 Affected Environment

In accordance with BLM Manual 6840, the BLM manages certain sensitive species not federally listed as threatened or endangered in order to prevent or reduce the need to list the species as threatened or endangered in the future. Table 3-8 lists the special management species that have the potential to occur in the analysis area. A Biological Survey Report for the proposed project was prepared and is provided in Appendix D. The Biological Survey Report provides the basis for the findings listed in Table 3-7.

Table 3-7. Bureau of Land Management special status species with potential to occur in the analysis area

Species	Habitat Associations
Mammals	
Spotted bat (*Euderma maculatum*)	The preferred habitat is meadows in subalpine coniferous forest. Also recorded in a wide variety of habitats, from riparian, Great Basin desert shrub, and piñon-juniper woodlands to ponderosa. Rocky cliffs are important for roosting. Permanent water sources are important for foraging.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Roosts mostly in caves or mines; at night can roost in abandoned buildings. Will also use rock crevices and hollow trees as roost sites. In summer, this species occurs widely across the state and can be found over desert-scrub, desert-mountains, oak-woodland, piñon-juniper, and coniferous forests.
Birds	
American peregrine falcon (*Falco peregrinus anatum*)	The breeding territories of peregrine falcons in New Mexico center on cliffs in wooded/forested habitats, with large "gulfs" of air nearby in which these predators can forage.
Bendire's thrasher (*Toxostoma bendirei*)	Typically inhabits sparse desert shrubland and open woodland with scattered shrubs or trees.
Ferruginous hawk (*Buteo regalis*)	Flat or rolling terrain in grasslands, shrub-steppes, deserts, and badlands; prefers elevated nest sites (e.g., buttes, utility poles, trees, and on the ground).
Golden eagle (*Aquila chrysaetos*)	In the western U.S., mostly open habitats in mountainous, canyon terrain, nests primarily on cliffs.
Prairie falcon (*Falco mexicanus*)	Arid, open regions of grassland or scrub vegetation with cliff formations that high and inaccessible. Breeding cliffs are sometimes in semi-open regions with scattered conifer trees and occasionally dense woodlands.
Plants	
Aztec gilia (*Aliciella formosa*)	Salt desert scrub communities on nearly barren clay hills in soils derived from the Nacimiento Formation from 5,000 to 6,000 feet.
Brack's hardwall cactus (*Sclerocactus cloveriae* ssp. *brackii*)	Desert scrub and scattered juniper communities. Sandy clay of the Nacimiento Formation in sparsely vegetated areas between 5,000 to 6,000 feet.

Twenty eight Brack's hardwall cacti were observed in the proposed project area during the biological surveys. No other BLM special management species were observed during the field survey.

3.6.2 Impacts from the Proposed Action

Direct and Indirect Impacts

The project area provides potential foraging habitat for spotted bat and Townsend's big-eared bat. No potential roosting habitat would be removed by the proposed action. Impacts to these bat species would be limited to avoidance of the area during nighttime drilling activities when they may incidentally forage

in the area. These impacts would be short term and limited to summer months when the species could be in the area.

The project area provides suitable habitat nesting for Bendire's thrasher. The proposed action would result in modification of 12.2 acres of undisturbed habitat and the long-term loss of 2.6 acres. Should construction and drilling occur during the breeding season, Bendire's thrasher would likely avoid the area. Pre-construction surveys would be conducted to identify any active nests within the proposed disturbance area if construction should occur between May 15 and July 31. This design feature would avoid or minimize impacts to nesting sensitive avian species.

The analysis area contains open desert scrub, providing potential foraging habitat for golden eagle, American peregrine falcon, ferruginous hawk, and prairie falcon. No potential nesting habitat for these species would be removed or modified by the proposed action. Direct impacts would include the modification of 12.2 acres of undisturbed foraging habitat for these raptor species. Approximately 40 piñon and juniper trees of various ages and sizes would be removed by the proposed action, resulting in a long-term loss of potential perch sites. This loss of perch habitat is not expected to adversely affect the foraging abilities of these raptor species, given the abundance of suitable sites in the surrounding area. After reclamation, there would be a short- to long-term change in vegetation density and composition. This could affect the prey base for these raptors. Approximately 2.6 acres of potential habitat would be converted to industrial use in the long term. Additional impacts may include avoidance of the analysis area by these raptor species during construction, drilling, and operation due to disturbance and activity from human and vehicle presence and associated noise.

Twenty-eight Brack's hardwall cacti were located in the proposed project area. Approximately 13 acres of suitable habitat occurs within the proposed project. The top 6 inches of topsoil in occupied Brack's cactus areas would be scraped, stored, and respread on site during interim reclamation. In addition, a fence will be placed along the southwest edge of disturbance to minimize impacts to individuals in proximity to the permitted area. The proposed action would result in be long-term impacts to approximately 13 acres of Brack's hardwall cactus habitat within the project area.

Cumulative Impacts

The BLM/FFO would continue to manage non-federally listed species according to BLM policies and guidelines, with the goal of contributing to the conservation of these species to reduce the potential for being listed under the Endangered Species Act (ESA) of 1973, as amended (USDI/BLM 2003a, 4-111). For reasonably foreseeable actions on federal lands, direct impacts to nesting special status raptor species would be avoided through the BLM's siting criteria. Development on federal and private lands would result in the removal or modification of potential foraging habitat. These effects would be related to availability of undisturbed habitat and the amount of disturbance that would occur within the analysis area.

The PRMP/FEIS determined that up to 5.5 percent (128,000 acres) of vegetation in the planning area could be impacted cumulatively by oil and gas development (USDI/BLM 2003a, page 4-125). Other reasonably foreseeable actions within the planning area that could impact special status species would include livestock grazing, agriculture, commercial and residential development, mining, and vegetation management.

3.7 Migratory Birds

3.7.1 Affected Environment

Under the Migratory Bird Treaty Act and Executive Order 13186, federal agencies are required to consider impacts to migratory birds from management activities. The BLM migratory bird conservation policy for the planning area is detailed in Instruction Memorandum No. NM-F00-2010-001 (USDI/BLM 2010). This management policy establishes a consistent approach for addressing migratory bird populations and habitats when by making project level implementation decisions. The management policy also outlines best management practices and design features to avoid or minimize impacts.

While all migratory songbirds are protected by law, certain species have been determined to be at greater risk than others. More than 350 avian species occur in San Juan County and the surrounding area administered by the BLM/FFO, which includes portions of Sandoval County. Data collected through breeding bird surveys coordinated by the USFWS and private sector efforts have provided the basis for the New Mexico Partners in Flight (NMPIF) organization to develop bird "watch lists" and the USFWS list of Birds of Conservation Concern. The NMPIF has also identified priority species of birds by habitat type for the state of New Mexico. The FFO area lies within the Colorado Plateau physiographic region, as identified by the NMPIF (NMPIF 2007).

Most of the priority bird species identified by the NMPIF also occur on the USFWS Division of Migratory Bird Management list of "Birds of Conservation Concern 2008" within the Bird Conservation Region 16–Southern Rockies/Colorado Plateau. Birds included on this list are those "species, subspecies, and populations of all migratory non-game birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973" (USFWS 2008).

The project area contains desert scrub (sage-grass) habitat. The Bird Conservation Plan developed for the State of New Mexico by the NMPIF lists the sage thrasher (*Oreoscoptes montanus*) and sage sparrow (*Amphispiza belli*) within the Great Basin desert scrub habitat type as "highest priority" species for conservation.

3.7.2 Impacts from Proposed Action

Direct and Indirect Impacts

Executive Order 13186 calls for increased efforts to fully implement the Migratory Bird Treaty Act. In keeping with this mandate, the BLM consulted the NMPIF Bird Conservation Plan for the State of New Mexico and the USFWS list of Birds of Conservation Concern. A review of these documents—specifically as they pertain to the Colorado Plateau physiographic area determined there are eight "priority" avian species with a known range of distribution in the FFO planning areas that utilize the sage-grass woodland habitat.

Various types of perturbations and/or anthropogenic activity may affect these species. These species and a brief assessment of the effects of the proposed action on their habitat are provided in Table 3-8.

Table 3-8. Migratory bird species of concern potentially occurring within the analysis area and potential impacts

Species	Habitat Type	Potential Impacts
Grasshopper sparrow (*Ammodramus savannarum*)	Sage-grass	May be positively affected due to conversion to grassland.
Sage sparrow[1] (*Amphispiza belli*)	Sage-grass	Minor loss of nesting and brood rearing habitat.
Burrowing owl (*Athene cunicularia*)	Sage-grass	No impact, nests in abandoned prairie dog burrows.
Ferruginous hawk (*Buteo regalis*)	Sage-grass/ piñon-juniper interface	Loss of foraging habitat; decrease in prey (small mammals) abundance likely.
Mountain plover (*Charadrius montanus*)	Sage/grass	No impact.
Long-billed curlew (*Numenius americanus*)	Sage/grass	May be positively affected due to conversion to grassland.
Sage thrasher[1] (*Oreoscoptes montanus*)	Sage/grass	May be some loss of sage/nesting habitat
Bendire's thrasher (*Toxostoma bendirei*)	Sage/grass	Minor impacts anticipated from loss of nesting habitat; increase in prey (i.e., arthropods) likely.

[1] "High Priority" bird species that are on the NMPIF Priority Species List, but not on the USFWS Birds of Conservation Concern 2008 list.

Source: NMPIF 2007.

Direct impacts to migratory birds would include the disturbance and modification of approximately 12.2 acres of undisturbed desert scrub vegetation; there would be a long-term loss of approximately 2.6 acres of habitat that would be converted to an industrial use. Migratory birds could be impacted by disturbance during construction, drilling, and completion; these impacts would be short term. During production, impacts to migratory birds would be related to an increase in habitat fragmentation and disturbance from periodic traffic for maintenance and fluid removal.

Impacts to migratory birds would be greater should construction occur during the breeding season (May 15 through July 31) and pre-construction surveys would be conducted to identify any active nests should construction occur during this time. Construction, drilling, and completions during the breeding season could result in nest destruction or may cause some nest abandonment in adjacent areas. Migratory birds could come into contact with chemicals or fluids stored on-site. Open pits will be netted and vent caps placed on all open pipes to prevent bird entry and nesting. Any spills would be promptly cleaned up. Although individual migratory birds could be impacted by the proposed action, no population level impacts are expected.

Cumulative Impacts

Other reasonably foreseeable actions within the planning area that could impact migratory birds would include livestock grazing, agriculture, commercial and residential development, mining, wildfire, and vegetation management. Cumulative impacts to migratory birds from the proposed action would result from the long-term changes in density and composition of approximately 2.6 acres, including the removal

of approximately 40 widely scattered piñon and juniper trees. The proposed action would contribute negligible impacts to migratory birds when combined with past, present, and future actions.

3.8 Cultural Resources

3.8.1 Affected Environment

The proposed analysis area is located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the prehistory of the San Juan Basin can be divided into five major periods: Paleoindian (ca. 10000 B.C. to 5500 B.C.), Archaic (ca. 5500 B.C. to A.D. 400), Basketmaker II to III and Pueblo I to IV periods (A.D. 1 to 1540), and the historic (A.D. 1540 to present) that includes Native Americans as well as later Hispanic and Euro-American settlers. A detailed description of these various periods and select phases within each period is provided in the Farmington PRMP/FEIS (USDI/BLM 2003a).

The entire area of potential effect (APE) for the proposed action was archaeologically surveyed by LAC at a BLM Class III level (100 percent). Reports were prepared and submitted to the BLM in accordance with the *Procedures for Performing Cultural Resources Fieldwork on Public Lands in the Area of New Mexico BLM Responsibilities* (USDI/BLM 2005). The cultural resource survey results are detailed in the report LAC Report 2014-5v (BLM 2014(IV)23F).

Prior to all field surveys of the proposed action, a Class I investigation of records at the BLM/FFO and an online search of Archeological Records Management Services was conducted to determine if any sites have been recorded within 0.25 mile of the survey area. There are four previously recorded sites within 0.25 mile of the proposed project.

All four of the sites (LA176729, LA176730, LA176731, and LA176732) were recently recorded during cultural surveys of the Williams Four Corners Lateral H-28 pipeline. Sites LA176731 and LA176732 are multicomponent lithic and/or ceramic scatter with 20th century Navajo habitations that are considered to be eligible for nomination to the National Register. Sites LA 176729 and LA176730 are eroded lithic scatters that have been previously determined to be ineligible for nomination to the Nation Register. None of the sites are within the APE.

3.8.2 Impacts from the Proposed Action

Direct and Indirect Impacts

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.

Significant cultural sites (e.g., National Register eligible/listed sites) are being avoided with the implementation of design features such as (but not limited to) the reduction of construction areas, temporary barriers, and site monitoring. These design features are detailed in the BLM Cultural Resource

Record of Review, attached to the COA in the APD and ROW grant. The proposed action is not known to physically threaten any traditional cultural property, 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 would have no direct or indirect impact on significant cultural sites (no historic properties affected).

Cumulative Impacts

The proposed action would have no negative cumulative impact on cultural resources, as significant cultural sites would be avoided. A positive cumulative effect is the additional scientific information yielded by the archaeological surveys.

4. SUPPORTING INFORMATION

4.1 Tribes, Individuals, Organizations, or Agencies Consulted

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Mark Heil, WPX

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Appendix A - Maps and Photographs

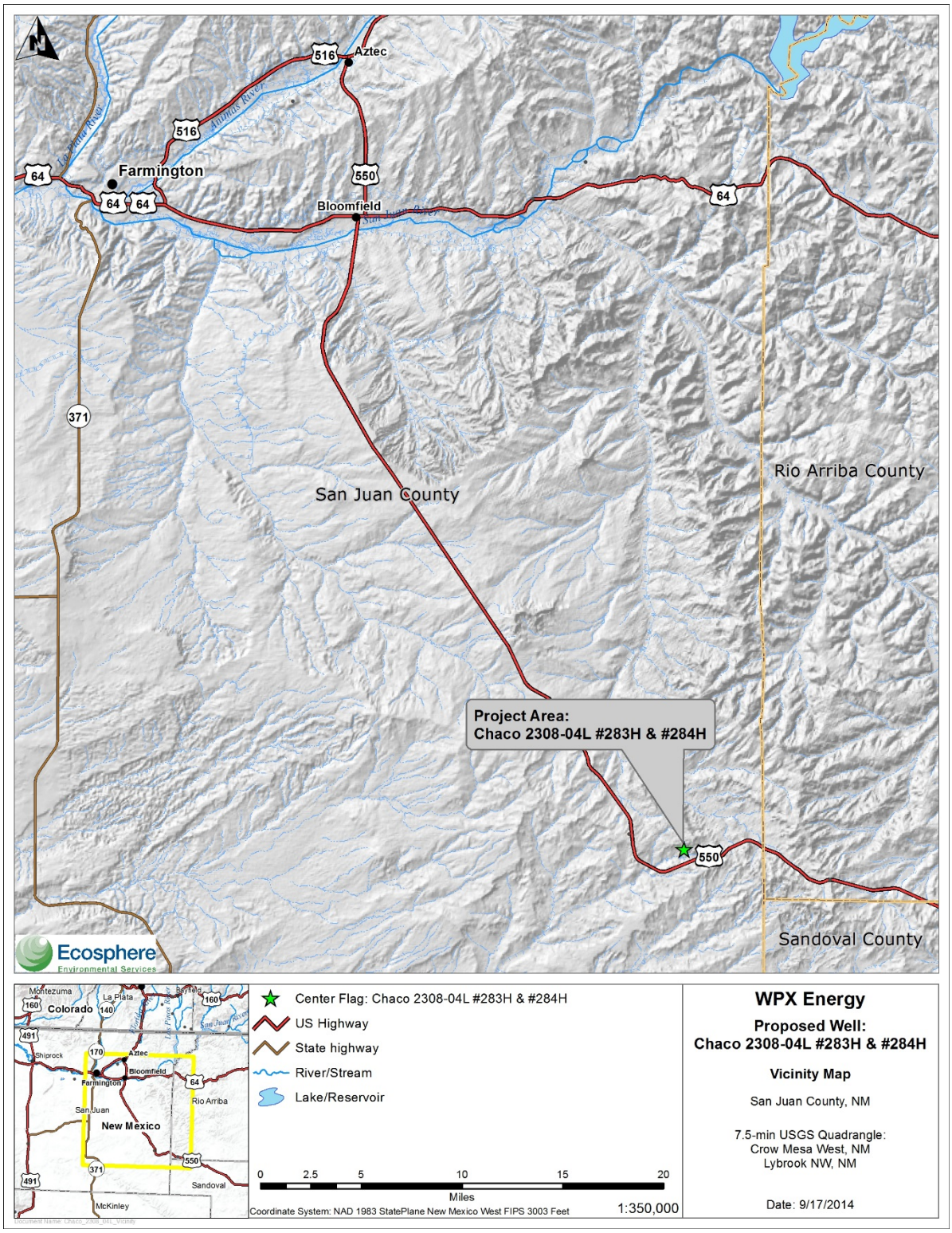

Figure 1: Proposed Chaco 2308-04L Nos. 283H and No. 284H project area and vicinity

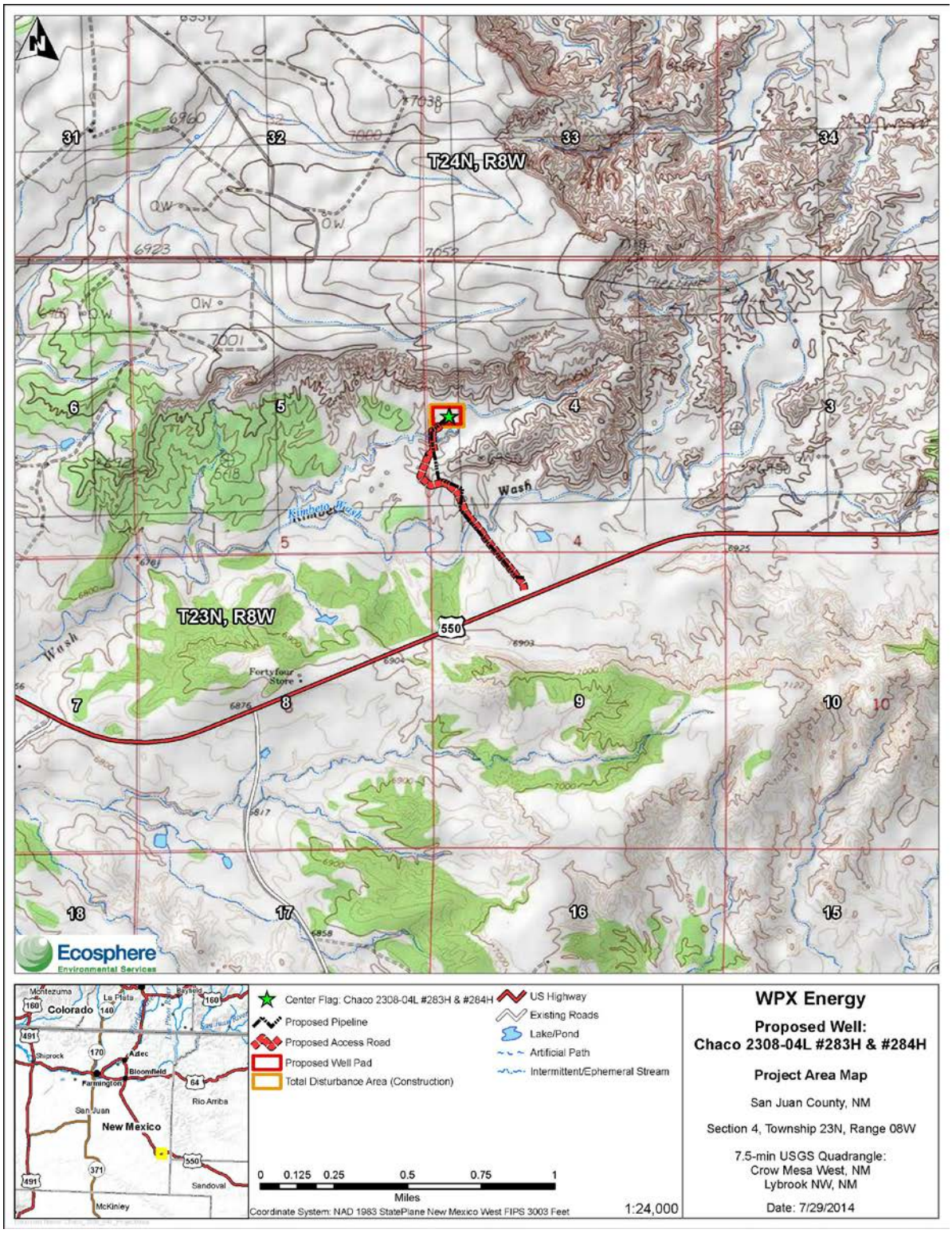

Figure 2. Proposed Chaco 2308-04L Nos. 283H and No. 284H Well Pad, Access Road, and Pipeline project area

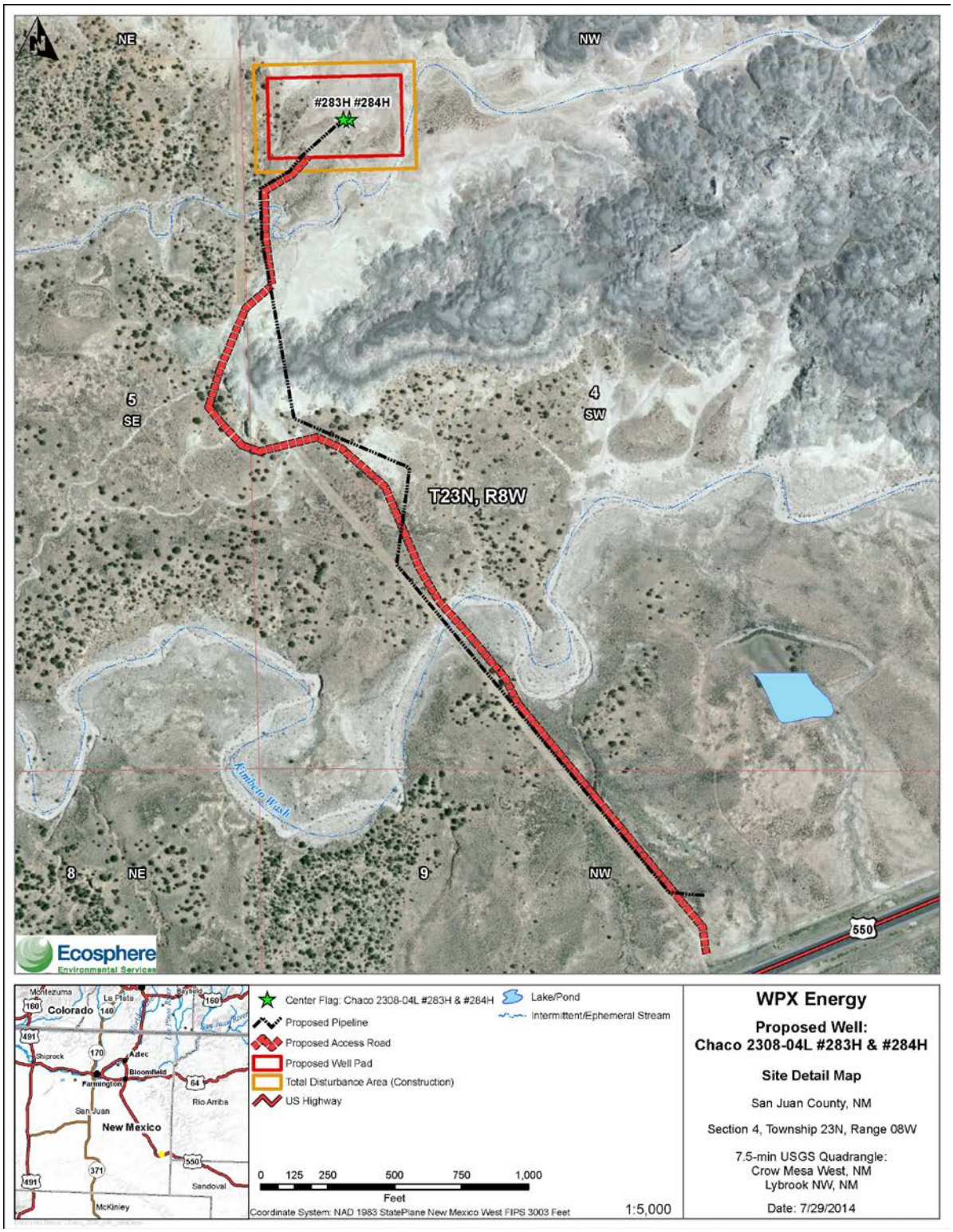

Figure 3. Proposed Chaco 2308-04L Nos. 283H and No. 284H Well Pad, Access Road, and Pipeline site detail

Photograph 1: Chaco 2308-04L Nos. 283H and 284H from corner 5 looking northwest

Photograph 2: Chaco 2308-04L Nos. 283H and 284H from the center stake looking east

Appendix B - Plats

Appendix C – Conditions of Approval and Pipeline Stipulations

Appendix D - Biological Survey Report