UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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

DECISION RECORD

for the

Encana Oil & Gas (USA) Company
Cluster 49 B

Escrito D30 2408 02H, Escrito I24A 2409 01H,02H, 03H, 04H, 05H,
Escrito L30 2408 01H 02H, Escrito M30 2408 01H, 02H,
Escrito N19 2408 01H, 02H
Oil Wells

NEPA No. DOI-BLM-NM-F010-2015-0080

(ATS No.'s F010-14-379, 380, 381, 382, 383, 384, 385, 386, 387,404, 405, 406)

I. Decision

I have decided to select Alternative B for implementation as described in the Environmental Assessment (EA) for ***Encana Oil & Gas (USA) Company, Escrito D30 2408 02H, Escrito I24A 2409 01H, 02H, 03H, 04H, 05H, Escrito L30 2408 01H, 02H, Escrito M30 2408 01H, 02H, Escrito N19 2408 01H, 02H***. Based on my review of the Environmental Assessment (EA) and project record, I have concluded that Alternative B was analyzed in sufficient detail to allow me to make an informed decision. I have selected this alternative because the proposed project would allow ***Encana Oil & Gas (USA) Company*** access to their proposed drilling sites in order to horizontally drill for oil and gas within their valid existing lease.

II. Conformance and Compliance

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

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

III. Finding of No Significant Impact

I have reviewed the direct, indirect and cumulative effects of the proposed activities documented in the EA for the ***Encana Oil & Gas (USA) Company***. I have also reviewed the project record for this analysis. The effects of the proposed action and alternatives are disclosed in the Alternatives and Environmental Consequences sections of the EA. I have determined that construction of a well pad, access road and on lease pipeline to allow ***Encana Oil & Gas (USA) Company*** reasonable access to the mineral lease in order to develop the existing lease as described in the EA will not significantly affect the quality of the human environment. Accordingly, I have determined that the preparation of an Environmental Impact Statement is not necessary.

IV. Other Alternatives Considered

No other alternatives were analyzed that would result in less disturbance.

V. Rationale for the Decision

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

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

Specifically, the proposed project supports the following BLM policy:

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

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

I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8). Cultural resources were identified in the project areas. Monitoring and site protection barriers will be required on this project.

Note: If there are questions about these stipulations, contact Geoffrey Haymes (BLM) at 505.564.7684 or ghaymes@blm.gov.

The proposed activities are not likely to adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act (40 CFR 1508.27(b)(9)). The project area is within a Sensitive Species (Bracks hardwall cacti) habitat, but not within any Threaten and Endangered habitat.

VI. Public Involvement

The Notice of Staking was made available for the public to review at the Farmington Field Office. No comments were received. The project was posted on the Farmington Field Office NEPA log. No comments were received.

VII. Administrative Review and Appeal

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

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

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

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

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

(1) The relative harm to the parties if the stay is granted or denied;

(2) The likelihood of the appellant's success on the merits;

(3) The likelihood of immediate and irreparable harm if the stay is not granted; and

(4) Whether the public interest favors granting the stay.

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

Timothy J. Wakefield
Acting Field Manager
Farmington Field Office

9-15-15
Date

United States Department of the Interior
Bureau of Land Management

Environmental Assessment DOI-BLM-NM-F010-2015-0080

Escrito I24A-2409 Nos. 01H, 02H, 03H, 04H, and 05H, Escrito L30-2408 Nos. 01H and 02H, and Escrito M30-2408 Nos. 01H and 02H Oil and Natural Gas Wells Projects, and Escrito N19-2408 Nos. 01H and 02H Natural Gas Wells Project

August 2015

New Mexico • Farmington Field Office

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

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

Encana Oil & Gas (USA) Inc. (Encana) has submitted 11 Applications for Permit to Drill (APDs) and 12 Right-of-Way (ROW) Grant applications to the Bureau of Land Management – Farmington Field Office (BLM-FFO) for the following four Encana Oil & Gas (USA) Inc. (Encana) oil and natural gas wells project areas:

- Escrito I24A-2409 Nos. 01H, 02H, 03H, 04H, and 05H (Escrito I24)
- Escrito L30-2408 Nos. 01H and 02H (Escrito L30)
- Escrito M30-2408 Nos. 01H and 02H (Escrito M30)
- Escrito N19-2408 Nos. 01H and 02H (Escrito N19; natural gas wells)

The proposed projects would consist of a total of 11 wells and associated facilities. The proposed action is the approval of the APDs and ROW Grants by the BLM-FFO, located in Farmington, New Mexico.

The proposed projects would involve the horizontal drilling, possible production, and final abandonment of 11 wells that would be drilled to BLM-FFO-managed minerals. Each of the 11 wells would be permitted under an approved APD issued by the BLM-FFO. Each of the proposed projects would involve the construction, usage, and reclamation of a well pad (including construction zone), access road, and well-connect pipeline located on BLM-FFO-managed surface. Each of these surface features would be authorized by a BLM-approved ROW Grant. The proposed projects are described in the table below.

Table 1: Proposed Project Details

Proposed Project	Well Pad Dimensions (Feet)	Access Road Length (Feet)	Well-Connect Pipeline Length (Feet)	NMNM Lease No.	Mineral Pool
Escrito I24	400 x 520	129	73	01H, 03H, & 04H: 41650 02H & 05H: 78860	Basin Mancos
Escrito L30	400 x 430	218	245	01H: 78860 02H: 54981 & 54980	
Escrito M30	400 x 430	59	55	01H & 02H: 78860	
Escrito N19	400 x 430	155	3,271	01H & 02H: 54981 & 54980	Basin Mancos Gas

Additionally, the proposed Escrito L30 project would involve the construction, usage, and reclamation of a range improvement pond (silt trap). The proposed range improvement pond would be used to acquire fill material for road construction and to create a water source for livestock and wildlife.

The proposed Escrito N19 would also involve the rerouting of an existing road and construction, usage, and reclamation of a pullout area along the road reroute. The existing road that currently located within the southern half of the proposed well pad is proposed to be rerouted along the northern side of the proposed well pad.

Oil and natural gas, vital components of the nation's energy supply, account for approximately 36 and 25 percent of total energy consumed in the U.S., respectively. These energy sources are used in residential and commercial buildings, in transportation, and by industry (U.S. Energy Information Administration 2012). Common uses for natural gas include space heating, water heating, cooling, cooking, waste treatment and incineration, metals preheating, drying and humidification, glass melting, food processing, fueling industrial boilers, vehicle fueling, and electricity generation. Gases such as butane, ethane, and propane can be extracted from natural gas to be used for products such as fertilizers and pharmaceuticals. Natural gas can also be used to create methanol, which is utilized in the production of formaldehyde, acetic acid, fuel cell sources, and additives for cleaner burning gasoline (Natural Gas Supply Association 2010). Most oil goes into fuels, including gasoline, jet fuel, and home-heating oil. Additionally, non-fuel compounds extracted from oil are used to develop lubricants; asphalt for roads; tar for roofing; waxes for food wrapping; solvents for paints; cosmetics and dry-cleaning products; plastics; and foams (U.S. Energy Information Administration 2012).

Approximately 84 percent of natural gas and 55 percent of oil consumed in the U.S. is produced in the U.S. Additionally, U.S.-produced oil and natural gas is also exported to other countries (U.S. Department of Energy 2011). Within the U.S., oil and natural gas reserves are concentrated within distinct fields. The BLM-FFO management area is within the San Juan Basin, one of the most prolific gas-producing basins in the country. Currently, the San Juan Basin produces small amounts of oil (BLM 2003a, 3-9).

Taxes and royalties on oil, natural gas, and carbon dioxide production contribute approximately 25 percent of New Mexico's general fund, and the oil and gas industry is one of the largest private sector employers in the State of New Mexico (State; New Mexico Bureau of Geology and Mineral Resources 2012). Additionally, the Federal government receives royalties, or a share of the production income, for extracted Federal minerals. In 2011, Federal natural gas royalties totaled over 2 billion dollars (Office of Natural Resources Revenue 2012).

The proposed project areas are located within the San Juan Basin in San Juan County, New Mexico. The proposed project areas are approximately 32 to 33 areal miles southeast of the town of Bloomfield, New Mexico, and are approximately1 to 2 areal miles northeast of the community of Nageezi, New Mexico and U.S. Highway 550 (see Figure A.1, Appendix A).

1.2. Purpose and Need for Action

The purpose of the proposed action is to allow Encana reasonable access to BLM-managed lands to develop their Federal mineral leases.

The need for the proposed action is established by the BLM's responsibility under the Mineral Leasing Act of 1920, as amended (MLA; 30 U.S. Code [USC] 181 et seq.), and the Federal Land Policy and Management Act of 1976 (FLPMA, 43 USC 1701 et seq.). The MLA authorizes the BLM to lease public lands for the development of mineral deposits (including oil, gas, and other hydrocarbons) and permit the development of those leases. The FLPMA authorizes the BLM to grant, issue, or renew ROW Grants over public lands for multiple uses. It is the policy of the BLM, as derived from several laws, including the MLA and FLPMA, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs. Per 43 Code of Federal Regulations (CFR) 3160 (Onshore Oil and Gas Operations), the BLM is required to respond to a request for an APD and ROW Grant.

1.3. Decision to be Made

The BLM-FFO will decide whether or not to issue the APDs and ROW Grants associated with the proposed projects, and if so, under what terms and conditions. Under the National Environmental Policy Act (NEPA; Public Law 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 APDs and ROW Grants with design features as submitted
- To approve the APDs and ROW Grants with additional mitigation added
- To analyze the effects of the proposed action in an EIS
- To deny the APDs and ROW Grants

1.4. Conformance with Applicable Land Use Plan(s)

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

Specifically, the proposed action supports the following BLM policy:

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

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

As required by NEPA, this EA addresses site-specific resources and effects of the proposed action that were not specifically covered within the PRMP/FEIS.

1.5. Relationship to Statutes, Regulations or Other Plans

Encana would comply with applicable Federal, State, and local laws and regulations. Necessary permits and approvals for the proposed projects would be obtained prior to project implementation.

Many requirements regulating specific environmental elements are found in the appropriate elements sections of this EA (Chapter 3). Several permits, licenses, consultations, or other requirements are discussed below.

1.5.1. *Clean Water Act*

The proposed action is in conformance with the Clean Water Act, as amended (CWA; 33 USC 1251 et seq.).

Section 401

Under Section 401 of the CWA, an applicant for a Federal license or permit to conduct an activity that may result in a discharge into a water of the U.S. must provide the Federal agency with a Section 401 certification declaring that the discharge would comply with the CWA. The certification would be granted by the New Mexico Environment Department (NMED).

Section 402

Under Section 402 of the CWA, the U.S. Environmental Protection Agency (EPA) regulates storm water discharges from industrial and construction activities under the National Pollution Discharge Elimination

System program. Permits are required if discharge results in a reportable quantity for which notification is required (pursuant to 40 CFR 117.21, 40 CFR 302.6, or 40 CFR 110.6) or if the discharge contributes to a violation of a water quality standard.

Section 404

Under Section 404 of the CWA, the EPA regulates the discharge of dredged or fill material into waters of the U.S., including wetlands. The Section 404 program is administered by the EPA and U.S. Army Corps of Engineers (USACE). Under the CWA, the USACE has jurisdiction over waters of the U.S. Waters of the U.S. are considered jurisdictional because they have a "significant nexus" to traditional navigable waters. The BLM-FFO and USACE - Durango Regulatory Office have determined that jurisdictional waters (i.e., waters of the U.S.) within the BLM-FFO planning area may include U.S. Geological Survey (USGS) watercourses (i.e., "blue lines" on USGS 1:24,000 topographic maps).

1.5.2. *National Historic Preservation Act*

Section 106 of the National Historic Preservation Act of 1966 (NHPA; 16 USC 470) requires Federal agencies to take into account the effects of their actions on historic properties, and allow the Advisory Council on Historic Preservation a reasonable opportunity to comment. Compliance with the requirements of the NHPA is met by following the Protocol Agreement between the New Mexico BLM and New Mexico State Historic Preservation Officer, which is authorized by the Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (1997).

1.5.3. *Clean Air Act*

The Clean Air Act of 1972, as amended (CAA; 42 USC 7401 et seq.), establishes national ambient air quality standards (NAAQS) to control air pollution. In New Mexico, the NMED has adopted most of the CAA into the New Mexico Administrative Code (NMAC). The NMED issues construction and operating permits for air quality and enforces air quality regulations and permit conditions.

1.5.4. *New Mexico State Regulations*

The New Mexico Oil Conservation Division (NMOCD), which is in the New Mexico Energy, Minerals, and Natural Resources Department (EMNRD), regulates oil and gas operations in New Mexico. The NMOCD has the responsibility of gathering production data, permitting new wells, establishing pool rules and allowables, issuing discharge permits, enforcing rules and regulations, monitoring underground injection wells, ensuring that abandoned wells are properly plugged, and ensuring that the land is responsibly restored. Oil and gas regulations administered by NMOCD are contained in NMAC 19.15. These regulations include the following, with which Encana would comply:

- The EMNRD requires operators to follow "pit rule" guidelines (NMAC 19.15.17) to reduce groundwater contamination from industry-related activities.
- NMAC 19.15.15 establishes requirements for well acreage spacing, obtaining approval of unorthodox well locations, and pooling or communitizing small acreage oil lots.
- NMAC 19.15.16.19 requires the disclosure of hydraulic fracture constituents.

1.6. Scoping, Public Involvement, and Issues

1.6.1. *Scoping and Public Involvement*

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

Pre-disturbance onsite meetings were attended by Encana, BLM-FFO representatives, and an environmental consultant (Nelson Consulting, Inc. [NCI]), were held for the proposed projects on September 10 and October 31, 2014. A public invitation to the pre-disturbance onsite meetings was also posted online (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html) and the Nageezi Chapter House of the Navajo Nation was also invited. No private citizens or groups attended the meetings. A BLM-FFO Interdisciplinary Team meeting was held for the proposed projects on October 6, 2014.

At the aforementioned meetings, potential issues of concern were identified by the BLM-FFO and NCI.

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*

Issues Analyzed

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

- Would drilling the proposed wells impact groundwater?
- How would vegetation clearing, proposed project activities, and final reclamation associated with the proposed projects impact upland vegetation?
- How would vegetation clearing, proposed project activities, and final reclamation associated with the proposed projects impact noxious weeds and invasive species?
- How would vegetation clearing, proposed project activities, and final reclamation impact wildlife, including migratory birds?
- How would vegetation clearing, proposed project activities, and final reclamation impact the following BLM Special Status Species (SSS): Aztec gilia (*Aliciella formosa*), Brack's fishhook cactus (*Sclerocactus cloveriae* var. *brackii*), Bendire's thrasher (*Toxostoma bendirei*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), prairie falcon (*Falco mexicanus*), and Townsend's big-eared bat (*Corynorhinus townsendii*)?
- How would surface-disturbing activities associated with construction of the proposed projects impact cultural resources?
- How would proposed project activities impact travel and transportation?
- How would vegetation clearing, proposed project activities, and final reclamation impact livestock?
- How would proposed project activities impact public health and safety?
- How would proposed project activities impact environmental justice?

Issues Considered but not Analyzed

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

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

Under Section 7 of the Endangered Species Act of 1973 (ESA; 16 USC 1531-1544), all Federal agencies are required to consult with the USFWS or National Marine Fisheries Service if they are proposing an action that may affect listed species or designated habitat. Consultation with the USFWS was conducted as part of the PRMP/FEIS to address the cumulative effects of RMP implementation (Consultation No. 2-22-01-1-389, Appendix M of the PRMP/FEIS). Based on a review of species currently listed by the USFWS as occurring in San Juan County (USFWS 2015), as well as the location of the proposed project areas and habitat within the proposed project areas, the potential does not exist for USFWS-listed species to occur within the proposed project areas (see Biological Survey Reports [BSRs], Appendix B). Water for drilling would be obtained from the permitted Blanco Trading Post SJ-2105 water well; no unaccounted-for water depletions within USFWS-listed fish habitat would occur. Therefore, there is no need for additional Section 7 consultation.

Native American Religious Concerns

For the proposed action, identification efforts for Native American Religious Concerns were limited to a review of existing published and unpublished literature (e.g., Van Valkenburgh 1941, 1974; Brugge 1993; Kelly et al. 2006), development of the site-specific Class III survey reports prepared for the proposed action by La Plata Archaeological Consultants [LAC] 2014a, 2014b, 2015a, and 20105b), and a review by the BLM's cultural resources program regarding the presence of Traditional Cultural Properties (TCPs) identified through ongoing BLM tribal consultation efforts. There are currently no known remains that fall within the purview of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA; 25 USC 3001) or the Archaeological Resources Protection Act (ARPA; 16 USC 470) within the proposed project areas.

Ground Water Resources

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 (EPA 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 (EPA 2004) or disposal. Stimulation techniques have been used in the United States since 1949 and in the San Juan Basin since the 1950s. Over the last 10 years, advances in multi-stage and multi-zone hydraulic fracturing have allowed development of gas fields that previously were uneconomic, including the San Juan Basin.

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

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Proposed Action

The proposed action is the BLM-FFO approval of 11 APDs and 12 ROW Grants associated with Encana's proposed Escrito I24A, Escrito L30, Escrito M30, and Escrito N19 projects. The proposed projects would include the following:

- Drilling, production, and final abandonment of nine oil and natural gas wells and two natural gas wells associated with the proposed projects
- The construction, use, and reclamation of four associated well pads (with construction zones), four associated access roads, and four associated well-connect pipeline corridors with the proposed projects.
- The construction, use, and reclamation of a proposed reroute of an existing road and an associated pullout area associated with the proposed Escrito N19 project
- The construction, use, and reclamation of one range improvement pond (silt trap) associated with the proposed Escrito L30 project

The primary objective of the Escrito 124A, Escrito L30, and Escrito M30 wells would be to produce oil; however, it is likely that natural gas would be a byproduct. The primary objective of the Escrito N19 wells would be natural gas.

Commencement of the proposed projects would take place upon receipt of the APDs and ROW Grants. The scheduled commencement of the proposed projects could be delayed based on the issuance date of the approved APDs and ROW Grants or drill rig scheduling.

Construction plats and photographs associated with the proposed projects are provided in Appendices C and D, respectively.

2.1.1. *Location of Proposed Project Areas*

The proposed project areas are located within the San Juan Basin in San Juan County, New Mexico. The proposed project areas are located approximately 32 to 33 areal miles southeast of the town of Bloomfield, New Mexico, and. 1 to 2 areal miles northeast of the community of Nageezi, New Mexico and U.S. Highway 550 (see Figure A.1, Appendix A).

The general region surrounding the proposed project areas is characterized by broad valleys with rolling hills and badlands terrain along steeper hill slopes. Larger mesas are located distantly to the north and east of the proposed project areas. Elevation of the proposed project areas ranges from approximately 6,760 to 6,900 feet above mean sea level (AMSL). The legal location (New Mexico Principal Meridian) for the proposed project areas is provided in the table below.

Table 2: Legal Land Description for Project Features

Facility	Legal Location (New Mexico Principal Meridian)		
	Quarter-Quarter	Section	Township & Range
Escrito I24A			
Well Pad & Construction Zone	west½ of the southwest¼	19	Township 24 North, Range 8 West
	east½ of the southeast¼	24	Township 24 North, Range 9 West
Access Road & Well-Connect Pipeline	northeast¼ of the southeast¼		
Escrito L30			
Well Pad & Construction Zone	southwest¼ of the northwest¼	30	Township 24 North, Range 8 West
Well Pad, Construction Zone, Access Road, & Well-Connect Pipeline	northwest¼ of the southwest¼		
Access Road & Well-Connect Pipeline	northeast¼ of the southeast¼	25	Township 24 North, Range 9 West
Escrito M30			
Well Pad, Construction Zone, Access Road, & Well-Connect Pipeline	northwest¼ of the southwest¼	30	Township 24 North, Range 8 West
Well Pad & Construction Zone	southwest¼ of the southwest¼		
Escrito N19			
Well Pad , Construction Zone, Access Road, Road Reroute, & Well-Connect Pipeline	southeast¼ of the southwest¼	19	Township 24 North, Range 8 West
Road Reroute & Well-Connect Pipeline	northeast¼ of the southwest¼		
Well-Connect Pipeline	northwest¼ of the southwest¼	24	Township 24 North, Range 9 West
	northeast¼ of the southeast¼		

The latitude and longitude and footages of the bottom hole and surface hole (wellhead) locations are provided in the table below.

Table 3: Bottom Hole and Surface Hole Locations for Proposed Wells

Wellhead/ Bottom Hole	Geographical Coordinate System (UTM, NAD83 [1])		Legal Location (New Mexico Principal Meridian)	
	Latitude	Longitude	Footages [2]	Township, Range, Section
Escrito I24A				
01H				
Wellhead	36.297100°	-107.731965°	1,647 feet FSL 19 feet FEL	Township 24 North, Range 9 West, Section 24
Bottom Hole	36.298307°	-107.715042°	2,086 feet FSL 330 feet FEL	Township 24 North, Range 8 West, Section 19
02H				
Wellhead	36.297028°	-107.732014°	1,621 feet FSL 33 feet FEL	Township 24 North, Range 9 West, Section 24
Bottom Hole	36.295821°	-107.748880°	1,270 feet FSL 330 feet FWL	Township 24 North, Range 8 West, Section 24

Wellhead/ Bottom Hole	Geographical Coordinate System (UTM, NAD83 [1])		Legal Location (New Mexico Principal Meridian)	
	Latitude	Longitude	Footages [2]	Township, Range, Section
03H				
Wellhead	36.296955°	-107.732063°	1,595 feet FSL 47 feet FEL	Township 24 North, Range 9 West, Section 24
Bottom Hole	36.296382°	-107.715042°	1,385 feet FSL 330 feet FEL	Township 24 North, Range 8 West, Section 19
04H				
Wellhead	36.296883°	-107.732113°	1,569 feet FSL 61 feet FEL	Township 24 North, Range 9 West, Section 24
Bottom Hole	36.294683°	-107.715042°	766 feet FSL 330 feet FEL	Township 24 North, Range 8 West, Section 19
05H				
Wellhead	36.296811°	-107.732162°	1,543 feet FSL 76 feet FEL	Township 24 North, Range 9 West, Section 24
Bottom Hole	36.294086°	-107.748899°	638 feet FSL 330 feet FWL	
Escrito L30				
01H				
Wellhead	36.284987°	-107.730842°	2,518 feet FSL 350 feet FWL	Township 24 North, Range 8 West, Section 30
Bottom Hole	36.286677°	-107.748935°	2,060 feet FNL 330 feet FWL	Township 24 North, Range 9 West, Section 25
02H				
Wellhead	36.284904°	-107.730843°	2,488 feet FSL 350 feet FWL	Township 24 North, Range 8 West, Section 30
Bottom Hole	36.278989°	-107.722230°	330 feet FSL 2,400 feet FEL	
Escrito M30				
01H				
Wellhead	36.281264°	-107.730514°	1,162 feet FSL 454 feet FWL	Township 24 North, Range 8 West, Section 30
Bottom Hole	36.282989°	-107.748940°	1,885 feet FSL 330 feet FWL	Township 24 North, Range 9 West, Section 25
02H				
Wellhead	36.281184°	-107.730540°	1,133 feet FSL 447 feet FWL	Township 24 North, Range 8 West, Section 30
Bottom Hole	36.279337°	-107.748940°	555 feet FSL 330 feet FWL	Township 24 North, Range 9 West, Section 25
Escrito N19				
01H				
Wellhead	36.295559°	-107.724820°	1,085 feet FSL 2,095 feet FWL	Township 24 North, Range 8 West, Section 19
Bottom Hole	36.284130°	-107.715147°	2,198 feet FSL 330 feet FEL	Township 24 North, Range 8 West, Section 30
02H				
Wellhead	36.295559°	-107.724921°	1,085 feet FSL 2,065 feet FWL	Township 24 North, Range 8 West, Section 19
Bottom Hole	36.281677°	-107.715177°	1,305 feet FSL 330 feet FEL	Township 24 North, Range 8 West, Section 30

[1]UTM: Universal Transverse Mercator, NAD83: North American Datum of 1983
[2]FNL: From North Line, FSL: From South Line, FEL: From East Line, FWL: From West Line

Maps and photographs of the proposed project areas are provided in Appendices A and D, respectively. The proposed project areas are plotted on the Blanco Trading Post and Crow Mesa West, New Mexico, 7.5-minute USGS quadrangles (Figure A.2) and the 2011 San Juan County National Agriculture Imagery Program aerial photograph (Figure A.3).

Escrito I24A

Existing disturbance adjacent to the proposed Escrito I24A project area consists of the following:

- The western side of the proposed well pad and construction zone is located adjacent to the Escrito I24-2409 well-connect pipeline corridor and an existing resource road leading to the inactive Dugan Production Corporation (Dugan) Largo B Federal No. 91 well pad and Encana's active Escrito I24-2409 well pad.
- The eastern side of the proposed well pad and construction zone are located parallel to an existing resource road and Dugan's active Lee's Ferry No. 1 access road.
- The proposed well pad is located approximately 570 feet southeast of Dugan's inactive Largo B Federal No. 91, approximately 100 feet south of Encana's active Escrito I24-2409 No. 1H well pad, and approximately 250 feet southwest of Dugan's active Lee's Ferry No. 1 well pad.
- The proposed well pad and construction zone cross an existing fence line that would be rerouted around the eastern side of the proposed well pad.
- Existing two-track roads travel through the proposed well pad and construction zone.
- The proposed well-connect pipeline ties into the existing Escrito I24-2409 well-connect pipeline.

The proposed Escrito I24A well pad is located on even to gently rolling terrain with a flat to gentle slope to the west. Elevation of the proposed project area ranges from 6,890 to 6,900 feet AMSL.

Escrito L30

The proposed Escrito L30 well pad is located approximately 0.7 mile south of the proposed Escrito I24A well pad.

Existing disturbance adjacent to the proposed Escrito L30 project area consists of the following:

- The western side of the proposed well pad and construction zone is parallel to a resource road and Encana's I24-2409 well-connect pipeline.
- The proposed access road and well-connect pipeline corridor begin at a resource road and cross an existing fence line that runs north-south and parallel to the resource road.
- The proposed well-connect pipeline crosses a resource road and ties in to Encana's existing Escrito 124-2409 well-connect pipeline.

The proposed Escrito L30 project area is located on gently rolling terrain with a gentle slope to the southwest. Elevation of the proposed project area ranges from 6,800 to 6,820 feet AMSL.

Escrito M30

The proposed Escrito M30 well pad is located approximately 0.2 mile south of the proposed Escrito L30 well pad and approximately 1.0 mile south of the proposed Escrito I24A well pad.

Existing disturbance adjacent to the proposed Escrito M30 project area consists of the following:

- The northeastern side of the proposed well pad and construction zone is parallel to a resource road and Encana's I24-2409 well-connect pipeline.
- The proposed well pad and construction zone are located approximately 0.2 miles west of Dugan's inactive Sheba Temple No. 1 well pad and access road.
- The proposed well pad construction zone crosses an existing fence line that would be rerouted around to the western side of the proposed well pad during construction and replaced during interim reclamation.
- The proposed well-connect pipeline ties into Encana's existing I24-2409 well-connect pipeline.

The proposed Escrito M30 project area is located on gently rolling terrain with a gentle slope to the west. Elevation of the proposed project area ranges from 6,780 to 6,800 feet AMSL.

Escrito N19

The proposed Escrito N19 well pad is located approximately 1.0 mile northeast of the proposed Escrito M30 well pad, 0.7 mile northeast of the proposed Escrito L30 well pad, and approximately 0.3 mile east-southeast of the proposed Escrito I24A well pad.

Existing disturbance adjacent to the proposed Escrito N19 project area consists of the following:

- An existing resource road travels east-west through the southern portion of the proposed well pad.
- Existing two-track roads travel through the proposed well pad and construction zone.
- Dorfman Production Companies' (Dorfman) plugged and abandoned Sapp B No. 2 well is located approximately 300 feet west of the proposed well pad.
- The proposed access road crosses an existing two-track road.
- The proposed road reroute passes within approximately 30 feet of Dorfman's plugged and abandoned Sapp B No. 2 well.
- The proposed well-connect pipeline crosses four existing two-track roads and an existing fence line near Encana's active Escrito I24-2409 No. 1H well pad.
- The proposed well-connect pipeline travels along the northern edge of Dugan's active Lee's Ferry No. 1 well pad and the northern and western edges of Encana's active Escrito I24-2409 No. 1H well pad
- The proposed well-connect pipeline ties into Encana's existing I24-2409 well-connect pipeline.

The proposed Escrito N19 project area is located on flat to gently rolling and hilly terrain with a gentle slope to the northeast. There is a steep hillslope near the west central portion of the well-connect pipeline. Elevation of the proposed project area ranges from 6,760 to 6,900 feet AMSL.

2.1.2. *Description of Proposed Projects*

For a detailed description of design features and construction practices associated with the proposed projects, refer to the APDs and ROW Grant Applications on file at the BLM-FFO. The plats (Appendix C) provide additional details.

Design Features and Best Management Practices

Encana would comply with 43 CFR 3160, Onshore Oil and Gas Orders, and BLM guidance and standards established in *The Gold Book: Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development* (*The Gold Book*; BLM and U.S. Forest Service [USFS] 2007).

Encana would adhere to the Conditions of Approval (COAs) attached to the approved APDs and stipulations attached to the ROW Grants.

Vehicles would be restricted to proposed disturbance areas and existing areas of surface disturbance, such as existing roads and well pads. Construction and maintenance activities would cease when soil or road surfaces become saturated to the extent that construction equipment is unable to stay within the proposed project areas and/or when activities would cause irreparable harm to roads, soils, or streams. If equipment creates ruts deeper than six inches, the soil would be deemed too wet for construction or maintenance. No frozen soils would be used for construction purposes or trench backfilling.

The well locations would have informational signs, as required by Onshore Oil and Gas Operations regulations (43 CFR 3160).

The following general design features and best management practices (BMPs) would occur.

Control of Waste

Liquid and solid wastes would be disposed of at an appropriate waste-disposal site. The proposed project areas would be maintained in a sanitary condition. Hazardous substances would be handled and disposed of according to Federal law. Waste resulting from construction activities would be removed from the proposed project areas and disposed of in an authorized area, such as an approved landfill.

The operator would follow NMOCD "Pit Rule" guidelines and Onshore Order No. 1 (issued under Onshore Oil and Gas Operations [43 CFR 3160]).

Protection of Paleontological Resources

If a paleontological site is discovered, the BLM would be notified and the site would be avoided by personnel, personal vehicles, and company equipment. Workers would be informed that it is illegal to collect, damage, or disturb some such resources, and that such activities are punishable by criminal and/or administrative penalties.

Protection of Cultural Resources

All cultural resource stipulations would be followed as indicated in the Cultural Resource Records of Review, attached to the COAs and stipulations in the approved APDs and ROW Grants, respectively. These cultural resource stipulations could include, but would not be limited to, temporary or permanent fencing or other physical barriers, monitoring of earth-disturbing construction, reduction of the proposed project areas and/or establishment of specific construction avoidance zones, and employee education.

Employees, contractors, and sub-contractors associated with the proposed projects would be informed by Encana that cultural sites are to be avoided by personnel, personal vehicles, and company equipment. These individuals would 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 ARPA.

In the event of a cultural discovery during construction, Encana would immediately stop all construction activities in the immediate vicinity of the discovery and immediately notify the archaeological monitor, if present, or the BLM. The BLM would then evaluate or cause the site to be evaluated. Should a discovery be evaluated as significant (e.g., eligible for the National Register of Historic Places [NRHP] or protected under NAGPRA or ARPA), it would be protected in place until mitigating measures could be developed and implemented according to guidelines set by the BLM.

Protection of Flora and Fauna, including SSS and Livestock

Because the proposed projects would each disturb more than four acres of vegetation, if construction activities associated with any of the proposed projects would occur during the migratory bird breeding season (May 15 through July 31), a migratory bird nest survey of the proposed project areas would take place one to two days prior to construction. This survey would be conducted by a BLM-FFO-approved biologist following BLM-FFO protocol. If, during the nest survey or during construction, active nests are located within or adjacent to the proposed project areas, the BLM-FFO biologist would be notified and project activities would not be permitted until fledging has occurred. If postponement is not an option, the operator would contact the USFWS's Migratory Bird Permit Office regarding permitting.

Should any active raptor nests be observed within one-third mile of the proposed project areas or should any additional SSS (listed by the USFWS or BLM) be observed within the proposed project areas prior to or during project implementation, construction would cease and the BLM-FFO would be immediately contacted. The BLM-FFO would then ensure evaluation of the resource. Should a discovery be evaluated as significant (protected under the ESA, etc.), it would be protected in place until mitigation could be developed and implemented according to guidelines set by the BLM.

Wildlife hazards associated with the proposed projects would be fenced, covered, and/or contained in storage tanks, as necessary. Per BLM Instruction Memorandum No. 2013-033, if any open pits or tanks are associated with the proposed projects, they would be netted to prevent birds from entering them.

As stated above (Control of Waste), Encana would follow "Pit Rule" guidelines and Onshore Order No. 1.

Encana would notify the USFWS upon discovery of a dead or injured migratory bird, bald or golden eagle, or USFWS-listed species within or adjacent to the proposed project areas. If the BLM becomes aware of such mortality or injury, the BLM would inform Encana. If Encana fails to notify the USFWS of the mortality or injury, the BLM would notify the USFWS. The BLM and the USFWS would then attempt to determine the cause of mortality and evaluate and identify appropriate mitigation measures to avoid future occurrences.

Livestock grazing operators in the vicinity of the proposed project areas would be contacted by Encana at least 10 days prior to construction. Any range improvements (such as fences, gates, cattle guards, or waterlines) that could be impacted by the proposed projects would be identified and impacts would be mitigated prior to construction. If any range improvements are damaged during project activities, they would immediately be repaired to their former state or better.

For each proposed pipeline trench, gaps would be made in topsoil and subsoil stockpiles, where necessary, to allow for wildlife or cattle crossings.

No more than the amount of pipeline trench than can be worked on in one day would be open at any given time. Trenches would not be left open for more than 24 hours. If a trench is left open overnight, Encana would provide a night guard to monitor the open trench and ensure that no livestock or wildlife becomes trapped.

The ends of the proposed pipeline trenches would be sloped (3-to-1, horizontal-to-vertical) each night to allow wildlife and livestock to escape. If present, established wildlife or livestock trails would be left in place as crossovers. Escape ramps or crossovers would be constructed within the trenches; if active livestock grazing is occurring in the proposed project areas, these ramps/crossovers would be constructed where necessary. The escape ramps/crossovers would be constructed with a minimum 3-to-1 slope at each end. The escape ramps/crossovers would be a minimum of 10 to 12 feet wide and would not be fenced. The ends of the pipes would be plugged to prevent animals from crawling inside them. Before the trenches are closed, they would be inspected for wildlife and livestock. Any trapped wildlife or livestock would be promptly removed and released at least 150 yards from the trenches.

Escrito I24A
A fence line will be cut and braced and rerouted around the proposed well pad edge of disturbance at the southern corner (corner 2), the southeastern side (side 1), and the northeastern corner (corner 6) during construction. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with t *The Gold Book* (BLM and USFS 2007).

Escrito L30

- An existing fence line will be cut and braced for access road and pipeline installation. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with *The Gold Book* (BLM and USFS 2007).
- A cattle guard and wing gate will be installed 60 feet off the existing road.
- A 150-foot-by-100 foot range improvement pond (silt trap) will be constructed near the southeastern corner (corner 5) of the proposed well pad outside of the edge of disturbance.

Escrito M30
A fence line will be rerouted around the edge of disturbance near the southwestern corner of the proposed well pad construction zone (corner 6) during construction and drilling. The fence will be restored to its original positioning at interim reclamation.

Escrito N19
A fence line will be cut and braced for well-connect pipeline installation. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with *The Gold Book* (BLM and USFS 2007).Protection of Water Resources

As stated above (Control of Waste), the operator would follow "Pit Rule" guidelines and Onshore Order No. 1.

Protection of Topsoil

Topsoil, which would be stripped from the surface of the proposed project areas during the construction phase of the proposed projects, would be stored and protected until it is redistributed during reclamation. The top 6 inches of topsoil would be segregated and wind-rowed along the edge of the proposed access roads and well pad construction zones; thereby, topsoil would be stored separately from subsoil material. The topsoil would be free of brush, tree limbs, tree stumps, and root balls, but could include chipped or mulched material that is incorporated into the topsoil stockpile. Topsoil would not be stripped when soils are moisture-saturated or frozen below stripping depth. The topsoil would be used during reclamation, as described further below (Interim Reclamation) and within the proposed project reclamation plans (Appendix E).

Vehicle/equipment traffic would not be allowed to cross topsoil stockpiles.

If the proposed project areas becomes prone to wind or water erosion, appropriate measures would be taken to prevent topsoil loss. Such measures could include using tackifiers or water to wet the topsoil stockpile so that a crust is created across the exposed soil.

For the proposed pipe trenches, the topsoil would not be used for padding the pipes and would not be mixed with excavated subsoil. The excavated subsoil would be stockpiled separately along the edge of the proposed pipeline corridors. For the proposed well-connect pipelines, gaps would be made in topsoil and subsoil stockpiles, where necessary, to avoid ponding or to divert water during storm events.

Protection of the Public

The hauling of equipment and materials on public roads would comply with Department of Transportation regulations. Any accidents involving persons or property would immediately be reported to the BLM-FFO. Encana would notify the public of potential hazards by posting signage (e.g., trucks turning or construction ahead), having flaggers, or using lighted signs, as necessary.

Worker safety incidents would be reported to the BLM-FFO as required under Notice to Lessees (NTL) - 3A (USGS 1979). Encana would adhere to company safety policies and Occupational Safety and Health Administration regulations. The operator would comply with pipeline safety regulations (49 CFR 190 and 192). The proposed pipeline trenches would be excavated and sloped in accordance with OSHA specifications.

The soil stockpiles and pipe string would also be used as safety barriers during construction of the proposed well-connect pipelines. If a pipeline trench is left open at a road crossing, orange safety fencing or barricades would be installed, if needed. During construction, access to the proposed well-connect pipeline corridors would be limited to pipeline construction crews.

Prevention and Control of Weeds

It would be Encana's responsibility to monitor, control, and eradicate all invasive, non-native plant species within the proposed project areas throughout the life of the proposed projects. Encana would contact the BLM-FFO regarding acceptable weed-control methods. If Encana does not hold a current Pesticide Use Permit, a Pesticide Use Permit would be submitted prior to pesticide application. Only pesticides authorized for use on BLM lands would be used. The use of pesticides would comply with Federal and State laws. Pesticides would be used only in accordance with their registered use and limitations. Encana would contact the BLM-FFO prior to using these chemicals.

Protection of Air Resources

The BLM's regulatory jurisdiction over field production operations has resulted in the development of BMPs designed to reduce impacts to air quality by reducing all emissions from field production and operations. Typical measures could include flaring hydrocarbons and gases at high temperatures in order to reduce emissions of incomplete combustion, requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored, ensuring that compressor engines 300 horsepower or less have nitrogen oxide (NO_x) emissions limited to 2 grams per horsepower hour, vegetating areas not required for production facilities to reduce the amount of dust, and watering dirt roads during periods of high use in order to reduce fugitive dust emissions. Magnesium chloride, organic-based compounds, or polymer compounds could be also be applied to roads or other surfaces to reduce fugitive dust. Neither petroleum-based products nor produced water would be used.

Any additional dust-suppression practices would include the BLM-standard BMPs found in *The Gold Book* (BLM and USFS 2007) and the BMPs outlined in the COAs attached to the approved APDs and/or stipulations attached to the approved ROW Grants.

Noise

Production would comply with noise standards outlined in NTL 04-2 FFO (BLM 2004). Encana would adhere to the noise stipulations, if any, included in the COAs attached to the approved APDs and/or stipulations attached to the ROW Grants.

Erosion Control

During reclamation, stockpiled rocks, if available, would be placed within the reclamation area for erosion control and/or OHV control (if requested by the BLM-FFO), and/or in a manner that visually blends with the adjacent, undisturbed landscape.

Within the proposed pipeline corridors, erosion-control features, such as waterbars would be applied as specified by the BLM-FFO Authorized Officer. If waterbars are constructed, they would follow the horizontal contour of the hillslope on which they would be placed. The spacing requirements (by hillslope grade) are provided in the table below.

Table 4: Waterbar Spacing Requirements by Percent Grade of Hillslope

Hillslope Percent Grade (%)	Waterbar Spacing (feet)
Less than 1	400
1-5	300
5-15	200
15-25	100

The placement of water- and erosion-control features within the proposed project areas would be determined during reclamation. Erosion-control features would be applied as specified by the authorized BLM-FFO officer.

Escrito I24A
During the pre-disturbance onsite meeting, the BLM-FFO determined that the following water- and erosion-control features will be installed within the project area during reclamation:

- Two 24-inch-diameter culverts will be installed along the access road at approximate stationing 0+00 (at beginning of access road) and 1+29 (at entrance to well pad).
- Water will be diverted around the Escrito I24A well pad from the southern corner (corner 2) to the eastern corner (corner 6) and from the southern corner (corner 2) to the western corner (corner 3).

Escrito L30
During the pre-disturbance onsite meeting, the BLM-FFO determined that the following water- and erosion-control features will be installed within the project area during reclamation:

- Three 24-inch-diameter culverts will be installed along the Escrito L30 access road at approximate stationing 0+00 (start of access road), 0+23 (small wash), and 2+18 (entrance to well pad).
- Silt traps will be constructed within the well pad construction zone near corner 2 and corner 3 on the northern side of the well pad.
- Water will be diverted around the well pad center towards silt traps located in corner 2 and corner 3 of the well pad.

Escrito M30
During the pre-disturbance onsite meeting, the BLM-FFO determined that the following water- and erosion-control features will be installed within the project area during reclamation:

- Two 24-inch-diameter culverts will be installed along the Escrito M30 access road at approximate stationing 0+00 (start of access road) and 0+59 (entrance to well pad).
- Water will be diverted around the Escrito M30 well pad from the northeastern corner (corner 3) to the southeastern corner (corner 5) and from the northeastern corner (corner 3) to the northwestern corner (corner 2).

Escrito N19
During the pre-disturbance onsite meeting, the BLM-FFO determined that the following water- and erosion-control features will be installed within the project area during reclamation:

- Three 24-inch-diameter culverts will be installed along the existing road reroute at approximate stationing 5+34, 9+51, and 14+73.
- A 24-inch-diameter culvert will be installed on the access road near the well pad entrance at approximate station 1+38.

- Water will be diverted around the Escrito N19 well pad from the southern end (corner 4) to the northern end around corner 3 and corner 5.
- A silt trap will be constructed within the well pad construction zone near the southwestern corner of the well pad between corner 4 and corner 5.

Proposed Project Phases

Proposed project phases would be similar for the proposed Escrito I24A, Escrito L30, Escrito M30, and Escrito N19 projects. The general phases described below would apply to each individual project. Where differences between the projects would exist, these differences are specified at the end of the appropriate section.

During all project phases, vehicles would use proposed access roads, as well as developed BLM roads and highways in the region. Traffic would include light vehicles (such as cars and pick-up trucks) and heavy vehicles (such as water trucks and large tractor-trailers hauling equipment).

Refer to the section above (Design Features and Best Management Practices) for resource-protection details associated with all proposed project phases.

Under the proposed action, the following phases would occur.

Upgrade of Existing Roads

If the proposed wells are commercially viable, Encana would schedule a meeting with the BLM-FFO to discuss which portions of the existing roads, if any, would require upgrades and/or surfacing to prevent soil erosion and accommodate year-round traffic.

Existing roads would be maintained in the same or better condition as existed prior to the commencement of the operation phase of the proposed projects. This maintenance would continue until final abandonment and reclamation of the proposed project areas. Encana would inspect and maintain the existing roads as outlined in their Road Maintenance Plans attached to their APD and ROW Grant applications.

Escrito N19
Approximately 1,580 feet of an existing Resource Road would be rerouted around the proposed well pad. The rerouted road will be upgraded following *The Gold Book* (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e).

The existing road reroute would include the construction of one pullout area to accommodate vehicle traffic for site mitigation safety and use as a passing area.

Construction of Access Roads and Well Pads

Access road and well pad construction would take two to four weeks at each proposed project site. During construction of the proposed access roads and well pads, the following equipment could be utilized onsite: chainsaw, brush hog, scraper, maintainer, excavator, and dozer.

Water diversions and silt traps (if needed) would be installed during interim reclamation; please see the "Design Features and Best Management Practices – Erosion Control," above and the "Interim Reclamation" section, below. Additional sediment- and/or erosion-control features would be installed, as necessary. Additional resource-protection design features and mitigation associated with construction are listed above, in "Design Features and Best Management Practices".

Proposed Well Pads
The proposed well pads would be cleared of vegetation and leveled. Vegetation removed during construction, including trees that measure less than 3 inches in diameter (at ground level) and slash/brush, would be chipped, shredded, or mulched and incorporated into topsoil for later use in interim

reclamation. When chipping slash and brush, the "chips" would be distributed in a manner that would not impede seeding with machinery or the establishment of successful revegetation. Trees 3 inches in diameter or greater (at ground level) would be cut to ground level and de-limbed. Tree trunks (left whole) and cut limbs would be placed along the proposed access roads, well pads, and/or well-connect pipeline corridors in a manner so as to not create additional disturbance or degrade new/existing reclamation, if present. The subsurface portion of the trees (tree stumps and root balls) would be hauled to an approved disposal facility or stockpiled at the edge of the well pad and buried in the cut slopes of the well pad during interim reclamation.

The top 6 inches of topsoil would be salvaged and stockpiled within the proposed well pad construction zones. The protection of topsoil is discussed in "Design Features and Best Management Practices – Protection of Topsoil," above.

The proposed well pads would be constructed from the native borrow soil and subsoil accumulated during construction activities. The excavated material from well pad cuts would be used on the fill portions of the proposed well pads in order to create a level well pad surface. If additional fill or surfacing material would be needed, Encana would obtain the material from an existing permitted or private source and haul the material by truck utilizing existing access roads. The well pad construction zones could be limited in areas if specified by COAs and stipulations attached to the approved APDs and ROW Grants.

The size of the proposed well pads are slightly larger than typical well pads in the BLM-FFO area because the equipment (such as tanks) associated with the new hydraulic fracturing design requires a larger area.

The maximum well pad cuts and maximum well pad fills are as follows:

- Escrito I24A: The maximum well pad cut would be 7.8 feet on the southern corner of the proposed well pad (corner 2). The maximum well pad fill would be 9.1 feet on the northern corner (corner 5).
- Escrito L30: The maximum well pad cut would be 18.7 feet on the northern side of the proposed well pad (between corners 2 and 3). The maximum fill would be 15.8 feet on the southwestern corner (corner 6).
- Escrito M30: The maximum well pad cut would be 14.6 feet on the northeastern corner of the proposed well pad (corner 3). The maximum well pad fill would be 11.7 feet on the southwestern corner (corner 6).
- Escrito N19: The maximum well pad cut would be 17.7 feet on the southern side of the proposed well pad (between corners 5 and 3). The maximum well pad fill would be 10.2 feet on the northeastern corner (corner 2).

Nine feet of fill would be taken from the existing Escrito I24-2409 well pad for construction and leveling of the proposed Escrito I24A well pad. The fill will be pulled back to the Escrito I24-2409 upon interim reclamation.

Proposed Access Roads

The proposed access roads would be cleared of vegetation and leveled. Vegetation removal, topsoil removal, and access road construction would be similar to that described for well pads, above.

The top 6 inches of topsoil would be salvaged and stockpiled along the proposed access roads. The protection of topsoil is discussed in "Design Features and Best Management Practices – Protection of Topsoil," above.

The 30-foot-wide workspace associated with the proposed access roads would include a 14-foot-wide running surface with adequate crowning. The proposed access roads would be designed (e.g., drainage design, culvert sizing, and culvert installation) and constructed as Resource Roads in accordance with

The Gold Book (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e). If the wells are commercially viable, Encana would upgrade the proposed access roads, as necessary, to accommodate year-round traffic and meet all-weather standards. The proposed access roads would be maintained for the life of the proposed projects in accordance with *The Gold Book* (BLM and USFS 2007).

The length and maximum road grade for the proposed access roads are as follows:

- Escrito I24A: The proposed access road would be 129 feet long. The maximum road grade would be 2 percent.
- Escrito L30: The proposed access road would be 218 feet long. The maximum road grade would be 2 to 3 percent.
- Escrito M30: The proposed access road would be 59 feet long. The maximum road grade would be 2 to 3 percent.
- Escrito N19: The proposed access road would be 155 feet long. The maximum road grade would be 2 to 3 percent.

Drilling and Completion

Drilling

Once well pad and access road construction is completed, a drilling rig would be transported to the well pads and assembled. Drilling activities would take place around the clock for approximately two to three weeks per well; during this phase, there would be constant onsite supervision. During drilling, the following equipment would be on site: drilling rig, stockpiles of drill pipe and casing, closed-loop system for collection cuttings and fluid, above-ground tanks for collecting cuttings and fluid, mud shakers to separate cuttings from fluid, generators to provide power to the drill rig, light towers, toilet facilities, trash containers, and office trailers equipped with sleeping quarters for essential personnel.

Water for drilling would be obtained from an existing private water well located in the southwestern quarter of the northeastern quarter of Section 32, Township 25 North, Range 9 West (New Mexico Principal Meridian). The New Mexico Office of the State Engineer-assigned permit number for this water well is SJ-2105 (Blanco Trading Post). Water for drilling would be hauled by truck using existing and proposed access roads.

The proposed projects include directional wells. The proposed wells would be targeting oil and natural gas within the formations provided in Table 1 in Section 1.1 (Background). The wells would be drilled from the proposed wellheads to the proposed bottom holes provided in Table 3 in Section 2.1.1 (Location of Proposed Project Areas).

Utilizing a fresh water-based drilling mud system, the surface casings would be installed at an approximate depth of 500 feet. After a surface casing is installed, the casing would be cemented in place by pumping cement down the casing and circulating the cement back up the outside of the casing to create a cement sheath around the entire casing. The casing would then be tested to ensure the quality and integrity of the cement. The casing and cementing would stabilize the wellbore. In addition, the casing and cementing would isolate hydrocarbon zones from overlying freshwater aquifers, thereby providing protection to any overlying freshwater aquifers.

Prior to drilling below the surface casing, a blowout preventer (BOP) would be installed on the surface casing. The BOP and surface casing would be pressure tested for integrity. After installation and testing of the BOP, a string of intermediate casing would be installed. The intermediate casing would then be cemented and tested to ensure the quality and integrity of the cement.

Once the intermediate string is cemented, a synthetic oil-based and/or freshwater-based drilling mud system would be used to drill the horizontal portion of the wellbore. A downhole mud motor would be

used to increase the penetration rate during drilling. The drill rig would pump drilling fluids to drive the mud motor, cool the drill bit, and remove cuttings from the wellbore. Additives could be mixed with the mud system to achieve borehole stability, minimize potential damage to geologic formations, provide adequate viscosity to carry the drill cuttings out of the wellbore, and reduce downhole fluid losses.

After the wellbores have been drilled to their final depths, production liners would be installed and secured into place utilizing an external swell packer system. The production liners would provide additional isolation of the wellbores and create a pathway for oil and natural gas to travel from mineral formation to the surface.

Completion

After the production liners have been secured into place, the drilling rig would be removed from the proposed well pads, and a completion rig would be moved to the proposed well pads. Completion is the process in which a well is enabled to produce oil and natural gas. Completion typically takes one to two weeks for each well. During completion, the following equipment would be onsite: completions rig, completions command center, steel storage tanks, pump trucks and transports, blending and mixing facilities, and related ancillary completions equipment.

A completion rig would run a completion string into a wellbore for tying it into the liner/liner hanger. The completion string would be of the same size, weight, and grade as the production liner. The completions string tie in would provide a secondary barrier during completion operations for protecting the intermediate casing from pressures needed to pump into the formation.

Completion would require hydraulic fracturing, which is the process of injecting water, sand, and a small amount of fluid additives into the wellbore, under very high pressure, to fracture the targeted formations and release oil and natural gas. During this process, within the horizontal portion of the wellbores, a series of charges would be set through the producing interval to perforate the production liner and casing and create small fractures in the formation. A fluid and sand mixture would be injected into the formation, at high pressure, to create cracks or fractures. The sand would keep the fractures open and allow oil and natural gas to move more efficiently into the wellbore. The hydraulic fracturing process utilizes a series of plugs to isolate portions of a well that have been fractured. Once hydraulic fracturing has been completed, these plugs would be drilled out to allow the oil and natural gas to flow to a wellhead.

The completions would be designed with nitrogen foam for minimizing water usage and improving fluid recoveries following the completion phase. Water for completions would be obtained from the existing private water well (SJ-2105 [Blanco Trading Post]) described above and trucked to the locations. Water would be stored in steel storage tanks within the proposed project areas. After the completion phase, a portion of the water injected for hydraulic fracturing would flow back to the wellheads and be collected in steel storage tanks stationed within the proposed project areas. This flow-back water would be disposed of at a State of New Mexico-permitted wastewater facility.

The final step of the completion phase would be the installation of tubing in the wellbores. This tubing would enhance production by creating a more efficient path for oil and natural gas to travel to the wellheads. At the wellheads, the flow of oil and natural gas would be regulated and controlled by a series of valves and instruments.

Construction of Well-Connect Pipelines

If the proposed wells prove to be productive, four well-connect pipelines would be constructed and installed to carry natural gas from the 11 proposed wells to Encana pipeline systems; the lifetime of each well-connect pipeline is anticipated to be 30 to 50 years. Pipeline construction would take two to four weeks for each proposed project location.

The proposed well-connect pipelines would be up to 6-inch-diameter steel pipes.

The maximum allowable operating pressure of the proposed well-connect pipelines would be 500 pounds per square inch gauge. Additional, related aboveground appurtenances (i.e., cathodic protection

equipment, futures, and block valves with blowdowns) would be installed within the well-connect pipeline corridors. Equipment that would be subject to safety requirements would not be painted Covert Green.

For each proposed well-connect pipeline, site preparation would include clearing vegetation from the proposed corridor, salvaging and stockpiling topsoil, and excavating the pipe trench. The site preparation activities would be limited to the minimum area required for safe and efficient construction.

Vegetation clearing activities would be similar to those described in the "Proposed Project Phases - Construction of Access Roads and Well Pads" section, above. Topsoil would be stockpiled along the edge of the proposed well-connect pipeline corridor. Trees cleared from the proposed corridors would be stacked along the proposed corridors and/or proposed access roads; the tree limbs could also be stockpiled for use during interim reclamation. The tree stumps and root balls would be cut to ground level and would be buried within the corresponding proposed project area.

For each proposed pipe trench, the cover from the top of the pipe to ground level would be a minimum of 36 inches deep when located within typically encountered soil and rock and a minimum of 48 inches deep at road crossings. Where rock is encountered within the pipe trench, tractor-mounted mechanical rippers or rock trenching equipment could be used during trenching excavation activities.

Well-connect pipeline construction and installation would include stringing the pipe, bending the pipe for horizontal or vertical angles in the pipeline alignment, welding pipeline segments together, inspecting the pipe, coating the pipe to prevent corrosion, and lowering the pipe into the trench. The pipe inspection would include the verification that the minimum pipe cover has been provided, the trench bottom is free of rocks/debris, the external pipe coating has not been damaged, and the pipe has been properly fitted and installed in the trench. The fine soil would be sifted from the subsoil stockpile in order to provide rock-free pipeline padding and bedding. In rocky areas, a padding material or rock shield would be used to protect the pipe. After a section of pipe has been lowered into the pipeline trench and inspected, the pipeline trench would be backfilled. Once the pipeline trench has been backfilled, cleanup activities would be initiated and interim reclamation would take place within the workspace, as described in the following section (Interim Reclamation) and within the proposed project reclamation plans (Appendix E).

Additional resource-protection design features and mitigation associated with construction are listed above, in "Design Features and Best Management Practices".

Escrito I24A
The proposed well-connect pipeline would be 40 feet in width and 73 feet in length. The proposed well-connect pipeline would tie into Encana's Escrito I24-2409 pipeline.

Escrito L30
The proposed well-connect pipeline would be 40 feet in width and 245 feet in length. The proposed well-connect pipeline would tie into Encana's Escrito I24-2409 pipeline.

Escrito M30
The proposed well-connect pipeline would be 40 feet in width and 55 feet in length. The proposed well-connect pipeline would tie into Encana's Escrito I24-2409 pipeline.

Escrito N19
The proposed well-connect pipeline would be 40 feet in width and 3,271 feet in length. The proposed well-connect pipeline would tie into Encana's Escrito I24-2409 pipeline.

Interim Reclamation

If the wells associated with the proposed projects prove to be productive, portions of the proposed project areas that would not be required for production (non-working areas [areas not necessary for the routine, long-term operation and maintenance of an authorized site]) would be reclaimed. Interim reclamation would be initiated within 120 days of construction. Interim reclamation would take two to four weeks for each project's well pad and access road. Interim reclamation would take one week for each well-connect

pipeline corridor. The BLM-FFO would be notified at least 48 hours prior to the start of interim reclamation activities at each location. Interim reclamation could occur simultaneously with production.

During interim reclamation, the following equipment could be utilized onsite: pick-up trucks, dozer, blade, farm tractor with a disc, trackhoe, and scraper.

Areas reclaimed during interim reclamation would include the project features described in Section 2.1.3 (Proposed Surface Disturbance), below. Approximately 20.6 acres of new surface disturbance would be reclaimed at this time.

In areas that would be reclaimed within the proposed project areas, slopes would be re-contoured to pre-construction topographical contours, if possible. Encana would diminish the evidence of cuts, fills, and flat well pad surfaces.

Water- and erosion-control features would be installed within the proposed project areas as described in "Design Features and Best Management Practices – Erosion Control." Additional water diversions, if needed, would be installed at this time.

Reclaimed areas would be seeded using the Sagebrush/Grass Community Seed Mixture for each of the proposed project areas.

The reclamation standards would comply with BLM-FFO Bare Soil Reclamation Procedure (BLM 2013b) Details of the interim reclamation process are provided in the reclamation plan (Appendix E).

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), the BLM-FFO would monitor reclaimed surfaces to document successful interim reclamation; monitoring and reporting are discussed in the reclamation plans (Appendix E).

Production

The production phase of wells varies; the lifetime is anticipated to be 30 to 50 years. The installation of production equipment would take approximately three to four weeks at each project location. The proposed access roads and the working areas of the proposed well pads would be maintained for the life of the proposed projects.

Production equipment that would remain on the well pads during production would include the following: wellheads, metering units, separators, aboveground condensate tanks, water tanks (tank battery), meter(s), and VRU compressor(s). If artificial lift would be required, pump jack(s) and/or gas skid lift(s) would also be installed.

The tank batteries would be placed within corrugated steel secondary containment berms that would be sized to contain a minimum of 110 percent of the storage capacity of the largest tank within the berm area. Containment berms would include an impermeable liner attached to the rings and laid under the tanks. All loading lines would also be placed inside the containment berms or would have secondary containment vessels.

At the proposed well sites, site security guidelines would be followed, as identified in 43 CFR 3162.7-5 and Onshore Oil and Gas Order No. 3. Production facilities would be painted Covert Green to blend with the natural environment. Equipment that would be subject to safety requirements would not be painted Covert Green. Production facilities would be placed, to the extent practical, to minimize visual impacts.

Occasionally, work-over or recompletion of the proposed wells would be necessary to ensure efficient production is maintained. Work-overs and recompletions would be scheduled as needed to improve and maintain production of the proposed wells. Work-over activities could include repairs to the wellbore equipment (e.g., casing, tubing, rods, pump), wellheads, or production facilities.

Final Reclamation and Abandonment

If the wells prove to be unproductive, or when the wells are no longer commercially viable, the wells would be abandoned and final reclamation would take place. The final abandonment phase typically takes two to four weeks per project location.

During final reclamation, the following equipment could be utilized onsite: dozer, blade, farm tractor with a disc, trackhoe, and scraper.

Encana would provide the BLM-FFO with technical and environmental aspects of the final plugging, abandonment, and reclamation procedures.

Downhole well abandonment would be carried out under current BLM-FFO and State regulations. The bores would be plugged with cement and the production facilities would be removed. An aboveground marker would be placed over each plugged hole. Each marker would contain individual well identification information.

The underground well-connect pipelines would typically be plugged and left in place.

If the BLM-FFO does not consider the retention of the proposed well pads and/or access roads, as well as existing access road(s) to the locations, necessary for the management and multiple uses of natural resources, they would be reclaimed. The goal of final reclamation would be to return the disturbed areas associated with the proposed projects to pre-construction conditions, if possible, by diminishing the evidence of cuts, fills, and flat well pad surfaces. Disturbed areas would be re-contoured to pre-construction topographical contours, covered with salvaged topsoil, and seeded. Erosion control measures, if needed, would be installed at this time.

Reclaimed areas would be seeded using the Sagebrush/Grass Community Seed Mixture for each of the proposed project areas.

The reclamation standards would comply with BLM-FFO Bare Soil Reclamation Procedure (BLM 2013b). Details of the interim reclamation process are provided in the reclamation plan (Appendix E).

Under the BLM-FFO Bare Soil Reclamation Procedures (BLM 2013b), the BLM-FFO would monitor reclaimed surfaces to document successful final reclamation; monitoring and reporting are discussed in the reclamation plans (Appendix E).

2.1.3. *Proposed Surface Disturbance*

New surface disturbance associated with the proposed projects would total 29.5 acres. Of this, 1.0 acre would be reseeded (but not recontoured) and 19.6 acres would be fully reclaimed during interim reclamation. The remaining 8.9 acres would remain disturbed throughout the life of the proposed projects. This disturbance is summarized in the table below. Individual proposed project disturbances are summarized in the sub-sections below.

Table 5: Surface Disturbance Associated with Proposed Projects

Feature	Acreage		Description of New Disturbance Acreage Following Interim Reclamation		
	Total	New Disturbance	Fully Reclaimed (Reseeded and Recontoured)	Reseeded Only*	Un-reclaimed*
Escrito I24A					
Access Road	0.1	0.1	-	<0.1	<0.1
Well Pad	4.8	4.8	0.7	-	4.1
Well Pad Construction Zone	2.3	2.2	2.2	-	-
Well-Connect Pipeline Corridor	0.1	-	-	-	-
Total	**7.3**	**7.1**	**2.9**	**<0.1**	**4.1**
Escrito L30					
Access Road	0.2	0.2	-	0.1	0.1
Well Pad	4.0	4.0	2.6	-	1.4
Well Pad Construction Zone	2.1	2.1	2.1	-	-
Well-Connect Pipeline Corridor	0.2	0.1	0.1	-	-
Range Improvement Pond	0.3	0.3	-	0.3	-
Total	**6.8**	**6.7**	**4.8**	**0.4**	**1.5**
Escrito M30					
Access Road	<0.1	<0.1	-	<0.1	<0.1
Well Pad	4.0	4.0	2.6	-	1.4
Well Pad Construction Zone	2.1	2.1	2.1	-	-
Well-Connect Pipeline Corridor	0.1	<0.1	<0.1	-	-
Total	**6.2**	**6.1**	**4.7**	**<0.1**	**1.4**
Escrito N19					
Access Roads	1.2	1.2	-	0.6	0.5
Pullout Area	0.1	0.1	-	< 0.1	< 0.1
Well Pad	3.9	3.6	2.5	-	1.4
Construction Zone	2.1	2.1	2.1	-	-
Well-Connect Pipeline Corridor	3.0	2.6	2.6	-	-
Total	**10.3**	**9.6**	**7.2**	**0.6**	**1.9**
Total	**30.6**	**29.5**	**19.6**	**1.0**	**8.9**

*This acreage would be fully reclaimed during final reclamation.

Escrito I24A

New surface disturbance associated with the proposed Escrito I24A project would total 7.1 acres. Of this, less than 0.1 acre would be reseeded (but not recontoured) and 2.9 acres would be fully reclaimed during interim reclamation. Approximately4.1 acres would remain disturbed throughout the life of the proposed project. This disturbance is summarized below.

- Access Road: The proposed access road corridor would be 129 feet long and 30 feet wide (0.1 acre).
    - The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (less than 0.1 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.
    - The remainder of the proposed access road corridor (less than 0.1 acre) would be reseeded during interim reclamation and fully reclaimed during final reclamation.

- Well Pad: The proposed well pad would measure 400 by 520 feet (4.8 acres). The working area, which would measure 360 by 500 feet (4.1 acres), would remain disturbed until final reclamation, when the proposed wells are abandoned. The remainder of the proposed well pad (0.7 acre) would be fully reclaimed during interim reclamation.

- Well Pad Construction Zone: A 50-foot-wide (2.3-acre) construction zone would surround the proposed well pad. Approximately 0.1 acre of the access road would overlap the Escrito I24A construction zone. Therefore, the construction zone would result in 2.2 acres of new surface disturbance. All of this disturbance would be fully reclaimed during interim reclamation.

- The well-connect pipeline corridor will be 73 feet long and 40 feet wide (0.1 acre). All of the well-connect pipeline corridor will overlap the Escrito I24A well pad construction zone. Therefore, no new surface disturbance will be associated with the well-connect pipeline corridor.

Escrito L30

New surface disturbance associated with the proposed Escrito L30 project would total 6.7 acres. Of this, 0.4 acre would be reseeded (but not recontoured) and 4.8 acres would be fully reclaimed during interim reclamation. The remainder (1.5 acres) would remain disturbed throughout the life of the proposed project. This disturbance is summarized below.

- Access Road: The proposed access road corridor would be 218 feet long and 30 feet wide (0.2 acre).
    - The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (0.1 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.
    - The remainder of the proposed access road corridor (0.1 acre) would be reseeded during interim reclamation and fully reclaimed during final reclamation.

- Well Pad: The proposed well pad would measure 400 by 430 feet (4.0 acres). The working area, which would measure 250 by 250 feet (1.4 acres), would remain disturbed until final reclamation, when the proposed wells are abandoned. The remainder of the proposed well pad (2.6 acres) would be fully reclaimed during interim reclamation.

- Well Pad Construction Zone: A 50-foot-wide (2.1-acre) construction zone would surround the proposed well pad. Less than 0.1 acre of the construction zone would overlap the proposed Escrito L30 access road. Therefore, the construction zone would result in 2.1 acres of new surface disturbance. All new surface disturbance associated with the proposed construction zone would be fully reclaimed during interim reclamation.

- Well-Connect Pipeline Corridor: The proposed well-connect pipeline corridor would be 245 feet long and 40 feet wide (0.2 acres). Portions of the proposed well-connect pipeline corridor would overlap previously existing disturbance and disturbance associated the proposed Escrito L30 project (described below). Therefore, new surface disturbance associated with the proposed well-connect pipeline corridor would be 0.1 acres. All of this disturbance would be fully reclaimed during interim reclamation.
    - Approximately 218 feet of the proposed well-connect pipeline corridor length would travel parallel and adjacent to the proposed Escrito L30 access road. Where the proposed well-connect pipeline corridor would parallel the proposed access road, approximately 15 feet of the proposed well-connect pipeline corridor would overlap the road. There would be 1.0 acres of new surface disturbance associated with this portion of the proposed well-connect pipeline corridor.

- Approximately 27 feet of the proposed well-connect pipeline corridor length crosses Indian Service Route 459. There would be no new surface disturbance associated with this portion of the proposed well-connect pipeline corridor.

- Range Improvement Pond: A 100-foot-wide-by-150-foot range improvement pond (silt trap; 0.3-acre) would be constructed east of the southeastern corner of the well pad construction zone (corner 5). The proposed range improvement pond would be used to acquire fill material for road construction and to provide a water source for livestock and wildlife. The range improvement pond would result in 0.3 acre of new surface disturbance. The proposed range improvement pond would be reseeded during interim reclamation and fully reclaimed during final reclamation.

Escrito M30

New surface disturbance associated with the proposed Escrito M30 project would total 6.1. Of this, less than 0.1 acre would be reseeded (but not recontoured) and 4.7 acres would be fully reclaimed during interim reclamation. The remaining 1.4 acres would remain disturbed throughout the life of the proposed project. This disturbance is summarized below.

- Access Road: The proposed access road corridor would be 59 feet long and 30 feet wide (less than 0.1 acre).

  - The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (less than 0.1 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.

  - The remainder of the proposed access road corridor (less than 0.1 acre) would be reseeded during interim reclamation and fully reclaimed during final reclamation.

- Well Pad: The proposed well pad would measure 400 by 430 feet (4.0 acres). The working area, which would measure 250 by 250 feet (1.4 acres), would remain disturbed until final reclamation, when the proposed wells are abandoned. The remainder of the proposed well pad (2.6 acres) would be fully reclaimed during interim reclamation.

- Well Pad Construction Zone: A 50-foot-wide (2.1-acre) construction zone would surround the proposed well pad. Less than 0.1 acre of the construction zone will overlap the Escrito M30 access road. Therefore, the construction zone will result in 2.1 acres of new disturbance. All of this disturbance would be fully reclaimed during interim reclamation.

- Well-Connect Pipeline Corridor: The proposed well-connect pipeline corridor would be 50 feet long and 40 feet wide (0.1 acre). Approximately 50 feet (0.1 acre) of the well-connect pipeline corridor will overlap the well pad construction zone. Therefore, new surface disturbance associated with the well-connect pipeline corridor will be less than 0.1 acre. All of this disturbance will be fully reclaimed during interim reclamation.

Escrito N19

New surface disturbance associated with the proposed Escrito N19 project would total 9.6 acres. Of this, 0.6 acre would be reseeded (but not recontoured) and 7.2 acres would be fully reclaimed during interim reclamation. Approximately 1.8 acres would remain disturbed throughout the life of the proposed project. This disturbance is summarized below.

- Access Road – Existing Road Reroute:

  - The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (0.5 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.

- The remainder of the proposed access road corridor (0.6 acre) would be reseeded during interim reclamation and fully reclaimed during final reclamation.

- Access Road: The proposed access road corridor would be 155 feet long and 30 feet wide (0.1 acre).
  - The 14-foot-wide running surface of the proposed access road and the bottoms of the bar ditches alongside the proposed access road (less than 0.1 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.
  - The remainder of the proposed access road corridor (less than 0.1 acre) would be reseeded during interim reclamation and fully reclaimed during final reclamation.

- Pullout Area: One pullout area associated with the rerouted road (0.1 acre) would be 100 feet long, with 25 feet on each end (150 feet total) used for entering and exiting the pullout area. The pullout area would be located at approximate stationing 8+43 to 9+93 along the relocated road.
  - The 10-foot-wide running surface of the proposed pullout area (less than 0.1 acre) would remain disturbed for the lifetime of the proposed project. This acreage would be reclaimed during final reclamation.
  - The top soil extracted from the pullout area would be salvaged by Encana and redistributed on the 10-foot-wide (less than 0.1 acre) slope and drainage area. This area would be reseeded upon interim reclamation.

- Well Pad: The proposed well pad would measure 400 by 430 feet (3.9 acres). The mid-section of the southern end of the well pad would be moved northward slightly to avoid excessive cut at that location. Approximately 540 feet of an existing road (0.3 acre) travels through the well pad and well pad construction zone and would be considered existing disturbance. The working area, which would measure 250 by 250 feet (1.4 acres), would remain disturbed until final reclamation, when the proposed wells are abandoned. The remainder of the proposed well pad (2.5 acres) would be fully reclaimed during interim reclamation.

- Well Pad Construction Zone: A 50-foot-wide (2.1-acre) construction zone would surround the proposed well pad. Less than 0.1 acre of the proposed access road would overlap the Escrito N19 construction zone. Therefore, the construction zone would result in 2.1 acres of new surface disturbance. All of this disturbance would be fully reclaimed during interim reclamation.

- Well-Connect Pipeline Corridor: The proposed well-connect pipeline corridor would be 3,271 feet long and 40 feet wide (0.3 acres). Portions of the proposed well-connect pipeline corridor would overlap previously existing disturbance and disturbance associated the proposed Escrito N19 project (described below). Therefore, new surface disturbance associated with the proposed well-connect pipeline corridor would be 2.6 acres. All of this disturbance would be fully reclaimed during interim reclamation.
  - Approximately 242 feet of the proposed well-connect pipeline corridor length would travel across the proposed Escrito N19 well pad. There would be no new surface disturbance associated with this portion of the proposed well-connect pipeline corridor.
  - Approximately 40 feet of the proposed well-connect pipeline corridor length would parallel the proposed access road within the well pad construction zone. There would be no new surface disturbance associated with this portion of the proposed well-connect pipeline corridor.
  - Approximately 102 of the well-connect pipeline corridor would travel across reclaimed portions of the Escrito I24-2409 well pad. Therefore, there would be 0.1acres of new surface disturbance associated with this portion of the well-connect pipeline corridor.

- Approximately 2,212 feet (2.0 acres) of the well-connect pipeline corridor will travel cross-country. Approximately 148 feet (0.1 acre) of the cross-country section of the well-connect pipeline corridor would travel across the well pad construction zone and will not parallel the access road. Therefore, there would be 1.9 acres of new surface disturbance associated with this portion of the well-connect pipeline corridor.

- Approximately 675 feet of the well-connect pipeline corridor would parallel an existing, aboveground pipeline Therefore, there would be 0.6 acres of new surface disturbance associated with this portion of the well-connect pipeline corridor.

2.2. No Action

Under this alternative, the APDs would not be approved and the ROW Grants would not be issued. The proposed wells would not be drilled and the proposed well pads, access roads, well-connect pipelines, Escrito L30 range improvement pond and the Escrito N19 pullout area would not be constructed. Current land and resource uses would continue to occur in the proposed project areas.

2.3. Alternatives Considered but Eliminated from Detailed Study

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

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

For each well pad location, a *SHL [Surface Hole Location] Polygon & Feasibility Map* and SHL polygon shapefile were created for Encana's ideal well(s) location footage(s). The *SHL Polygon & Feasibility Map* and SHL polygon shapefile were created to provide Encana, its surveyors, and its environmental consultants with information that was used in determining the best well pad location based on environmental considerations (topography, hydrology, wildlife habitats, etc.), technical limitations associated with horizontal drilling resource recovery considerations, and correlative rights issues. No alternative well pad locations were identified for the proposed projects that would result in less surface disturbance than the proposed well pad locations.

2.3.1. *Escrito I24A*

Utilizing the *SHL Polygon & Feasibility Map* and SHL polygon shapefile (depicted on Figure A.3.1 [Appendix A]), Encana was not able to place the proposed project at their ideal well location.. However, the proposed project would remain near the preferred location and well within the Tolerable Well Placement Area. Two initial well locations and their reasons for being dismissed are provided below:

- 1,100 feet FSL and 400 feet FWL (Section 19): This location was dismissed because a large archeological site would have been located within the proposed well pad.

- 1,100 feet FNL and 300 feet FWL (Section 20): This location was dismissed because Encana determined it could drill all the wells from the currently proposed location.

2.3.2. *Escrito L30*

Utilizing the *SHL Polygon & Feasibility Map* and SHL polygon shapefile (depicted on Figure A.3.2 [Appendix A]), Encana was not able to place the proposed project at their ideal well location (1,980 feet FSL and 250 feet FEL) because of drainage and topographical issues.

2.3.3. *Escrito M30*

Utilizing the *SHL Polygon & Feasibility Map* and SHL polygon shapefile (depicted on Figure A.3.3 [Appendix A]), Encana was not able to place the proposed project at their ideal well location (1,320 feet FSL and 250 feet FL) because the southwest corner of the originally proposed well pad would have been within the boundary of an existing USGS Federal Emergency Management Agency flood plain. Also, the length of the proposed well-connect pipeline corridor would be greater for reaching the proposed 02H well from this location; therefore, it was considered a less desirable location from an operational perspective. However, the proposed project would remain within the preferred location and within the Tolerable Well Placement Area.

2.3.4. *Escrito N19*

Utilizing the *SHL Polygon & Feasibility Map* and SHL polygon shapefile (depicted on Figure A.3.4 [Appendix A]), Encana was not able to place the proposed project at their ideal well location (137 feet FSL and 1,830 feet FWL) because of drainage and topographical issues. However, the southern portion of the proposed well pad falls within the Tolerable Well Placement Area.

The proposed well-connect pipeline corridor would be 3,271-feet long and 40-feet wide (0.3 acres). Portions of the proposed well-connect pipeline corridor would overlap previously existing disturbance and disturbance associated with the proposed N19 project. Therefore, new surface disturbance associated with the proposed well-connect pipeline corridor would be 2.6 acres. All of this disturbance would fully reclaimed during the interim reclamation.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

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

3.1. Air Resources

3.1.1. *Affected Environment*

The proposed wells are located in San Juan County, New Mexico. Additional general information on air quality in the area is contained in Chapter 3 of the BLM-FFO PRMP/FEIS (BLM 2003a, 3-48 – 3-53). In addition, new information about greenhouse gases (GHGs), and their effects on national and global climate conditions has emerged since this document was prepared. On-going scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO_2) methane (CH_4); nitrous oxide (N_2O); water vapor; and several trace gases on global climate. Through complex interactions on a global scale, GHG emissions may cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report; BLM 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 EPA has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement CAA requirements for GHG emissions. Climate has potential to influence renewable and non-renewable resource management.

Air Quality

Criteria Air Pollutants

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

"Design Values" are the concentrations of air pollution at a specific monitoring site that can be compared to the NAAQS. The 2012 design values for criteria pollutants are listed below in Table 6. There is no monitoring for CO and lead in San Juan County, but because the county is relatively rural, it is likely that these pollutants are not elevated. PM10 design concentrations are not available for San Juan County.

Table 6: 2012 Criteria Pollutant Monitored Values in San Juan County

Pollutant	2012 Design Concentration	Averaging Time	NAAQS	NMAAQS
O_3	0.071 ppm	8-hour	0.075 ppm[1]	-
NO_2	13 ppb	Annual	53 ppb[2]	50 ppb
NO_2	38 ppb	1-hour	100 ppb[3]	-
$PM_{2.5}$	4.7 $\mu g/m^3$	Annual	12 $\mu g/m^3$[3,4]	60 $\mu g/m^3$[3,6]
$PM_{2.5}$	14 $\mu g/m^3$	24 hour	35 $\mu g/m^3$[3,3]	150 $\mu g/m^3$[3,6]
SO_2	19 ppb	1-hour	75 ppb[5]	-

Source: PA 2014a

[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

In 2005, the EPA estimates that there was less than 0.01 ton per square mile of lead emitted in FFO counties, which is less than 2 tons total (EPA 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. The AQI is a national index, the air quality rating and the associated level of health concern is the same everywhere in the country. The AQI is an important indicator for populations sensitive to air quality changes.

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

Although the AQI in the region has reached the level considered unhealthy for sensitive groups on several days almost every year in the last decade, there are no patterns or trends to the occurrences (Table 7). On eight days in the past decade, air quality has reached the level of "unhealthy" and on two days, air quality reached the level of "very unhealthy". In 2009 and 2012, there were no days that were

"unhealthy for sensitive groups" or worse in air quality. In 2005 and 2013, there was one day that was "unhealthy" during each year. In 2010, there were five "unhealthy" days and two "very unhealthy days".

Table 7: 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: EPA 2013a										

Hazardous Air Pollutants

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

Climate

The analysis area is located in a semiarid climate regime typified by dry windy conditions and limited rainfall. Summer maximum temperatures are generally in the range of 80 or 90 degrees Fahrenheit (°F), and winter minimum temperatures are generally in the teens to 20s. Temperatures occasionally reach above 100°F in June and July and have dipped below zero in December and January. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. Table 8 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 8: Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (°F)	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	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

Month	Average Temperature (°F)	Average Maximum Temperature (°F)	Average Minimum Temperature (°F)	Average Precipitation (inches)
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50
Source: data collected at New Mexico State Agricultural Science Center - Farmington				

Very recently, pioneering research using space-borne (satellite and aircraft) determination of methane concentrations have indicated anomalously large methane concentrations may occur in the Four Corners region (Kort et al. 2014). A subsequent study (Schneising et al. 2014) indicated larger anomalies over other oil and gas basins in the U.S. Methane is 34 times more potent at trapping greenhouse gas emissions than CO_2 when considering a time horizon of 100 years (Intergovernmental Panel on Climate Change, 2013). While space-borne studies can determine the pollutant concentration in a column of air, these studies cannot pinpoint the specific sources of air pollution. Further study is required to determine the sources responsible for methane concentrations in the Four Corners region; however, it is known that a significant amount of methane is emitted during oil and gas well completion (Howarth et al. 2011). Methane is also emitted from process equipment, such as pneumatic controllers and liquids unloading, at oil and gas production sites. Ground-based, direct source monitoring of pneumatic controllers conducted by the Center for Energy and Environmental Resources (Allen et al. 2014a) show that methane emissions from controllers exhibit a wide range of emissions and a small subset of pneumatic controllers emitted more methane than most. Emissions measured in the study varied significantly by region of the U.S., the application of the controller and whether the controller was continuous or intermittently venting. The Center for Energy and Environmental Resources had similar findings of variability of methane emissions from liquid unloading (Allen et al. 2014b). In October 2012, USEPA promulgated air quality regulations controlling volatile organic compound (VOC) emissions at gas wells. These rules require air pollution mitigation measures that reduce the emissions of VOCs. These same mitigation measures have a co-benefit of reducing methane emissions. Future ground-based and space-borne studies planned in the Four Corners region with emerging pollutant measurement technology may help to pinpoint significant, specific sources of methane emissions in the region.

The Air Resources Technical Report summarizes information about GHG 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, increasing concentrations of GHGs are likely to accelerate the rate of climate change.

3.1.2. *Impacts from Alternative A: No Action Alternative*

Under the No Action alternative, the proposed project would not be constructed and the three associated oil and natural gas wells would not be drilled. No new impacts on ambient air pollution and GHG emissions would occur.

3.1.3. *Impacts from Alternative B: Proposed Action*

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

Direct and Indirect Impacts

Criteria Pollutants

Table 9 shows estimated emissions from one proposed horizontal oil well for criteria pollutants, VOCs and GHGs. For comparison, Table 10 shows total human-caused emissions for each of the counties in the BLM-FFO and La Plata County, Colorado, based on the EPA's 2011 emissions inventory (EPA 2014b).

Table 9: 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/yr)								
Oil Haul Truck and Small Truck (100 bbl/day)	0.009	0.006	0.0012	0.0009	0.0008	-	0.0001	3.88
Total	**6.13**	**1.64**	**0.55**	**2.54**	**0.29**	**0.11**	**0.01**	**671.54**

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

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

Table 10: Analysis Area Emissions in Tons/Year, 2011

County	NO_X (1)	CO (2)	VOC (3)	PM_{10} (4)	$PM_{2.5}$ (5)	SO_2 (6)
McKinley	11,952.9	17,007.8	3,891.2	70,096.4	7,645.2	1,381.1
Rio Arriba	12,012.3	27,344.6	19,149.8	33,761.2	4,130.6	60.4
San Juan	42,231.5	63,568.9	26,110.8	76,638.3	9,201.0	5,559.3
Sandoval	4,143.8	19,513.9	4,373.1	39,343.0	4,510.8	109.3

La Plata	4,838.2	17,116.3	3,740.1	2,330.0	919.6	127.9
Total	**75,187.7**	**144,551.5**	**57,265.1**	**222,168.9**	**26,407.2**	**7,237.9**

(1) NO_X – nitrogen oxides

(2) CO – carbon monoxide

(3) VOC – volatile organic compounds

(4) 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 11 displays the percent increase in total emissions in the analysis area from the proposed action to construct and operate one horizontal oil well.

Table 11: Percent Increase in Analysis Area Emissions from the Proposed Action

	NO_X(1)	CO(2)	VOC(3)	PM_{10}(4,5)	$PM_{2.5}$(5,6)	SO_2(5,7)
Total Emissions	75,187.7	144,551.5	57,265.1	222,168.9	26,407.2	7,237.9
Horizontal Gas Well Emissions	6.28	1.94	0.65	2.55	0.30	0.13
Percent Increase	**0.008**	**0.001**	**0.001**	**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

Hazardous Air Pollutants

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

Total Greenhouse Gases

The available statewide GHG summary combines GHG emissions from CO_2 and CH_4. To compare the GHG emissions from the Proposed Action estimated by the calculator with statewide GHG emissions, 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 BLM-FFO manages Federal hydrocarbon resources in San Juan, Sandoval, Rio Arriba, and McKinley Counties. There are approximately 21,150 active oil and gas wells in the San Juan Basin. About 14,843 of the wells in these counties are Federal wells. Analysis of cumulative impacts for reasonable development scenarios and reasonably foreseeable development scenarios of oil and gas wells on public lands in the BLM-FFO was presented in the 2003 RMP. This included modeling of impacts on air quality. A more detailed discussion of cumulative effects can be found in the Air Resources Technical Report (BLM 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 (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 Earth's atmosphere. The incremental contribution to global GHGs from the action alternatives cannot be translated into effects on climate change globally or in the area of this site-specific action. It is currently not feasible to predict with certainty the net impacts from the action alternatives on global or regional climate.

The Air Resources Technical Report (BLM 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. Surface Water Resources

3.2.1. *Affected Environment*

Under the Clean Water Act, the USACE has jurisdiction over "waterways of the U.S." 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 following proposed projects cross USGS watercourses:

- Escrito L30: The southeast corner (corner 5) of the proposed well pad and construction zone is crossed by one USGS waterway. Corner 5 of the well pad will be rounded off during construction, so that no fill will be placed in the "blue line".

- Escrito N19: The proposed well-connect pipeline corridor and proposed road reroute each cross one USGS waterway.

3.2.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Potential impacts to surface water 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 30.6 acres of soil as a sediment source entering area drainage ways in the short term, and approximately 8.9 acres would remain exposed at well pads and access roads after interim reclamation. 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 FFO Bare Soil Reclamation Procedure (2013), monitoring, best management practices and other preventive measures, such as re-establishment of vegetation and proper site hydrological diversions.

The disturbance created by the proposed Escrito N19 well tie and rerouted road within the ordinary high water mark of the "USGS blue lines" would be covered under the U.S. Army Corps of Engineers Nationwide Permits #12 (for Utility Line Activities), #14 (Linear Transportation Crossings).

Corner 5 of the Escrito L30 well pad will be rounded off during construction, so that no fill will be placed in the "blue line". A silt trap would be constructed to aid in storm water control and to catch sedimentation. These preventative sediment contamination techniques would help prevent sediments from entering the waterway.

Minimal amounts of hazardous materials (i.e., gas, diesel, etc.) would be used and stored on the well pad locations. There would be the potential for accidental spills or releases of these materials that could impact local surface water quality. The proposed wells would be drilled using a closed-loop system to contain drill cuttings and fluids. All chemicals stored on-site would be properly contained. Containment structures sufficiently impervious to prevent a discharge to waters of the U.S., such as containment dikes, containment walls, drip pans, or equivalent protective structures would be installed and maintained. 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.

Cumulative Impacts

The analysis area and impact indicator for cumulative impacts is the same as for direct and indirect impacts. Past, present, and reasonably foreseeable future actions within the analysis area, Blanco Canyon watershed (HUC10; 1408010305), that may also impact surface water resulting from erosion caused by surface disturbance include the following:

- Oil and gas development, including associated roads and pipelines
- Livestock grazing
- Vegetation manipulation and management activities

- Public recreation activites
- Prescribed and natural fires

1534 oil and gas wells have been developed in the Blanco Canyon watershed (HUC10; 1408010305). These wells have resulted in aproximately 3806 acres of surface disturbance. Based on the RFD (Engler, et al., 2014), oil and gas development in the Blanco Canyon watershed (HUC10; 1408010305) may result in 341 additional wells that would require and additional 2179 acres of disturbance. There would be approximately 1667 acres of short-term disturbance and 512 acres of long-term disturbance. This results in a total of 5,985 acres of surface disturbance from oil and gas development in the 169,788 acre watershed. This disturbance would have the same impacts as described for direct and indirect impacts.

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.

The total surface disturbance from past, present, and reasonably foreseeable actions in the Blanco Canyon watershed (HUC10; 1408010305) is 5,985 acres. The Proposed Action would contribute 30.6 acres to that total and represents 0.005% of the cumulative impacts to surface water.

3.3. Upland Vegetation

3.3.1. *Affected Environment*

The proposed project areas are located within the Arizona/New Mexico Plateau ecological region. This ecological region occurs primarily in Arizona, Colorado, and New Mexico; a small portion of the region is located within Nevada. This region encompasses approximately 45,870,500 acres (185,632 square kilometers), and the elevation ranges from 2165 to 11,949 feet (660 to 3642 meters) AMSL. The ecological region's landscapes include low mountains, hills, mesas, foothills, irregular plains, alkaline basins, wetlands, and some sand dunes. The Arizona/New Mexico Plateau ecological region is a large transitional area located between the semiarid grasslands to the east; the drier shrublands and woodlands to the north; and the lower, hotter, less-vegetated areas to the west and south. Vegetation communities within this region include shrublands of big sagebrush (*Artemisia tridentata*), rabbitbrush (*Ericameria* spp.), winterfat (*Krascheninnikovia lanata*), shadscale saltbush (*Atriplex confertifolia*), and greasewood (*Sarcobatus vermiculatus*); and grasslands of blue grama (*Bouteloua gracilis*), western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), and needle-and-thread grass (*Hesperostipa comata*). Higher elevations within the Arizona/New Mexico Plateau ecological region may support piñon pine (*Pinus edulis*) and juniper (*Juniperus* spp.) woodlands. This ecological region includes the urban areas of Santa Fe and Albuquerque, New Mexico. Important land uses within the region include irrigated farming, recreation, rangeland, wildlife habitat, and some natural gas production (Griffith, et al. 2006).

The general region surrounding the proposed project areas are characterized by valleys vegetated with sagebrush shrublands and rolling hills vegetated with open to dense piñon-juniper woodlands. Minimally vegetated badlands are also scattered throughout the region.

The proposed project areas are characterized by sagebrush shrubland with scattered piñon pine and oneseed juniper (*Juniperus monosperma*) trees and badlands with open piñon-juniper woodlands. There are approximately 150 to 200 trees present within the proposed project areas. These vegetation communities are described in detail in the BSRs (Appendix B).

Escrito I24A

The proposed project area is characterized by sagebrush shrublands on flat to gently rolling terrain.

Sagebrush Shrubland

Two oneseed juniper trees (100 percent mature) are present within this vegetation community. Ground cover within this vegetation community is approximately 40 to 60 percent.

Reclaimed Shrubland

The reclaimed shrubland vegetation community is crossed by the proposed access road and well-connect pipeline near the western corner of the proposed Escrito I24A construction zone. The northern corner of the proposed well pad and construction zone is also within reclaimed portions of Encana's Escrito I24-2409 well pad. Ground cover within this vegetation community is approximately 40 to 50 percent.

Escrito L30

The proposed project area is characterized by sagebrush shrublands. Approximately 13 piñon pine and oneseed junipers trees (90 percent mature and 10 percent juvenile) are present within this vegetation community. Ground cover within this vegetation community is approximately 40 to 60 percent.

Escrito M30

The proposed project area is characterized by sagebrush shrublands. Ground cover within this vegetation community is approximately 40 to 50 percent.

Escrito N19

The proposed project area is predominantly characterized by a sagebrush shrubland vegetation community and reclaimed shrublands. Areas of badlands with scattered piñon pine and oneseed juniper trees also exist within the proposed project area.

Sagebrush Shrubland with Scattered Piñon Pine and Oneseed Juniper Trees

Approximately 50 to 75 piñon pine and oneseed junipers trees (80 percent mature and 20 percent juvenile) are present within this vegetation community. Ground cover within this vegetation community is approximately 40 to 70 percent.

Reclaimed Shrubland

The reclaimed shrubland vegetation community parallels the proposed well-connect pipeline near Encana's active Escrito I24-2409 well pad. Ground cover within this vegetation community is approximately 10 to 30 percent.

Badlands with Open Piñon-Juniper Woodlands

Approximately 100 to 125 piñon pine and oneseed junipers trees (70 percent mature, 25 percent juvenile, and 5 percent standing dead) are present within this vegetation community. Ground cover within this vegetation community is approximately 20 to 40 percent.

3.3.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

During the construction phase of the proposed projects, all vegetation within the 29.5 acres associated with the proposed project areas would be cleared. During interim reclamation, approximately 20.6 acres of the proposed project areas would be reclaimed. The remaining 8.9 acres would remain as compacted, barren surface for the life of the proposed wells. During final reclamation, Encana would reclaim all portions of the proposed project areas that were not reclaimed during interim reclamation.

During interim and final reclamation, the BLM-FFO Sagebrush/Grass Community Seed Mixture would be utilized for the proposed project areas. Re-established vegetation would consist of native grass, forb, and shrub species included in the seed mixture, as well as native species that are not deliberately planted. It is also possible that invasive, non-native species could become established within the proposed project areas, as such species could be transported by project equipment and tend to thrive in disturbed areas. Following the reclamation process, the resulting vegetation community could differ from the native plant community surrounding the proposed project areas. Within reclaimed areas, it is not expected that the vegetation community would return to native conditions within 20 years (BLM 2003a, 4-18).

The deposition of fugitive dust generated during vegetation-clearing activities, during the use of the proposed well pads and access roads, and during wind events could reduce photosynthesis and productivity of the surrounding vegetation (Thompson, et al. 1984; Hirano, et al. 1995), increase water loss in plants near the proposed project areas (Eveling and Bataille 1984), and result in injury to leaves of surrounding vegetation.

Cumulative Impacts

The spatial analysis area includes the proposed project areas and immediately adjacent lands.

The following existing disturbances have occurred within the proposed Escrito I24A spatial analysis area:

- The western side of the proposed well pad and construction zone is located adjacent to the Escrito I24-2409 well-connect pipeline corridor and an existing resource road leading to the inactive Dugan Production Corporation (Dugan) Largo B Federal No. 91 well pad and Encana's active Escrito I24-2409 well pad.
- The eastern side of the proposed well pad and construction zone are located parallel to an existing resource road and Dugan's active Lee's Ferry No. 1 access road.
- The proposed well pad is located approximately 570 feet southeast of Dugan's inactive Largo B Federal No. 91, approximately 100 feet south of Encana's active Escrito I24-2409 No. 1H well pad, and approximately 250 feet southwest of Dugan's active Lee's Ferry No. 1 well pad.
- The proposed well pad and construction zone cross an existing fence line that would be rerouted around the eastern side of the proposed well pad.
- Existing two-track roads travel through the proposed well pad and construction zone.
- The proposed well-connect pipeline ties into the existing Escrito I24-2409 well-connect pipeline.
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within the Largo Community grazing allotment (Allotment No. 5083), which is permitted for 145 head of cattle and 596 head of sheep annually.

The following existing disturbances have occurred within the proposed Escrito L30 spatial analysis area:

- The western side of the proposed well pad and construction zone is parallel to a resource road and Encana's I24-2409 well-connect pipeline.
- The proposed access road and well-connect pipeline corridor begin at a resource road and cross an existing fence line that runs north-south and parallel to the resource road.
- The proposed well-connect pipeline crosses a resource road and ties in to Encana's existing Escrito 124-2409 well-connect pipeline.

- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within the Nageezi grazing allotment (Allotment No. 5085) which is permitted for 6 head of cattle annually.

The following existing disturbances have occurred within the proposed Escrito M30 spatial analysis area:

- The northeastern side of the proposed well pad and construction zone is parallel to a resource road and Encana's I24-2409 well-connect pipeline.
- The proposed well pad and construction zone are located approximately 0.2 miles west of Dugan's inactive Sheba Temple No. 1 well pad and access road.
- The proposed well pad construction zone crosses an existing fence line that would be rerouted around to the western side of the proposed well pad during construction and replaced during interim reclamation.
- The proposed well-connect pipeline ties into Encana's existing I24-2409 well-connect pipeline.
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within the Nageezi grazing allotment (Allotment No. 5085); this allotment is described above for the Escrito L30 spatial analysis area.

The following existing disturbances have occurred within the proposed Escrito N19 spatial analysis area:

- An existing resource road travels east-west through the southern portion of the proposed well pad.
- Existing two-track roads travel through the proposed well pad and construction zone.
- Dorfman Production Companies' (Dorfman) plugged and abandoned Sapp B No. 2 well is located approximately 300 feet west of the proposed well pad.
- The proposed access road crosses an existing two-track road.
- The proposed road reroute passes within approximately 30 feet of Dorfman's plugged and abandoned Sapp B No. 2 well.
- The proposed well-connect pipeline crosses four existing two-track roads and an existing fence line near Encana's active Escrito I24-2409 No. 1H well pad.
- The proposed well-connect pipeline travels along the northern edge of Dugan's active Lee's Ferry No. 1 well pad and the northern and western edges of Encana's active Escrito I24-2409 No. 1H well pad
- The proposed well-connect pipeline ties into Encana's existing I24-2409 well-connect pipeline.
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within the Largo Community grazing allotment (Allotment No. 5083); this allotment is described above for the Escrito I24A spatial analysis area.

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

3.4. Noxious Weeds and Invasive Species

3.4.1. *Affected Environment*

Management of noxious weeds and invasive plant species is mandated under several pieces of legislation, including the Lacey Act, as amended (16 USC 3371-3378); the Federal Noxious Weed Act of 1974, as amended (7 USC 2801 et seq.); the New Mexico Noxious Weed Management Act of 1998; and Executive Order (EO) 13112 regarding Invasive Species. Under EO 13112, Federal agencies are ordered not to authorize or carry out actions that would cause or promote the introduction of invasive species.

In the San Juan Basin, noxious weeds and invasive species are frequently found in areas that have been disturbed by surface activities. A mission of the BLM-FFO is to detect new noxious weeds and invasive plant species populations, prevent the spread of these new populations, manage existing populations, and eradicate these populations. This is to be accomplished in a timely manner, using the safest environmental methods available. For all actions on BLM-FFO lands that involve surface disturbance or reclamation, reasonable steps are required to prevent the introduction or spread of noxious weeds and invasive species (BLM 2003a, 3-34 – 3-35).

The U.S. Department of Agriculture (USDA) has designated certain plants as federally listed noxious weeds (NRCS 2010). The New Mexico Department of Agriculture (NMDA) has designated certain plants as State-listed Class A or B noxious weeds (NMDA 2009). A total of 212 invasive and poisonous weed species have been identified on BLM-FFO lands. The PRMP/FEIS lists the invasive, non-native plant species of concern in the BLM-FFO area (BLM 2003a, 3-34 – 3-35).

No federally listed or BLM-listed invasive, non-native plant species of concern were identified during the biological surveys (NRCS 2010; BLM 2003, 3-34 – 3-35).

Cheatgrass (*Bromus tectorum*), a Class C noxious weed species listed by the New Mexico Department of Agriculture (NMDA) is located along the existing road north of the proposed Escrito M30 well pad. Class C species are widespread in the State (NMDA 2010).

Russian thistle was found within all of the proposed project areas. Although this species is not included on the federal, BLM, or NMDA noxious weed lists, it is known to outcompete desirable, native vegetation (Whitson et al. 1992).

3.4.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Noxious weeds and invasive species are generally tolerant of disturbed conditions, and disturbed soils within the proposed project areas may provide an opportunity for the introduction and establishment of noxious weeds and invasive species. Seeds or other propagules of noxious weeds and invasive species may be transported to the proposed project areas from infested areas by heavy equipment or other vehicles that are used at the proposed project areas. Noxious weeds and invasive species may also spread from established populations near the proposed project areas and colonize soils disturbed by proposed project activities. The longer time periods required for the re-establishment of plant communities in arid regions may create an increased potential for the establishment and spread of noxious weeds and invasive species. Noxious weeds and invasive species typically develop high population densities and tend to exclude most other plant species, thereby reducing species diversity and potentially resulting in long-term effects. The establishment of noxious weeds and invasive species may greatly reduce the success of native plant community restoration efforts in the proposed project areas and create a source of future colonization and degradation of adjacent undisturbed areas.

The establishment of invasive species, particularly annual grasses, such as cheatgrass, which produce large amounts of easily ignitable fuel over large contiguous areas, may also alter fire regimes. This situation may result in an increase in the frequency and intensity of wildfires, and in some areas, such as in some desert-scrub communities, a fire regime may be created where none was present before. In plant communities that are not adapted to frequent or intense fires, native species, particularly shrubs and trees, may be adversely affected, and their populations may be greatly reduced, creating opportunities for

greater increases in noxious weeds and invasive species populations (Brooks and Pyke 2001). Increases in fire frequency or severity may thus result in a reduction of biodiversity and may promote the conversion of some habitats (e.g., forest, shrubland, or shrub-steppe) to other types, prolonging or preventing the development of mature native habitats (BLM and U.S. Department of Energy 2010).

Cumulative Impacts

The spatial analysis area includes the proposed project areas and immediately adjacent lands. Within the spatial analysis area, there is existing disturbance. This disturbance is described in detail in Section 3.2.2 (Upland Vegetation – Impacts from the Proposed Action – Cumulative Impacts).

The proposed projects would contribute to surface disturbance and ongoing activity within the spatial analysis area, and thus potentially contribute to the introduction/spread of noxious weeds and invasive species within the spatial analysis area.

3.5. Wildlife

3.5.1. *Affected Environment*

General Wildlife

The vegetation communities found within the proposed project areas provide habitat for a variety of vertebrate and invertebrate species. The objectives of the BLM wildlife management program are to "ensure optimum populations and a natural abundance and diversity of fish and wildlife values by restoring, maintaining, and enhancing habitat conditions for consumptive and non-consumptive uses" (BLM 2003a, 2-24). The significance of the general region to the overall Lybrook/Upper Largo ecosystem is that it represents a metapopulation with respect to mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*).

No prairie dog colonies have been recorded by the BLM-FFO within or adjacent to the proposed project areas (BLM 2012b); the closest recorded colony is approximately 5 miles north of the proposed project areas. No sign of prairie dogs was observed during the biological surveys.

General wildlife for each proposed project is described in detail in the BSRs (Appendix B).

Migratory Birds

EO 13186, dated January 17, 2001, calls for increased efforts to more fully implement the Migratory Bird Treaty Act of 1918. In keeping with this mandate, the BLM-FFO has issued an interim policy to minimize unintentional take, as defined by the EO, and to better optimize migratory bird efforts related to BLM-FFO activities. In keeping with this policy, a list of priority birds of conservation concern which occur in ecological regions similar to the proposed project areas was compiled through a review of existing bird conservation plans, including the following:

- USFWS Birds of Conservation Concern
- New Mexico Partners in Flight New Mexico Bird Conservation Plan
- Comprehensive Wildlife Conservation Strategy for New Mexico
- Gray Vireo Recovery Plan
- The North American Waterbird Conservation Plan
- Recovery plans and conservation plans/strategies prepared for federally listed candidate species

Selected species that have a known distribution in the BLM-FFO area and may be affected by various types of perturbations, as well as an evaluation of their potential to occur within the proposed project areas are discussed in the BSRs (Appendix B); a list of species identified within the proposed project areas during the biological field surveys is also provided.

3.5.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

There is available, similar habitat in the region surrounding the proposed project areas that wildlife could utilize. However, the clearing of vegetation and the transformation of the proposed project areas to a reseed community would remove potential habitat and result in habitat fragmentation for numerous wildlife species, including priority bird species.

During the construction phase of the proposed projects, all vegetation within the 29.5 acres associated with the proposed project areas would be cleared. Approximately 8.9 acres would remain barren of vegetation for the long term. Reclaimed portions of the proposed project areas would be converted to a reseed community following interim reclamation and final reclamation. The impacts to the vegetation communities are described in detail in Section 3.2 (Upland Vegetation). If interim and final reclamation are successful, sagebrush shrubland and open piñon-juniper woodland communities would become re-established within the proposed project areas. However, as discussed in Section 3.2, the re-establishment of a mature, native plant community could require decades, and it is possible that the plant community could never fully recover from disturbance (BLM 2003a, 4-18).

Habitat loss and fragmentation likely reduce the carrying capacity for wildlife, although the exact level of reduction cannot be quantified (BLM 2003a, 4-26 – 4-27). Fragmentation would result from construction within areas that are not adjacent to existing surface disturbance. There would be approximately 7,995 linear feet (1.5 miles) of habitat fragmentation resulting from the proposed access roads, well pads, and well-connect pipelines; this fragmentation would exist until final reclamation is deemed successful. Initial habitat fragmentation would result from the following:

- Proposed Escrito I24A project features
  - Access road: 129 feet
  - Well pad/construction zone: 620 feet (along longest side)
  - Well-Connect Pipeline: 73 feet
- Proposed Escrito L30 project features
  - Access road: 218 feet
  - Well pad/construction zone: 530 feet (along longest side)
  - Well-Connect Pipeline: 245 feet (The majority of this pipeline would parallel the proposed L30 access road.)
- Proposed Escrito M30 project features
  - Access road: 59 feet
  - Well pad/construction zone: 530 feet (along longest side)
  - Well-Connect Pipeline: 55 feet
- Proposed Escrito N19 project features
  - Access road: 155 feet
  - Road Reroute:1,580
  - Well pad/construction zone: 530 feet (along longest side)

- Well-Connect Pipeline: 3,271 feet (The majority of this pipeline would travel cross country.)

For the long term, the proposed access roads, Escrito N19 road reroute, and the working areas of the proposed well pads (250 feet [Escrito L30, Escrito M30, and Escrito N19] and 500 feet [Escrito I24A] along longest sides) would result in 3,391 linear feet (0.6 mile) of long-term habitat fragmentation.

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

General Wildlife

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

During the construction phase of the proposed well-connect pipelines, terrestrial wildlife could fall into the open pipeline trenches and be injured, stressed, or killed. The presence of open trenches could also disrupt normal wildlife movements to and from water and/or food sources. Wildlife could have to skirt the open-trench portions of the proposed pipeline corridors to access water and/or food. This disruption could stress wildlife and result in the loss of valuable energy resources. As discussed in Section 2.1.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock), design features and BMPs would be implemented during the construction phase of the proposed well-connect pipelines to assist in the prevention of injury, stress, or death of wildlife.

Migratory Birds

Due to the mobility of adult birds, they would be unlikely to be directly harmed by the proposed projects. If the vegetation-clearing phase of construction for any of the proposed projects is scheduled to occur during migratory bird breeding season, a pre-construction nest survey would take place, as discussed in Section 2.1.2 (Description of Proposed Project – Protection of Flora and Fauna, Including SSS and Livestock). Therefore, it is unlikely that any nests, eggs, or young birds would be directly harmed by the proposed projects. Birds nesting outside of but near the proposed project areas could abandon existing nests as a result of visual and audial disturbances.

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

Cumulative Impacts

The spatial analysis area for wildlife includes the proposed project areas and an approximately two-mile radius around the proposed project areas. Within the spatial analysis area, there is existing and proposed disturbance, and the region has been fragmented. Existing and reasonably foreseeable future disturbance within the spatial analysis area includes the following:

- 18 new or active oil and/or gas wells and associated well pads
- 14 inactive oil and/or gas wells and associated well pads (some reclaimed)

- 3 proposed oil and/or gas well pads and associated roads and utility corridors
- Approximately 48 miles of existing roads (including approximately 4 miles of U.S. Highway 550)
- Numerous existing and proposed utility ROWs
- Active wildlife and livestock grazing; the spatial analysis area is within 2 grazing allotments:
    - Largo Community (Allotment No. 5083): This allotment is described in Section 3.2.2 (Upland Vegetation – Impacts from the Proposed Action – Cumulative Impacts).
    - Nageezi (Allotment No. 5085): This allotment is described in Section 3.2.2 (Upland Vegetation – Impacts from the Proposed Action – Cumulative Impacts).

Habitat disturbance and fragmentation in the spatial analysis area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors). The direct and indirect habitat disturbance, fragmentation, and human activities associated with these disturbances could deter wildlife from utilizing portions of the spatial analysis area. The proposed action would contribute to direct and indirect habitat disturbance and fragmentation in the spatial analysis area.

3.6. Special Status Species

3.6.1. *Affected Environment*

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

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

Based on known range and habitat, nine BLM SSS have the potential to occur within the proposed project areas. These species and their habitat requirements are discussed in detail in the BSRs (Appendix B). Potential SSS habitat is similar within the proposed project areas. The SSS with the potential to occur within the proposed project areas are as follows:

- Aztec gilia (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013a). No individuals identified during transect surveys of proposed project areas.
- Brack's fishhook cactus (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat "zone" (BLM 2013a). One individual was identified adjacent to the proposed Escrito N19 project area.
- Bendire's thrasher (BLM Sensitive): potential foraging and nesting habitat available within all of the proposed project areas
- Gray vireo (State Threatened): potential foraging and nesting habitat available within the Escrito N19 project area
- Pinyon jay (BLM Sensitive): potential foraging habitat available within all four proposed project areas; potential nesting habitat within the proposed Escrito L30 and Escrito N19 project areas.

- Prairie falcon (BLM SMS): potential foraging habitat available
- Ferruginous hawk (BLM Sensitive and SMS): potential foraging habitat available
- Golden eagle (BLM SMS): potential foraging habitat available
- Townsend's big-eared bat (BLM Sensitive): potential foraging habitat available within all four proposed project areas; potential roosting habitat in the abandoned house located adjacent to the proposed Escrito I24A project area.

3.6.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Aztec Gilia and Brack's Fishhook Cactus

The proposed projects would result in the disturbance of up to 29.5 acres of Aztec gilia/Brack's fishhook cactus habitat. Of this, 18.9 acres would remain unvegetated and in use by project personnel throughout the lifetime of the proposed projects. Approximately 1.0 acre would be reseeded during interim reclamation. The remaining 19.6 acres would be fully reclaimed during interim reclamation. The reseeded and fully reclaimed acreage could become populated by Aztec gilia and Brack's fishhook cacti in the future, although the likelihood of these species becoming reestablished in a recently disturbed area is unlikely.

During final reclamation, Encana would reclaim all portions of the proposed project areas that were not fully reclaimed during interim reclamation. This would include clearing the vegetation from within the 0.7-acre portion of the proposed access road corridors that were only reseeded (not recontoured) during interim reclamation. It is possible that if Aztec gilia and/or Brack's fishhook cacti become established within this reseed-only areas following interim reclamation, they could be killed during the clearing-and-contouring phase of final reclamation.

Aztec Gilia
As no Aztec gilia were identified during the biological surveys, no direct impacts to individuals are anticipated as a result of the proposed projects. However, it is possible that Aztec gilia individuals that were overlooked during the biological surveys could be destroyed by the proposed projects.

Brack's Fishhook Cactus
Under BLM guidance (BLM 2014), no transplanting is required for proposed project areas with less than 30 Brack's fishhook cacti. Therefore, no five cacti within the proposed project areas would be killed as a result of the proposed projects. It is possible that additional Brack's fishhook cacti that were overlooked during the biological surveys could also be destroyed.

Bendire's Thrasher, Gray Vireo, and Pinyon Jay

Impacts to Bendire's thrashers would be similar to those described for migratory birds (Section 3.5.2 [Wildlife– Impacts from the Proposed Action – Migratory Birds]).

Ferruginous Hawk, Golden Eagle, and Prairie Falcon

Due to the mobility of adult raptors and the lack of appropriate nesting sites for these raptors in the vicinity of the proposed project areas, it is unlikely that these raptors would be directly harmed by activities associated with the proposed projects.

The clearing of vegetation would result in the removal of foraging habitat and the creation of habitat fragmentation for raptors. In addition, audial and visual disturbances associated with the proposed projects could cause indirect habitat loss. Habitat loss and fragmentation are described in detail in Section 3.5.2 (Wildlife – Impacts from the Proposed Action - Direct and Indirect Impacts).

Townsend's big-eared bat

Because adult bats are highly mobile and nocturnal, no roosting sites would be directly impacted by the proposed projects. Therefore, no direct impacts to this bat species would be expected as a result of the proposed projects.

The clearing of vegetation would result in the removal of foraging habitat and the creation of habitat fragmentation for bats. In addition, audial and visual disturbances associated with the proposed projects could cause indirect habitat loss. Habitat loss and fragmentation are described in detail in Section 3.5.2 (Wildlife – Impacts from the Proposed Action - Direct and Indirect Impacts).

Cumulative Impacts

The spatial analysis area for SSS includes the proposed project areas and an approximately two-mile radius around the proposed project areas. Within the spatial analysis area, there is existing disturbance and reasonably foreseeable future disturbance is anticipated. This disturbance is described in detail in Section 3.5.2 (Wildlife – Impacts from the Proposed Action – Cumulative Impacts). Habitat disturbance in the area is primarily the result of oil and gas development (including well pads, access roads, and pipeline corridors).

Cumulative impacts to these SSS would be similar to those described for wildlife (Section 3.5.2 [Wildlife - Impacts from the Proposed Action – Cumulative Impacts]).

3.7. Cultural Resources

3.7.1. *Affected Environment*

The proposed project areas are located within the archaeologically rich San Juan Basin of northwestern New Mexico. In general, the history of the San Juan Basin can be divided into five major periods: Paleo Indian (circa [ca.] 10000 B.C. to 5500 B.C.); Archaic (ca. 5500 B.C. to A.D. 400); Basketmaker II-III and Pueblo I-IV (aka Anasazi; A.D. 1-1540); and historic (A.D. 1540 to present), which includes Native American as well as later Hispanic and Euro-American settlers. Detailed descriptions of these various periods are provided in the BLM-FFO PRMP/FEIS (BLM 2003a, pp. 3-65 – 3-84) and will not be reiterated here. Additional information can also be found in an associated document, the Cultural Resources Technical Report (Science Applications International Corporation 2002).

Cultural sites vary considerably, and can include but are not limited to simple artifact scatters, domiciles of various types with a myriad of associated features, rock art and inscriptions, ceremonial/religious features, and roads and trails.

The entire Area of Potential Effect (APE) for the proposed actions was archaeologically surveyed by LAC at a BLM Class III (100-percent) level. The archaeological 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* (BLM 2005).

Escrito I24A

The Class III inventory identified no cultural sites within the APE (LAC 2014-2w [2014a]; BLM 2015(I)012F). No TCPs are known to exist in the APE.

Escrito L30

The Class III inventory identified one cultural site within the APE (LAC 2014-2r [2015a]; BLM 2015(II)023F). This cultural site is recommended as being eligible or potentially eligible for nomination to the NRHP. Temporary fencing along the proposed access road and well-connect pipeline corridor and on the western edge of the proposed well pad construction zone is recommended. No TCPs are known to exist in the APE.

Escrito M30

The Class III inventory identified no cultural sites within the APE (LAC 2014-2s [2014]; BLM 2015(I)004F). No TCPs are known to exist in the APE.

Escrito N19

The Class III inventory identified no cultural sites within the APE (LAC 2014-9g [2015b]; BLM 2015(II)024F). No TCPs are known to exist in the APE.

3.7.2. *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 of or other alteration to cultural sites in the area.

Significant cultural sites (e.g., sites eligible for the NRHP) would be avoided with the implementation of design features such as, but not limited to, reduction of construction areas, installation of temporary barriers, and site monitoring. These design features are detailed in the Cultural Resource Record of Review, attached to the COAs in the approved APDs and stipulation attached to the ROW Grants. The proposed action would not be expected to physically threaten any TCPs, prevent access to sacred sites, prevent the possession of sacred objects, or interfere with or otherwise hinder the performance of traditional ceremonies/rituals pursuant to the AIRFA (42 USC 1996), EO 13007, or the NAGPRA (25 USC 3001). The proposed action would have no direct or indirect impact on significant cultural sites.

Cumulative Impacts

There would be 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 survey.

3.8. Travel and Transportation

3.8.1. *Affected Environment*

The project area is located in San Juan County, New Mexico. The proposed area would be accessed utilizing U. S. Highway 550 and County Road #7998. U.S. Highway 550 carries a significant amount of high-speed traffic, consisting of both light and heavy vehicles. Traffic on County Road #7998 is relatively light, with use by oil and gas personnel, residents, and recreationists.

The proposed Escrito N19 well pad would require the construction of1,580 feet (1.1 acres) of a new rerouted road. The existing resource road that travels through the southern portion of the proposed well pad would be rerouted around the northern side of the proposed well pad. The rerouted road will be upgraded following *The Gold Book* (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e). A detailed description of the proposed road reroute is provided in Section 2.1.3. (Proposed Surface Disturbance - Escrito N19 - Access Roads).

3.8.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

Under the proposed action, increased use of the area by construction vehicles and personnel could result in a safety issue for the public. The proposed new access route follows along an existing road and thus does not contribute to additional roads in the area. For existing County Roads or roads that are considered collector roads, Oil Company will defer to the county or to the Roads Committee, when formed, for maintenance determinations. Roads will be maintained in the same or better condition as existed prior to the commencement of operations, and maintenance will continue until final abandonment and reclamation of the well location. Traffic impacts from routine maintenance personnel at the well sites would be ongoing throughout the production life of the well.

The proposed action would result in short-term increases in the volume of both heavy and light traffic during the construction, drilling and completion phases of the project. The action area is rural, but travelers of the area could be impacted in the short term by the construction of access and pads, drill-rig moves, and pipeline construction. These impacts would be reduced after well completion. It is anticipated that two to three pick-up truck would visit the proposed well pad daily during the normal work week, resulting in road degradation, fugitive dust and equipment related noise. As discussed in Section 2.1.2 (Description of Proposed Project – Additional Design Features and BMPs), design features and BMPs would be implemented to reduce impacts of disturbance from vehicles and to increase public safety.

Dust Emissions would be controlled on the proposed roads and locations during construction, drilling, and completions operations with application of dust suppressants (e.g. water and/or magnesium chloride). Dust control would be implemented when dust plumes become larger than normal road use conditions or when directed by a BLM Authorized Officer.

The proposed road reroute will be constructed with one pullout area (stationing 8+43 to 9+93) for sight mitigation safety and to allow traffic to pass. Signs would be placed along the road reroute at stations 0+00, 8+43, and 15+80 to direct drivers to stay on the driving surface and use pullout areas to pass.

A detailed description of the proposed pullout area is provided in Section 2.1.3. (Proposed Surface Disturbance – Escrito N19 - Pullout Area).

Cumulative Impacts

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

The existing road would remain open until construction of the road reroute is completed, at which point the existing road would be closed and the proposed road reroute would be opened for travel. Therefore, transportation in this area would not be hindered by the proposed road reroute and would cause minimal cumulative impacts to travel and transportation in the area.

Economic Features

3.8.3. *Affected Environment*

The proposed project area is located in San Juan County, New Mexico. The proposed area would be accessed utilizing U. S. Highway 550 and County Road #7998. U.S. Highway 550 carries a significant amount of high-speed traffic, consisting of both light and heavy vehicles. Traffic on County Road #7998 is relatively light, with use by oil and gas personnel, residents, and recreationists.

3.8.4. *Impacts from Alternative A (the Proposed Action)*

Direct and Indirect Impacts

Under the proposed action, increased use of the area by construction vehicles and personnel could result in a safety issue for the public. The proposed new access road follows along an existing road and thus does not contribute to additional roads in the area. For existing County Roads or roads that are considered collector roads, Encana will defer to the county or to the Roads Committee, when formed, for maintenance determinations. Roads will be maintained in the same or better condition as existed prior to the commencement of operations, and maintenance will continue until final abandonment and reclamation of the proposed well locations. Traffic impacts from routine maintenance personnel at the well sites would be ongoing throughout the production life of the proposed wells.

The proposed action would result in short-term increases in the volume of both heavy and light traffic during the construction, drilling and completion phases of the project. The action area is rural, but travelers of the area could be impacted in the short term by the construction of the proposed access roads and well pads, drill-rig moves, and well-connect pipeline construction. These impacts would be reduced after the proposed wells are completed. It is anticipated that two to three pick-up trucks would visit the proposed well pad daily during the normal work week, resulting in road degradation, fugitive dust and equipment related noise. As discussed in Section 2.1.2 (Description of Proposed Project – Additional Design Features and BMPs), design features and BMPs would be implemented to reduce impacts of disturbance from vehicles and to increase public safety.

Cumulative Impacts

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

3.9. Livestock

3.9.1. *Affected Environment*

Proposed Project Areas

Escrito I24A, Escrito L30, Escrito N19

The entirety of the proposed Escrito I24A and Escrito N19 project areas and approximately 100 feet of the proposed Escrito L30 access road and well-connect pipeline corridor are located in the Largo Community Allotment (Allotment No. 5083). Vegetation communities within the allotment include sagebrush shrubland, reclaimed shrubland, and piñon-juniper woodlands. The allotment is permitted for 145 head of cattle and 596 head of sheep, annually. The term grazing authorization permits the utilization of 1,676 active Animal Unit Months (AUMs) of forage for cattle and 1,370 active AUMs of forage for sheep. An AUM is the amount of forage needed to sustain a cow (1000-pound) or cow/calf pair for one month. The allotment is 47,698 acres and consists of 100-percent BLM-authorized AUMs. The average rangeland carrying capacity for the allotment is 28.5 acres per AUM for cattle and 34.8 acres per AUM for sheep.

The analysis area contains the following range improvements:

Escrito I24A
A fence line will be cut and braced around the proposed construction zone at the southeastern side (corner 1), southern corner (corner 2), and the eastern corner (corner 6) during construction. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with *The Gold Book* (BLM and USFS 2007).

Escrito L30

- An existing fence line will be cut and braced for proposed access road and pipeline installation. A cattle guard and wing gate will be installed 60 feet off the main road. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with *The Gold Book* (BLM and USFS 2007).

- A 150-foot-by-100 foot range improvement pond will be constructed near the southeastern corner of the proposed well pad (corner 5) outside of the construction zone.

Escrito N19
A fence line will be cut and braced for well-connect pipeline installation. H-braces will be installed prior to cutting the fence. The H-braces will be constructed in accordance with *The Gold Book* (BLM and USFS 2007).Escrito L30 and Escrito M30.

The entirety of the proposed Escrito M30 project area and majority of the proposed Escrito L30 project area are located in the Nageezi Allotment (Allotment No. 5085). Vegetation communities within this allotment include sagebrush shrubland and piñon-juniper woodlands. The term grazing authorization permits the utilization of 72 active AUMs of forage for six head of cattle. The allotment is 2,897acres and consists of 100-percent BLM-authorized AUMs. The average rangeland carrying capacity for the allotment is 40.2 acres per AUM for cattle.

Escrito M30
A fence will be rerouted around the proposed construction zone near the southwestern corner of the proposed well pad (corner 6) during construction and drilling. The fence will be restored to its original positioning at interim reclamation

3.9.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

The proposed projects would result in the surface disturbance of 29.5 acres within the Largo Community and Nageezi allotments. Impacts to these allotments would consist of the following:

- Largo Community: The estimated short-term impact to range carrying capacity would be a loss of 1.0 AUMs for cattle and 1.2 AUMs for sheep (assuming an average rangeland carrying capacity of 28.5 acres per AUM for cattle, 34.8 acres per AUM for sheep, and a disturbance area of 16.8 acres). After successful interim reclamation, the long-term-loss would be 0.6 AUM for cattle and 0.5 AUM for sheep (assuming an average rangeland carrying capacity of 28.5 acres per AUM for cattle and 34.8 aces for sheep and a long-term working area of 6.1 acres).

- Nageezi: The estimated short-term impact to range carrying capacity would be a loss of less than 0.1 AUM (assuming an average rangeland carrying capacity of 40.2 acres per AUM and a disturbance area of 12.7 acres). After successful interim reclamation, the long-term-loss would be 0.3 AUM for cattle AUMs (assuming an average rangeland carrying capacity of 40.2 acres per AUM long-term working area of 2.9 acres).

Additional short-term impacts could include displacement of permitted livestock during construction activities or exposure of livestock to hazards. After construction, livestock should become acclimated to the wells and traffic associated with their maintenance. Vehicle traffic associated with the wells could pose impacts to livestock, considering that the area is open range and livestock may be found on roads in the area.

Direct impacts to livestock could occur if holes or ditches are not excluded properly. Any type of hole or ditch is potentially a hazard to livestock while grazing. Cow or calf injuries could occur if these animals fall into or try to get out of a ditch-type cavity. Cow or calf leg injuries could also occur if a small hole is left uncovered. Livestock could step into the hole and break a leg. Mitigation associated with the protection of livestock during pipeline trenching is discussed in detail in Section 2.1.2 (Description of Proposed Projects – Design Features and Best Management Practices - Protection of Flora and Fauna, including SSS and Livestock).

Cumulative Impacts

The spatial analysis area for livestock is the Largo Community and Nageezi allotments. Within these allotments, the following existing and reasonably foreseeable disturbances are present:

- Several existing utility corridors
- Largo Community:
  - 77 active oil and/or gas wells and associated well pads
  - 82 inactive oil and/or gas wells and associated well pads (some reclaimed)
  - 21 proposed oil and/or gas wells and associated well pads, roads, and utility corridors
  - 145 miles of roads (including approximately 17 miles of U.S. Highway 550 and 50 miles of County Roads)
- Nageezi:
  - 9 active oil and/or gas wells and associated well pads
  - 4 inactive oil and/or gas wells and associated well pads (some reclaimed)

- 6 proposed oil and/or gas wells and associated well pads, roads, and utility corridors
- 10 miles of roads

The proposed projects would contribute to cumulative disturbance within these allotments.

3.10. Public Health and Safety

3.10.1. *Affected Environment*

Worker safety is regulated under the Occupational Safety and Health Act of 1970, as amended (29 USC 651). Additional safety regulations found in Pipeline Safety Programs and Rulemaking Procedures (49 CFR 190) and Transportation of Natural and Other Gas by Pipeline: Minimal Federal Safety Standards (40 CFR 192) apply to natural gas pipelines.

The proposed project area is remote. The nearest town, Nageezi, New Mexico (population 286 [U.S. Census Bureau 2010]) and U.S. Highway 550, are approximately 1 to 2 miles southwest and of the proposed project areas. There are no designated recreation areas, commercial areas, or occupied residential areas within one mile of the proposed project areas. However, the location is accessible to the public by dirt roads.

The nearest hospital is in Farmington, New Mexico. This hospital is approximately 41 areal miles or approximately 50 road miles (2 miles of dirt road and 48 miles of paved road) from the proposed projects.

3.10.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

As a result of the proposed projects, short-term effects to public health and safety would be low to moderate. For the long term, effects to public health and safety would be low.

The proposed projects would affect transportation. During construction, the proposed projects would result in increased traffic on area roads; some vehicles would be hauling heavy equipment. Therefore, there would be an increased potential for traffic accidents. Dust associated with construction activities or travel on dirt access roads may result in poor visibility in the area. The increased use of dirt access roads during muddy conditions may worsen the roads' conditions. The proposed reroute of the existing road associated with the proposed Escrito N19 project would include a pullout area that would be an improvement to safety conditions. Following construction, traffic levels would be similar to current levels; long-term effects on transportation would be low.

During construction, drilling, and maintenance activities, the operation of heavy equipment poses potential safety concerns. Existing facilities (such as oil and gas wells, pipelines, and power lines) could be damaged or ruptured, posing a risk to human safety.

During the operation of the proposed wells, facility failure (such as pipeline ruptures) could represent a potential danger to the public.

Hazardous and solid wastes associated with the proposed projects are discussed in Section 2.1.2. (Description of Proposed Projects – Design Features and Best Management Practices, Control of Waste). As a result of the proposed projects, the public could be exposed to hazardous materials.

Cumulative Impacts

The general BLM-FFO region has been developed by the oil and gas industry for over six decades, which contributes to public health and safety concerns in the area.

Transportation issues are a primary safety concern. Vehicles associated with the oil and gas industry utilize the developed highway and county road systems. In addition, the oil and gas industry constructs

and utilizes dirt access roads in the area. These roads, most of which are accessible by the public, are often hazardous, particularly during and following periods of inclement weather.

Additional safety concerns in the region include wildfire; oil and gas facility leakage or rupture; moving equipment (such as pump jacks); oil and gas explosions; and the handling, storage, and disposal of wastes, chemicals, or condensate. Hazardous and solid wastes are discussed in Section 2.1.2. (Description of Proposed Projects – Design Features and Best Management Practices, Control of Waste).

The proposed projects would contribute minimally to the cumulative public safety impacts in the region.

3.11. Environmental Justice

3.11.1. *Affected Environment*

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

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

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

- Low-income population. A low-income population is determined based on annual statistical poverty thresholds developed by the US Census Bureau. In 2012, poverty level is based on total income of $11,720 for an individual and $23,283 for a family of four (US Census Bureau 2012a). A low-income community may include either a group of individuals living in geographic proximity to one another or dispersed individuals, such as migrant workers or Native Americans.

- Minority. Minorities are individuals who are members of the following population groups: American Indian, Alaskan Native, Asian, Pacific Islander, Black, or Hispanic.

- Minority population area. A minority population area is so defined if either the aggregate population of all minority groups combined exceeds 50 percent of the total population in the area or if the percentage of the population in the area comprising all minority groups is meaningfully greater than the minority population percentage in the broader region. Like a low-income population, a minority population may include either individuals living in geographic proximity to one another or dispersed individuals.

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

Low-income Populations

Income and poverty data estimates for study area counties from the US Census Small Area Poverty Estimates model indicate that the percent of the population living below the poverty level in the socioeconomic study area as a whole is slightly above that of the state (21.3 percent and 20.6 percent), but it is much higher than the national average of 12.1 percent (Table 12). Poverty levels ranged from 37.7 percent in McKinley County to 13.7 percent in San Juan County. Only that of Sandoval County was below the state average.

Table 12: Study Area County Population in Poverty (2002-2012)

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

Source: US Census Bureau 2013

Similarly, estimates from 2012 indicate that Sandoval and San Juan Counties had household median incomes ($57,376 and $45,901) that were above the state level of $42,828. McKinley County ($29,821) and Rio Arriba County ($36,900) were below that of the state in 2012 (Table 12). While no area communities meet the CEQ definition of a low-income population area (50 percent or higher), the highest poverty rates were seen in Bloomfield (29 percent), Espanola (26.3 percent), and Bernalillo (24.1 percent; Table 13).

Table 13: Study Area Key Community Race/Ethnicity and Poverty Data

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

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

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

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

Minority Populations

Based on 2008-2012 data, minorities made up 59.5 percent of the population in New Mexico, compared to 36.3 percent in the United States as a whole (Table 14). The proportion of minorities in the socioeconomic study area (65.3 percent) substantially exceeded the United States and is slightly higher than the state average. At the county level, the population ranged from 89.7 percent minority in McKinley County to 52.8 percent in Sandoval County. Within relevant tribal nations, Native Americans represented the vast majority of the population. The largest minority groups were Hispanics/Latinos in Rio Arriba and Sandoval Counties and Native Americans in McKinley and San Juan Counties.

Table 14. Study Area County Population by Race/Ethnicity (2008-2012)

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

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

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

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

Native American Populations

Data in Table 14 account for a substantial portion of the study area population in some areas, notably McKinley and San Juan Counties, where the population is 72.8 and 36.3 percent American Indian respectively. Three tribal governments have reservations within the planning area: the Jicarilla Apache Nation, the Navajo Nation, and the Ute Mountain Nation (Table 15). The Southern Ute Nation has lands just north of the planning area in the state of Colorado, but none within the planning area. Almost one half of the planning area is tribal lands. Each tribe maintains a general concern for protection of and access to areas of traditional and religious importance, and the welfare of plants, animals, air, landforms, and water on reservation and public lands. Policies established in 2006 by the BLM and US Forest Service, in coordination with Federal tribes, ensure access by traditional native practitioners to area plants. The policy also ensures that management of these plants promotes ecosystem health for public lands. The BLM is encouraged to support and incorporate into their planning traditional native and native practitioner plant-gathering for traditional use (Boshell 2010).

Table 15. Tribal Nations in the Planning Area

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

3.11.2. *Impacts from the Proposed Action*

Direct and Indirect Impacts

The proposed projects would result in no disproportionate, negative effects to minority or low-income populations. The proposed projects would not negatively affect socioeconomics in the region.

There one abandoned house within a one-mile radius of the proposed project areas. Therefore, no negative, direct effects to individuals, groups, or communities would be expected.

Indirectly, there could be positive, short- and/or long-term effects to socioeconomics associated with the proposed projects. The proposed projects could contribute to employment opportunities in the oil and gas industry. In addition, there could be taxes and royalties to state and county governments as a result of the proposed projects.

Cumulative Impacts

The spatial analysis area for the proposed projects is the BLM-FFO planning area. In the BLM-FFO planning area, the oil and gas industry is the dominant force in the economy. In New Mexico, the oil and gas industry provides nearly one billion dollars per year in taxes, royalties, and interest to the State; at least half of this is related to oil and gas production in the San Juan Basin. This industry is a primary

employer and provides higher paying jobs than many other job sectors available to the population. As of 2000, over 11,000 people in northwestern New Mexico were employed in the industry. Overall, the positive effects of oil and gas development in the spatial analysis area are expected to outweigh any changes in jobs, expenditures, or revenues resulting from any other actions expected or likely in the region (BLM 2003a). The proposed projects would contribute to this positive cumulative impact.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

Table 1 contains a list of tribes, individuals, organizations, and agencies invited to attend the on-site for the project.

Table 16: Tribes, Individuals, Organizations, and Agencies Invited to the On-Site

Name	Tribe, Organization, or Agency	Attended On-Site
Cooley	Dine Care	No
Schlenker-Goodrich	Western Environmental Law Center	No
Ream	WildEarth Guardians	No
Dronkers	Earthworks	No
Wright	Chaco Alliance	No
Graham	Western Resource Advocates	No
Sage	Counselor Chapter	No
Eisenfeld	San Juan Citizens Alliance	No
Blancett	Blancett Ranch	No
Schrieber	Devils Spring Ranch	No
	Nageezi Chapter House - Navajo Nation	No

4.2. List of Preparers

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

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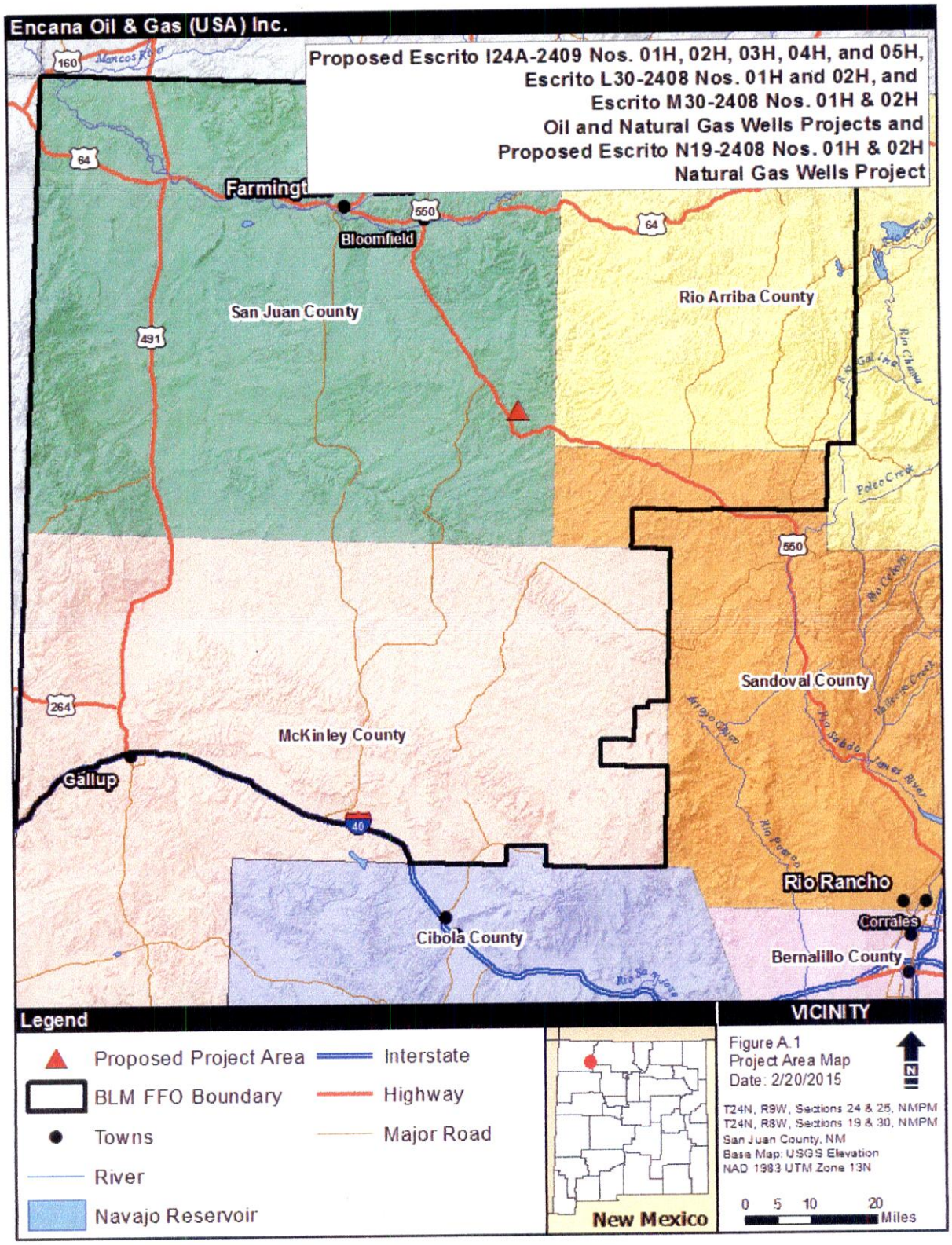
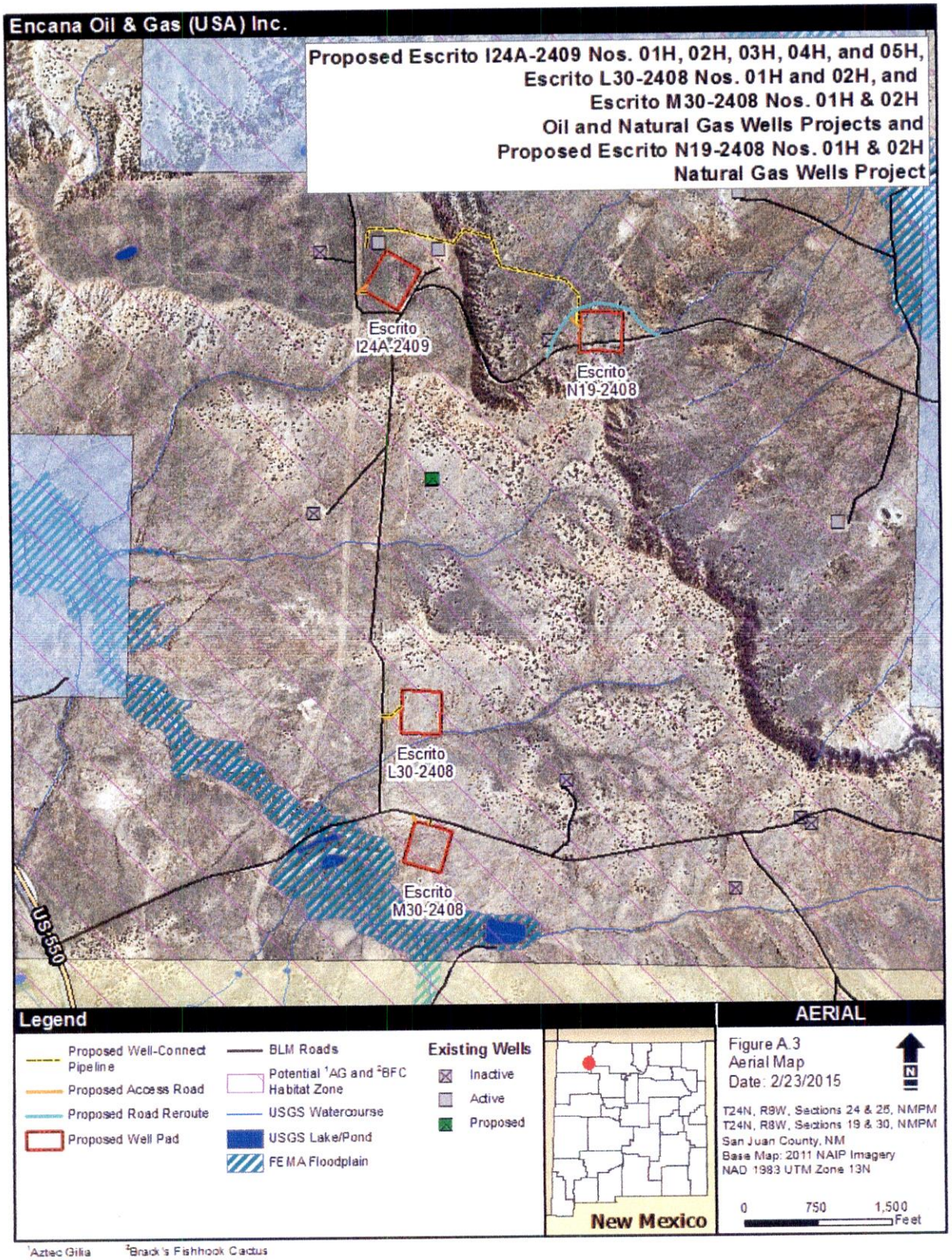
APPENDIX A. MAPS

A.1. Vicinity Map

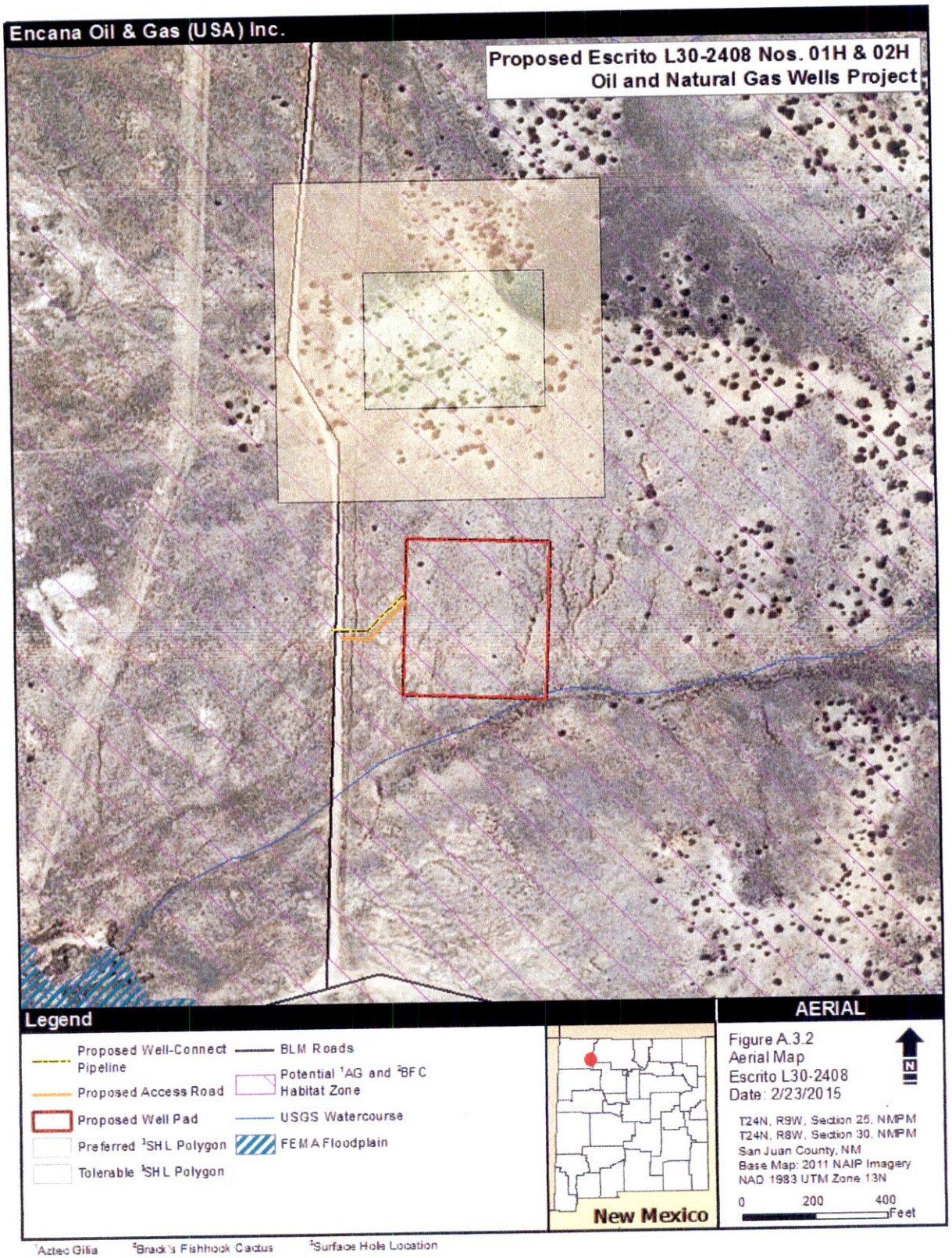


A.3. Aerial Maps



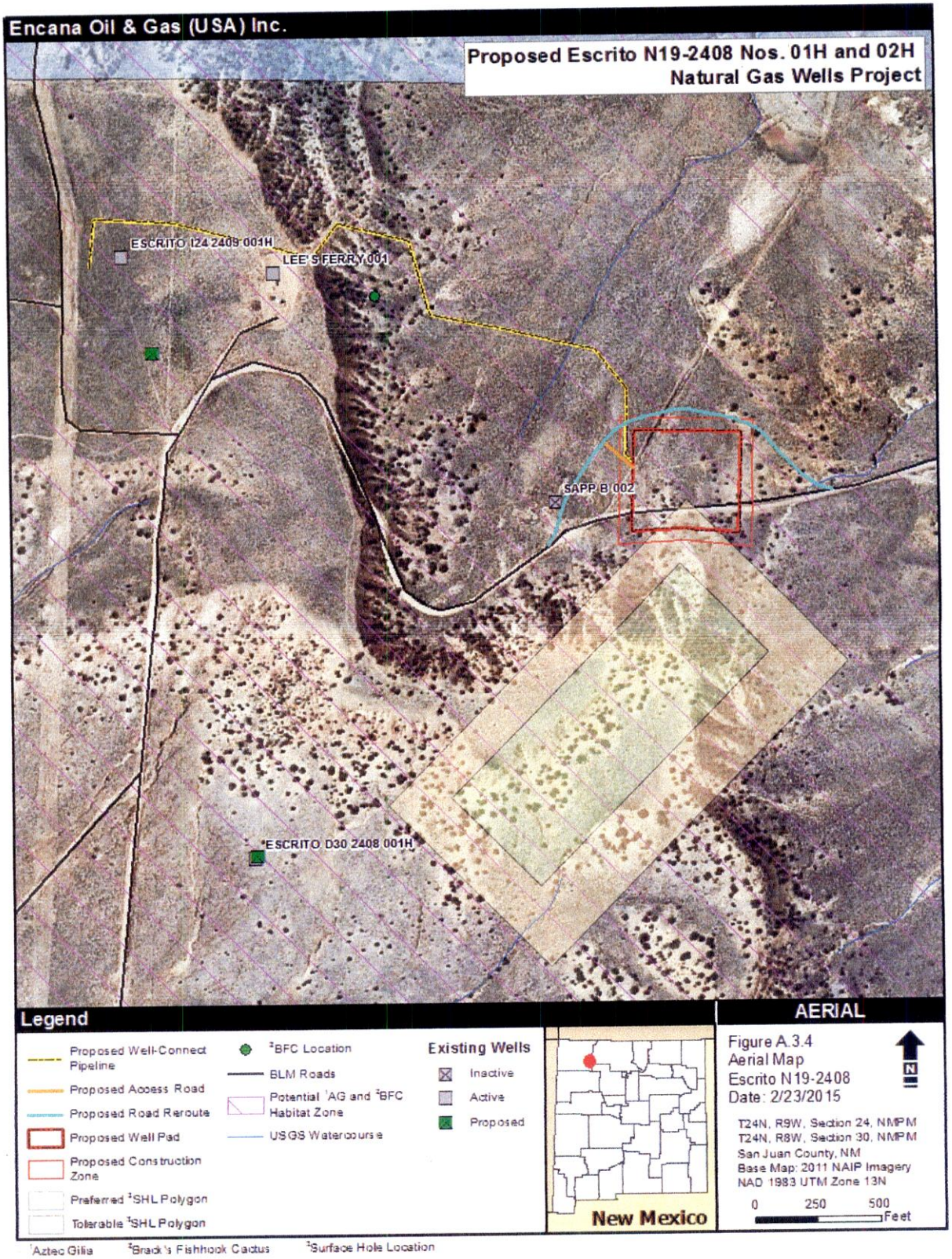
[1]Aztec Gilia [2]Brack's Fishhook Cactus

A.3.2. Escrito L30



[1]Aztec Gilia [2]Brack's Fishhook Cactus [3]Surface Hole Location

A.3.4. Escrito N19



APPENDIX C. PLATS

C.1. Escrito I24

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO I24A-2409	01H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6892.4'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	24N	9W		1647'	SOUTH	19'	EAST	SAN JUAN

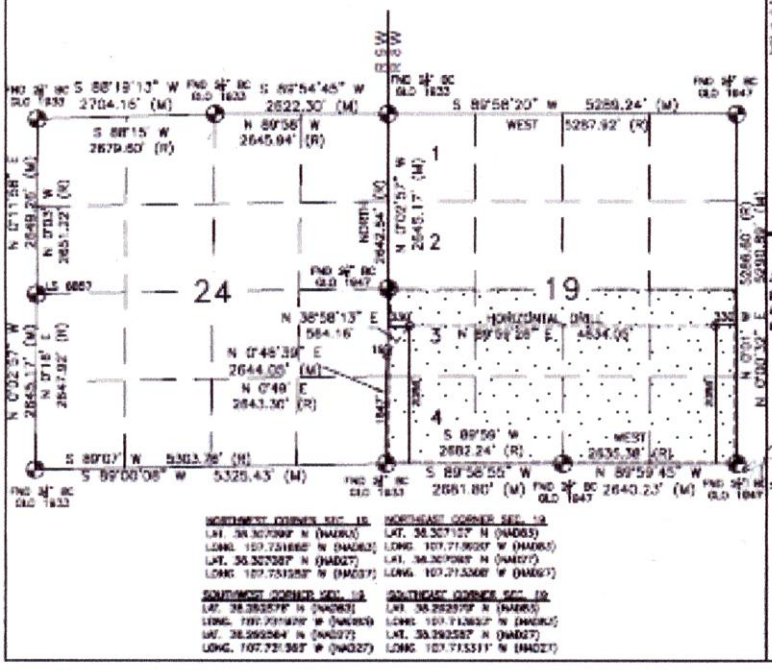
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	19	24N	9W		2086'	SOUTH	330'	EAST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 325.00 ACRES S/2 SEC. 19			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

AUGUST 28, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID E. RUSSELL
NEW MEXICO
10201
REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
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WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO 124A-2409	02H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6892.4'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	24N	9W		1621'	SOUTH	33'	EAST	SAN JUAN

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	24	24N	9W		1270'	SOUTH	330'	WEST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 24			

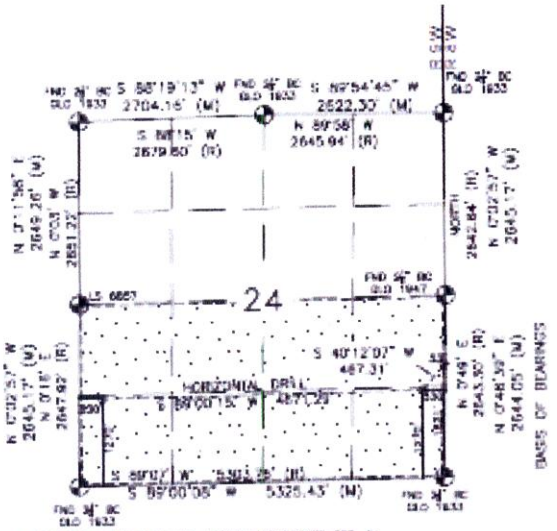
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

WELL CLAD
LAT. 36.297028° N (NAD83)
LONG. 107.732714° W (NAD83)
LAT. 36.297018° N (NAD27)
LONG. 107.731461° W (NAD27)

ENTRY POINT
LAT. 36.298347° N (NAD83)
LONG. 107.733037° W (NAD83)
LAT. 36.298339° N (NAD27)
LONG. 107.732424° W (NAD27)

BOTTOM HOLE
LAT. 36.295651° N (NAD83)
LONG. 107.748887° W (NAD83)
LAT. 36.295600° N (NAD27)
LONG. 107.748387° W (NAD27)



NORTHEAST CORNER SEC. 24
LAT. 36.307088° N (NAD83)
LONG. 107.731885° W (NAD83)
LAT. 36.307087° N (NAD27)
LONG. 107.731358° W (NAD27)

NORTHWEST CORNER SEC. 24
LAT. 36.308887° N (NAD83)
LONG. 107.748651° W (NAD83)
LAT. 36.308857° N (NAD27)
LONG. 107.748317° W (NAD27)

SOUTHEAST CORNER SEC. 24
LAT. 36.283578° N (NAD83)
LONG. 107.731408° W (NAD83)
LAT. 36.283564° N (NAD27)
LONG. 107.731387° W (NAD27)

SOUTHWEST CORNER SEC. 24
LAT. 36.282232° N (NAD83)
LONG. 107.748422° W (NAD83)
LAT. 36.282222° N (NAD27)
LONG. 107.748422° W (NAD27)

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

AUGUST 28, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID B. RUSSELL
NEW MEXICO
10201
REGISTERED PROFESSIONAL ENGINEER AND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

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	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO 124A-2409	03H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6892.4'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	24N	9W		1595'	SOUTH	47'	EAST	SAN JUAN

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	19	24N	8W		1385'	SOUTH	330'	EAST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 19			

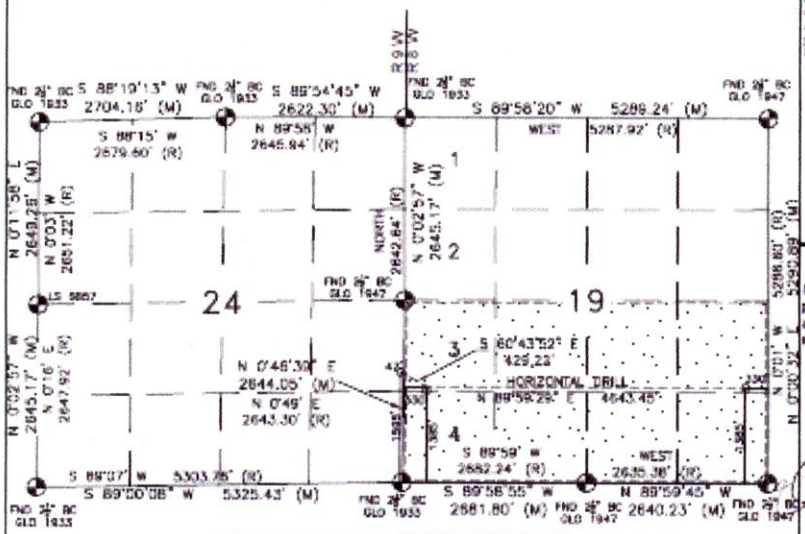
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

WELL FLAG
LAT. 36.299965° N (NAD83)
LONG. 107.732063° W (NAD83)
LAT. 36.299943° N (NAD27)
LONG. 107.731450° W (NAD27)

ENTRY POINT
LAT. 36.295379 N (NAD83)
LONG. 107.730793° W (NAD83)
LAT. 36.295367 N (NAD27)
LONG. 107.730180° W (NAD27)

BOTTOM HOLE
LAT. 36.296382° N (NAD83)
LONG. 107.715042° W (NAD83)
LAT. 36.296370° N (NAD27)
LONG. 107.714437° W (NAD27)



NORTHWEST CORNER SEC. 19
LAT. 36.307099° N (NAD83)
LONG. 107.737593° W (NAD83)
LAT. 36.307087° N (NAD27)
LONG. 107.737292° W (NAD27)

NORTHEAST CORNER SEC. 19
LAT. 36.307107° N (NAD83)
LONG. 107.713920° W (NAD83)
LAT. 36.307095° N (NAD27)
LONG. 107.713308° W (NAD27)

SOUTHWEST CORNER SEC. 19
LAT. 36.292578° N (NAD83)
LONG. 107.737578° W (NAD83)
LAT. 36.292564° N (NAD27)
LONG. 107.737363° W (NAD27)

SOUTHEAST CORNER SEC. 19
LAT. 36.292579° N (NAD83)
LONG. 107.713923° W (NAD83)
LAT. 36.292567° N (NAD27)
LONG. 107.713317° W (NAD27)

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Printed Name

E-mail Address

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	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO 124A-2409	04H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6892.4'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	24N	9W		1569'	SOUTH	61'	EAST	SAN JUAN

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	19	24N	8W		766'	SOUTH	330'	EAST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 19			

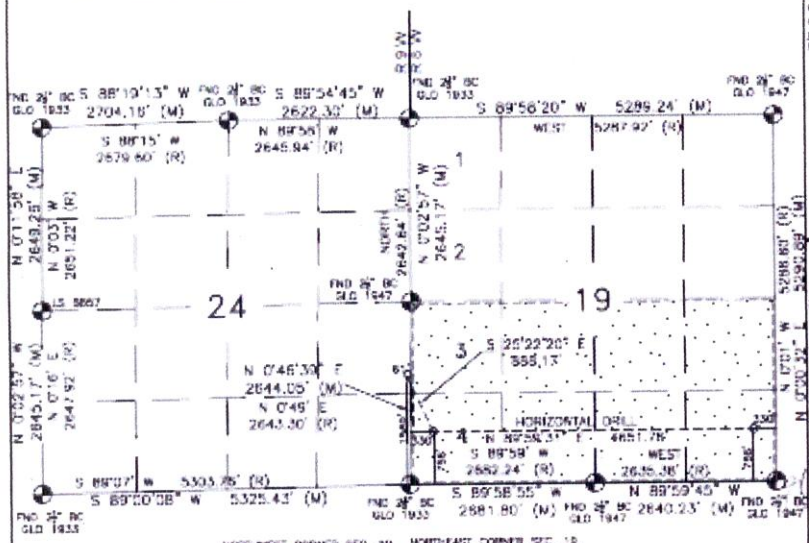
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

WELL FLAG
LAT. 36.295887° N (NAD83)
LONG. 107.732113° W (NAD83)
LAT. 36.295947° N (NAD27)
LONG. 107.731450° W (NAD27)

ENTRY POINT
LAT. 36.294680° N (NAD83)
LONG. 107.730831° W (NAD83)
LAT. 36.294688° N (NAD27)
LONG. 107.730208° W (NAD27)

BOTTOM HOLE
LAT. 36.294657° N (NAD83)
LONG. 107.715042° W (NAD83)
LAT. 36.294671° N (NAD27)
LONG. 107.714437° W (NAD27)



NORTH-WEST CORNER SEC. 19
LAT. 36.307099° N (NAD83)
LONG. 107.731582° W (NAD83)
LAT. 36.307087° N (NAD27)
LONG. 107.731252° W (NAD27)

NORTH-EAST CORNER SEC. 19
LAT. 36.307107° N (NAD83)
LONG. 107.713230° W (NAD83)
LAT. 36.307095° N (NAD27)
LONG. 107.712908° W (NAD27)

SOUTH-WEST CORNER SEC. 19
LAT. 36.292576° N (NAD83)
LONG. 107.731976° W (NAD83)
LAT. 36.292564° N (NAD27)
LONG. 107.731643° W (NAD27)

SOUTH-EAST CORNER SEC. 19
LAT. 36.292576° N (NAD83)
LONG. 107.713223° W (NAD83)
LAT. 36.292567° N (NAD27)
LONG. 107.712911° W (NAD27)

[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

AUGUST 28, 2014

Date of Survey

Signature and Seal of Professional Surveyor:

DAVID RUSSELL NEW MEXICO 10201 REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO 124A-2409	05H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6892.4'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	24	24N	9W		1543'	SOUTH	76'	EAST	SAN JUAN

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	24	24N	9W		638'	SOUTH	330'	WEST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 24			

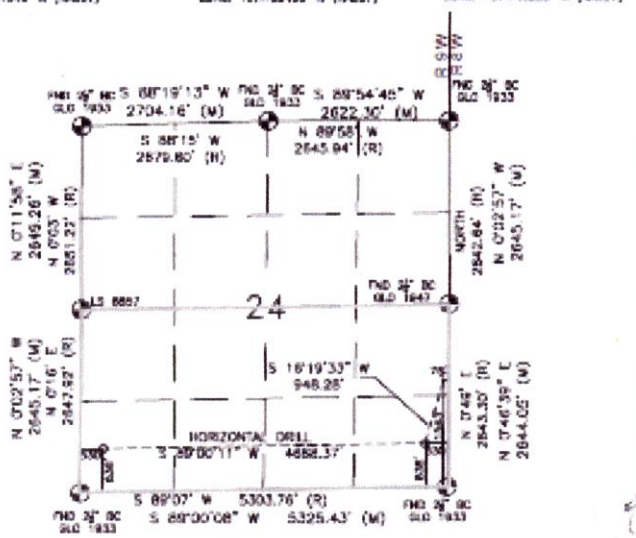
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

WELL FLAG
LAT. 36.295811° N (NAD83)
LONG. 107.731182° W (NAD83)
LAT. 36.295709° N (NAD27)
LONG. 107.731549° W (NAD27)

ENTRY POINT
LAT. 36.294312° N (NAD83)
LONG. 107.733088° W (NAD83)
LAT. 36.294300° N (NAD27)
LONG. 107.732452° W (NAD27)

BOTTOM HOLE
LAT. 36.294088° N (NAD83)
LONG. 107.748899° W (NAD83)
LAT. 36.294074° N (NAD27)
LONG. 107.748288° W (NAD27)



NORTHEAST CORNER SEC. 24
LAT. 36.307099° N (NAD83)
LONG. 107.731865° W (NAD83)
LAT. 36.307087° N (NAD27)
LONG. 107.731352° W (NAD27)

NORTHWEST CORNER SEC. 24
LAT. 36.308887° N (NAD83)
LONG. 107.748651° W (NAD83)
LAT. 36.308875° N (NAD27)
LONG. 107.748147° W (NAD27)

SOUTHEAST CORNER SEC. 24
LAT. 36.283578° N (NAD83)
LONG. 107.731609° W (NAD83)
LAT. 36.283564° N (NAD27)
LONG. 107.731363° W (NAD27)

SOUTHWEST CORNER SEC. 24
LAT. 36.283232° N (NAD83)
LONG. 107.748436° W (NAD83)
LAT. 36.283220° N (NAD27)
LONG. 107.748422° W (NAD27)

17 OPERATOR CERTIFICATION

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Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

AUGUST 28, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID B. RUSSELL NEW MEXICO 10201 REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

ENCANA OIL & GAS (USA) INC.

ESCRITO I24A-2409 #05H
1543' FSL & 76' FEL
LOCATED IN THE NE/4 SE/4 OF SECTION 24, T24N, R9W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6892', NAVD 88
FINISHED PAD ELEVATION: 6892.4', NAVD 88

WELL FLAG
LATITUDE: 36.296811° N
LONGITUDE: 107.732162° W
DATUM: NAD83

9.5° E
MN
TN
50' 0 50' 100'
SCALE = 100'

NOTES

1.) BASIS OF BEARING: BETWEEN FOUND MONUMENTS AT THE SOUTHEAST CORNER AND THE EAST QUARTER CORNER OF SECTION 24, TOWNSHIP 24 NORTH, RANGE 9 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO. LINE BEARS: N 0°48'35" E A DISTANCE OF 2544.05 FEET AS MEASURED BY G.P.S.

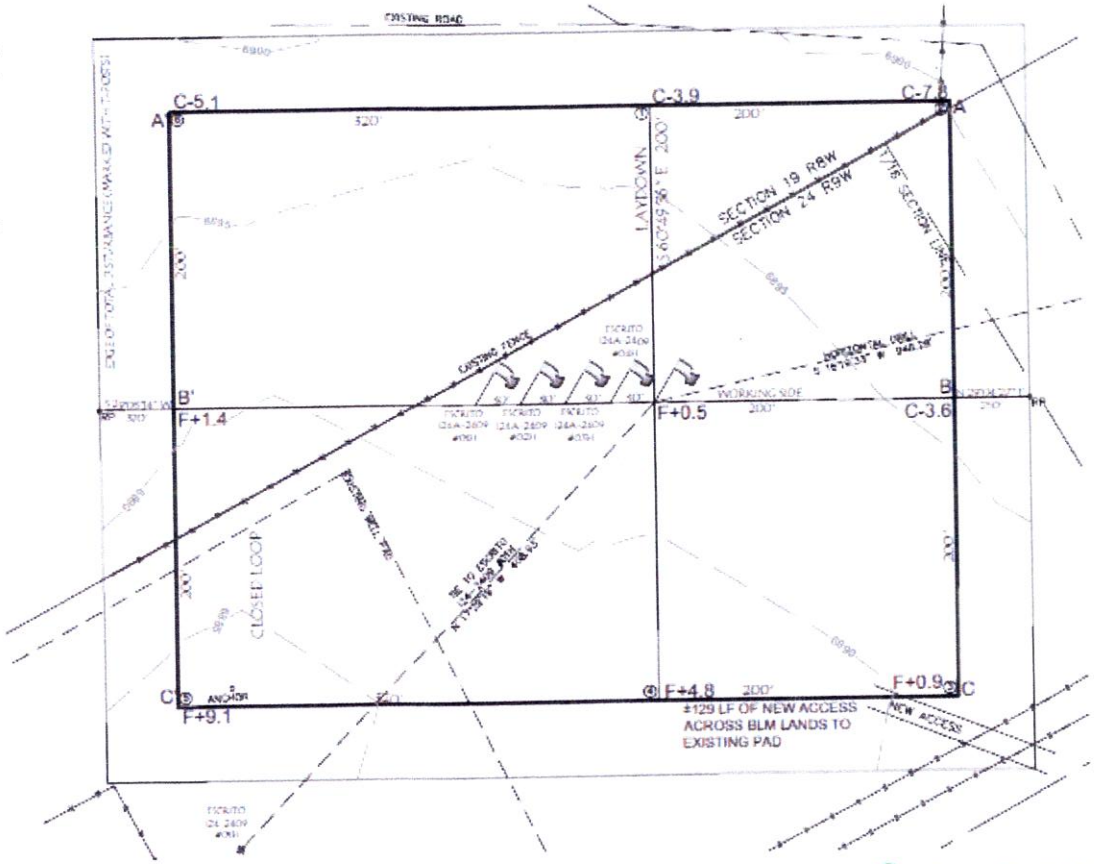
2.) LATITUDE, LONGITUDE AND ELLIPSOIDAL HEIGHT BASED ON ASTEC CORS U1 PHASE CENTER. DISTANCES SHOWN ARE GROUND DISTANCES USING A TRAVERSE MERCATOR PROJECTION FROM A WGS84 ELLIPSOID, CONVERTED TO NAD83. NAVD88 ELEVATIONS AS PREDICTED BY GEOID03.

3.) LOCATION OF UNDERGROUND UTILITIES DEPICTED ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE FIELD VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE CALL AUTHORITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

4.) T-POSTS HAVE BEEN SET TO DEFINE THE EDGE OF DISTURBANCE LIMITS WHICH ARE 50' OFFSETS FROM THE EDGE OF THE STAKED WELL PAD.

- SURFACE OWNERSHIP -
BUREAU OF LAND MANAGEMENT

SLOPES TO BE CONSTRUCTED TO MATCH THE ORIGINAL CONTOURS AS CLOSE AS POSSIBLE.



TOTAL PERMITTED AREA
5 FOOT CONTOUR INTERVAL SHOWN
500' x 620' = 7.12 ACRES
SCALE: 1" = 100'
JOB No.: ENC400
DATE: 08/03/2014
DRAWN BY: TWT

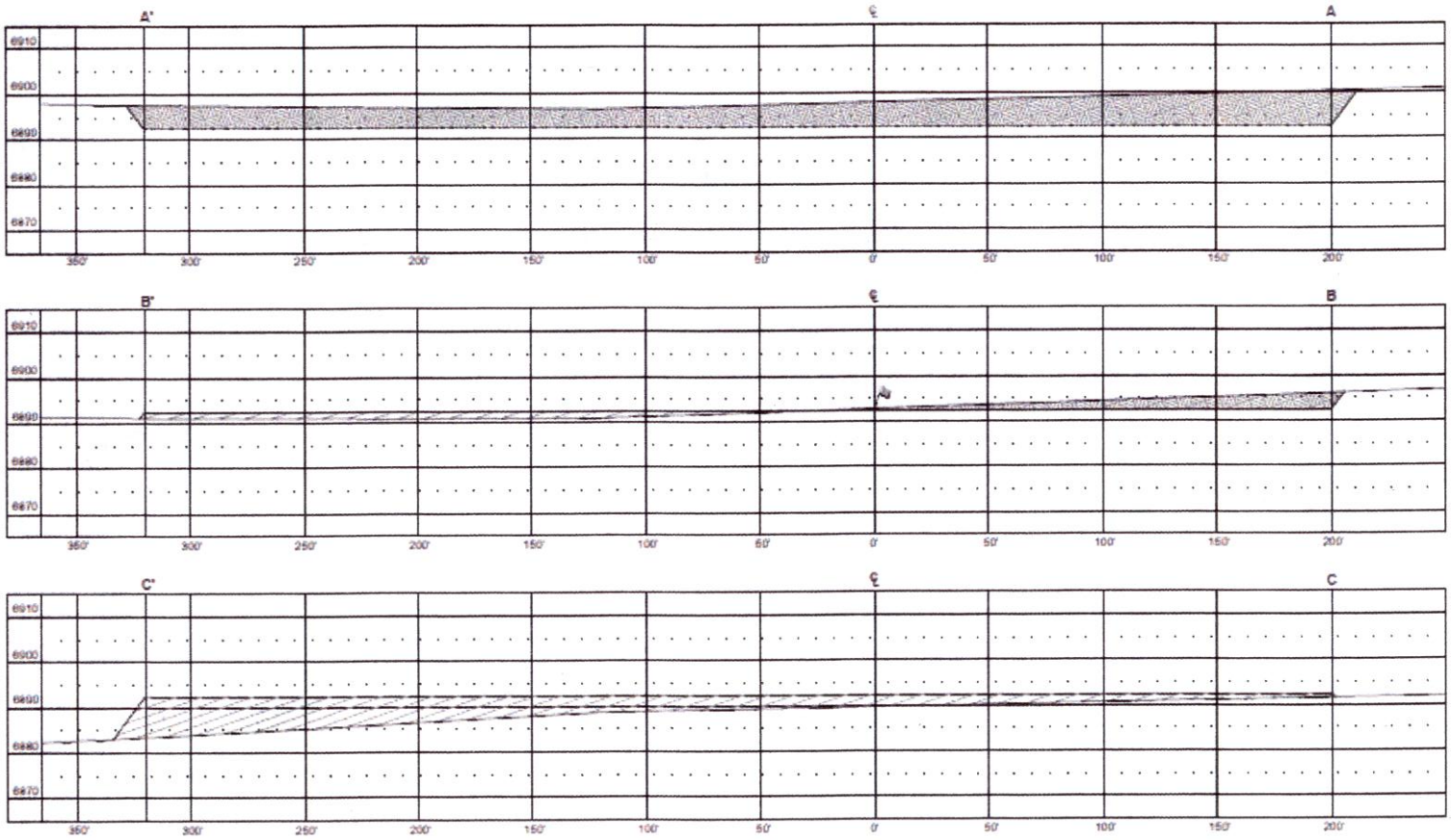
NOTE:
SCORPION SURVEY & CONSULTING, L.L.C. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES. CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED, BURIED PIPELINES OR CABLES ON WELL PAD, IN CONSTRUCTION ZONE AND/OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELL FLAG
LATITUDE: 36.296811° N
LONGITUDE: 107.732162° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO I24A-2409 #05H
1543' FSL & 76' FEL
LOCATED IN THE NE/4 SE/4 OF SECTION 24, T24N, R9W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6892', NAVD 88
FINISHED PAD ELEVATION: 6892.4', NAVD 88



VERT. SCALE: 1" = 30'
HORZ. SCALE: 1" = 60'
JOB No.: ENC400
DATE: 08/03/2014
DRAWN BY: TWT

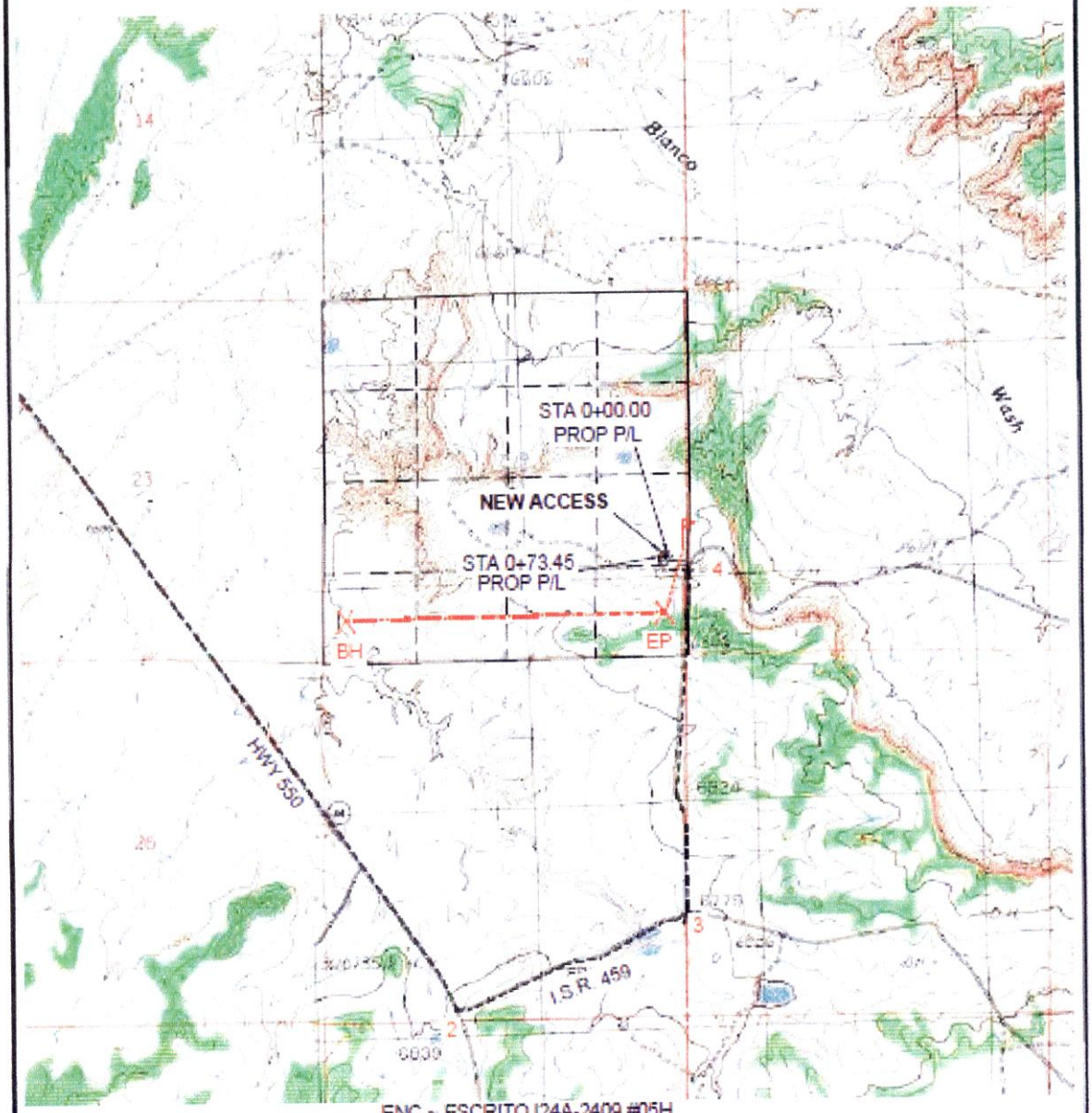
THIS DIAGRAM IS AN ESTIMATE OF DIRT BALANCE AND IS NOT INTENDED TO BE AN EXACT MEASURE OF VOLUME

FILL CUT

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELL FLAG
LATITUDE: 36.296811° N
LONGITUDE: 107.732162° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.
ESCRITO I24A-2409 #05H
1543' FSL & 76' FEL
LOCATED IN THE NE/4 SE/4 OF SECTION 24,
T24N, R9W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6892', NAVD 88
±129 OF NEW ACCESS ACROSS BLM LANDS



U.S.G.S. QUAD: CROW MESA WEST
SCALE: 1" = 2000' (1:24,000)
JOB No.: ENC400
DATE: 09/03/2014
DRAWN BY: TWT

ENC ~ ESCRITO I24A-2409 #05H
±129 OF NEW / UPGRADED ACCESS
INSTALL NEW 24" CMP
STA. 0+00 - EX. ROAD
STA. 1+29.06 - @ PAD

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

PROPOSED PIPELINE FOR

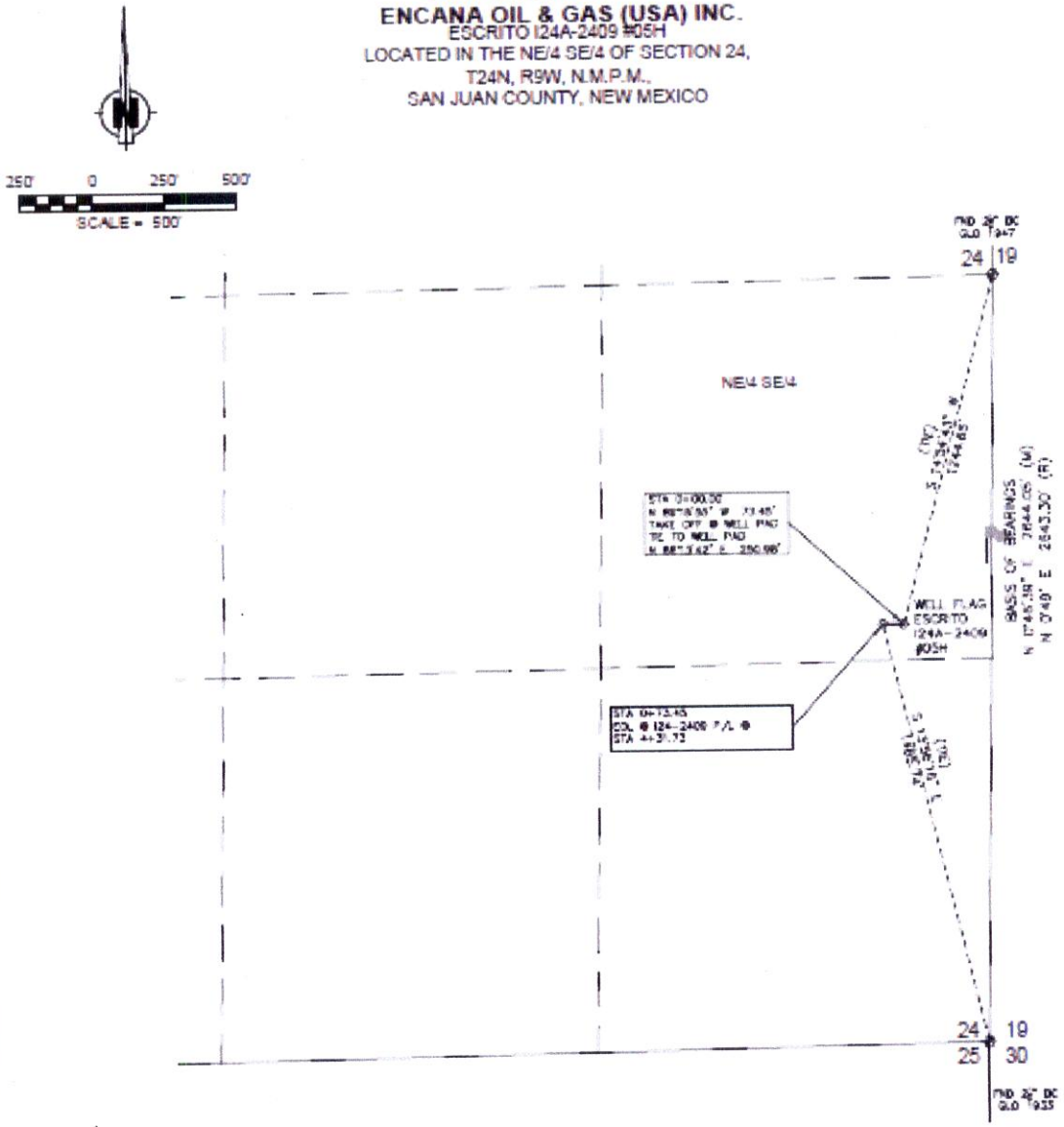
ENCANA OIL & GAS (USA) INC.

ESCRITO I24A-2409 #05H

LOCATED IN THE NE/4 SE/4 OF SECTION 24,

T24N, R9W, N.M.P.M.,

SAN JUAN COUNTY, NEW MEXICO



NOTES:

1.) BASIS OF BEARING BETWEEN FOUND MONUMENTS AT THE SOUTHWEST CORNER AND THE EAST QUARTER CORNER OF SECTION 24, TOWNSHIP 24 NORTH, RANGE 9 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO. LINE BEARS N 0°49'30" E A DISTANCE OF 2644.02' FEET AS MEASURED BY G.P.S.

2.) LOCATION OF UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE FIELD VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE-CALL AUTHORITIES AT LEAST 48 HOURS TO CONSTRUCTION.

I, DAVID R. RUSSELL, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

DAVID R. RUSSELL, PLS
NEW MEXICO L.S. #10201

DATE: SEPTEMBER 3, 2014

DAVID R. RUSSELL NEW MEXICO 10201 PROFESSIONAL LAND SURVEYOR

– SURFACE OWNERSHIP –		
BUREAU OF LAND MANAGEMENT		
SECTION 24		
0+00 TO 0+73.45		
73.45 FT / 4.45 RODS		
DATE OF SURVEY	08/02/14	JC/SA

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

JOB No.: ENC400 DATE: 09/03/2014 DRAWN BY: TWT

C.2. Escrito L30

State of New Mexico
Energy, Minerals & Natural Resources Department

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO L30-2408	01H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6814.0'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	30	24N	8W	3	2518'	SOUTH	350'	WEST	SAN JUAN

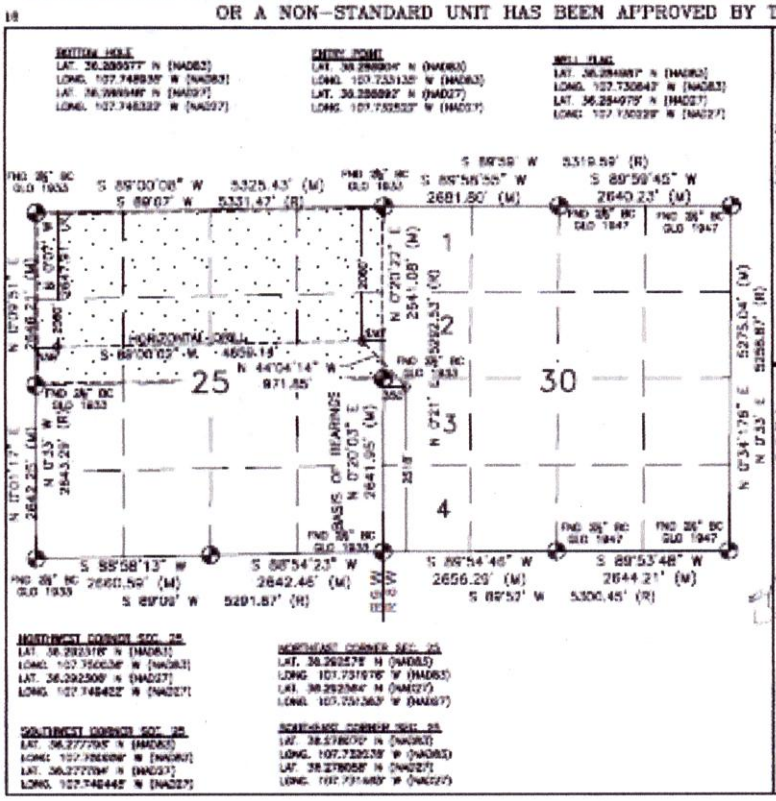
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
E	25	24N	9W		2060'	NORTH	330'	WEST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES N/2 SEC. 25			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

[16]



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 8, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID RUSSELL
Certificate Number 10201

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

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1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO L30-2408	02H
[7] OGRID No.	**[8] Operator Name**	**[9] Elevation**
282327	ENCANA OIL & GAS (USA) INC.	6814.0'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	30	24N	8W	3	2488'	SOUTH	350'	WEST	SAN JUAN

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	30	24N	8W		330'	SOUTH	2400'	EAST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 641.18 ACRES ALL SEC. 30			

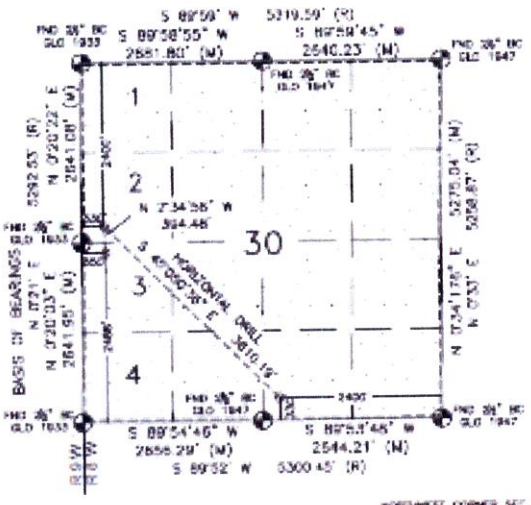
NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

BOTTOM HOLE
LAT. 36.270000° N (NAD83)
LONG. 107.723330° W (NAD83)
LAT. 36.270000° N (NAD27)
LONG. 107.721617° W (NAD27)

ENTRY POINT
LAT. 36.282587° N (NAD83)
LONG. 107.730603° W (NAD83)
LAT. 36.282575° N (NAD27)
LONG. 107.730387° W (NAD27)

WELL PLAN
LAT. 36.284884° N (NAD83)
LONG. 107.730642° W (NAD83)
LAT. 36.284891° N (NAD27)
LONG. 107.730387° W (NAD27)



NORTHEAST CORNER SEC. 30
LAT. 36.282579° N (NAD83)
LONG. 107.731928° W (NAD83)
LAT. 36.282564° N (NAD27)
LONG. 107.721365° W (NAD27)

NORTHWEST CORNER SEC. 30
LAT. 36.282579° N (NAD83)
LONG. 107.713653° W (NAD83)
LAT. 36.282567° N (NAD27)
LONG. 107.713511° W (NAD27)

SOUTHEAST CORNER SEC. 30
LAT. 36.270000° N (NAD83)
LONG. 107.723039° W (NAD83)
LAT. 36.270000° N (NAD27)
LONG. 107.721465° W (NAD27)

SOUTHWEST CORNER SEC. 30
LAT. 36.270000° N (NAD83)
LONG. 107.714707° W (NAD83)
LAT. 36.270000° N (NAD27)
LONG. 107.713460° W (NAD27)

17 OPERATOR CERTIFICATION

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Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

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APRIL 8, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID RUSSELL
NEW MEXICO
10201
REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

ENCANA OIL & GAS (USA) INC.

ESCRITO L30-2408 #02H
2488' FSL & 350' FWL
LOCATED IN THE NW/4 SW/4 OF SECTION 30, T24N, R8W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6814', NAVD 88
FINISHED PAD ELEVATION: 6814.0', NAVD 88

WELL FLAG
LATITUDE: 36.284904° N
LONGITUDE: 107.730843° W
DATUM: NAD83

NOTES:

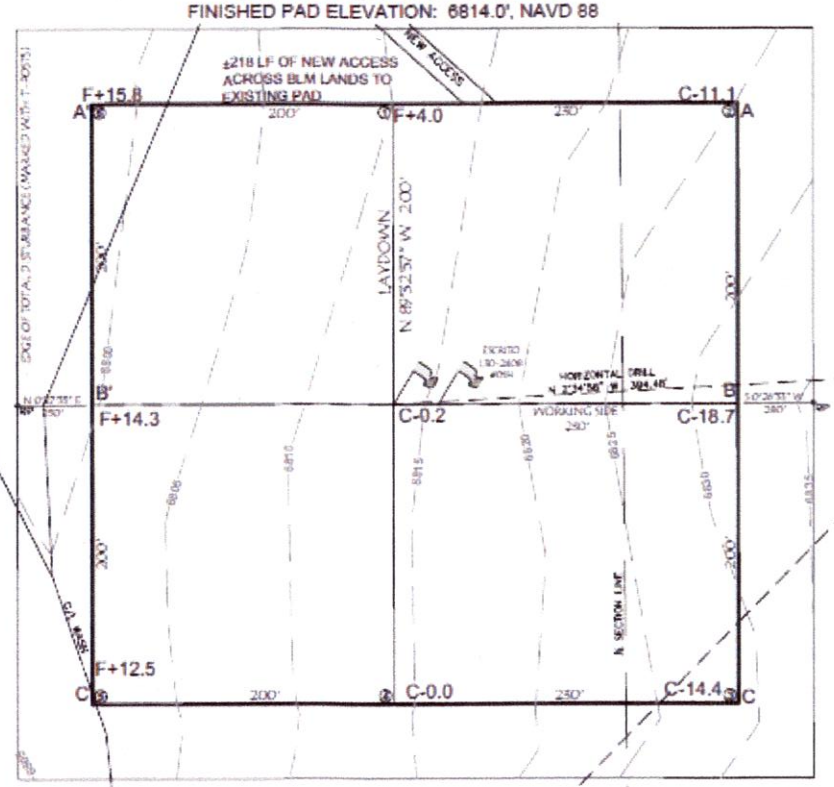
1.) BASIS OF BEARINGS BETWEEN FOUND MONUMENTS AT THE SOUTHWEST CORNER AND THE WEST QUARTER CORNER OF SECTION 30, TOWNSHIP 24 NORTH, RANGE 8 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO. LINE BEARS N 0°26'33" E A DISTANCE OF 2641.35 FEET AS MEASURED BY G.P.S.

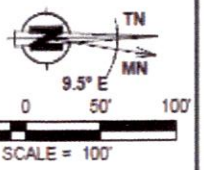
2.) LATITUDE, LONGITUDE AND ELLIPSOIDAL HEIGHT BASED ON AZTEC CORS L1 PHASE CENTER. DISTANCES SHOWN ARE GROUND DISTANCES USING A TRAVERSE MERCATOR PROJECTION FROM A WGS84 ELLIPSOID, CONVERTED TO NAD83. NAVD88 ELEVATIONS AS PREDICTED BY GEOID03.

3.) LOCATION OF UNDERGROUND UTILITIES DEPICTED ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE FIELD VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE-CALL AUTHORITIES AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

4.) T-POSTS HAVE BEEN SET TO DEFINE THE EDGE OF DISTURBANCE LIMITS WHICH ARE 50' OFFSETS FROM THE EDGE OF THE STAKED WELL PAD.

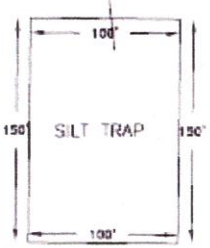
-- SURFACE OWNERSHIP --
BUREAU OF LAND MANAGEMENT





NOTE:
SCORPION SURVEY & CONSULTING, L.L.C. IS NOT LIABLE FOR UNDERGROUND UTILITIES OR PIPELINES.
CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED, BURIED PIPELINES OR CABLES ON WELL PAD, IN CONSTRUCTION ZONE AND/OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

SLOPES TO BE CONSTRUCTED TO MATCH THE ORIGINAL CONTOURS AS CLOSE AS POSSIBLE.



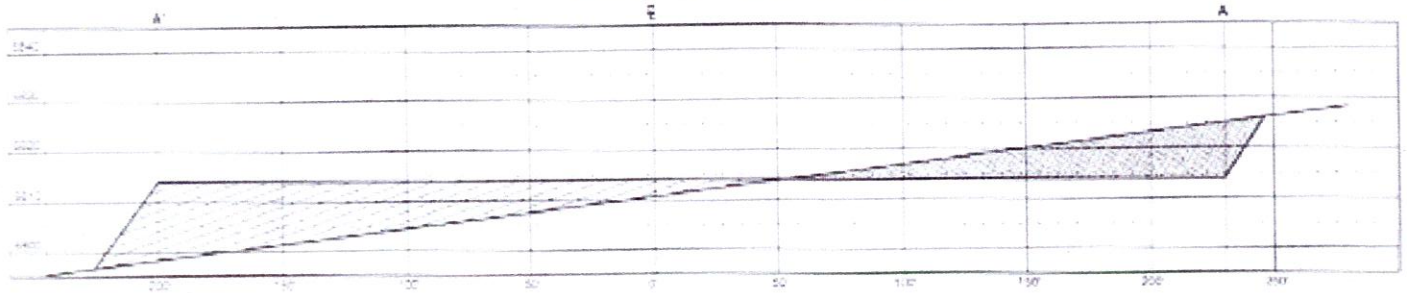
TOTAL PERMITTED AREA
5 FOOT CONTOUR INTERVAL SHOWN
500' x 530' = 6.08 ACRES
SCALE: 1" = 100'
JOB No.: ENC184
DATE: 07/22/2014
DRAWN BY: TWT

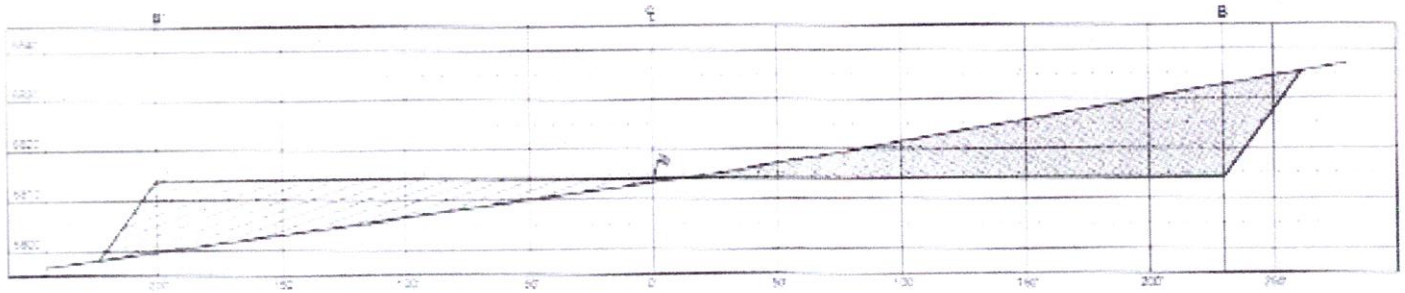
Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

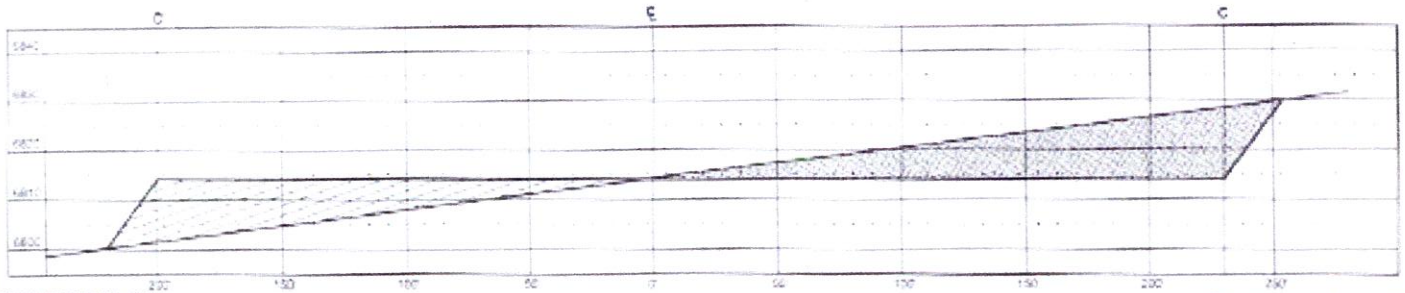
WELL FLAG
LATITUDE: 36.284904° N
LONGITUDE: 107.730843° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO L30-2408 #02H
2488' FSL & 350' FWL
LOCATED IN THE NE/4 SE/4 OF SECTION 30, T24N, R8W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6814', NAVD 88
FINISHED PAD ELEVATION: 6814.0', NAVD 88







VERT. SCALE: 1" = 30'
HORZ. SCALE: 1" = 60'
JOB No.: ENC184
DATE: 07/22/2014
DRAWN BY: TWT

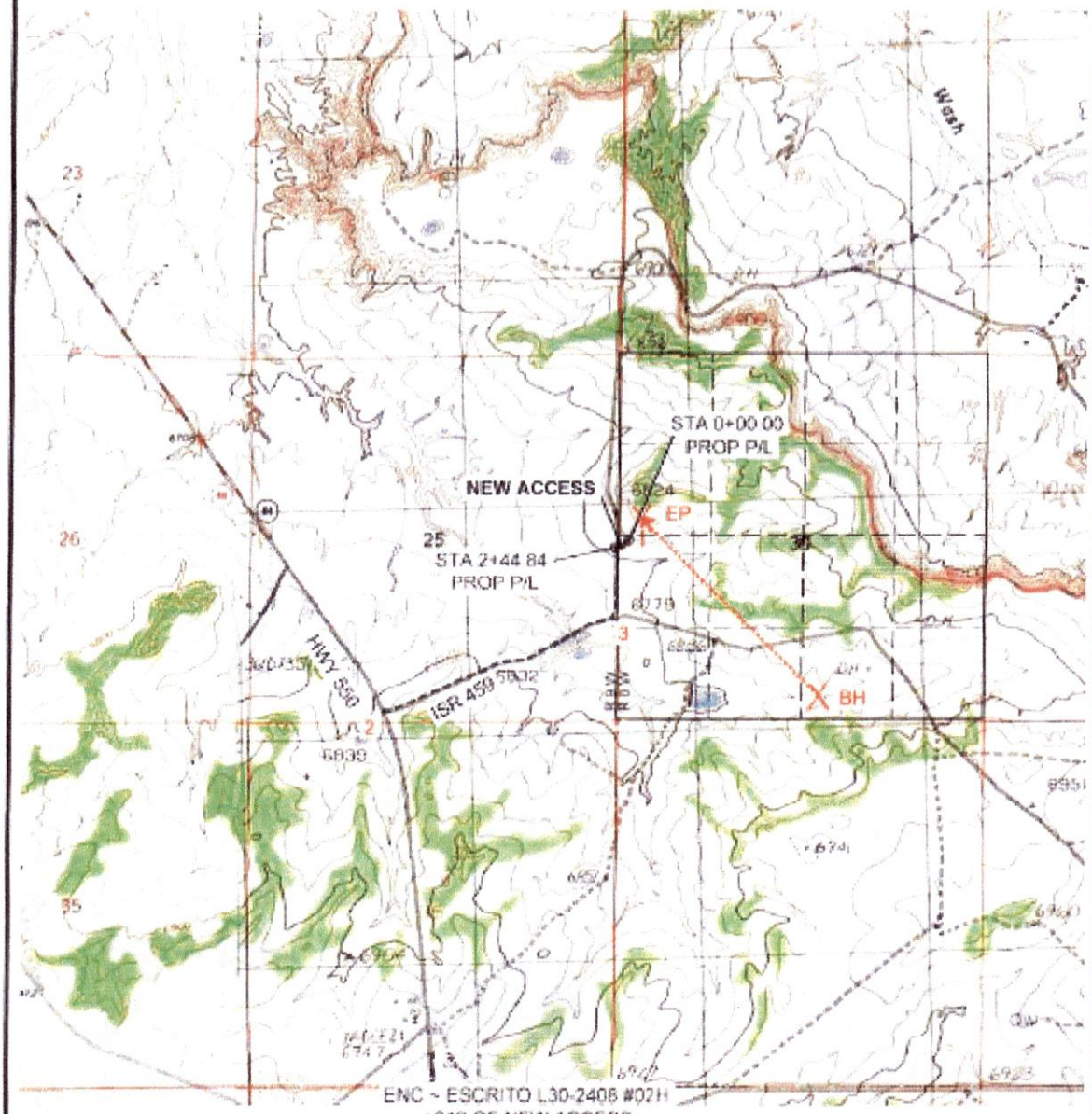
THIS DIAGRAM IS AN ESTIMATE OF DIRT BALANCE AND IS NOT INTENDED TO BE AN EXACT MEASURE OF VOLUME

FILL CUT

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELL FLAG
LATITUDE: 36.284904° N
LONGITUDE: 107.730843° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.
ESCRITO L30-2408 #02H
2488' FSL & 350' FWL
LOCATED IN THE NE/4 SE/4 OF SECTION 30,
T24N, R8W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6814', NAVD 88
±218 OF NEW ACCESS ACROSS BLM LANDS



ENC ~ ESCRITO L30-2408 #02H
±218 OF NEW ACCESS
INSTALL NEW 24" CMP
STA. 0+00 - EX. ROAD
STA. 0+23.30 - C/L WASH X-ING
STA. 2+18.18 - @ PAD

U.S.G.S. QUAD: CROW MESA WEST
SCALE: 1" = 2000' (1:24,000)
JOB No.: ENC184
DATE: 07/22/2014
DRAWN BY: TWT

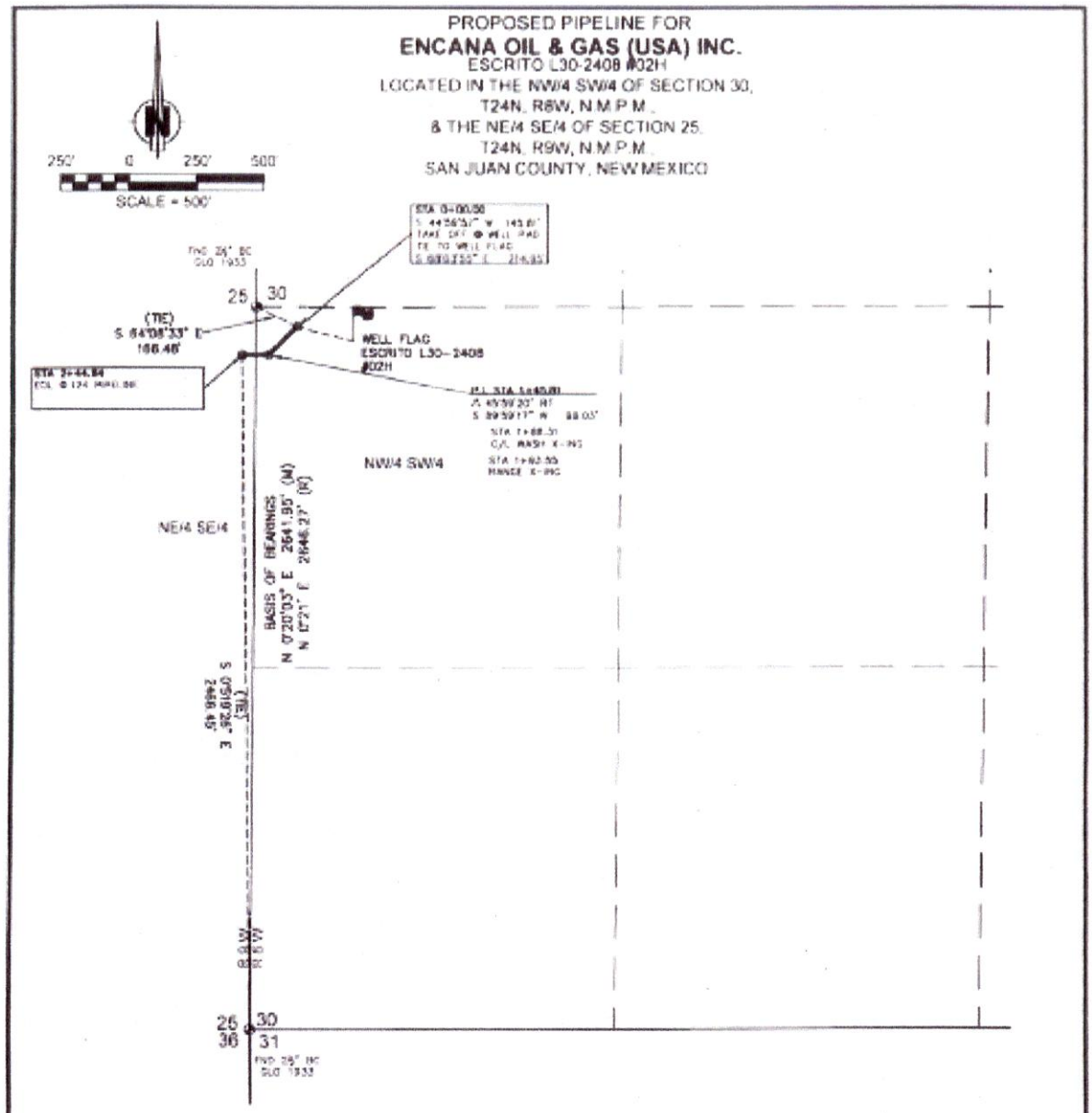
Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

PROPOSED PIPELINE FOR

ENCANA OIL & GAS (USA) INC.

ESCRITO L30-2408 #02H

LOCATED IN THE NW/4 SW/4 OF SECTION 30,
T24N, R8W, N.M.P.M.,
& THE NE/4 SE/4 OF SECTION 25,
T24N, R9W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



NOTES:

1.) BASIS OF BEARING: BETWEEN FOUND MONUMENTS AT THE SOUTHWEST CORNER AND THE WEST QUARTER CORNER OF SECTION 30, TOWNSHIP 24 NORTH, RANGE 8 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO (BAR BEARS N 0°20'03" E A DISTANCE OF 2641.95 FEET AS MEASURED BY G.P.S.

2.) LOCATION OF UNDERGROUND UTILITIES DEPICTED ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE FIELD VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE-CALL AUTHORITIES AT LEAST 48 HOURS TO CONSTRUCTION.

I, DAVID R. RUSSELL, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO.

DAVID R. RUSSELL, PLS
NEW MEXICO L.S. #10201

DAVID R. RUSSELL
NEW MEXICO
10201
REGISTERED PROFESSIONAL LAND SURVEYOR

on July 26, 2014

~ SURFACE OWNERSHIP ~ BUREAU OF LAND MANAGEMENT
SECTION 30 R8W 0+00 TO 1+93.55 193.55 FT / 11.73 RODS
SECTION 25 R9W 1+93.55 TO 2+44.84 51.29 FT / 3.11 RODS
TOTAL 0+00 TO 2+44.84 244.84 FT / 14.84 RODS
DATE OF SURVEY 04/08/14 SC.NA

JOB No.: ENC184 DATE: 07/23/2014 DRAWN BY: TWT

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

C.3. Escrito M30

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO M30-2408	01H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6800.6'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	30	24N	8W		1162'	SOUTH	454'	WEST	SAN JUAN

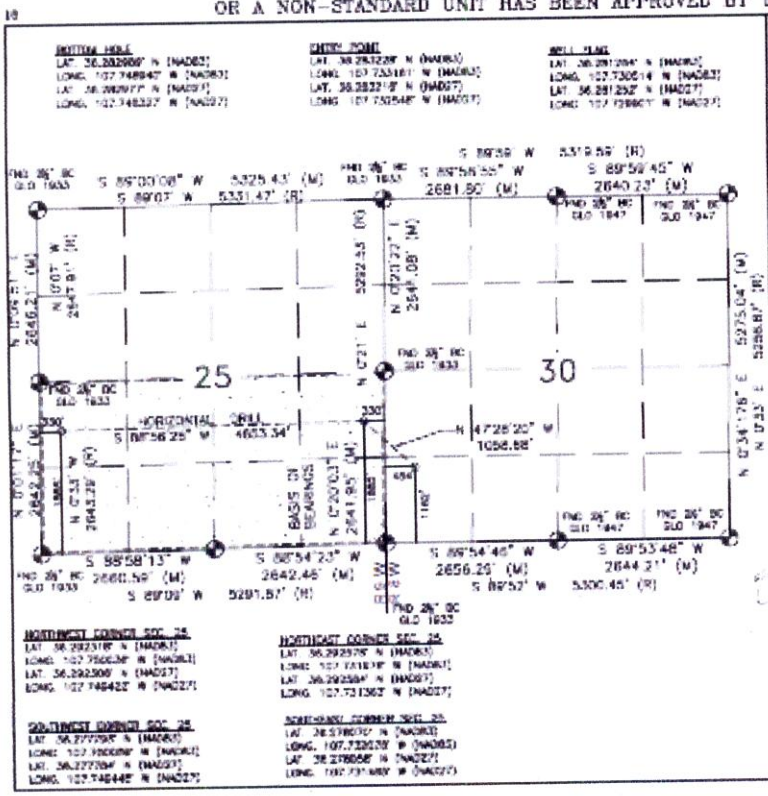
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	25	24N	9W		1885'	SOUTH	330'	WEST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 25			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16



[17] OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 1, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID E. RUSSELL NEW MEXICO 10201 REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

Certificate Number 10201

DISTRICT I
1625 N. French Dr., Hobbs, N.M. 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, N.M. 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Rd., Aztec, N.M. 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
	97232	BASIN MANCOS

[4] Property Code	[5] Property Name	[6] Well Number
	ESCRITO M30-2408	02H

[7] OGRID No.	[8] Operator Name	[9] Elevation
282327	ENCANA OIL & GAS (USA) INC.	6800.6'

[10] Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	30	24N	8W		1133'	SOUTH	447'	WEST	SAN JUAN

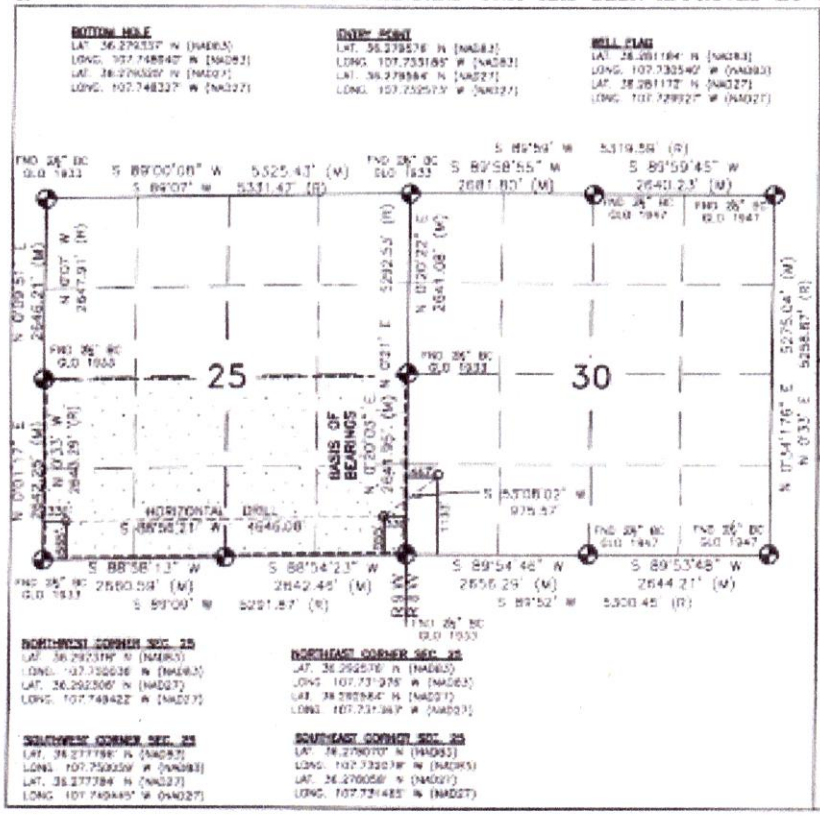
[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	25	24N	9W		555'	SOUTH	330'	WEST	SAN JUAN

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
PROJECT AREA 320.00 ACRES S/2 SEC. 25			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16



17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

E-mail Address

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

APRIL 1, 2014

Date of Survey

Signature and Seal of Professional Surveyor

DAVID R. RUSSELL
NEW MEXICO
10201
REGISTERED PROFESSIONAL LAND SURVEYOR

DAVID RUSSELL

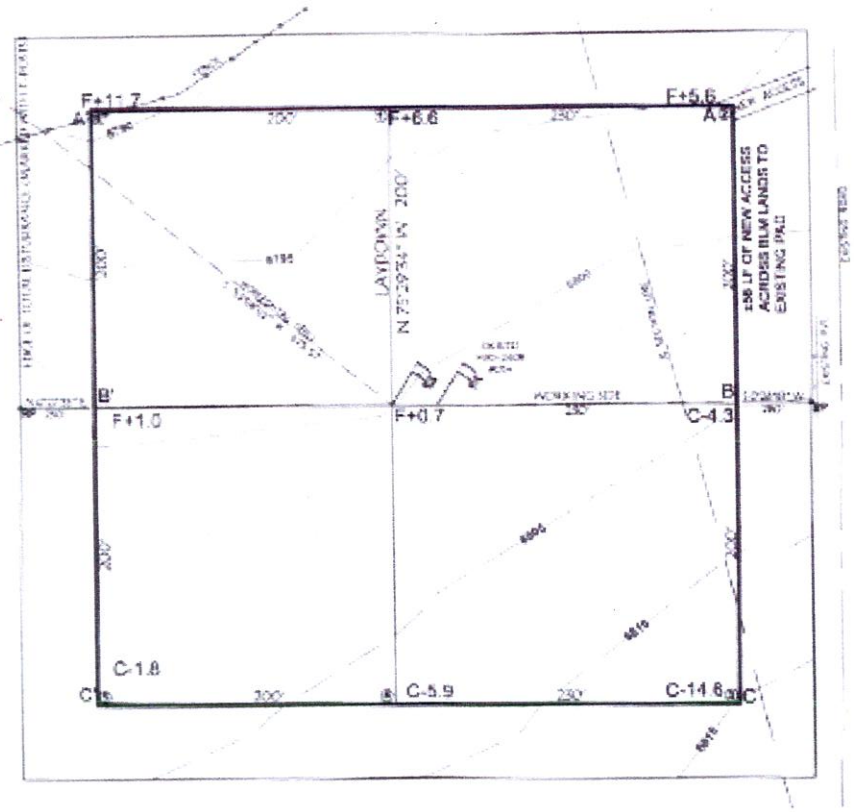
Certificate Number 10201

WELL FLAG
LATITUDE: 36.281184° N
LONGITUDE: 107.730540° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO M30 2408 #02H
1133' FSL & 447' FWL
LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R6W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6800', NAVD 88
FINISHED PAD ELEVATION: 6800.6', NAVD 88

TN
MN
9.5° E
50' 0 50' 100'
SCALE = 100'



— SURFACE OWNERSHIP —
BUREAU OF LAND MANAGEMENT

SLOPES TO BE CONSTRUCTED TO MATCH THE ORIGINAL CONTOURS AS CLOSE AS POSSIBLE.

TOTAL PERMITTED AREA
5 FOOT CONTOUR INTERVAL SHOWN
500' x 530' = 6.08 ACRES
SCALE: 1" = 100'
JOB No.: ENC254
DATE: 07/22/2014
DRAWN BY: TWT

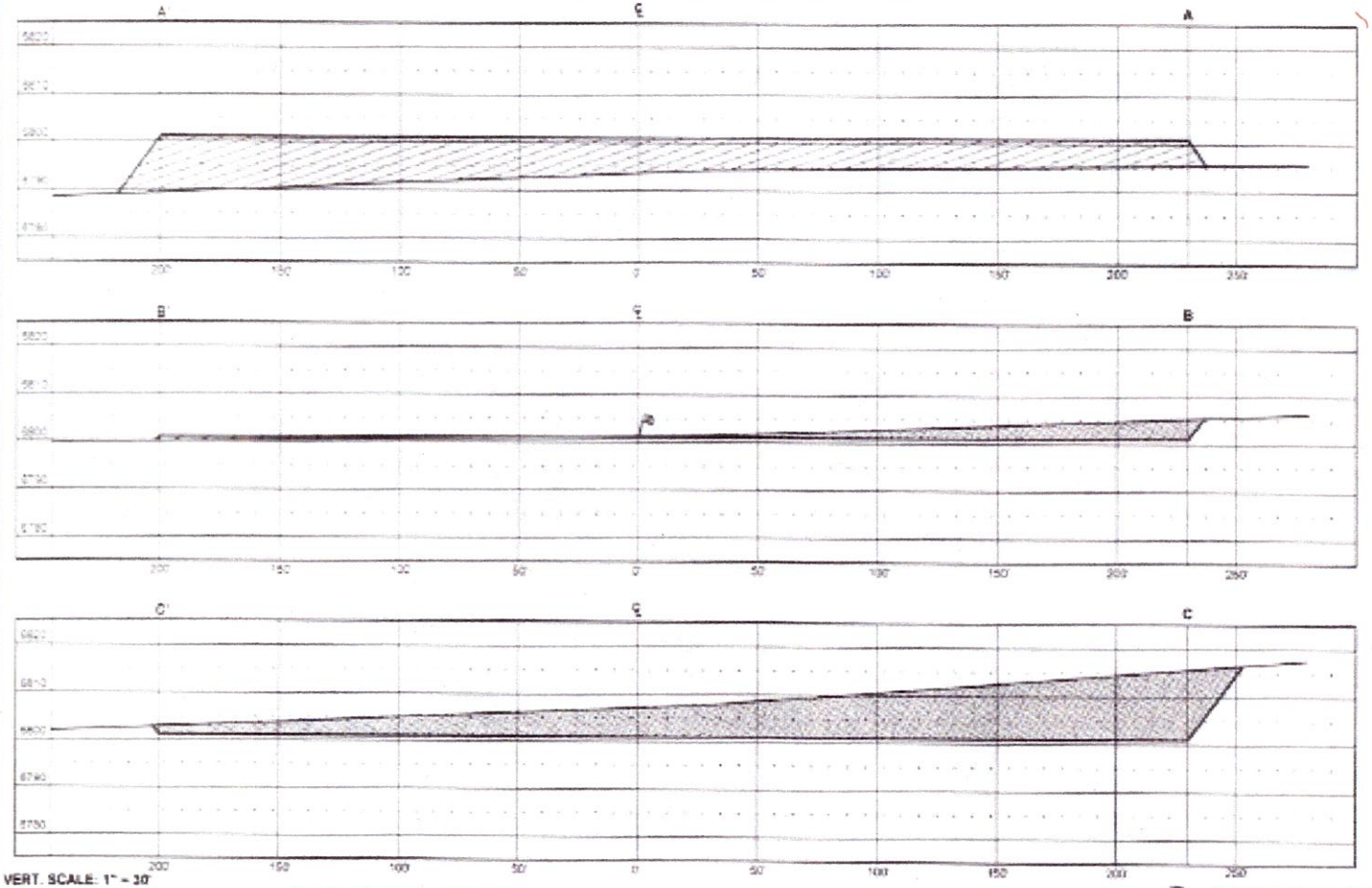
NOTE:
SCORPION SURVEY & CONSULTING, L.L.C. IS NOT LIABLE FOR UNDERGROUND UTILITES OR PIPELINES. CONTRACTOR SHOULD CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED, BURIED PIPELINES OR CABLES ON WELL PAD, IN CONSTRUCTION ZONE AND/OR ACCESS ROAD AT LEAST TWO (2) WORKING DAYS PRIOR TO CONSTRUCTION.

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELL FLAG
LATITUDE: 36.281184° N
LONGITUDE: 107.730540° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO M30-2408 #02H
1133' FSL & 447' FWL
LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R8W, N.M.P.M.,
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6800', NAVD 88
FINISHED PAD ELEVATION: 6800.6', NAVD 88



VERT. SCALE: 1" = 30'
HORZ. SCALE: 1" = 40'
JOB No.: ENC254
DATE: 07/22/2014
DRAWN BY: TWT

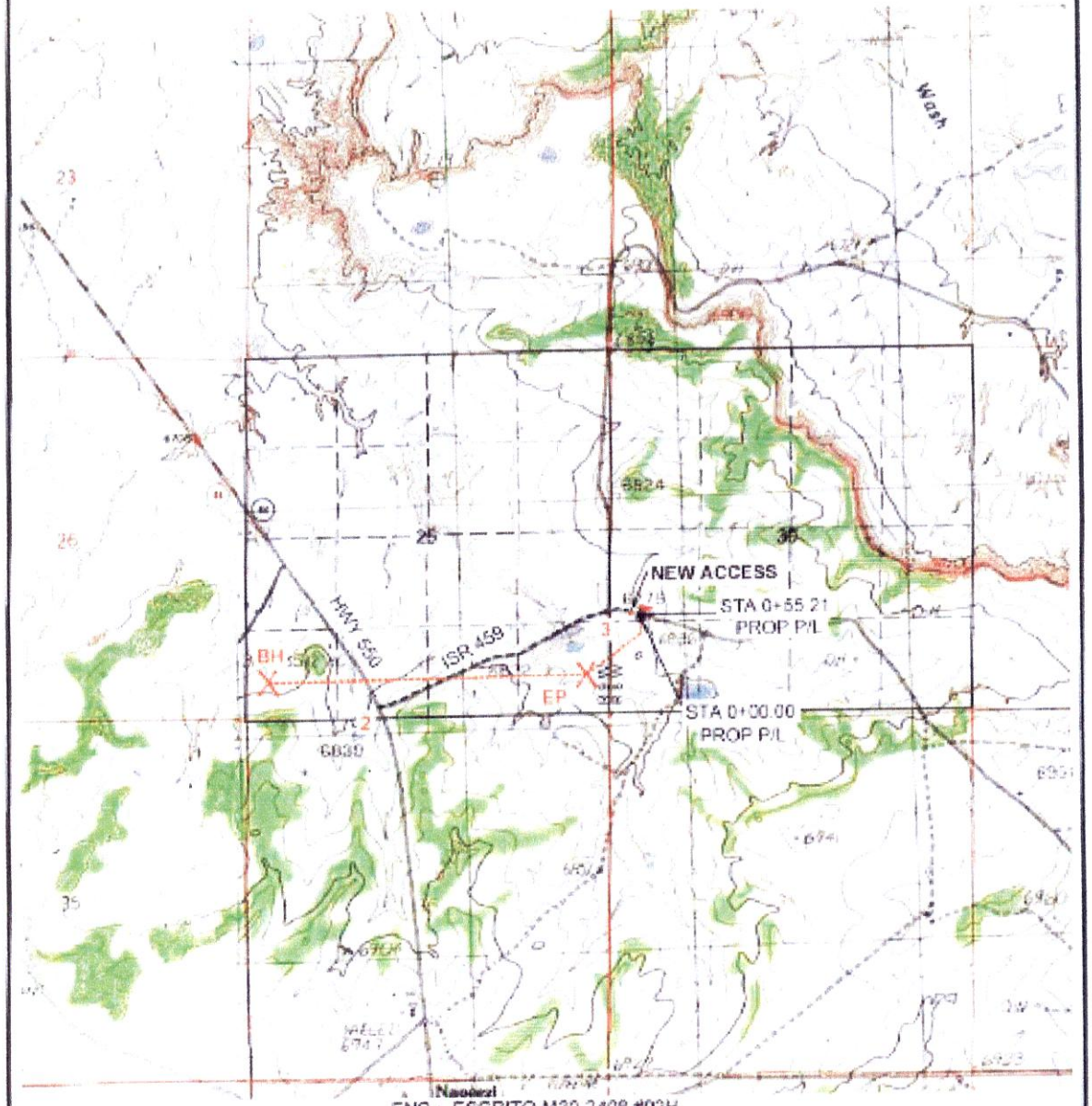
THIS DIAGRAM IS AN ESTIMATE OF DIRT BALANCE AND IS NOT INTENDED TO BE AN EXACT MEASURE OF VOLUME

FILL CUT

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

WELL FLAG
LATITUDE: 36.281184° N
LONGITUDE: 107.730540° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.
ESCRITO M30-2408 #02H
11.0' FSL & 447' FWL
LOCATED IN THE SW/4 SW/4 OF SECTION 30
T24N, R8W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
GROUND ELEVATION: 6800', NAVD 88
±58' OF NEW ACCESS ACROSS BLM LANDS



U.S.G.S. QUAD: CROW MESA WEST
SCALE: 1" = 2000' (1:24,000)
JOB No.: ENC254
DATE: 07/22/2014
DRAWN BY: TWT

ENC - ESCRITO M30-2408 #02H
±58' OF NEW ACCESS
INSTALL NEW 24" CMP
STA. 0+00 - EX. ROAD
STA. 0+58.75 - @ PAD

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4007

PROPOSED PIPELINE FOR

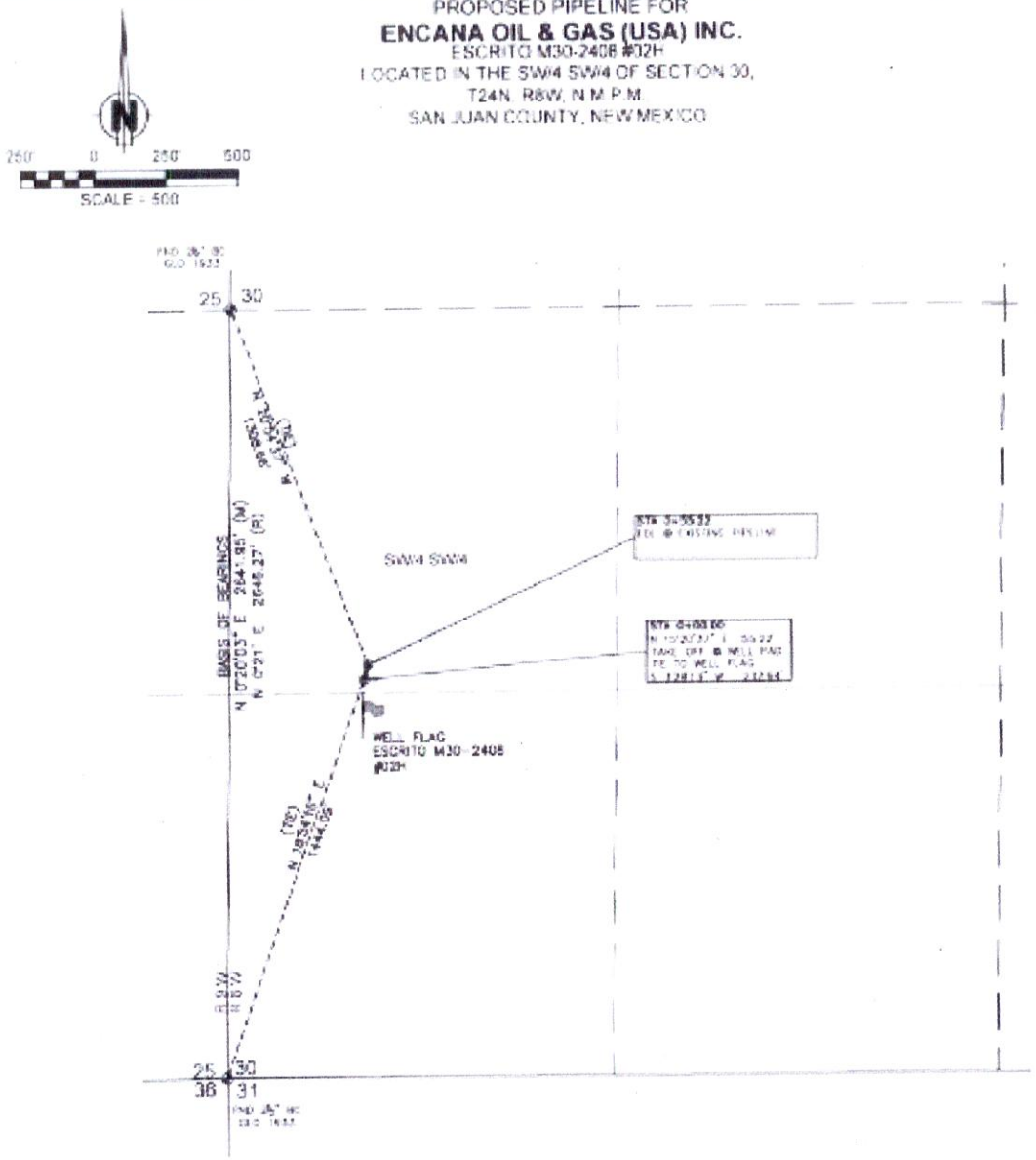
ENCANA OIL & GAS (USA) INC.

ESCRITO M30-2408 #02H

LOCATED IN THE SW/4 SW/4 OF SECTION 30,

T24N, R8W, N.M.P.M.

SAN JUAN COUNTY, NEW MEXICO



NOTES:

1) BASIS OF BEARING BETWEEN FOUND MONUMENTS AT THE SOUTHWEST CORNER AND THE WEST QUARTER CORNER OF SECTION 30, TOWNSHIP 24 NORTH, RANGE 8 WEST, N.M.P.M. SAN JUAN COUNTY, NEW MEXICO LINE BEARS "N 0°20'03" E" A DISTANCE OF 2641.95' FEET AS MEASURED BY E.P.S.

2) LOCATION OF UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. PRIOR TO EXCAVATION UNDERGROUND UTILITIES SHOULD BE TOLL VERIFIED. ALL CONSTRUCTION ACTIVITIES SHOULD BE FIELD VERIFIED WITH NEW MEXICO ONE-CALL AUTHORITIES AT LEAST 48 HOURS TO CONSTRUCTION.

I, DAVID R. RUSSELL, A NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY. THAT THIS SURVEY IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND THAT THIS SURVEY AND PLAT MEET THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO

DAVID R. RUSSELL NEW MEXICO 10201 REGISTERED PROFESSIONAL LAND SURVEYOR

DATE July 25, 2014

DAVID R. RUSSELL, P.S.
NEW MEXICO L.S. #10201

JOB No. ENC284 DATE: 07/22/2014 DRAWN BY: TWT

– SURFACE OWNERSHIP – BUREAU OF LAND MANAGEMENT	
SECTION 30 0+00 TO 0+55.21 55.21 FT / 3.35 RODS	
DATE OF SURVEY	04/01/14 DC.34

Scorpion Survey & Consulting, L.L.C.
302 S. Ash
Aztec, New Mexico 87410
(505) 334-4667

C.4. Escrito N19

District I
1625 N. French Dr., Hobbs, NM 88240
Phone (575) 393-6161 Fax (575) 393-0720
District II
811 S. First St., Artesia, NM 88210
Phone (575) 748-1283 Fax (575) 748-9720
District III
1000 Rio Brazos Road, Aztec, NM 87410
Phone (505) 334-6178 Fax (505) 334-6170
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone (505) 476-3460 Fax (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
	97232	BASIN MANCOS GAS

4 Property Code	5 Property Name	6 Well Number
	ESCRITO N19-2408	01H

7 OGRID No.	8 Operator Name	9 Elevation
282327	ENCANA OIL & GAS (USA) INC.	6792.4'

10 Surface Location

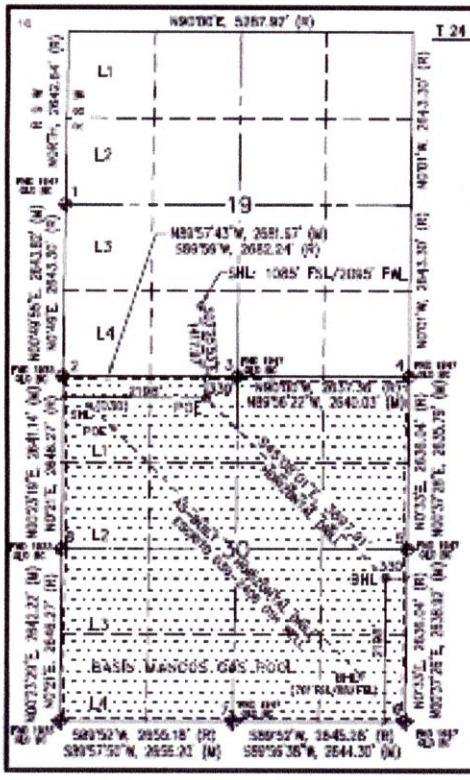
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	19	24N	8W		1085	SOUTH	2095	WEST	SAN JUAN

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	30	24N	8W		2198	SOUTH	330	EAST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
641.16ACRES — ALL SECTION 30 PROJECT AREA			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



ESCRITO N19-2408 01H WELL

SHL (WELL FLAG)
LAT. 36.295559 °N (NAD83)
LONG. 107.724820 °W (NAD83)
LAT. 36.295547 °N (NAD27)
LONG. 107.724207 °W (NAD27)

POE (POINT OF ENTRY)
LAT. 36.291673 °N (NAD83)
LONG. 107.724927 °W (NAD83)
LAT. 36.291661 °N (NAD27)
LONG. 107.723914 °W (NAD27)

BHL (BOTTOM HOLE LOCATION)
LAT. 36.284130 °N (NAD83)
LONG. 107.715147 °W (NAD83)
LAT. 36.284117 °N (NAD27)
LONG. 107.714535 °W (NAD27)

SECTION CORNERS

1 LAT. 36.299839 °N (NAD83)
LONG. 107.731855 °W (NAD83)
LAT. 36.299824 °N (NAD27)
LONG. 107.731243 °W (NAD27)

2 LAT. 36.293577 °N (NAD83)
LONG. 107.731876 °W (NAD83)
LAT. 36.293563 °N (NAD27)
LONG. 107.731263 °W (NAD27)

3 LAT. 36.292580 °N (NAD83)
LONG. 107.722879 °W (NAD83)
LAT. 36.292567 °N (NAD27)
LONG. 107.722266 °W (NAD27)

4 LAT. 36.292579 °N (NAD83)
LONG. 107.713624 °W (NAD83)
LAT. 36.292567 °N (NAD27)
LONG. 107.713012 °W (NAD27)

5 LAT. 36.293042 °N (NAD83)
LONG. 107.714813 °W (NAD83)
LAT. 36.293029 °N (NAD27)
LONG. 107.714201 °W (NAD27)

6 LAT. 36.278066 °N (NAD83)
LONG. 107.714102 °W (NAD83)
LAT. 36.278053 °N (NAD27)
LONG. 107.713490 °W (NAD27)

7 LAT. 36.278062 °N (NAD83)
LONG. 107.723070 °W (NAD83)
LAT. 36.278049 °N (NAD27)
LONG. 107.722457 °W (NAD27)

8 LAT. 36.285294 °N (NAD83)
LONG. 107.723027 °W (NAD83)
LAT. 36.285282 °N (NAD27)
LONG. 107.722414 °W (NAD27)

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature Date

Printed Name

Email Address

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

October 7, 2014
Date of Survey

Signature and Seal of Professional Surveyor:

RICHARD L. MULLIKEN
NEW MEXICO
16873
10-09-14
PROFESSIONAL SURVEYOR

RICHARD L. MULLIKEN
Certificate Number 16873

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
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State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number	2 Pool Code	3 Pool Name
	97232	BASIN MANCOS GAS

4 Property Code	5 Property Name	6 Well Number
	ESCRITO N19—2408	02H

7 OGRID No.	8 Operator Name	9 Elevation
282327	ENCANA OIL & GAS (USA) INC.	6792.4'

10 Surface Location

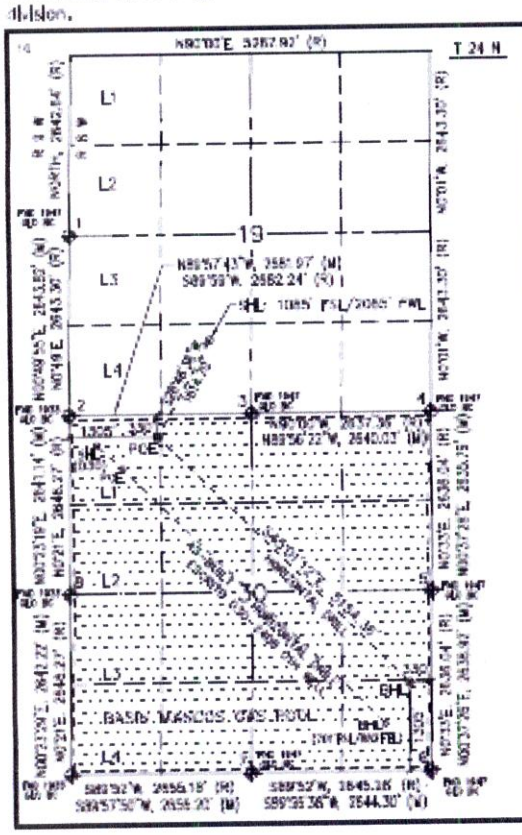
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
N	19	24N	8W		1085	SOUTH	2065	WEST	SAN JUAN

11 Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	30	24N	8W		1305	SOUTH	330	EAST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
640 ACRES — ALL SECTION 30 (PROJECT AREA)			

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.



ESCRITO N19—2408 02H WELL
SHL (WELL FLAG)
LAT 36.2859569°N (NAD83)
LONG 107.724927°W (NAD83)
LAT 36.285547°N (NAD27)
LONG 107.724309°W (NAD27)
POE (POINT OF ENTRY)
LAT 36.291572°N (NAD83)
LONG 107.727558°W (NAD83)
LAT 36.291560°N (NAD27)
LONG 107.726943°W (NAD27)
BHL (BOTTOM HOLE LOCATION)
LAT 36.291677°N (NAD83)
LONG 107.715177°W (NAD83)
LAT 36.291660°N (NAD27)
LONG 107.714565°W (NAD27)

SECTION CORNERS

1 LAT. 36.299839°N (NAD83)
LONG. 107.731055°W (NAD83)
LAT. 36.299824°N (NAD27)
LONG. 107.731243°W (NAD27)

2 LAT. 36.292571°N (NAD83)
LONG. 107.731076°W (NAD83)
LAT. 36.292560°N (NAD27)
LONG. 107.731363°W (NAD27)

3 LAT. 36.292580°N (NAD83)
LONG. 107.722879°W (NAD83)
LAT. 36.292567°N (NAD27)
LONG. 107.723166°W (NAD27)

4 LAT. 36.292579°N (NAD83)
LONG. 107.713624°W (NAD83)
LAT. 36.292567°N (NAD27)
LONG. 107.713312°W (NAD27)

5 LAT. 36.285632°N (NAD83)
LONG. 107.714013°W (NAD83)
LAT. 36.285620°N (NAD27)
LONG. 107.713401°W (NAD27)

6 LAT. 36.278066°N (NAD83)
LONG. 107.714102°W (NAD83)
LAT. 36.278053°N (NAD27)
LONG. 107.713489°W (NAD27)

7 LAT. 36.278062°N (NAD83)
LONG. 107.725070°W (NAD83)
LAT. 36.278049°N (NAD27)
LONG. 107.724457°W (NAD27)

8 LAT. 36.285334°N (NAD83)
LONG. 107.726072°W (NAD83)
LAT. 36.285321°N (NAD27)
LONG. 107.725464°W (NAD27)

17 OPERATOR CERTIFICATION

I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature: Shannon Turk
Date:
Printed Name: shannon.turk@encana.com
Email Address:

18 SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

October 7, 2014
Date of Survey
Signature and Seal of Professional Surveyor:

RICHARD L. MULLIKEN
NEW MEXICO 16873 PROFESSIONAL SURVEYOR
10-09-14

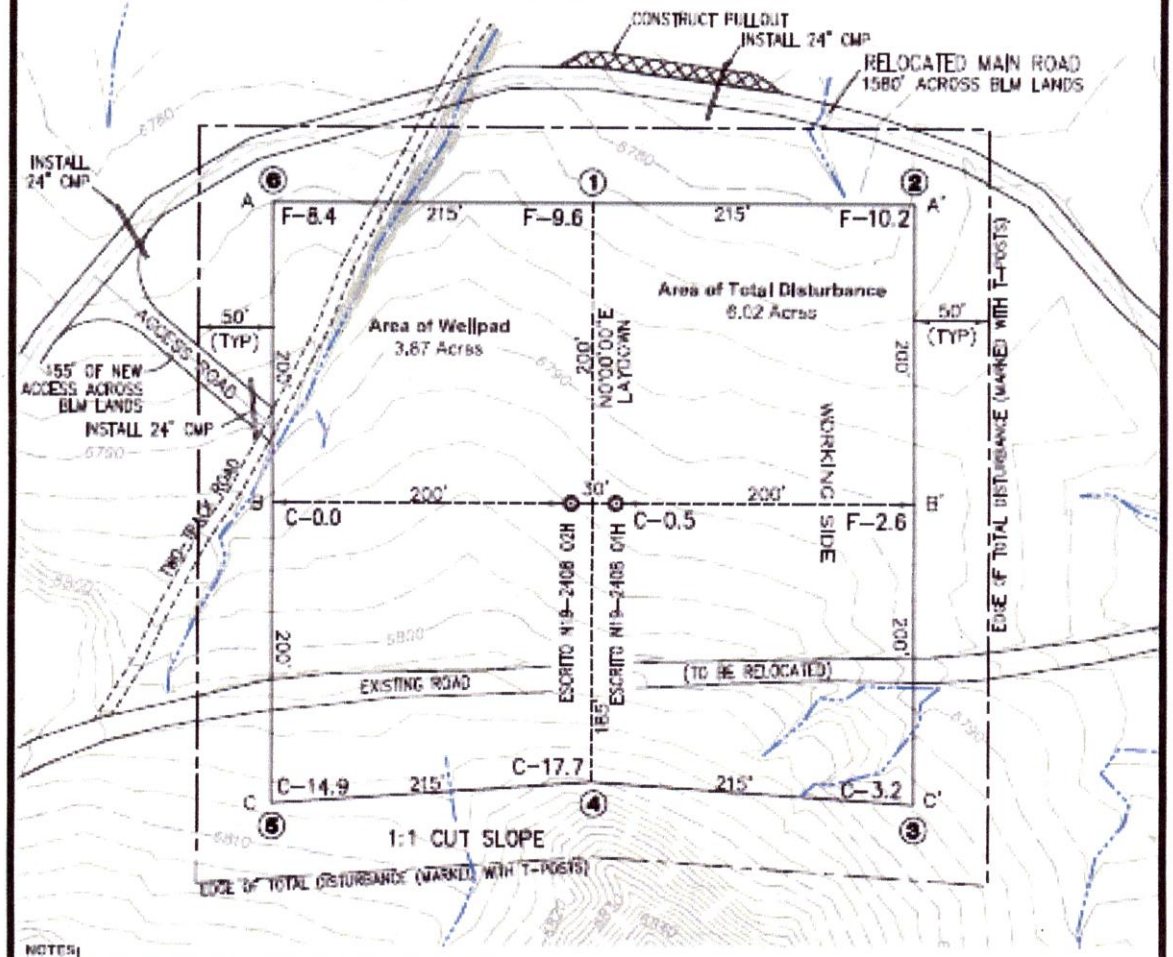
RICHARD L. MULLIKEN
Certificate Number 16873

WELL FLAG
LATITUDE: 36.295559° N
LONGITUDE: 107.724921° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO N19-2408 #02H
1085' FSL & 2065' FWL
LOCATED IN THE SE1/4 SW1/4 OF SECTION 19
T24N, R08W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
EXISTING GROUND ELEVATION: 6794.0', NAVD 88
FINISHED PAD ELEVATION: 6792.4', NAVD 88

~ SURFACE OWNERSHIP ~
Bureau of Land Management
S/2 SECTION 19



NOTES:
1.) Basis of Bearing: Between found monuments at the South One-Quarter corner and Southwest corner of Section 19, T24N, R8W, N.M.P.M. Line bears: N88°57'43"W, 2681.37'

2.) Wasatch Surveying and Encana Oil & Gas (USA) Inc. are not liable for underground utilities or pipelines. Contractor should call One-Call for location of any marked or unmarked, buried pipelines or cables on well pad, in construction zone and/or access road at least two (2) working days prior to construction.

3.) Steel T-Posts have been set to define the Edge of Disturbance lines which are 50' offset from the edge of the staked wellpad.

TOTAL PERMITTED AREA
= 6.02 ACRES
JOB No. 14-07-10 REV-1
DATE: 10/07/14
DRAWN BY: SGT

N

100' 0' 100'
SCALE: 1" = 100'

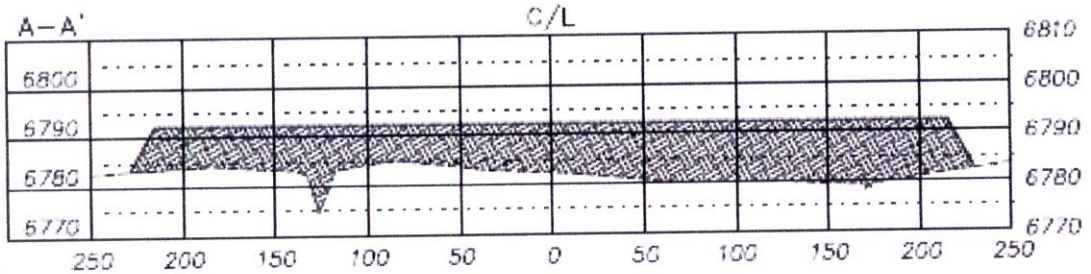
DATUM NOTE:
Datum NAD83(2011) Epoch 2010.000 (CRS83)
Projection Type = Transverse Mercator
Origin Latitude = 36°15'00" North
Origin Longitude = 107°52'30" West
Scale Reduction = 1.000 297 165 Unitless
Units = U.S. Survey Foot (USSF)
GEOID12a NAVD88
(WSA Local Coord Sys: Crow Mesa)

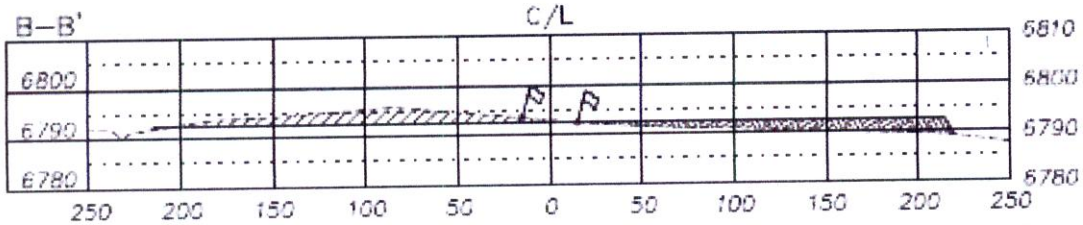
WASATCH SURVEYING
WASATCH SURVEYING ASSOCIATES
905 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

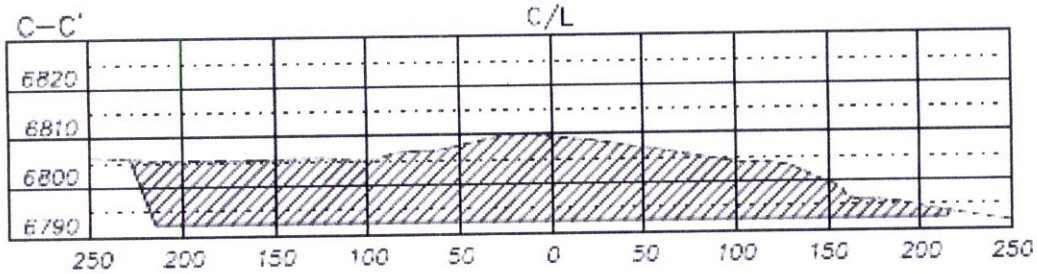
WELL FLAG
LATITUDE: 36.296559° N
LONGITUDE: 107.724921° W
DATUM: NAD83

ENCANA OIL & GAS (USA) INC.

ESCRITO N19-2408 #02H
1085' FSL & 2065' FWL
LOCATED IN THE SE1/4 SW1/4 OF SECTION 19
T24N, R08W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
EXISTING GROUND ELEVATION: 6794.0', NAVD 88
FINISHED PAD ELEVATION: 6792.4', NAVD 88







CUT
FILL

HORIZ. SCALE: 1"=30'
VERT. SCALE: 1" = 10'
JOB No. 14-07-40 REV-1
DATE: 10/30/14

NOTE:
Wasatch Surveying and Encana Oil & Gas (USA) Inc. are not liable for underground utilities or pipelines. Contractor should call One-Call for location of any marked or unmarked, buried pipelines or cables on well pad. In construction zone and/or access road at least two (2) working days prior to construction.

WASATCH SURVEYING

WASATCH SURVEYING ASSOCIATES
906 MAIN STREET EVANSTON, WY 82930
(307) 786-4545

ENCANA OIL & GAS (USA) INC.

ESCRITO N19-2408 #02H

▪ PROPOSED ACCESS ROAD ▪

LOCATED IN THE E/2 SW/4 & SW1/4 SE1/4

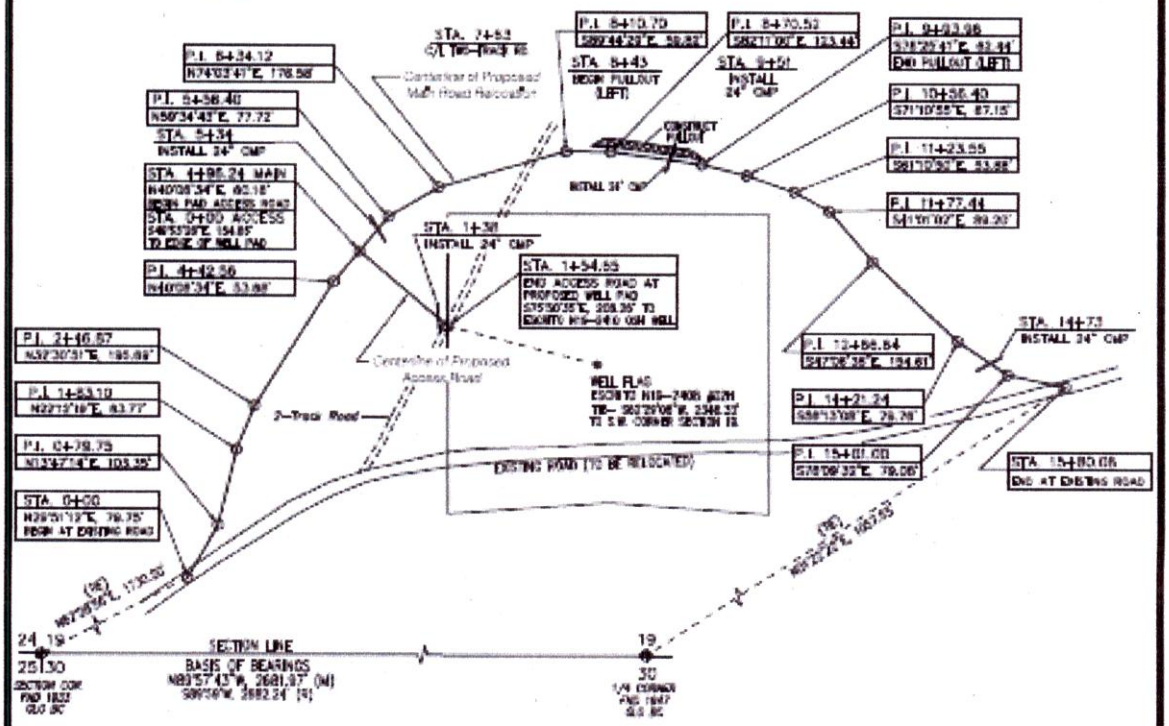
SECTION 19, T24N, R8W, N.M.P.M.

SAN JUAN COUNTY, NEW MEXICO

N

100' 0' 200'

SCALE: 1" = 200'



SURFACE OWNERSHIP	SECTION	STATION	FEET or RODS
BUREAU OF LAND MANAGEMENT	SECTION 19	Main Road Reroute 0+00 to 15+80.08	1580.08 FT or 95.76 RODS
		Proposed Pad Access 0+00 to 1+54.65	1+54.65 FT or 9.37 RODS
		TOTAL	1734.73 FT or 105.13 RODS

RICHARD L. MULLIKEN
NEW MEXICO
16873
PROFESSIONAL SURVEYOR

NOTES:

1.) Basis of Bearings: Between found monuments at the South One-Quarter corner and Southwest corner of Section 19, T24N, R8W, N.M.P.M.
Line bears: N89°57'43"W, 2681.97'

2.) Wasatch Surveying and Encana Oil & Gas (USA) Inc. are not liable for underground utilities or pipelines. Contractor should call OneCall for location of any marked or unmarked, buried pipelines or cables on well pad, in construction zone and/or access road at least two (2) working days prior to construction.

I, Richard L. Mulliken, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and meets the minimum standards for surveying in New Mexico.

Richard L. Mulliken Date: 10 -09 -14

Richard L. Mulliken, PS
New Mexico L.S. #16873

WASATCH SURVEYING

WASATCH SURVEYING ASSOCIATES
905 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

JOB No. 14-07-10 REV-1 DATE: 10/9/14 DRAWN BY: SGT

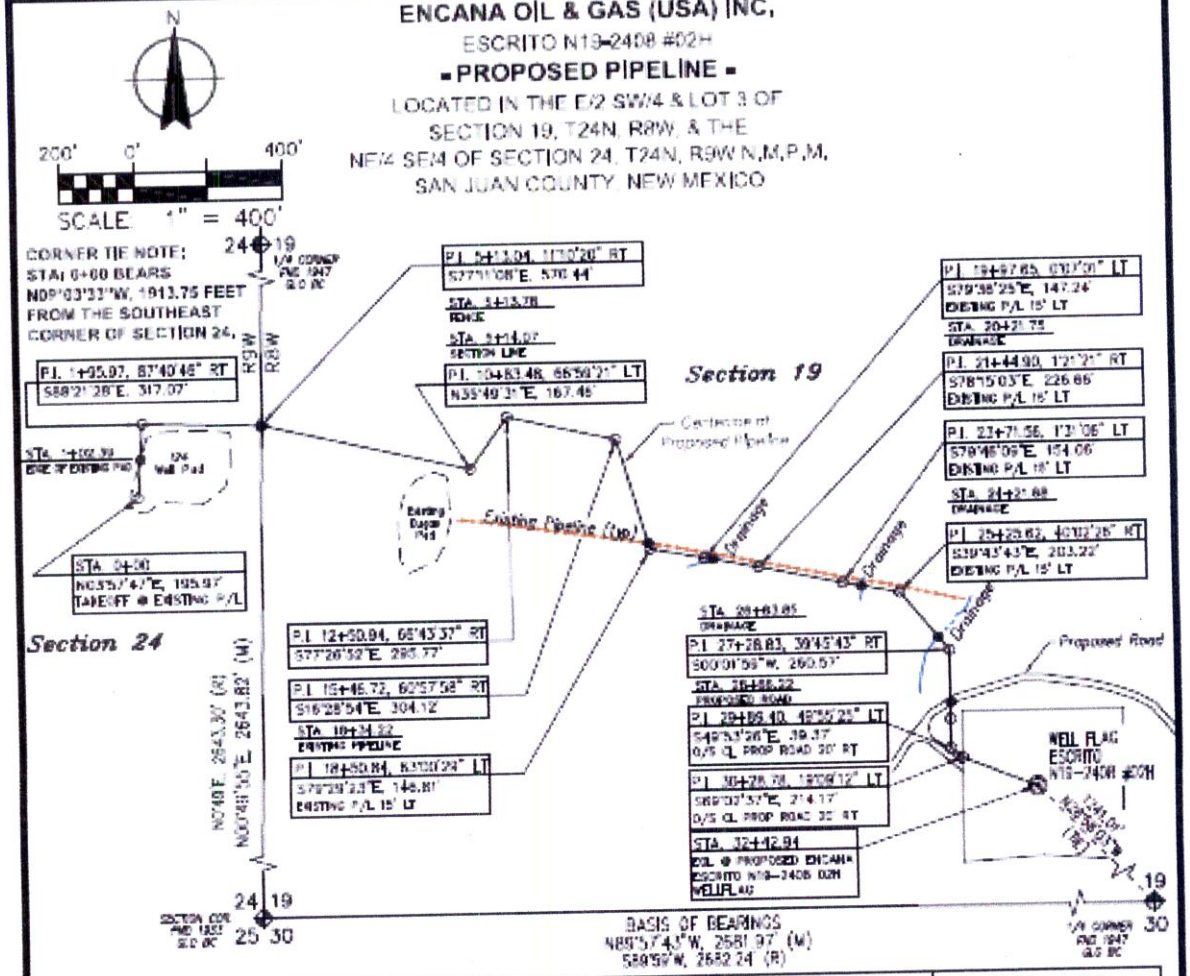
PAGE 1 of 1

ENCANA OIL & GAS (USA) INC.

ESCRITO N19-2408 #02H

- PROPOSED PIPELINE -

LOCATED IN THE E/2 SW/4 & LOT 3 OF
SECTION 19, T24N, R8W, & THE
NE/4 SE/4 OF SECTION 24, T24N, R9W N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



SURFACE OWNERSHIP	SECTION	STATION	FEET or RODS
BUREAU OF LAND MANAGEMENT	SE/4 SECTION 24	0+00 to 5+14.07	514.07 FT or 31.16 RODS
BUREAU OF LAND MANAGEMENT	SW/4 SECTION 19	5+14.07 to 32+42.94	2728.87 FT or 165.39 RODS
		TOTAL	3242.94 FT or 196.54 RODS

RICHARD L. MULLIKEN
NEW MEXICO
16873
PROFESSIONAL SURVEYOR

NOTES:

1.) Basis of Bearings between found monuments at the South One-Quarter corner and Southwest corner of Section 19, T24N, R8W, N.M.P.M.
(the mean) N88°57'43"W, 2681.97'

2.) Wasatch Surveying and Encana Oil & Gas (USA) Inc. are not liable for underground utilities or pipelines. Contractor should call OneCall for location of any marked or unmarked buried pipelines or cables on well pad. In construction zone and/or access road at least two (2) working days prior to construction.

I, Richard L. Mulliken, a registered Professional Surveyor under the laws of the State of New Mexico, hereby certify that this plat was prepared from field notes of an actual survey made by me or under my supervision, and that the same is true and correct to the best of my belief and meets the minimum standards for surveying in New Mexico.

Date: 10-09-14

Richard L. Mulliken, PS
New Mexico L.S. #16873

WASATCH SURVEYING

WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

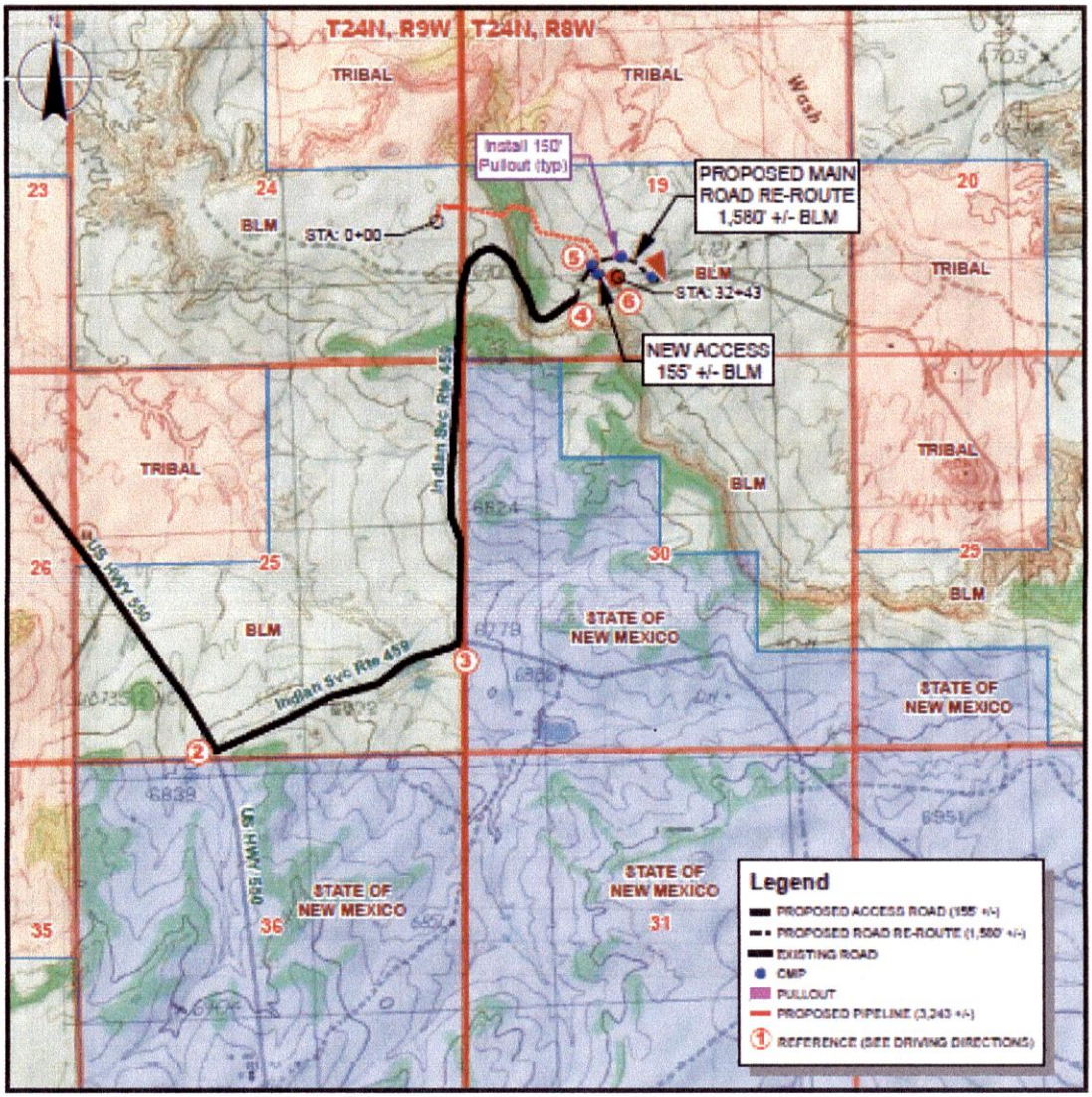
JOB No. 14-07-19 REV.# DATE: 10/07/14 DRAWN BY: SGT

PAGE 1 of 1

LATITUDE: 36.295559° N
LONGITUDE: 107.724921° W
DATUM: NAD 83

ENCANA OIL & GAS (USA) INC.
ESCRITO N19-2408 #02H
1085' FSL & 2065' FWL
LOCATED IN THE SE/4 SW/4 OF SECTION 19
T24N, R08W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO

1,580' +/- RE-ROUTE OF EXISTING ROAD ACROSS BLM LANDS
155' +/- OF NEW ACCESS ACROSS BLM LANDS



U.S.G.S QUAD: CROW MESA WEST
SCALE: 1" = 2000' (1:24,000)
JOB No.: 14-07-10 REV1
DATE: 10/8/2014
DRAWN BY: SMM
SHEET 1 OF 1
WASATCH SURVEYING ASSOCIATES
906 MAIN STREET, EVANSTON, WY 82930
(307) 789-4545

CONSTRUCTION DETAILS

EXISTING ROAD RE-REROUTE
STA. 5+34 - Install 24" CMP
STA. 8+43 to 9+93
-Install Pullout (left)
STA. 9+51 - Install 24" CMP
STA. 14+73 - Install 24" CMP

NEW ACCESS
STA. 1+38 - Install 24" CMP

APPENDIX D. PHOTOGRAPHS

D.1. Escrito I24A

Well Pad: View from wellheads, looking northward

Well Pad: View from wellheads, looking southward

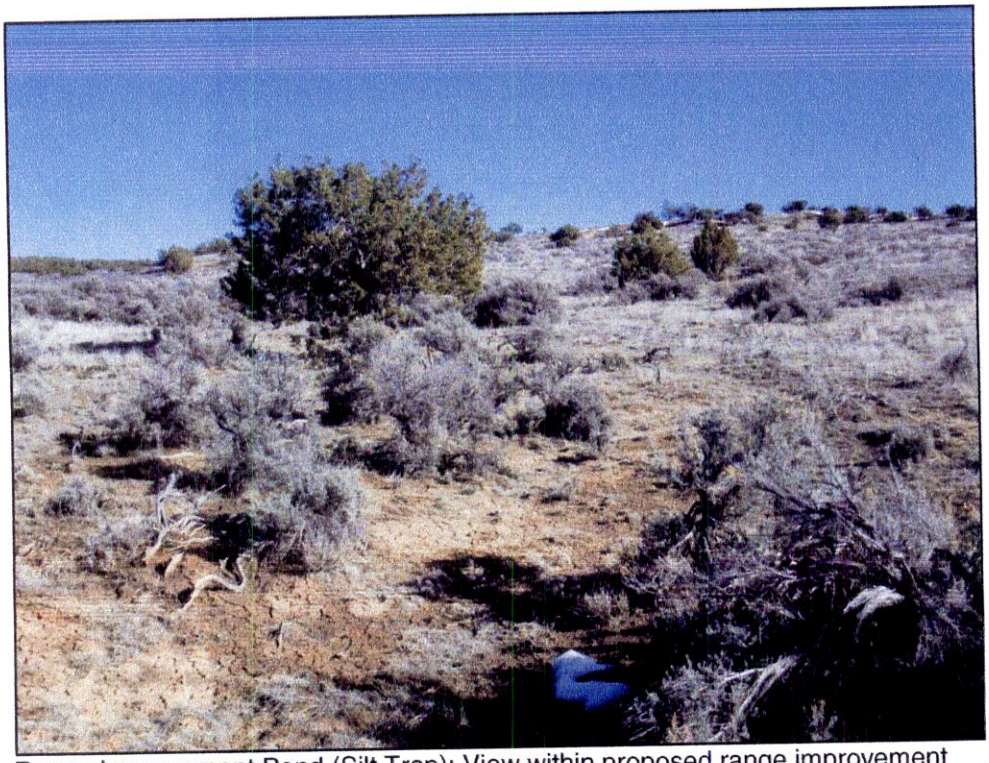
Access Road and Well-Connect Pipeline Corridor: View from eastern terminus of access road at well pad, looking southwestward

Existing Fence to be Relocated: View from fence corner near southern corner of well pad, looking northward along fence line and two-track road

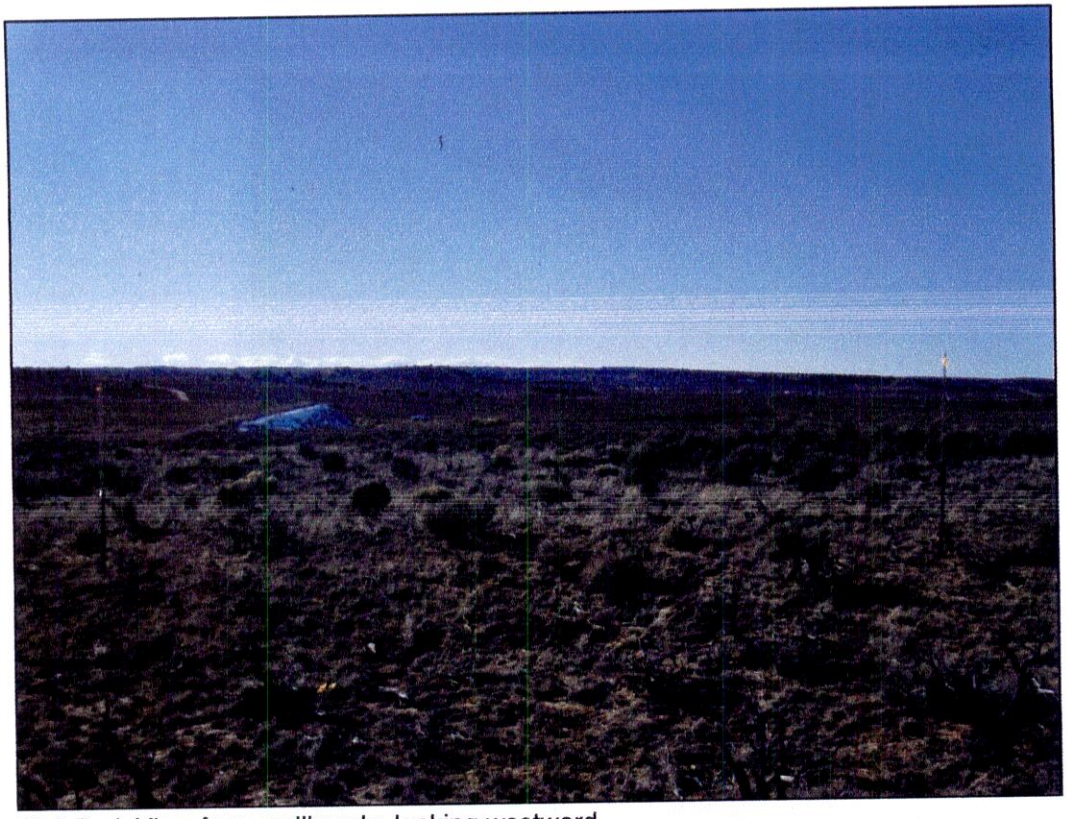
Well Pad: View from wellheads, looking westward

Well Pad: View from wellheads, looking eastward

Range Improvement Pond (Silt Trap): View within proposed range improvement pond facing westward along mapped USGS blue line; headcut is within foreground of photograph



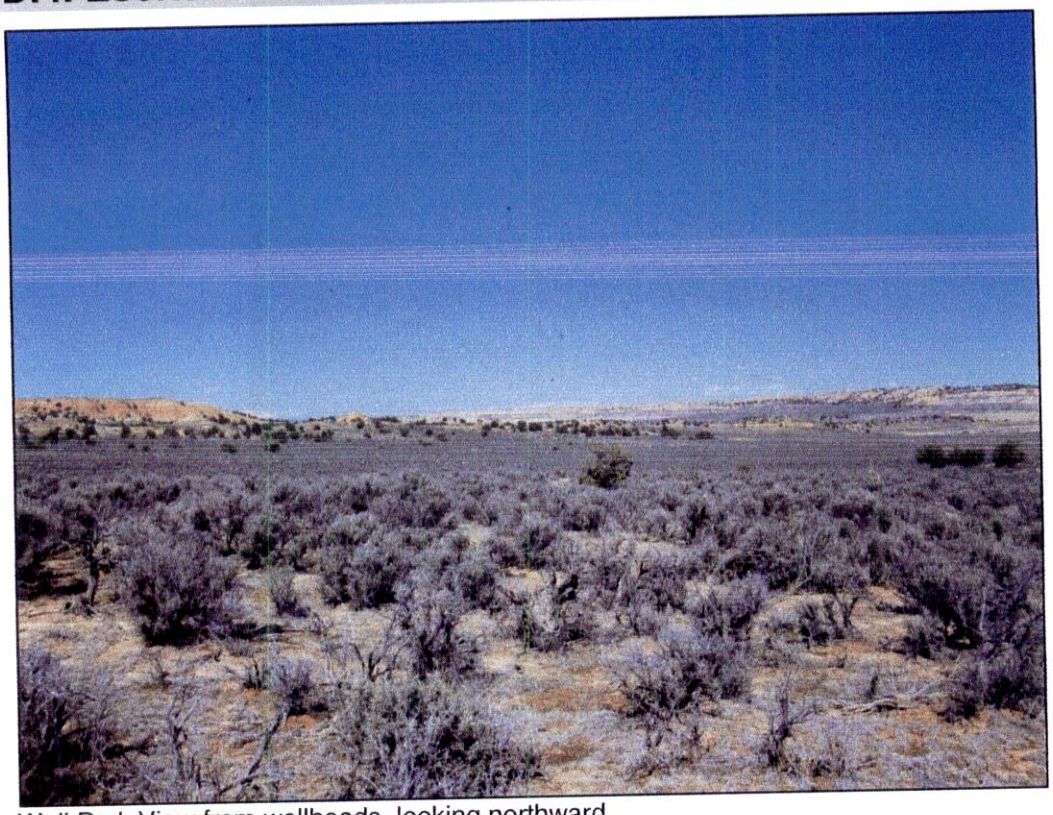
Range Improvement Pond (Silt Trap): View within proposed range improvement pond facing eastward along mapped USGS blue line; headcut is located directly behind where photograph was taken



Well Pad: View from wellheads, looking westward

Well Pad: View from wellheads, looking eastward

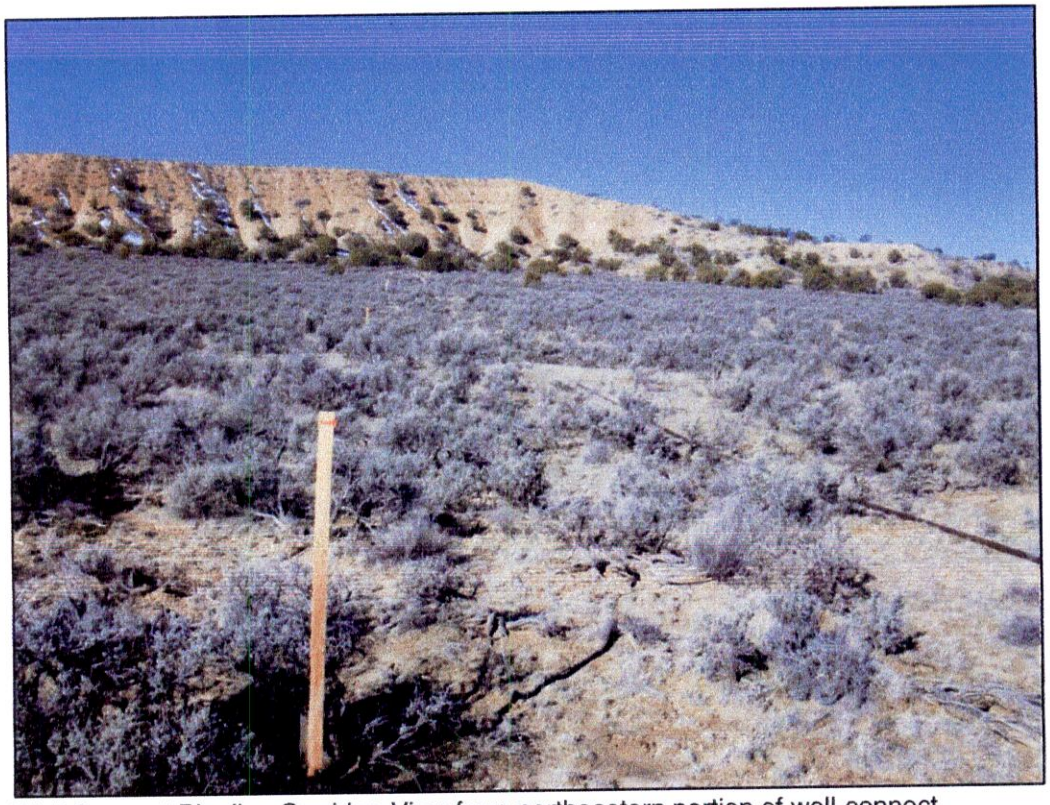
D.4. Escrito N19



Well Pad: View from wellheads, looking northward

Well Pad: View from wellheads, looking southward

Access Road: and Well-Connect Pipeline Corridor: View from northwestern terminus of access road, looking southeastward



Well-Connect Pipeline Corridor: View from northeastern portion of well-connect pipeline corridor paralleling an existing, aboveground pipeline, looking westward

APPENDIX E. RECLAMATION PLANS

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Farmington District
Farmington Field Office
6251 N College Blvd., Ste. A
Farmington, NM 87402

Finding of No Significant Impact
Encana Oil & Gas (USA) Company

Cluster 49 B

Escrito D30 2408 02H, Escrito I24A 01H,02H, 03H, 04H, 05H,
Escrito L30 2408 01H 02H, Escrito M30 2408 01H, 02H,
Escrito N19 2408 01H, 02H

NEPA No. DOI-BLM-NM-FO10-2015-0080

ATS No.'s F010-14-379, 380, 381, 382, 383, 384, 385, 386, 387,404, 405, 406

FINDING OF NO SIGNIFICANT IMPACT

I have determined that the proposed action, as described in Environmental Assessment (EA) **NM-FO10-2015-0080** will not have any significant impact, individually or cumulatively, on the quality of the human environment. Because there would not be any significant impact, an Environmental Impact Statement is not required.

In making this determination, I considered the following factors:

Context

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

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

remarkably straight and carefully constructed. The most notable is the Great North Road, which starts at Chaco Canyon and run north to the Aztec Ruins.

Located within the boundary of the FFO is much of Dinétah, the ancestral homeland to the Navajo. Here the Navajo constructed forked-stick hogans, shades, sweat lodges, and other structures over a several hundred year span. During a short period between 1680 and the mid-1700s, pueblitos were constructed, often associated with other structures. Although not firmly dated, extensive Navajo pictograph and petroglyph sites were painted, etched, pecked, or ground onto the sandstone cliffs of the canyons of Dinétah. Most are believed to be ceremonial art which is no longer traditionally executed in a permanent form.

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

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

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

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

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

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

Intensity

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

- How would dust and equipment emissions associated with the project impact air resources?
- How would vegetation-clearing, project activities, and final reclamation impact soils?
- Would drilling the proposed well impact groundwater?
- How would vegetation-clearing, project activities, and final reclamation associated with the project impact upland vegetation?
- How would vegetation-clearing, project activities, and final reclamation impact wildlife, including migratory birds?
- How would vegetation-clearing, project activities, and final reclamation impact the following BLM Special Status Species: American peregrine falcon (Falco peregrinus anatum), Aztec gilia (Aliciella formosa), Bendire's thrasher (Toxostoma bendirei), Brack's fishhook cactus (Sclerocactus cloveriae var. brackii), ferruginous hawk (Buteo regalis), golden eagle (Aquila chrysaetos), pinyon jay (Gymnorhinus cyanocephalus), Townsend' big-eared bat (Corinorhinus townsendii), and spotted bat (Euderma maculatum)?
- How would vegetation-clearing, project activities, and final reclamation impact the following Federally-listed threatened and endangered species: Bracks cactus (Sclerocactus cloverae ssp. brackii)?
- How would surface-disturbing activities associated with the proposed project impact cultural resources?
- How would the project affect human health and safety?
- Would the project have disproportionate effects on minority or low income populations?

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

2. The activities included in the proposed action would not significantly affect public health or safety (40 CFR 1508.27(b)(2)). The following design features have been included in the proposed action to address any impacts to public health and safety: The project area is within a sparsely populated, rural area. A unoccupied residence is ¼ mile from the I24A 2409 well pad The nearest town is Nageezi with a population of 286 according to the 2010 census (Census Bureau, 2010), approximately 1 ½ miles southwest of the project area. Nageezi does not offer visitor amenities. Temporary workers during the construction, drilling or reclamation phases of the project would likely stay in Broomfield, 37 miles north of the project site (population 6,146).

During the years 1998 to 2008, total crime in San Juan County increased from 1,800 to 3,400 (Recordspedia, 2009), representing an increase of 47 percent. Over that same time frame, violent crime increased by 34 percent. The crime rate per thousand people for Bloomfield is relatively high compared to other similar cities in New Mexico (3rd highest out of 10 similar cities) (Recordspedia, 2009). However, the crime rate for Bloomfield is down overall. Between the years of 2001 to 2008 crime data were available in Bloomfield, New Mexico. During that time frame, reported crime in Bloomfield has decreased by 40 percent. During the same interval, violent crime decreased by 45 percent. On the whole, the crime figures reflect a slight reduction in crime over the last 7 years in Bloomfield (Recordspedia, 2009).

Traffic statistics obtained from San Juan County (San Juan County, 2015) indicate that the accident rate along US 550 has been fairly stable over the past five years, although five fatalities did occur in 2014.

Table 1. San Juan County Sheriff's Office, Traffic Crashes on US 550 South of Broomfield.

Reported Crashes on US 550 South of Broomfield	2010	2011	2012	2013	2014	Five Year TOTALS
Total Number of Crashes	34	31	32	24	29	150
Fatal Crashes	0	2	2	3	2	9
Fatalities	0	3	2	3	5	13
Injury Accidents	7	10	10	11	7	45

Source: San Juan County Sheriff's Office 2015.

Air quality may effect health and safety. Air quality for San Juan County and for the State of New Mexico is described earlier in the **Air Resources section 3.1. of the EA (page(s) 30 thru 38.**

Traffic along US 550 would be most heavy during the construction phase of each well pad (a duration of 7 to 15 days per well pad), as well as during interim reclamation approximately 120 days after the start of the project (for a duration of 7 to 15 days per well pad). Approximately 5 to 40 vehicle trips would be needed during the project duration (about 4 to 5 months total per well). Construction crews are required to comply with all traffic laws; however, additional traffic could increase the risk of traffic accidents. Additional personnel residing in the project area could contribute to crime. About 10 to 40 construction personnel would be onsite during the project, depending on the stage of project completion. Personnel likely would find lodging and other requirements (fuel, food, etc.) in Bloomfield, New Mexico, about 37 miles north of the project area. The potential for increased crime, particularly given trends in the Bloomfield crime statistics, are speculative.

Changes to air quality from the proposed action are expected to be relatively minor, as discussed in Section 3.1. of the EA. It is unclear whether these air pollutants would affect the health of nearby residents or workers closest to the well. Workers in closest proximity to the drilling activity use engineering controls and protective gear to minimize risk of effects.

Cumulative impacts: None would be expected due to the relatively small scale and short duration of the project, as well as local traffic and crime trends.

3. The proposed activities would not significantly affect any unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas (40 CFR 1508.27(b)(3)). Unique characteristics are generally limited to those that have been identified through the land use planning process or other legislative, regulatory or planning processes (BLM 2008, page 71). The FFO does not contain any prime and unique farmlands, suitable or designated wild and scenic rivers, or designated caves. Table 2 discloses the distance of the proposed activities to wetlands delineated by the Army Corps of Engineers. Table 3 discloses the distance of the proposed activities to National Park Service units and Congressionally designated areas. ***The proposed action and alternatives are not located within an Area of Critical Environmental Concern.*** Impacts to historic or cultural resources are described in the Cultural Resources section of the EA and discussed further under item 8.

Table 2. Distance of the Proposed Activities from Wetlands

Delineated Wetlands	Distance from Proposed Activities
Bancos	59 – 60 miles
Blanco	35 – 36 miles
Bloomfield	38 – 39 miles
Cutter Canyon	32 – 33 miles
Carrizo Oxbow	30 – 31 miles
Desert Hills	40 – 41 miles
Valdez	37 – 38 miles

Table 3. Distance of the Proposed Activities from Park Lands and Ecologically Critical Areas

Park Land or Ecologically Critical Area	Distance from Proposed Activities
Ah-Shi-Sle-Pah Wilderness Study Area	13 – 14 miles
Aztec Ruins National Monument	49 - 50 miles
Bisti De-Na-Zin Wilderness Area	16 – 17 miles
Chaco Culture National Historical Park	20 – 21 miles
Fossil Forest Research Natural Area	23 – 24 miles

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

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

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

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

8. I have determined that the activities described in the proposed action will not adversely affect or cause loss or destruction of scientific, cultural, or historical resources, including those listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)). The proposed activities are not located in an ACEC containing relevant and important cultural values. Cultural resource surveys). Cultural resource surveys were completed **(BLM Report Numbers 2013 (III) 009 F, 2015 (I) 012 F, 2015 (II) 023 F, 2015 (I) 004 F, 2015 (II) 024 F). Cultural resources were identified near the Escrito D30 2408 and L30 2408, project areas.** The identified sites will be avoided in all cases and monitoring and installing site protection fencing along the edges of the access will be required during construction, drilling and reclamation as discussed in the **Cultural Resources section 36 (Page 41 and 42 of EA.)**

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

The New Mexico BLM has a two-party protocol with the New Mexico SHPO (2014) specifically encouraged by the NPA. This protocol details how the New Mexico BLM and SHPO will regulate their relationship and

consult. Specifically, this document outlines among other things, how and when consultation will be conducted between the BLM, SHPO, Tribes, and the public. The protocol also outlines when case-by-case SHPO consultation is or is not required for specific undertakings and the procedures for evaluating the effects of common types of undertakings and resolving adverse effects to historic properties. These common types of undertakings regularly include the common actions undertaken in the BLM FFO.

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

The proposed action area provides potential foraging habitat for American peregrine falcon, prairie falcon, golden eagle, and to a lesser degree ferruginous hawk. The proposed project and action area were visually scanned for raptors, raptor nests, and whitewash. One unknown stick nest was observed near, but outside the proposed project areas. Ravens, but no other raptors or their sign were observed during the on-site field survey.

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

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

No Aztec gilia or Brack's hardwall cacti were detected during surveys. Surveys for the species were conducted simultaneously and in coordination and compliance with BLM FFO guidance. Potential habitat for the two species is poor to marginal in nature and limited to one north-facing slope located approximately 50 meters south of the proposed Brannon 304 H well pad boundary. Because no gilia or cacti were detected during the surveys, there would be no direct or indirect effects to either plant species.

The proposed action would have a negligible impact on Special Status Species. There were no observations of Special Status Species, and very limited potential foraging habitat of several raptor species. Cumulative impacts would be negligible as discussed in **Section 3.5 Special Status Species page(s) 39 thru 41.**

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

REFERENCES

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

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APPROVED:

9-15-15

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Date