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Encana Oil & Gas (USA) Inc.'s Escrito A28-2409 Nos. 01H & 02H and Escrito M30-2409 Nos. 01H & 02H Oil and Natural Gas Wells Projects

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1. PURPOSE AND NEED FOR ACTION

1.1. Background

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

- Escrito A28-2409 Nos. 01H – 02H (Escrito A28)
- Escrito M30-2409 Nos. 01H – 02H (Escrito M30)

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 four wells that would be drilled to BLM-FFO-managed minerals. Each of the four wells would be permitted under an approved APD issued by the BLM-FFO. The two proposed wells associated with each project would be twinned with one another on one well pad. Each of the proposed projects would involve the construction, usage, and reclamation of a well pad, well pad construction zone, access road, and pipeline tie. The proposed projects are described further below.

Table 1. Proposed Project Details

Proposed Project	Well Pad and Construction Zone (Acres)	Access Road Length (Feet)	Pipeline Tie Length (Feet)	Mineral Pool	NMNM Lease No.
Escrito A28	5.6	25	247	Bisti Lower- Gallup / Bain Mancos	12374
Escrito M30	6.2	1,436	4,207	Basin Mancos	5991

The proposed Escrito A28 well pad and access road would be permitted under the Escrito A28 approved APDs. The associated pipeline corridor would be permitted under a ROW Grant. Two proposed temporary use areas (TUAs) would be permitted under a ROW Grant.

The proposed Escrito M30 well pad, access road, and pipeline tie are located off lease and would each be permitted under a ROW Grant. One action alternative was identified for the Escrito M30 project. This alternative will be analyzed in this Environmental Assessment (EA).

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 natural gas and oil 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 31 areal miles south-southeast of the town of Bloomfield, 3 to 5 areal miles west-northwest of the community of Nageezi, and 1 to 5 areal miles west of 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 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 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 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) and potentially tributaries to these USGS watercourses.

Escrito A28

Two USGS watercourses are located within the proposed Escrito A28 well pad and/or well pad construction zone (Figures A.2 and A.3 [Appendix A]). Based on the absence of a significant nexus connection to a jurisdictional water, the BLM-FFO determined that these features would not be waters of the U.S.

Escrito M30

The proposed Escrito M30 project area would not cross a USGS watercourse or tributary to a USGS watercourse.

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).

The following pre-disturbance onsite meetings, which were attended by Encana, BLM-FFO representatives, and an environmental consultant (Nelson Consulting, Inc. [NCI]), were held for the proposed projects:

- Escrito A28: May 16, 2013 and November 14, 2013
- Escrito M30: May 30, 2013 and August 8, 2013

The Nageezi Chapter House of the Navajo Nation was invited to the proposed Escrito A28 pre-disturbance onsite meetings by the BLM-FFO, and the Huerfano Chapter House of the Navajo Nation was invited to the proposed Escrito M30 pre-disturbance onsite meetings by the BLM-FFO. No representatives from the chapter houses attended the meetings.

A public invitation to the pre-disturbance onsite meetings was posted online (http://www.blm.gov/nm/st/en/fo/Farmington_Field_Office/ffo_oil_and_gas/ffo_onsites.html); no private citizens or groups attended the meetings. A BLM-FFO Interdisciplinary Team meeting was held for the proposed Escrito A28 project on November 25, 2013, and a BLM-FFO Interdisciplinary Team meeting was held for the proposed Escrito M30 project on August 19, 2013. 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.

- How would dust and equipment emissions associated with the proposed projects impact air resources?
- 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*), and pinyon jay (*Gymnorhinus cyanocephalus*)?
- How would surface-disturbing activities associated with construction of the proposed projects impact cultural resources?
- How would vegetation clearing, proposed project activities, and final reclamation impact livestock?

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 2014), 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 report prepared for the proposed action La Plata Archaeological Consultants [LAC] 2014a, 2014b, 2014c), 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.

2. PROPOSED ACTION AND ALTERNATIVE(S)

2.1. Alternative A (Proposed Action)

The proposed action is the BLM-FFO approval of four APDs and five ROW Grants associated with Encana's proposed Escrito A28 and Escrito M30 projects. The proposed projects would include the drilling, production, and final abandonment of four oil and natural gas wells and the construction, use, and reclamation of two associated well pads (with construction zones), two associated access roads, two associated pipeline corridors, and the use and reclamation of two TUAs associated with the proposed Escrito A28 project. The two TUAs would be located within a USGS watercourse crossing along each side of Encana's Escrito D34-2409 Nos. 01H – 04H (Escrito D34) access road.

The primary objective of the wells would be to produce oil; however, it is likely that natural gas would be a byproduct.

Commencement of the proposed projects is proposed for 2014. 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 Alternative A (Proposed Project Areas)

The proposed project areas are located on BLM-FFO-managed surface within the San Juan Basin in San Juan County, New Mexico. The proposed project areas are approximately 31 areal miles south-southeast of the town of Bloomfield, 3 to 5 areal miles west-northwest of the community of Nageezi, and 1 to 5 areal miles west of U.S. Highway 550. The proposed project areas are located within 2.8 miles of one another.

The general region surrounding the proposed project areas is characterized by rolling hills, shallow valleys, mesas, and badlands. The elevation within the proposed project areas ranges from 6,800 to 6,970 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 Alternative A Project Features

Proposed Project Feature	Legal Location (New Mexico Principal Meridian)		
	Quarter-Quarter	Section	Township & Range
Escrito A28			
Well Pad, Construction Zone, Access Road, & Pipeline Tie	eastern ½ of northeastern ¼	28	Township 24 North, Range 9 West
TUAs	southwestern ¼ of northwestern ¼	22	
Escrito M30			
Well Pad & Construction Zone	western ½ of southwestern ¼	30	Township 24 North, Range 9 West
Access Road	southwestern ¼ of southwestern ¼		
Pipeline Tie	southwestern ¼ of southwestern ¼		
	northern ½ & southeastern ¼ of northwestern ¼	31	

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 Alternative A Proposed Wells

Wellhead/ Bottom Hole	Geographical Coordinate System (UTM, NAD83 [1])		Legal Land Description (New Mexico Principal Meridian)		
	Latitude	Longitude	Footages (2)	Section	Township & Range
Escrito A28					
01H					
Wellhead	36.28898°	-107.78685°	1,223 feet FNL 346 feet FEL	28	Township 24 North, Range 9 West
Bottom Hole	36.29126°	-107.80242°	400 feet FNL 330 feet FWL		
02H					
Wellhead	36.28895°	-107.78765°	1,234 feet FNL 318 feet FEL	28	Township 24 North, Range 9 West
Bottom Hole	36.28851°	-107.80237°	1,400 feet FNL 330 feet FWL		
Escrito M30					
01H					
Wellhead	36.28070°	-107.83702°	1,074 feet FSL 636 feet FWL	30	Township 24 North, Range 9 West
Bottom Hole	36.28366°	-107.85585°	2,180 feet FSL 330 feet FWL	25	Township 24 North, Range 10 West
02H					
Wellhead	36.28066°	-107.83693°	1,060 feet FSL 662 feet FWL	30	Township 24 North, Range 9 West
Bottom Hole	36.28004°	-107.85586°	860 feet FSL 330 feet FWL	25	Township 24 North, Range 10 West

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

Maps of the proposed project areas are provided in Appendix A. The proposed project areas are plotted on the Blanco Trading Post, New Mexico, 7.5-minute USGS quadrangle (Figure A.2) and the 2011 San Juan County National Agriculture Imagery Program aerial photograph (Figures A.3 and A.4).

Escrito A28

Several existing two-track roads, planned well pads (including Encana's Escrito L27-2409 Nos. 01H and 02H [Escrito L27] and Escrito M27-2409 Nos. 01H and 02H [Escrito M27] located directly south of the proposed project area), oil and gas lease roads (including Encana's Escrito D34 access road located adjacent to the western boundary of the proposed well pad), and pipeline tie corridors are in the general vicinity of the proposed project area. Stock ponds have been previously constructed northeast of the proposed well pad.

During construction, there would be two TUAs associated with the proposed project. The two TUAs would be associated with a USGS watercourse crossing along each side of Encana's Escrito D34 access road. The TUAs are as follows:

- TUA 1: This TUA would be 200 feet by 50 feet and would be located along the western side of the Escrito 34 access road at stationing 27+14.6 to stationing 29+14.6.
- TUA 2: This TUA would be 400 feet by 50 feet and would be located along the eastern side of the Escrito D34 access road at stationing 25+14.6 to stationing 29+14.6.

The proposed well pad is located on uplands that generally slope northeastward, toward a stock pond that was historically associated with an ephemeral, unnamed tributary to Blanco Wash. The proposed TUAs are located within an arroyo that is associated with an ephemeral, unnamed tributary to Blanco Wash. The elevation of the proposed project area ranges from approximately 6,850 to 6,860 feet AMSL.

Escrito M30

Several existing two-track roads and existing well pads, access roads, and utility corridors are in the general vicinity of the proposed project. Approximately 1,121 feet of the 4,207-foot-long proposed pipeline corridor would parallel an existing oil and gas lease road.

The proposed project area is within hilly badlands and a rolling valley with a general southwestward slope. The elevation of the proposed project area ranges from approximately 6,800 to 6,970 feet AMSL.

2.1.2. Description of Proposed Projects (Alternative A)

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 Special Status Species 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.

The proposed project areas are within the BLM-designated habitat "zone" for two BLM SSS: Brack's fishhook cactus and Aztec gilia (BLM 2013a; Figure A.2 [Appendix A]).

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, cattleguards, or waterlines) that could be impacted by the proposed projects would be identified and impacts would be mitigated prior to construction. If any fences 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 every 1,320 feet within the trenches; if active livestock grazing is occurring in the proposed project areas, these ramps/crossovers would be constructed every 500 feet. 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 A28
During a biological survey by NCI, five Brack's fishhook cacti were identified adjacent to the proposed project impact areas, specifically the southern edge of the proposed well pad construction zone; no Brack's fishhook cacti or Aztec gilia were identified within the proposed project impact areas.

During the construction phase of the proposed project, a temporary fence would be placed around these five Brack's fishhook cacti.

Escrito M30
During a biological survey by NCI, 35 Brack's fishhook cacti and no Aztec gilia were identified within the proposed project areas. Under BLM-FFO guidance (BLM 2014b) and following BLM-FFO protocol (BLM 2013b), these 35 cacti would be transplanted prior to project construction activities.

Where the proposed pipeline tie would cross an existing fence line, H-braces will be placed and the wire secured before the fence is cut. The fence would be repaired to the former state or better. The operator will follow the BLM fencing stipulation.

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 pipeline ties, 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 pipeline ties. 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 pipeline tie 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, revegetating areas not required for production facilities to reduce the amount of dust, and watering dirt roads during periods of high use in order to reduce fugitive dust emissions. Magnesium chloride, organic-based compounds, or polymer compounds could 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 corridor, 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 below table.

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 project area would be determined during reclamation. Erosion-control features would be applied as specified by the authorized BLM-FFO officer.

Escrito M30
The following water- and erosion control features were specified during the August 2013 pre-disturbance onsite meeting:

- Stormwater runoff would be diverted from the western corner (corner 6) of the proposed well pad to the northern corner (corner 2) of the proposed well pad. This stormwater runoff would be diverted to an existing drainage at the northern end of the proposed project area.
- Four 24-inch-diameter culverts would be placed along the proposed access road. The locations of these culverts are depicted on the plats (Appendix C).
- Silt trap(s), if needed, would be constructed during interim reclamation.

Proposed Project Phases (Alternative A)

Proposed project phases would be similar for the proposed Escrito A28 and Escrito M30 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 would require upgrades and/or surfacing to prevent soil erosion and accommodate year-round traffic.

Escrito M30
Encana would upgrade an approximately one-mile portion of the existing road leading to the proposed project area from the start of the proposed access road to the unnamed county road. The road would be upgraded to standards established by *The Gold Book* (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e).

Construction of Access Roads, Well Pads, and TUAs

Access road and well pad construction would take two to three weeks at each proposed project site. Construction associated with the proposed Escrito A28 TUAs would take less than one week. During construction of the proposed access roads, well pads, and TUAs, 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 in “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 three 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 three inches in diameter or greater (at ground level) would be cut to ground level and delimbed. Tree trunks (left whole) and cut limbs would be stacked along the access roads, well pads, and/or pipeline corridors for wood gathering. The subsurface portion of the trees (tree stumps) would be hauled to an approved disposal site or buried within the cut slopes of the proposed 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/stipulations attached to the approved APDs and ROW Grants.

The size of the proposed well pads is 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 size of the proposed well pads, maximum well pad cut, and maximum well pad fill are as follows:

- Escrito A28: This proposed well pad would be an irregularly shaped well pad, as depicted on the plats (Appendix C). A 50-foot well pad construction zone would be located around the perimeter of the proposed pad. The maximum well pad cut would be 8 feet on the southwestern corner (corner 3). The maximum fill would be 9 feet on the eastern portion of the proposed well pad (between corners 2 and 6).

- Escrito M30: This proposed well pad would be 530 feet by 500 feet, including a 50-foot well pad construction zone around the perimeter of the proposed pad. The maximum well pad cut would be 19 feet on the western corner (corner 6). The maximum fill would be 14 feet on the eastern portion of the proposed well pad (between corners 3 and 5).

Additionally, the following construction techniques were specified for the proposed Escrito M30 well pad during the August 2013 pre-disturbance onsite meeting:

- The northern, eastern, and western corners (corners 2, 3 and 6, respectively) of the proposed well pad would be rounded.

- A high wall would be constructed between the northern and western corners (corners 2 and 6, respsectively) of the proposed well pad.

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 A28: The proposed access road would be 25 feet long. The maximum road grade would be 0 to 6 percent.
- Escrito M30: The proposed access road would be 1,436 feet long. The maximum road grade would be 8 percent.

Proposed TUAs
Vegetation within the TUAs would be brush-hogged. If necessary for erosion control, portions of the TUAs could be recontoured slightly.

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 natural gas and oil 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 natural gas and oil 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 natural gas and oil. 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 natural gas and oil. 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 act as a proppant to keep the fractures open and allow natural gas and oil 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 natural gas and oil 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) 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 flowback 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 natural gas and oil to travel to the wellheads. At the wellheads, the flow of natural gas and oil would be regulated and controlled by a series of valves and instruments.

Construction of Pipeline Ties

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

The proposed pipeline ties would be up to 6-inch-diameter steel pipes. The proposed pipeline corridors would be 40 feet in width. The length of each pipeline tie would be as follows:

- Escrito A28: 247 feet
- Escrito M30: 4,207 feet

The maximum allowable operating pressure of the proposed pipeline ties 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 pipeline corridors. Aboveground appurtenances would be painted Juniper Green to blend with the natural environment. Equipment that would be subject to safety requirements would not be painted Juniper Green.

For each proposed pipeline tie, 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, Well Pads, and TUAs” section, above. Topsoil would be stockpiled along the edge of the proposed pipeline corridor.

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.

Pipeline tie 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).

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

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, access road, and the two TUAs. Interim reclamation would take one week for each pipeline tie 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 new surface disturbance associated with the pipeline ties, the non-driving surface of the access roads, well pad construction zones, non-working portions of the well pads, and TUAs. Approximately 12.6 acres of new surface disturbance would be reclaimed at this time. Areas that would be fully reclaimed during this phase are described further in Section 2.1.3 (Proposed Surface Disturbance).

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.

After the proposed pipeline corridors have been recontoured, permanent erosion-control measures, such as waterbars, would be installed within the proposed pipeline corridors, where needed and as described in “Design Features and Best Management Practices”.

The subsurface portion of the trees (tree stumps) would be hauled to an approved disposal site or buried within the cut slopes of the proposed well pad during interim reclamation.

The reclamation standards would comply with BLM-FFO Bare Soil Reclamation Procedure B (BLM 2013c). Details of the interim reclamation process are provided in the reclamation plans (Appendix E). Reclaimed areas would be seeded using the Sagebrush/Grass Community Seed Mixture.

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

Escrito A28
Water diversions (e.g., 24-inch-diameter culverts, water bars, silt traps, and ditches), if needed, would be installed at this time.

Escrito M30
Water- and erosion control features would be installed within the proposed project area as described in “Design Features and Best Management Practices – Erosion Control.” Additional water diversions, if needed, would be installed at this time.

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 bermed 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 Juniper Green to blend with the natural environment. Equipment that would be subject to safety requirements would not be painted Juniper 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 pipeline ties 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, as described in the reclamation plans (Appendix E). Reclaimed areas would be seeded using the BLM-FFO Sagebrush/Grass Community Seed Mixture. Erosion control measures, if needed, would be installed at this time.

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

2.1.3. Proposed Surface Disturbance (Alternative A)

New surface disturbance associated with the proposed projects would total 15.9 acres. Of this, 0.5 acre would be reseeded (but not recontoured) and 12.1 acres would be fully reclaimed during interim reclamation. The remainder (3.3 acres) would remain disturbed throughout the life of the proposed projects. This disturbance is summarized in the table below.

Table 5. Surface Disturbance Associated with Proposed Projects

Feature	Total Disturbance (acres)	New Surface Disturbance (acres)	Portion of New Surface Disturbance Reclaimed during Interim Reclamation (acres)	New Surface Disturbance Remaining Disturbed (Barren and Level) for the Life of Proposed Project (acres)
Escrito A28				
Access Road	<0.1	<0.1	<0.1	<0.1
Well Pad	3.6	3.6	2.2	1.4
Well Pad Construction Zone	2.0	1.6	1.6	-
Pipeline Corridor	0.2	<0.1	<0.1	-
TUAs	0.7	0.7	0.7	-
Total	**6.5**	**5.9**	**4.5**	**1.4**
Escrito M30				
Access Road	1.0	1.0	0.5	0.5
Well Pad	4.0	4.0	2.6	1.4
Well Pad Construction Zone	2.2	2.2	2.2	-
Pipeline Corridor	3.9	2.8	2.8	-
Total	**11.1**	**10.0**	**8.1**	**1.9**
Total	**17.6**	**15.9**	**12.6**	**3.3**

Escrito A28

New disturbance associated with the proposed project would encompass 5.9 acres. Of this, 4.5 acres would be reclaimed during interim reclamation. The remaining working area and long-term access road (1.4 acres) would be reclaimed during final reclamation.

- Access Road: The proposed access road would be 30.0 feet in width and 25.0 feet in length (less than 0.1 acre).
    - The 14-foot-wide running surface of the road and the bottoms of the bar ditches alongside the road (less than 0.1 acre) would remain disturbed for the lifetime of the project. No reclamation would occur within these areas during interim reclamation.
    - The remainder of the access road corridor (less than 0.1 acre) would be reseeded during interim reclamation.
- Well Pad: The proposed well pad would be an irregularly-shaped well pad that would total approximately 3.6 acres; the dimensions of the well pad are provided on the plats in Appendix C.
    - Non-reseed area: Approximately 1.4 acres within the proposed well pad would be used for facilities and daily activities; within this area, no reclamation would occur during interim reclamation.
    - The remainder of the well pad (2.2 acres) would be fully reclaimed during interim reclamation.
- Construction Zone: A 50.0-foot wide construction zone (2.0 acres) would surround the proposed well pad. Less than 0.1 acre of the construction zone would overlap the proposed access road. Approximately 0.4 acre of Encana's existing Escrito D34 access road would overlap the proposed well pad construction zone. Therefore, the proposed construction zone would result in 1.6 acres of new disturbance.

  The construction zone would be fully reclaimed during interim reclamation.
- Pipeline Tie: The proposed pipeline tie corridor would be 218 feet long and 40 feet wide (0.2 acre). Approximately 203 feet of the proposed pipeline tie corridor would overlap the Escrito A28 well pad. Additionally, approximately 15 feet of the proposed pipeline tie corridor length would travel parallel and adjacent to the proposed Escrito A28 access road. Where the proposed pipeline tie corridor parallels the proposed access road, approximately 15 feet of the proposed pipeline tie corridor would overlap the proposed access road. Therefore, new surface disturbance associated with the proposed pipeline tie corridor would be less than 0.1 acre.

  All new surface disturbance associated with the proposed pipeline tie corridor would be reclaimed during interim reclamation.
- Two proposed TUAs, associated with the Escrito D34 access road, would be used for the proposed project. The proposed TUAs would be a total of 0.7 acre and would be located along Encana's existing Escrito D34 access road at a blue-line USGS watercourse crossing. The proposed TUAs would be fully reclaimed during interim reclamation. The proposed TUAs are described further below.
    - TUA 1: This TUA would be 200 feet by 50 feet (0.2 acre) and would be located along the western side of Encana's existing Escrito D34 access road at stationing 27+14.6 to stationing 29+14.6.
    - TUA 2: This TUA would be 400 feet by 50 feet (0.5 acre) and would be located along the eastern side of Encana's existing Escrito D34 access road at stationing 25+14.6 to stationing 29+14.6.

Escrito M30

New disturbance associated with the proposed project would encompass 10.0 acres. Of this, 8.1 acres would be reclaimed during interim reclamation. The remaining working area and long-term access road (1.9 acres) would be reclaimed during final reclamation.

- Access Road: The proposed access road would be 30.0 feet in width and 1,436.0 feet in length, or 1.0 acre.
    - The 14-foot-wide running surface of the road and the bottoms of the bar ditches alongside the road (approximately 0.5 acre) would remain disturbed for the lifetime of the project. No reclamation would occur within these areas during interim reclamation.
    - The remainder of the access road corridor (0.5 acre) would be reseeded during interim reclamation.
- Well Pad: The proposed well pad would measure 400.0 by 430.0 feet, resulting in 4.0 acres of surface disturbance.
    - Non-reseed area: Approximately 1.4 acres within the proposed well pad would be used for facilities and daily activities; within this area, no reclamation would occur during interim reclamation.
    - The remainder of the well pad (2.6 acres) would be fully reclaimed during interim reclamation.
- Construction Zone: A 50.0-foot wide construction zone (2.2 acres) would surround the well pad. Less than 0.1 acre of the construction zone would overlap the proposed access road. Therefore, new disturbance resulting from the construction zone would be 2.2 acres.

  The construction zone would be fully reclaimed during interim reclamation.
- Pipeline Tie: The proposed pipeline tie corridor would be 4,207 feet long and 40.0 feet wide (3.9 acres). Because portions of the pipeline corridor overlap existing disturbance or disturbance areas associated with other portions of the proposed project (described below), actual new surface disturbance associated with the pipeline corridor would be 2.8 acres.

  All new surface disturbance associated with the proposed pipeline tie corridor would be reclaimed during interim reclamation.
    - Approximately 244.0 feet of the corridor length would overlap the proposed well pad. This portion of the pipeline tie corridor would not result in new surface disturbance.
    - Approximately 2,560.0 feet of the corridor length would travel parallel and adjacent to the proposed access road or an existing road. The proposed pipeline tie centerline would be located 15 feet from the access road centerline. Because 15 feet of the pipeline corridor width would overlap the 30-foot-wide access road corridor, the new disturbance width associated with this portion of the pipeline corridor would be 25 feet; the new surface disturbance associated with this portion of the pipeline corridor would be 1.5 acres.
    - Approximately 1,403.0 feet of the corridor length (1.3 acres) would run cross-country.

2.2. No Action

Under the No Action 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, pipeline ties, and TUAs would not be constructed. Current land and resource uses would continue to occur in the proposed project areas.

2.3. Alternative B (Good Times P25)

One action alternative (Good Times P25-2410 Nos. 01H and 02H) was identified for the projects. Under this alternative, the Escrito M30-2409 Nos. 01H and 02H would be replaced by this Good Times P25-2410 Nos. 01H and 02H (referred to as the “Alternative Good Times P25”). The Alternative Good Times P25 well pad (including construction zone), access road, and pipeline tie corridor would be located further west thant the proposed Escrito M30 project. The Alternative Good Times P25 wells would each be permitted under an APD and the associated

well pad (including construction zone), access road, and pipeline tie would each be permitted under a ROW Grant. Under this Alternative B, the Escrito A28-2409 project would be approved as described in Alternative A.

A plat showing the Alternative Good Times P25 project features is provided in Appendix C.3. The alternative is shown on Figures A.2 and A.4 (Appendix A). Photographs of the alternative are provided in Appendix D.3.

Information provided in Section 2.1 (Proposed Action) would apply to the Alternative Good Times P25 project, with the following exceptions:

2.3.1. Location of Alternative B (Good Times P25) Project Feature

The legal location (New Mexico Principal Meridian) for the alternative is provided in the table below.

Table 6. Legal Land Description for Alternative Good Times P25 Project Features

Proposed Project Feature	Legal Location (New Mexico Principal Meridian)		
	Quarter-Quarter	Section	Township & Range
Well Pad & Construction Zone	eastern ½ of southeastern ¼	25	Township 24 North, Range 10 West
	western ½ of southwestern ¼	30	Township 24 North, Range 9 West
Access Road	southwestern ¼ of southwestern ¼		
Pipeline Tie			
	northern ½ & southeastern ¼ of northwestern ¼	31	
	southeastern ¼ of southeastern ¼	25	Township 24 North, Range 10 West

The Alternative Good Times P25 well pad and access road are located immediately west of the proposed Escrito M30 well pad and access road. With the exception of the portions of the pipeline ties that would parallel each corresponding access road, the pipeline ties would be the same for the Alternative Good Times P25 and proposed Escrito M30 projects.

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

Table 7. Bottom Hole and Surface Hole Locations for Proposed Wells

Wellhead/ Bottom Hole	Geographical Coordinate System (UTM, NAD83 [1])		Legal Land Description (New Mexico Principal Meridian)		
	Latitude	Longitude	Footages (2)	Section	Township & Range
01H					
Wellhead	36.28100°	-107.83944°	1,177 feet FSL 78 feet FEL	25	Township 24 North, Range 10 West
Bottom Hole	36.28366°	-107.85585°	2,180 feet FSL 330 feet FWL		
02H					
Wellhead	36.28092°	-107.83947°	1,148 feet FSL 87 feet FEL	25	Township 24 North, Range 10 West
Bottom Hole	36.28004°	-107.85586°	860 feet FSL 330 feet FWL		

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

Several existing two-track roads and existing well pads, access roads, and utility corridors are in the general vicinity of the Alternative Good Times P25 project. Approximately 2,408 feet of the 4,116-foot-long Alternative Good Times P25 pipeline corridor would parallel an existing oil and gas lease road.

The Alternative Good Times P25 project area is located on the top of a low, even ridge with a gentle southwestward slop. The elevation of the Alternative Good Times P25 project area ranges from approximately 6,800 to 6,970 feet AMSL.

No USGS watercourses would be crossed by the alternative.

2.3.2. Alternative B (Good Times P25) Design Features and Best Management Practices

The Alternative Good Times P25 project area is within the BLM-designated habitat "zone" for two BLM SSS: Brack's fishhook cactus and Aztec gilia (BLM 2013a; Figure A.2 [Appendix A]). During a biological survey by NCI, 32 Brack's fishhook cacti and no Aztec gilia were identified within the alternative project area. Under BLM-FFO guidance (BLM 2014b) and following BLM-FFO protocol (BLM 2013b), these 32 cacti would be transplanted prior to construction activities.

2.3.3. Alternative B (Good Times P25) Project Phases

Upgrade of Existing Roads

Encana would upgrade an approximately one-mile-long portion of the existing road leading to the Alternative Good Times P25 project area from the start of the alternative access road to the unnamed county road. The road would be upgraded to standards established by *The Gold Book* (BLM and USFS 2007) and BLM Manual 9113, Sections 1 and 2 (BLM 2011d and BLM 2011e).

Construction of Access Road and Well Pad

The Alternative Good Times P25 well pad would be 530 feet by 500 feet, including a 50-foot well pad construction zone around the perimeter of the proposed pad. The maximum well pad cut would be 15 feet on the northeastern corner (corner 2). The maximum fill would be 12 feet on the southwestern corner (corner 5).

Additionally, the following construction techniques were specified for the Alternative Good Times P25 well pad during the August 2013 pre-disturbance onsite meeting:

- The northeastern and southwestern corners (corners 2 and 5, respectively) of the alternative well pad would be rounded.
- A high wall would be constructed at the northeastern and southwestern corners (corners 2 and 5, respectively) of the alternative well pad.

The alternative access road would be 139 feet long. The maximum road grade would be 0 to 6 percent.

Construction of Pipeline Tie

The length of the alternative pipeline tie would be 4,116 feet.

Interim Reclamation

Water diversions (e.g., 24-inch-diameter culverts, water bars, silt traps, and ditches), if needed, would be installed at this time.

2.3.4. Alternative B (Good Times P25) Surface Disturbance

Under Alternative B (the Alternative Good Times P25 project), the total new disturbance associated with the Escrito A28 and Alternative Good Times P25 projects would be 14.8 acres (as opposed to 15.9 acres under the proposed

project). Of this, 2.8 acres would remain disturbed for the life of the alternative project (as opposed to 3.3 acres under the proposed project). The remaining 12.0 acres would be reclaimed during interim reclamation (as opposed to 12.6 acres under the proposed project).

New disturbance associated with the Alternative Good Times P25 project would be 8.9 acres. Of this, 7.5 acres would be reclaimed during interim reclamation. The remaining working area and long-term access road (1.4 acres) would be reclaimed during final reclamation.

The differences in surface disturbance between Alternative A (the proposed Escrito M30 project) and Alternative B (the Good Times P25 projects) are as follows:

- Access Road: The alternative access road would be 139 feet long; as opposed to a 1,436-foot-long access road. New disturbance associated with the alternative access road would be 0.1 acre; as opposed to 1.0 acre.
    - The 14-foot-wide running surface of the alternative road and the bottoms of the bar ditches alongside the alternative road (less than 0.1 acre) would remain disturbed for the lifetime of the project; as opposed to 0.5 acre. No reclamation would occur within these areas during interim reclamation.
    - The remainder of the alternative access road corridor (0.1 acre [as opposed to 0.5 acre]) would be reclaimed during interim reclamation.
- Pipeline Tie: The alternative pipeline corridor would be 4,116 feet long; as opposed to a 4,207-foot-long pipeline corridor. New disturbance associated with the alternative pipeline corridor would be 2.7 acres; as opposed to 2.8 acres. Approximately 2,423 feet of the alternative pipeline corridor would follow the same route as the proposed Escrito M30 pipeline corridor.

2.4. Alternatives Considered but Eliminated from Detailed Study

Natural gas and oil wells can be drilled vertically or directionally/horizontally. Vertical drilling places a well pad directly above the bottom hole, while directional/horizontal drilling allows for flexibility in the placement of the well pad and associated surface facilities. Directional/horizontal drilling often allows for “twinning,” or drilling two or more wells from one shared well pad. Directional/horizontal drilling applications throughout the San Juan Basin have become relatively 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 workover frequency is also a consideration. Generally, directional well completion and operating costs are 20 to 25 percent higher than vertical well drilling costs. The primary economic factors that determine the feasibility of directional applications include, but are not limited to, incremental drilling, completion, and operating costs; oil and gas reserves; rates of production; oil and gas prices; royalties and taxes; and return on investment.

For each well pad location, a *SHL [Surface Hole Location] Polygon & Feasibility Map* was 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.

2.4.1. Escrito A28

A different well pad (including construction zone), access road, and pipeline tie were considered; this different location was known as the Escrito M22-2409 No. 01H (Escrito M22) project. The Escrito M22 well pad location was outside of Encana’s surface hole location polygons for the proposed Escrito A28 wells; therefore, only one of the

proposed Escrito A28 wells would have been reached from the Escrito M22 well pad. As a result, Encana would have had to construct both the Escrito A28 and Escrito M22 projects in order to reach both of the proposed Escrito A28 wells. Escrito M22 and the surface hole location polygons for the proposed Escrito A28 wells are depicted on Figure A.3 (Appendix A).

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

Much of the information referenced in this section is incorporated from the Air Resources Technical Report for BLM Oil and Gas Development in New Mexico, Kansas, Oklahoma, and Texas (herein referred to as Air Resources Technical Report; (U.S. Department of Interior Bureau of Land Management, 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 Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality, including six nationally regulated ambient air pollutants (criteria pollutants). These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM10 and PM2.5), sulfur dioxide (SO2) and lead (Pb). EPA has established National Ambient Air Quality Standards (NAAQS) for criteria air pollutants. The NAAQS are protective of human health and the environment. EPA has approved New Mexico's State Implementation Plan and the state enforces state and federal air quality regulations on all public and private lands within the state, except for tribal lands and within Bernalillo County. Air quality is determined by atmospheric pollutants and chemistry, dispersion meteorology and terrain, and also includes applications of noise, smoke management, and visibility. Climate is the composite of generally prevailing weather conditions of a particular region throughout the year, averaged over a series of years. EPA has proposed or completed actions recently to implement Clean Air Act requirements for greenhouse gas emissions. Climate has the potential to influence renewable and non-renewable resource management.Air Quality

Criteria Air Pollutants

The Air Resources Technical Report describes the types of data used for description of the existing conditions of criteria pollutants, how the criteria pollutants are related to the activities involved in oil and gas development, and provides a table of current National and state standards. EPA's Green Book web page ***(U.S. Environmental Protection Agency, 2013)*** reports that all counties in the Farmington Field Office area are in attainment of all National Ambient Air Quality Standards (NAAQS) as defined by the Clean Air Act. The area is also in attainment of all state air quality standards (NMAAQS). The current status of criteria pollutant levels in the Farmington Field Office are described below. Total emissions of criteria pollutants from each source sector were calculated by adding together the emissions from the four counties that are located in FFO: San Juan, McKinley, Rio Arriba, and Sandoval.

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

Table 8. 2012 Criteria Pollutant Monitored Values in San Juan County *(U.S. Environmental Protection Agency, 2014)*

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

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

[2] Not to be exceeded during the year

[3] 98th percentile, averaged over 3 years

[4] Annual mean, averaged over 3 years

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

The NMAAQS is for Total Suspended Particulate (TSP)

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

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

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

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

Table 9. Number of Days classified as “unhealthy for sensitive groups” (AQI 101-150) or worse *(U.S. Environmental Protection Agency, 2013a)*

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

Hazardous Air Pollutants

The Air Resources Technical Report discusses the relevance of hazardous air pollutants (HAPs) to oil and gas development and the particular HAPs that are regulated in relation to these activities (U.S. Department of Interior Bureau of Land Management, 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 (U.S. Environmental Protection Agency, 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 3 shows climate normals for the 30-year period from 1981 to 2010 for the Farmington, New Mexico, area.

Table 10. Climate Normals for the Farmington Area, 1981-2010

Month	Average Temperature (^{O}F [1])	Average Maximum Temperature (^{O}F)	Average Minimum Temperature (^{O}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
November	40.5	52.2	28.8	0.68
December	31.0	41.2	20.7	0.50
Source: data collected at New Mexico State Agricultural Science Center - Farmington (1) degrees Fahrenheit				

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

3.1.2. Impacts from Alternative A (Proposed Action)

Methodology and assumptions for calculating air pollutant and greenhouse gas emissions are described in the Air Resources Technical Report. This document incorporates the sections discussing the modification of calculators developed by the BLM to address emissions for one horizontal gas well. The calculators give an approximation of criteria pollutant, HAP, and greenhouse gas (GHG) emissions to be compared to regional and national emissions levels (USDI/BLM 2013b). Also incorporated into this document are the sections describing the assumptions used in developing the inputs for the calculator (U.S. Department of Interior Bureau of Land Management, 2014).

Direct and Indirect Impacts

Criteria Pollutants

Table 11 shows estimated emissions from one proposed horizontal gas well for criteria pollutants, volatile organic compounds (VOC) and greenhouse gas (GHG). For comparison, Table 12 shows total human-caused emissions for each of the counties in the FFO and La Plata County, Colorado, based on USEPA's 2011 emissions inventory (U.S. Environmental Protection Agency, 2014).

Table 11. Criteria Pollutant and VOC Emissions Estimated for Construction of One Horizontal Gas Well; Average 25 Days to Drill and Complete

Activity	NOx	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	CH4	CO2
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)								
Equipment Leaks	-	-	-	-	-	-	0.013	-
Field Compression	0.14	0.29	0.10	0.01	0.01	-	-	19.30
Total	**6.28**	**1.94**	**0.65**	**2.55**	**0.30**	**0.11**	**0.02**	**686.96**

Table 12. Analysis Area Emissions in Tons/Year, 2011

County	NO_X (1)	CO (2)	VOC (3)	PM_{10} (4)	$PM_{2.5}$ (5)	SO_2 (6)
McKinley	11,952.9	17,007.8	3,891.2	70,096.4	7,645.2	1,381.1
Rio Arriba	12,012.3	27,344.6	19,149.8	33,761.2	4,130.6	60.4
San Juan	42,231.5	63,568.9	26,110.8	76,638.3	9,201.0	5,559.3
Sandoval	4,143.8	19,513.9	4,373.1	39,343.0	4,510.8	109.3
Total	**70,340.5**	**127,435.2**	**53,525.0**	**219,838.9**	**25,487.6**	**7,110.0**

(1) NO_X – nitrogen oxides
(2) CO – carbon monoxide
(3) VOC – volatile organic compounds
(4) PM_{10} – particulate matter with an aerodynamic diameter equal to or less than 10 microns
(5) $PM_{2.5}$ – particulate matter with an aerodynamic diameter equal to or less than 2.5 microns
(6) SO_2 – sulfur dioxide

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

Table 13. 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	70,340.5	127,435.2	53,525.0	219,838.9	25,487.6	7,110.0
Horizontal Gas Well Emissions	6.28	1.94	0.65	2.55	0.30	0.13
Percent Increase	**0.008**	**0.002**	**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 0.065 tons/year should be considered a very gross estimate.

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; (New Mexico Environment Department, 2010)). The estimated CO_2e metric tons emissions from one conventional gas well (623.2 metric tons) would represent a 0.0008 percent increase in New Mexico CO_2 emissions.

Cumulative Impacts

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

3.1.3. Impacts from Alternative B (Good Times P25 Action Alternative)

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and the alternative action.

3.2. Groundwater Resources

3.2.1. Affected Environment

Escrito A28

Within a 1-mile radius of the proposed well pad, there are two recorded water wells. These water wells are SJ-01712 (depth-to-groundwater 515 feet) and SJ-02465 (no depth-to-groundwater data available; New Mexico Office of the State Engineer 2011).

Escrito M30 and Alternative Good Times P25

Within a 1-mile radius of the proposed Escrito M30 well pad and Alternative Good Times P25 well pad, there are no recorded water wells (New Mexico Office of the State Engineer 2011).

3.2.2. Impacts from Alternative A (Proposed Action)

Direct and Indirect Impacts

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 fracking (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 fracking is completed, a portion of the injected fracking fluids returns to the wellbore and is recovered for future fracking operations (EPA 2004) or disposal. Stimulation techniques have been used in the U.S. since 1949 and in the San Juan Basin since

the 1950s. Over the last 10 years, advances in multi-stage and multi-zone fracking have allowed for the development of gas fields that previously were uneconomic, including the San Juan Basin.

Fracking is a common process in the San Juan Basin and applied to nearly all wells drilled. The producing zone targeted by the proposed project 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, which is located above both the Mancos Shale and Mesaverde formations. The Lewis Shale formation provides an impermeable layer that isolates the Mancos Shale and Mesaverde formations from both identified sources of drinking water and surface water. On average, the total depth of the proposed well bores would be about 5,000 feet below the ground surface. Fracking in the Basin Mancos formation is not expected to occur above depths of 4,000 feet below the ground surface. Fracking could possibly extend into the Mesaverde formation overlying the Basin Mancos; however, the formation has not been identified as an underground source of drinking water based on its depth and relatively high levels of total dissolved solids. No impacts to surface water or freshwater-bearing groundwater aquifers are expected to occur from fracking of the proposed wells.

Cumulative Impacts

As no direct or indirect impacts to groundwater are anticipated as a result of the proposed projects, there would be no cumulative impacts.

3.2.3. Impacts from Alternative B (Good Times P25 Action Alternative)

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and the alternative action.

3.3. Upland Vegetation

3.3.1. Affected Environment

The proposed and alternative 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).

Alternative A (Proposed Project Areas)

The general region surrounding the proposed project areas is characterized by open to dense piñon-juniper woodlands, sagebrush shrublands, and some badlands. Woodlands are found primarily on hillslopes, while shrublands are found primarily within shallow valleys. Badlands are intermixed on hillslopes throughout the area.

Escrito A28

The proposed Escrito A28 project area is characterized by sagebrush shrubland and open piñon-juniper woodland vegetation communities. There are approximately 80 to 100 scattered piñon pine and oneseed juniper (*Juniperus monosperma*) trees within the proposed project area; approximately 80 percent of these are mature, 18 percent are juvenile, and 2 percent are standing dead. Ground cover within the proposed project area is approximately 50 to 80 percent. The vegetation communities are each described in detail in the BSR (Appendix B).

Escrito M30

The proposed Escrito M30 project area is characterized by open to dense piñon-juniper woodlands, sagebrush shrublands with scattered piñon pine and oneseed juniper trees, and desert grasslands with scattered piñon pine and oneseed juniper trees. There are approximately 200 to 250 trees within the project area; approximately 92 percent of these are mature, 5 percent are juvenile, and 3 percent are standing dead. Ground cover within the proposed project area is approximately 60 to 70 percent. The vegetation communities are each described in detail in the BSR (Appendix B).

Alternative B (Good Times P25 Project Area)

The Alternative Good Times P25 project area is characterized by open to dense piñon-juniper woodlands, sagebrush shrublands with scattered piñon pine and oneseed juniper trees, and desert grasslands with scattered piñon pine and oneseed juniper trees. There are approximately 50 to 100 trees within the project area; approximately 92 percent of these are mature, 5 percent are juvenile, and 3 percent are standing dead. The vegetation communities are each described in detail in the BSR (Appendix B).

3.3.2. Impacts from Alternative A (Proposed Action)

Direct and Indirect Impacts

During the construction phase of the proposed project, all vegetation within the 15.9 acres associated with the proposed project areas would be cleared. This would include the removal of 280 to 350 trees. During interim reclamation, approximately 12.6 acres of the proposed project areas would be reclaimed. The remaining 3.3 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 existing disturbances within the Escrito A28 spatial analysis area include the following:

- Encana's Escrito D34 access road and pipeline corridor are located adjacent to the western boundary of the proposed Escrito A28 well pad.
- Encana's Escrito D34 access road and pipeline corridor travel between the proposed TUAs.
- An existing stock pond is located adjacent to the north-northeastern boundary of the proposed Escrito A28 well pad.
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within a grazing allotment (Largo Community, Allotment No. 5083), which is permitted for year-round grazing by 145 head of cattle and 596 sheep.

The existing disturbances within the Escrito M30 spatial analysis area include the following:

- Approximately 2,423 feet of the proposed pipeline tie would parallel an existing road.
- Approximately 200 feet of the proposed pipeline tie travels adjacent to Dugan Production Corporation's existing, active Fabulous Feb No. 1 well pad.
- Active wildlife and livestock grazing occurs in the spatial analysis area. The spatial analysis area is within two grazing allotments: Blanco Trading Post (Allotment No. 5081) and Kimbeto Community (Allotment No. 6013). The Blanco Trading Post Allotment is permitted for grazing by 177 head of cattle from November through June each year. The Kimbeto Communiy Allottment is permitted for year-round grazing by 324 head of cattle and 1,554 sheep, and grazing by 15 horses from August through October each year.

Aside from the proposed projects, no reasonably foreseeable disturbances are anticipated within the 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.

3.3.3. Impacts from Alternative B (Good Times P25 Action Alternative)

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and the alternative action, with the following exception: under the alternative action, there would be 14.8 acres of new disturbance to upland vegetation. During interim reclamation, approximately 12.0 acres of the proposed project areas would be reclaimed. The remaining 2.8 acres would remain as compacted, barren surface for the life of the proposed wells. Therefore, there would be 1.1 fewer acres of overall vegetative disturbance and 0.5 fewer acres of long-term disturbance under the alternative action as compared to the proposed action.

Cumulative Impacts

The spatial analysis area for the alternative action would be similar to the spatial analysis area for the proposed action. The existing disturbances within this spatial analysis area include those listed for the proposed Escrito A28, as well as the following:

- An existing road is located along the west-southwestern boundary of the alternative well pad.
- Approximately 2,021 feet of the alternative pipeline tie would parallel and existing road.
- Approximately 200 feet of the proposed pipeline tie travels adjacent to Dugan Production Corporation's existing, active Fabulous Feb No. 1 well pad.
- Active livestock grazing within the spatial analysis area would include the same grazing allotments as those described above for the proposed Escrito M30 project.

Cumulative impacts would be similar under the proposed action and the alternative action, with the exception of the differences between the proposed action and alternative action's Direct and Indirect Impacts, and the disturbances listed above.

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).

Escrito A28

During the site survey of the proposed project area, no USDA-listed noxious weeds, NMDA-listed Class A or B noxious weeds, or BLM-FFO-listed invasive species were identified within the proposed project area.

Escrito M30 and Alternative Good Times P25

During the site survey of the proposed and alternative project areas, no USDA-listed noxious weeds or BLM-FFO-listed invasive species were identified within these areas.

Halogeton (*Halogeton glomeratus*), a NMDA-listed Class B noxious weed species, was identified along the pipeline tie corridor associated with both alternatives (see Figure A.4 [Appendix A]). Class B species are limited to portions of the state. In areas with severe infestations, management is typically designed to contain the infestation and stop further spread (NMDA 2010).

3.4.2. Impacts from Alternative A (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 (*Bromus tectorum*), 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 3.3.2 (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.

3.4.3. Impacts from Alternative B (Good Times P25 Action Alternative)

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and the alternative action.

Cumulative Impacts

The spatial analysis area for the alternative action would be similar to the spatial analysis area for the proposed action. Within the spatial analysis area, there is existing disturbance. This disturbance is described in detail in Section 3.3.3 (Upland Vegetation – Impacts from the Alternative Good Times P25 Action – Cumulative Impacts).

Cumulative impacts would be similar under the proposed action and the alternative action, with the exception of the differences between the disturbances listed in Section 3.3.3 (Upland Vegetation – Impacts from the Alternative Good Times P25 Action – Cumulative Impacts).

3.5. Wildlife

3.5.1. Affected Environment

General Wildlife

The vegetation communities found within the proposed and alternative 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 or alternative project areas (BLM 2012b); the closest recorded colony is approximately 7 to 9 miles northeast of the proposed and alternative project areas. No sign of prairie dogs was observed during the site surveys.

General wildlife for each 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

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

3.5.2. Impacts from Alternative A (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, including 280 to 350 trees, within the 15.9 acres associated with the proposed project areas would be cleared. Approximately 3.3 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 3.3 (Upland Vegetation). If interim and final reclamation are successful, a sagebrush shrubland and open piñon-juniper woodland community would become re-established within the proposed project areas. However, as discussed in Section 3.3, 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 2,521 linear feet (0.5 mile) of initial habitat fragmentation resulting from the proposed well pads and access roads; this fragmentation would exist until interim reclamation is deemed successful. The proposed pipeline ties would parallel the proposed access roads or existing roads; therefore, the proposed pipeline ties would not contribute to habitat fragmentation. Initial habitat fragmentation would result from the following:

- Proposed Escrito A28 project features
    - Access road: 25 feet
    - Well pad/construction zone: 530 feet (along longest side)
- Proposed Escrito M30 project features
    - Access road: 1,436 feet
    - Well pad/construction zone: 530 feet (along longest side)

For the long term, the proposed access roads and the working areas of the proposed well pads (250 feet along longest sides) would result in 1,961 linear feet (0.4 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 pipeline ties, 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 pipeline ties 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:

- 41 new or active oil and/or gas wells and associated well pads
- 16 inactive oil and/or gas wells and associated well pads (some reclaimed)
- 5 proposed oil and/or gas well pads and associated roads and utility corridors
- Approximately 87 miles of existing roads
- Numerous existing and proposed utility ROWs
- Active wildlife and livestock grazing; the spatial analysis area is within four grazing allotments:
    - Blanco Trading Post (Allotment No. 5081): This allotment is permitted for grazing by 177 head of cattle from November through June each year.
    - Kimbeto Community (Allotment No. 6013): This allotment is permitted for year-round grazing by 324 head of cattle and 1,554 sheep, and grazing by 15 horses from August through October each year.
    - Largo Community (Allotment No. 5083): This allotment is permitted for year-round grazing by 145 head of cattle and 596 sheep.
    - Otis Community (Allotment No. 6011): This allotment is permitted for year-round grazing by 1,178 sheep.

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.

3.5.3. Impacts from Alternative B (Good Times P25 Action Alternative)

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and the alternative action, with the following exceptions:

- Under the alternative action, there would be slightly less vegetation disturbance than under the proposed action. Under the alternative action, there would be 1.1 fewer acres of direct vegetation removal, and 0.5 fewer acres of long-term vegetation removal than under the proposed action. Therefore, there would be slightly less habitat disturbance under the alternative action than under the proposed action.
- Under the alternative action, there would be slightly less initial and long-term habitat fragmentation than under the proposed action. Under the alternative action, there would be 1,297 linear feet (0.2 mile) less of initial habitat fragmentation, and 1,297 linear feet (0.2) less of long-term habitat fragmentation.

Cumulative Impacts

Cumulative impacts would be similar under the proposed and alternative projects, with the exception of the differences in the projects' Direct and Indirect Impacts.

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, 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, several BLM SSS have the potential to occur within the proposed and alternative 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 and alternative project areas. The SSS with the potential to occur within the proposed and alternative project areas are as follows:

- Aztec gilia (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat “zone” (BLM 2013a), but only marginal habitat present. No individuals identified during transect surveys of proposed and alternative project areas.
- Brack’s fishhook cactus (BLM Sensitive and SMS): within BLM-FFO-designated potential habitat “zone” (BLM 2013a). Seventy-two individuals identified during transect surveys of proposed and alternative project areas.
- Bendire’s thrasher (BLM Sensitive): potential foraging and nesting habitat available.
- Ferruginous hawk (BLM Sensitive and SMS): potential foraging habitat available.
- Golden eagle (BLM SMS): potential foraging habitat available.
- Pinyon jay (BLM Sensitive): potential foraging and nesting habitat available.

3.6.2. Impacts from Alternative A (Proposed Action)

Direct and Indirect Impacts

Aztec Gilia and Brack’s Fishhook Cactus

The proposed projects would result in the disturbance of up to15.9 acres of Aztec gilia/Brack’s fishhook cactus habitat. Of this, 3.3 acres would remain unvegetated and in use by project personnel throughout the lifetime of the proposed projects. The remaining 12.6 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 portion of the proposed access road corridors that was 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 area following interim reclamation, they could be killed during the clearing-and-recontouring phase of final reclamation.

Aztec Gilia
No Aztec gilia were identified during the surveys; therefore, 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 surveys could be destroyed by the proposed projects.

Brack's Fishhook Cactus
The five Brack's fishhook cacti identified during the Escrito A28 survey are located outside of the proposed Escrito A28 project impact area; therefore, no direct impacts to individuals are anticipated as a result of the proposed Escrito A28 project. During the construction phase of the proposed Escrito A28 project, a temporary fence would be placed around these five Brack's fishhook cacti.

Under BLM-FFO guidance (BLM 2014b) and following BLM-FFO protocol (BLM 2013b), the 35 cacti identified within the proposed Escrito M30 project area would be transplanted by Encana. Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the proposed Escrito M30 project on these Brack's fishhook cacti is not yet known.

Bendire's Thrasher and Pinyon Jay

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

Ferruginous Hawk and Golden Eagle

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).

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]).

3.6.3. Impacts from Alternative B (Good Times P25 Action Alternative)

Direct and Indirect Impacts

Direct and indirect impacts would be similar under the proposed action and the alternative action, with the following exceptions:

- Under the alternative action, there would be fewer acres of vegetative disturbance for SSS; these differences are described in detail in Section 3.5.2 (Wildlife – Impacts from the Alternative Good Times P25 Action – Direct and Indirect Impacts).
- Initial and long-term habitat fragmentation for wildlife SSS would be less for the alternative action. These differences are described in detail in Section 3.5.2 (Wildlife – Impacts from the Alternative Good Times P25 Action – Direct and Indirect Impacts).

- Under BLM-FFO guidance (BLM 2014b) and following BLM-FFO protocol (BLM 2013b), the 32 Brack's fishhook cacti identified within the Alternative Good Times P25 project area would be transplanted by Encana. Because the success of transplanting these individuals cannot be determined for several years, the direct impacts of the Alternative Good Times P25 project on these cacti is not yet known.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and alternative action, with the exception of the differences in the proposed action and alternative action's Direct and Indirect 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: PaleoIndian (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 documented, 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 and alternative actions were 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 A28

The Class III inventory discovered one cultural site and identified four previously recorded sites within the APE. Two of the cultural site are not recommended as eligible for nomination to the NRHP, two of the cultural sites are recommended as eligible for nomination to the NRHP, and one of the cultural sites would need additional data to determine eligibility for nomination to the NRHP (LAC Report 2012-1z [2014a]; BLM 2014(III)013F). No TCPs are known to exist within or adjacent to the APE.

Escrito M30

The Class III inventory identified two cultural sites within the APE. These two cultural sites are recommended as eligible for nomination to the NRHP (LAC Report 2012-1eee [2014b]; BLM 2014(III)059F). No TCPs are known to exist in the APE.

Alternative B (Good Times P25)

The Class III inventory identified one cultural site within the APE. This cultural site is recommended as eligible for nomination to the NRHP (LAC Report 2012-1eee-2 [2014c]; BLM 2014(III)059F). No TCPs are known to exist in the APE.

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

3.7.3. Impacts from Alternative B (Good Times P25 Action Alternative)

It is anticipated that direct, indirect, and cumulative impacts would be similar under the proposed action and alternative action.

3.8. Livestock

3.8.1. Affected Environment

Alternative A (Proposed Project Areas)

Escrito A28

The proposed project area is located in the Largo Community, Allotment No. 5083. The vegetation communities within the allotment are sagebrush shrubland, piñon-juniper woodland, and badlands. The allotment has a grazing authorization that permits 145 head of cattle and 596 sheep with a year-round grazing period. 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.

Escrito M30

The proposed project area is located in the Blanco Trading Post, Allotment No. 5081, and Kimbeto Community, Allottment No. 6013. The vegetation communities within the allotments are sagebrush shrubland, piñon-juniper woodland, and badlands.

- Blanco Trading Post: The allotment has a grazing authorization that permits 177 head of cattle with a November through June grazing period each year. The term grazing authorization permits the utilization of 1,014 active AUMs of forage for cattle. The allotment is 10,586 acres and consists of 72-percent BLM-authorized AUMs. The average rangeland carrying capacity for the allotment is 10.4 acres per AUM. The proposed well pad (including construction zone) and northern half of the proposed access road and pipeline tie are located within this allotment.

- Kimbeto Community: The allotment has a grazing authorization that permits 324 head of cattle and 1,554 sheep with a year-round grazing period and 15 horses with an August through October grazing period each year. The term grazing authorization permits the utilization of 2,931 active AUMs of forage for cattle, 162 active AUMs of forage for horses, and 3,220 active AUMs of forage for sheep. The allotment is 100,495 acres and consists of 100-percent BLM-authorized AUMs. The average rangeland carrying capacity for the allotment is 34.3 acres per AUM for cattle, 620.3 acres per AUM for horses, and 31.2 acres per AUM for sheep. The southern half of the proposed access road and pipeline tie are located within this allotment

The proposed pipeline tie would cross an existing fence line

Alternative B (Good Times P25 Project Area)

The alternative project area is located in the Blanco Trading Post and Kimbeto Community allotments. The alternative well pad (including construction zone) and northern half of the alternative access road and pipeline tie are located within the Blanco Trading Post Allotment. The southern half of the alternative access road and pipeline tie are located within the Kimbeto Community Allotment.

The alternative pipeline tie would cross an existing fence line at the same location as the proposed Escrito M30 pipeline tie.

3.8.2. Impacts from Alternative A (Proposed Action)

Direct and Indirect Impacts

The proposed projects would result in the surface disturbance of 15.9 acres within the Largo Community, Blanco Trading Post, and Kimbeto Community allotments. The impacts to these allotments would consist of the following:

- Largo Community:
    - Cattle: The estimated short-term impact to range carrying capacity would be a loss of 0.2 AUM (assuming an average rangeland carrying capacity of 28.5 acres per AUM and a disturbance area of 5.9 acres). After successful interim reclamation, the long-term-loss would be less than 0.1 AUM (assuming an average rangeland carrying capacity of 28.5 acres per AUM and a long-term working area of 1.4 acres).
    - Sheep: The estimated short-term impact to range carrying capacity would be a loss of 0.2 AUM (assuming an average rangeland carrying capacity of 34.8 acres per AUM and a disturbance area of 5.9 acres). After successful interim reclamation, the long-term-loss would be less than 0.1 AUM (assuming an average rangeland carrying capacity of 34.8 acres per AUM and a long-term working area of 1.4 acres).
- Blanco Trading Post: The estimated short-term impact to range carrying capacity would be a loss of 1.3 AUM (assuming an average rangeland carrying capacity of 10.4 acres per AUM and a disturbance area of 8.2 acres). After successful interim reclamation, the long-term-loss would be 0.2 AUM (assuming an average rangeland carrying capacity of 10.4 acres per AUM and a long-term working area of 1.9 acres).
- Kimbeto Community:
    - Cattle: The estimated short-term impact to range carrying capacity would be a loss of 0.1 AUM (assuming an average rangeland carrying capacity of 34.3 acres per AUM and a disturbance area of 1.8 acres). After successful interim reclamation, there would be no long-term-loss.
    - Sheep: The estimated short-term impact to range carrying capacity would be a loss of 0.1 AUM (assuming an average rangeland carrying capacity of 31.2 acres per AUM and a disturbance area of 1.8 acres). After successful interim reclamation, there would be no long-term-loss.
    - Horse: The estimated short-term impact to range carrying capacity would be a loss of less than 0 AUM (assuming an average rangeland carrying capacity of 620.3 acres per AUM and a disturbance area of 1.8 acres). After successful interim reclamation, there would be no long-term-loss.

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, Blanco Trading Post, and Kimbeto Community allotments. Within these allotments, the following existing and reasonably foreseeable disturbances are present:

- Several existing utility corridors
- Largo Community:
    - 75 active oil and/or gas wells and associated well pads
    - 79 inactive oil and/or gas wells and associated well pads (some reclaimed)
    - 14 proposed oil and/or gas wells and associated well pads, roads, and utility corridors
    - 176 miles of roads (including U.S. Highway 550)
- Blanco Trading Post:
    - 41 active oil and/or gas wells and associated well pads
    - 27 inactive oil and/or gas wells and associated well pads (some reclaimed)
    - 2 proposed oil and/or gas wells and associated well pads, roads, and utility corridors
    - 53 miles of roads (including U.S. Highway 550 and State Highway 57)
- Kimbeto Community:
    - 61 active oil and/or gas wells and associated well pads
    - 28 inactive oil and/or gas wells and associated well pads (some reclaimed)
    - 2 proposed oil and/or gas wells and associated well pads, roads, and utility corridors
    - 274 miles of roads (including State Highway 57)

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

3.8.3. Impacts from Alternative B (Good Times P25 Action Alternative)

Direct and Indirect Impacts

Impacts would be similar under the proposed action and alternative action, with the following exceptions:

- Surface disturbance within the Blanco Trading Post Allotment would be 7.6 acres. The estimated short-term impact to range carrying capacity would be a loss of 0.7 AUM (assuming an average rangeland carrying capacity of 10.4 acres per AUM and a disturbance area of 7.6 acres). After successful interim reclamation, the long-term-loss would be 0.1 AUM (assuming an average rangeland carrying capacity of 10.4 acres per AUM and a long-term working area of 1.4 acres).

Therefore, under the alternative action, surface disturbance within the Blacno Trading Post Allotment would be 0.6 fewer acres than under the proposed action. There would be a short-term loss of 0.6 fewer AUMs than under the proposed action. Long-term AUM loss would be similar under the proposed and alternative action.

- Surface disturbance within the Kimbeto Community Allotment would be 1.3 acres.
    - Cattle: 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 34.3 acres per AUM and a disturbance area of 1.3 acres). After successful interim reclamation, there would be no long-term-loss.
    - Sheep: 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 31.2 acres per AUM and a disturbance area of 1.3 acres). After successful interim reclamation, there would be no long-term-loss.
    - Horse: 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 620.3 acres per AUM and a disturbance area of 1.3 acres). After successful interim reclamation, there would be no long-term-loss.

Therefore, under the alternative action, surface disturbance within the Kimbeto Community Allotment would be 0.5 fewer acres than under the proposed action. Short-term AUM loss would be similar under the proposed and alternative action.

Cumulative Impacts

Cumulative impacts would be similar under the proposed action and alternative action, with the exception of the differences in the proposed action and alternative action's Direct and Indirect Impacts.

4. SUPPORTING INFORMATION

4.1. Tribes, Individuals, Organizations, or Agencies Consulted

The following tribes, individuals, organizations, and/or agencies were consulted during the development of this EA:

- Brenda Linster, Encana
- Jessica Gregg, Encana
- Jason Eckman, Encana
- Steven Merrell, Encana
- Fred Harden, LAC
- Steve Fuller, LAC

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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- Stanley Dykes, Noxious Weed Coordinator, BLM-FFO
- John Hansen, Wildlife Biologist, BLM-FFO
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- Dale Wirth, Branch Chief, Range & Multiple Resources, BLM-FFO

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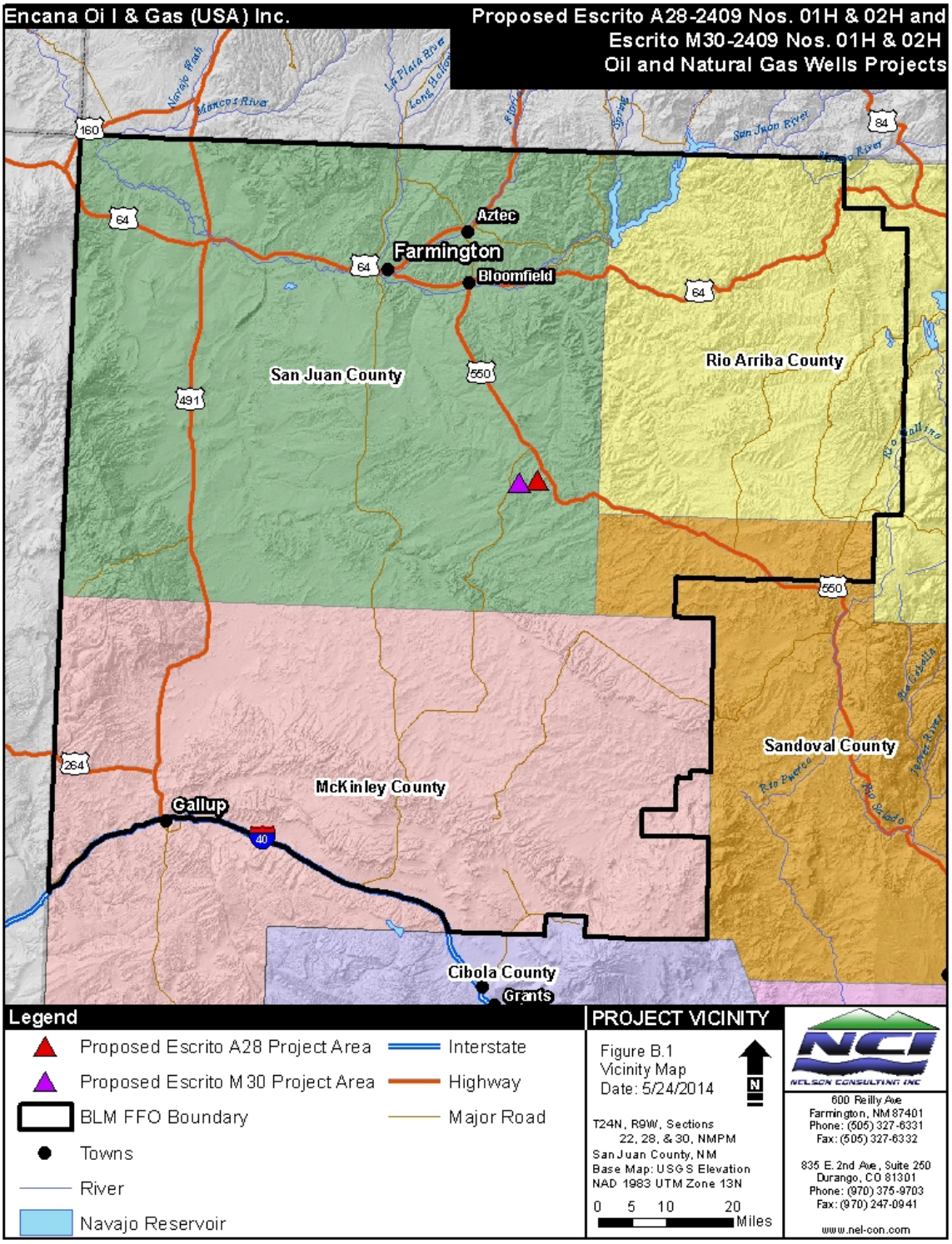
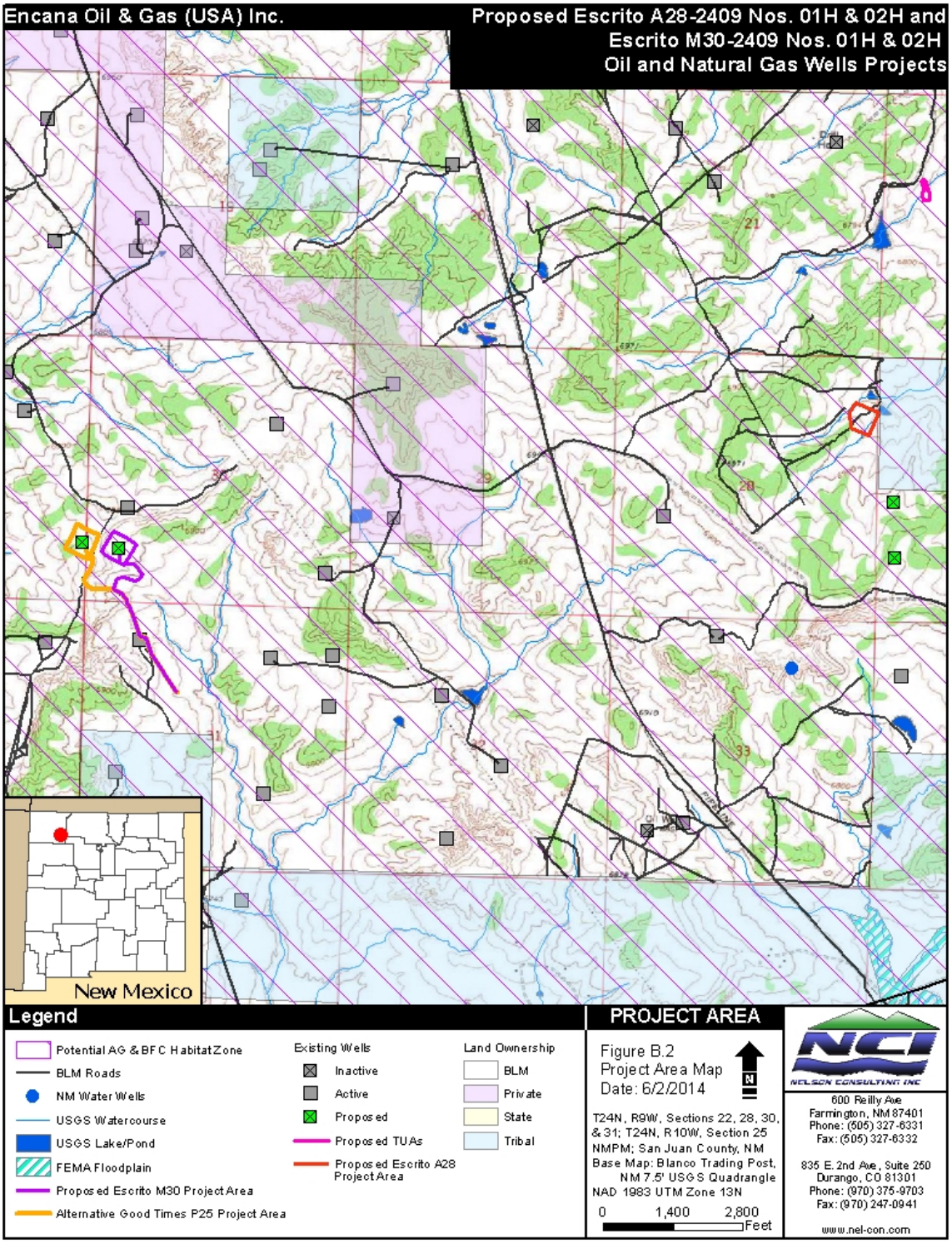
APPENDIX A. MAPS

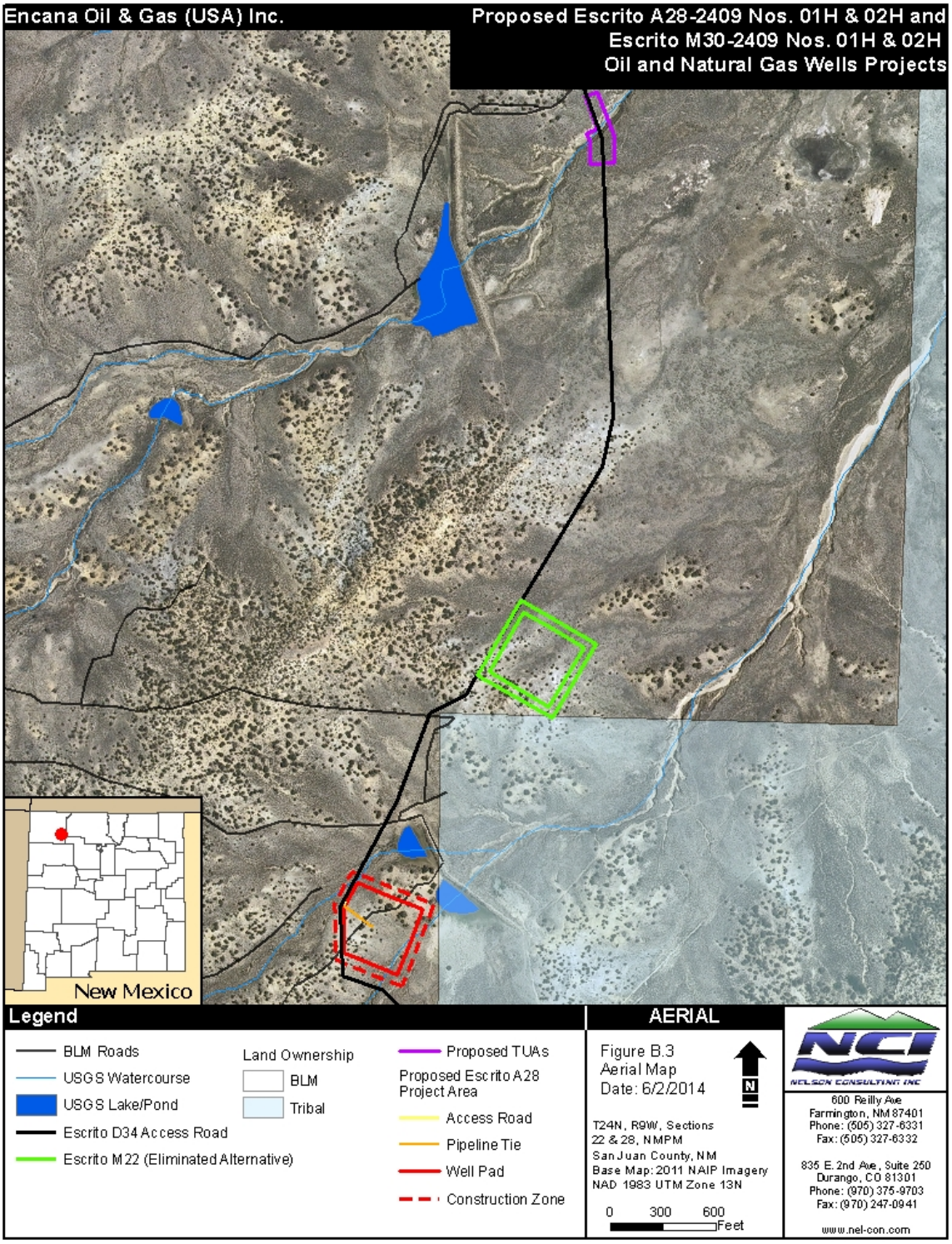
A.1. Vicinity Map



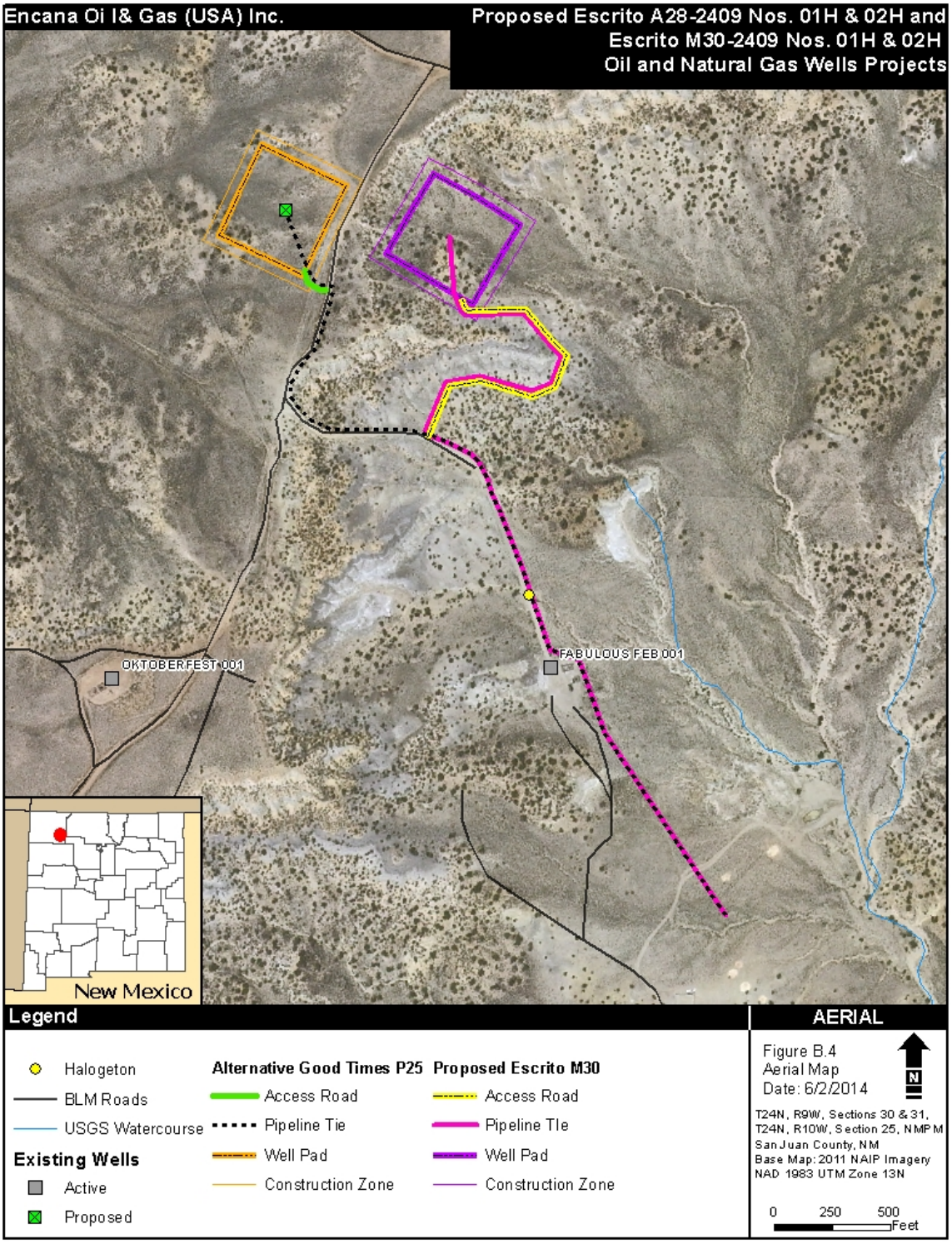
A.2. Project Area Map



A.3. Aerial Map – Escrito A28



A.4. Aerial Map – Escrito M30 and Alternative Good Times P25



APPENDIX B. BIOLOGICAL SURVEY REPORTS

APPENDIX C. PLATS

C.1. Escrito A28

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First Street, 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 Drive, 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 Drive
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
	5890 / 97232	BISTI LOWER - GALLUP / BASIN MANCOS

[4]Property Code	[5]Property Name	[6]Well Number
	ESCRITO A28-2409	01H

[7]OGRID No.	[8]Operator Name	[9]Elevation
282327	ENCANA OIL & GAS (USA) INC.	6861'

[10] Surface Location

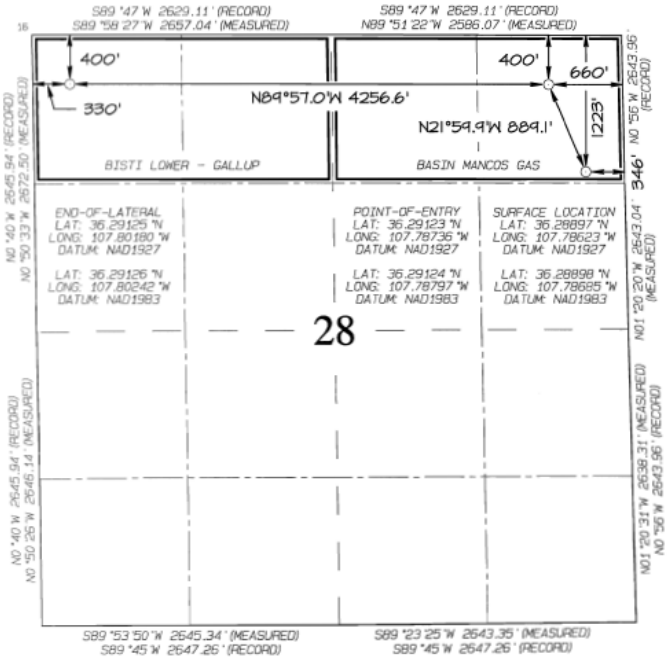
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	28	24N	9W		1223	NORTH	346	EAST	SAN JUAN

[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
D	28	24N	9W		400	NORTH	330	WEST	SAN JUAN

[12]Dedicated Acres	[13]Joint or Infill	[14]Consolidation Code	[15]Order No.
160.0 Acres N/2 N/2 - Section 28			

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



[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

[18] SURVEYOR CERTIFICATION

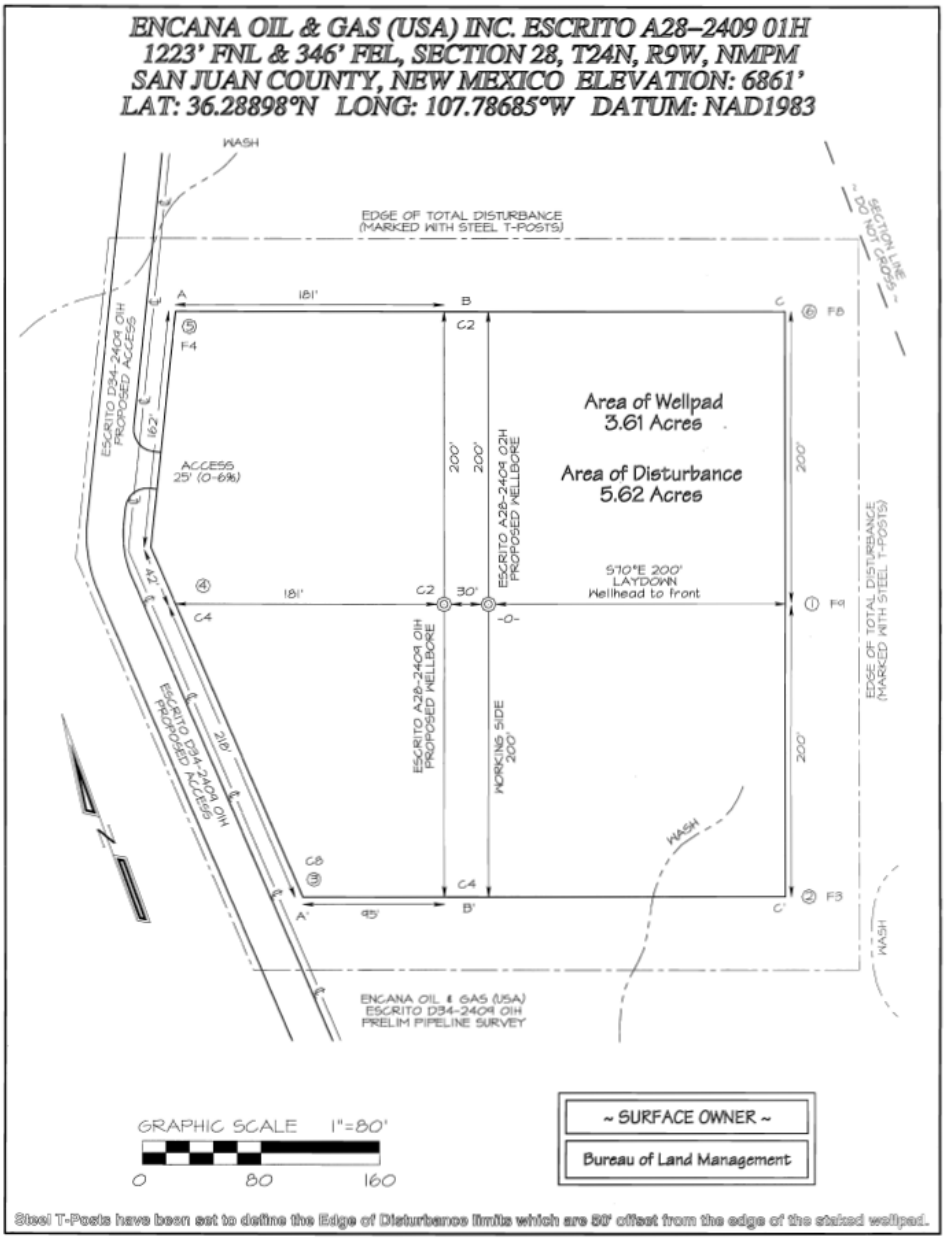
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

Date Revised: MAY 15, 2014
Survey Date: AUGUST 22, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

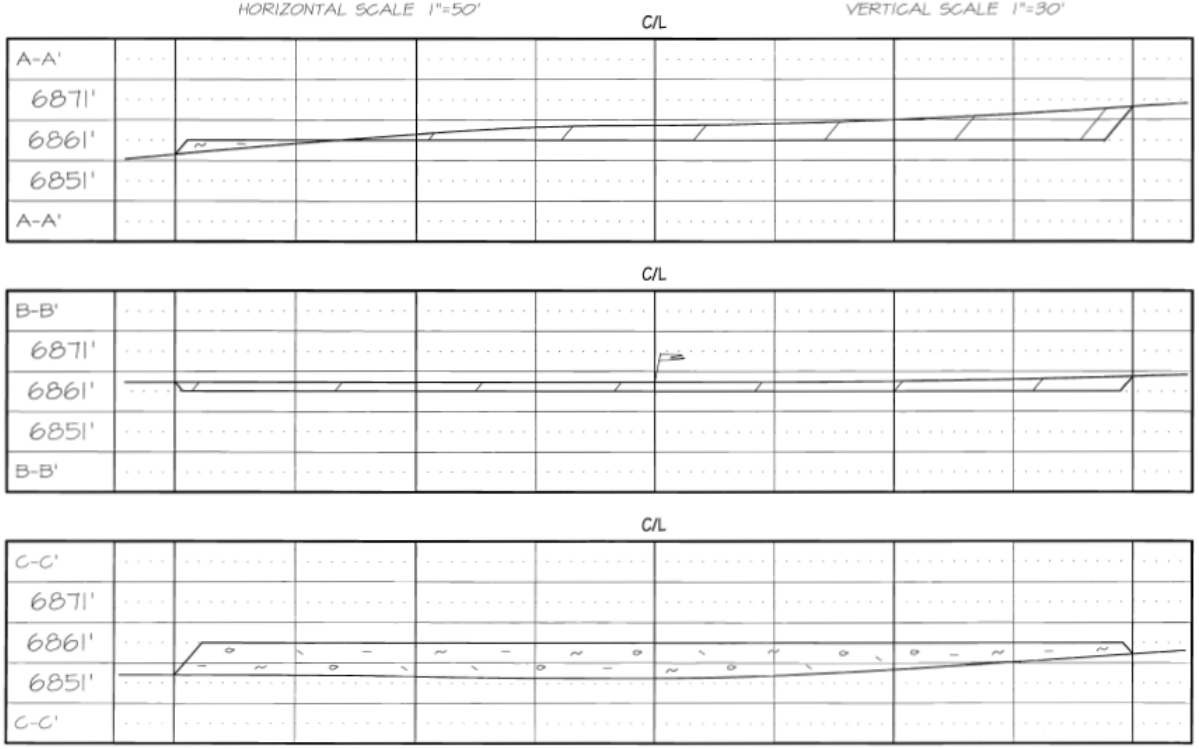


Steel T-Posts have been set to define the Edge of Disturbance limits which are 50' offset from the edge of the staked wellpad.

ENCANA OIL & GAS (USA) INC. ESCRITO A28–2409 01H
1223' FNL & 346' FEL, SECTION 28, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6861'

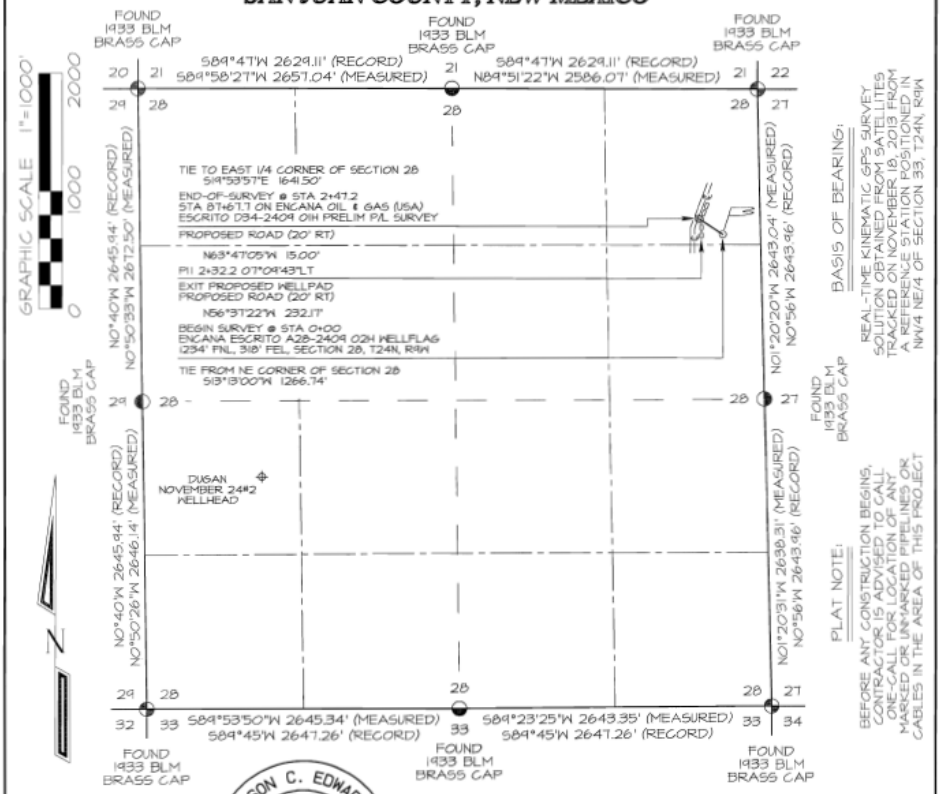
HORIZONTAL SCALE 1"=50'

VERTICAL SCALE 1"=30'



CONTRACTOR SHOULD CONTACT ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED UNDERGROUND UTILITIES OR PIPELINES ON WELLPAD AND/OR ACCESS ROAD AT LEAST TWO WORKING DAYS PRIOR TO CONSTRUCTION.

ENCANA OIL & GAS (USA) INC. ESCRITO A28-2409 02H
PROPOSED PIPELINE SURVEY LOCATED IN
NE/4 NE/4 OF SECTION 28, T24N, R9W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
0+00 TO 2+47.2	247.2 FT / 15.0 RODS

I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.

JASON C. EDWARDS Date: May 15, 2014
Jason C. Edwards
New Mexico LS #15269

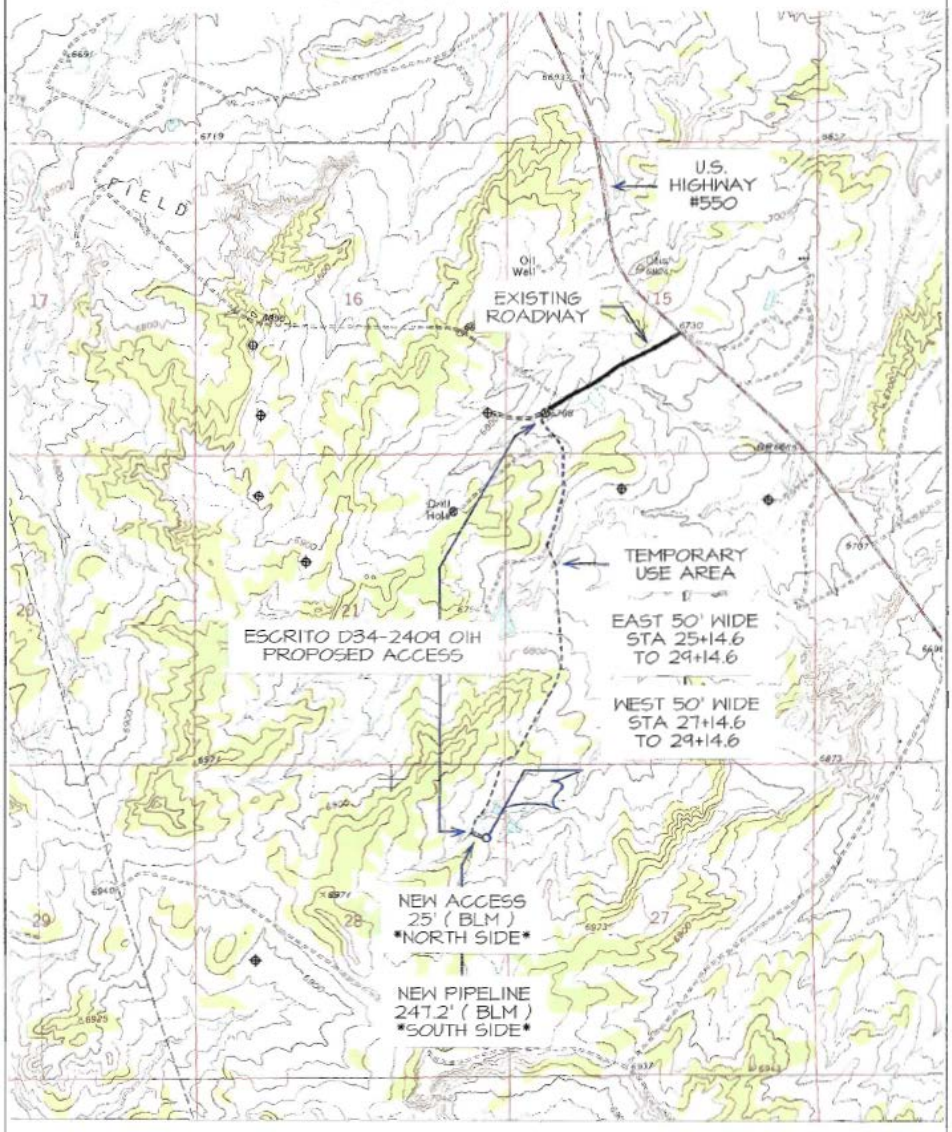
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1700
DENVER, CO 80202

N C E
SURVEYS, INC.

Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)

CHECKED: JCE
DRAWN BY: RAP
SHEET 4 OF 6
FILENAME: 2412BA00

ENCANA OIL & GAS (USA) INC. ESCRITO A28-2409 02H
1234' FNL & 318' FEL, SECTION 28, T24N, R9W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO



NAME OF TOPO : BLANCO TRADING POST ⊕ PRODUCING WELL ⊗ PLUGGED & ABANDONED WELL

C.2. Escrito M30

District I
1625 N. French Drive, Hobbs, NM 88240
Phone (575) 393-6161 Fax (575) 393-0720
District II
811 S. First Street, 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 Drive, 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 Drive
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

*API Number	*Pool Code	*Pool Name
	97232	BASIN MANCOS

*Property Code	*Property Name	*Well Number
	ESCRITO M30-2409	01H
*OGRID No.	*Operator Name	*Elevation
282327	ENCANA OIL & GAS (USA) INC.	6919'

10 Surface Location

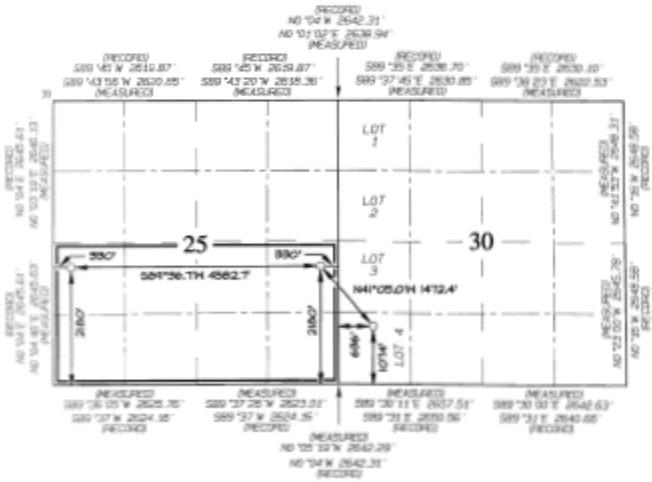
U. or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	30	24N	9W	4	1074	SOUTH	636	WEST	SAN JUAN

11 Bottom Hole Location If Different From Surface

U. or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	25	24N	10W		2180	SOUTH	330	WEST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
320.00 Acres S/2 - Section 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



END-OF-LATERAL
2180' FSL 330' FWL
SECTION 25, T24N, R10W
LAT: 36.28365 °N
LONG: 107.85524 °W
DATUM: NAD1927

LAT: 36.28366 °N
LONG: 107.85585 °W
DATUM: NAD1983

POINT-OF-ENTRY
2180' FSL 330' FEL
SECTION 25, T24N, R10W
LAT: 36.28374 °N
LONG: 107.83959 °W
DATUM: NAD1927

LAT: 36.28375 °N
LONG: 107.84031 °W
DATUM: NAD1983

SURFACE LOCATION
1074' FSL 636' FWL
SECTION 30, T24N, R9W
LAT: 36.28059 °N
LONG: 107.83641 °W
DATUM: NAD1927

LAT: 36.28070 °N
LONG: 107.83702 °W
DATUM: NAD1983

16 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

17 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.

Date Revised: APRIL 16, 2014
Date of Survey: JUNE 21, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS

Certificate Number 15269

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1625 N. French Drive, Hobbs, NM 88240
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State of New Mexico
Energy, Minerals & Natural Resources Department

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

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Revised August 1, 2011

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☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number	*Pool Code	*Pool Name
	97232	BASIN MANCOS

*Property Code	*Property Name	*Well Number
	ESCRITO M30-2409	02H
*OGRID No.	*Operator Name	*Elevation
282327	ENCANA OIL & GAS (USA) INC.	6919'

10 Surface Location

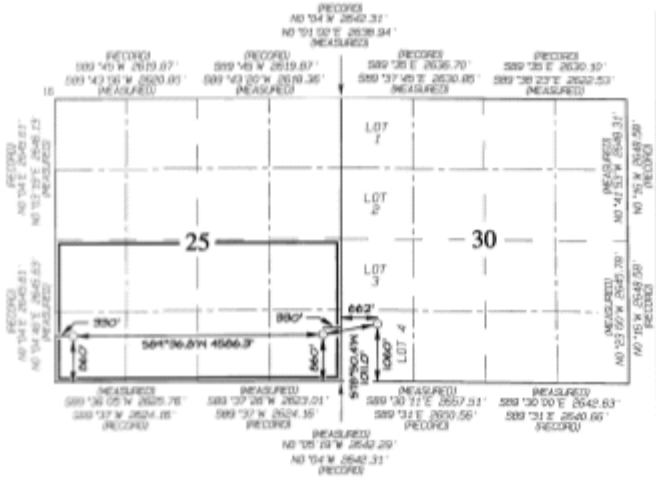
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	30	24N	9W	4	1060	SOUTH	662	WEST	SAN JUAN

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	10W		860	SOUTH	330	WEST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
320.00 Acres S/2 - Section 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



END-OF-LATERAL
860' FSL 330' FWL
SECTION 25, T24N, R10W
LAT: 36.28003°N
LONG: 107.85204°W
DATUM: NAD1927

LAT: 36.28004°N
LONG: 107.85586°W
DATUM: NAD1983

POINT-OF-ENTRY
860' FSL 330' FEL
SECTION 25, T24N, R10W
LAT: 36.28011°N
LONG: 107.81969°W
DATUM: NAD1927

LAT: 36.28013°N
LONG: 107.84030°W
DATUM: NAD1983

SURFACE LOCATION
1060' FSL 662' FWL
SECTION 30, T24N, R9W
LAT: 36.28065°N
LONG: 107.83532°W
DATUM: NAD1927

LAT: 36.28066°N
LONG: 107.83923°W
DATUM: NAD1983

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

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.

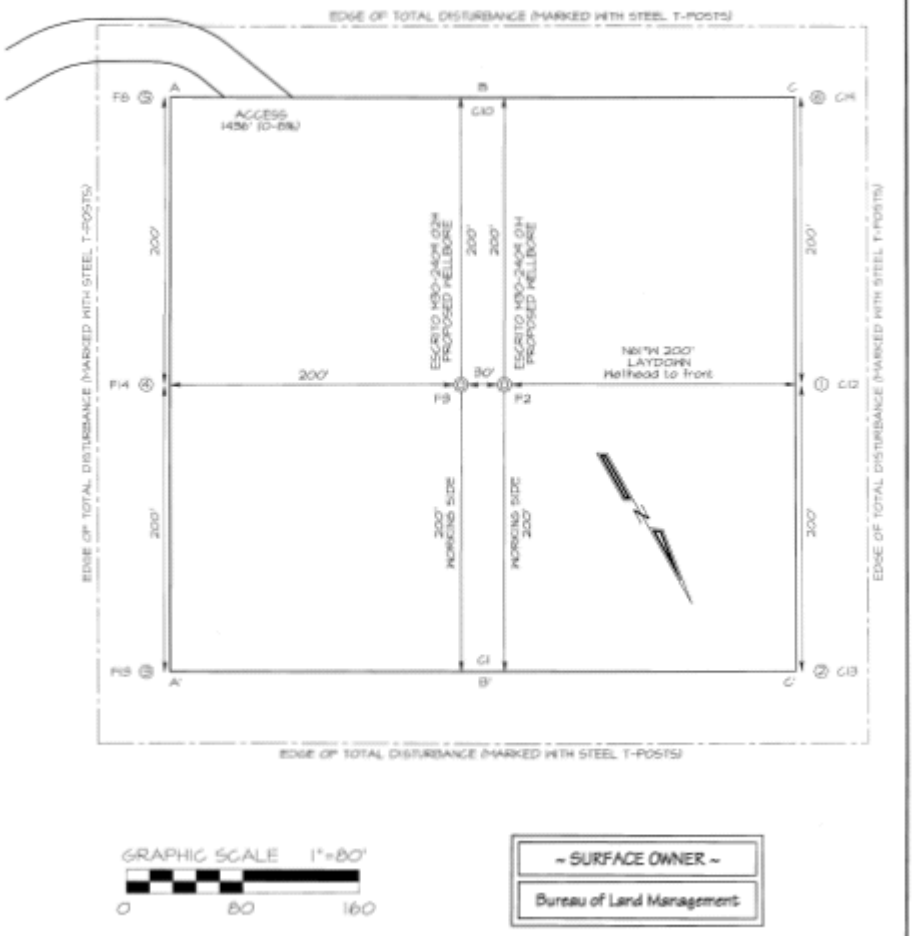
Date Revised: APRIL 15, 2014
Date of Survey: JUNE 21, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

ENCANA OIL & GAS (USA) INC. ESCRITO M30–2409 01H
1074' FSL & 636' FWL, SECTION 30, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6919'
LAT: 36.28070°N LONG: 107.83702°W DATUM: NAD1983



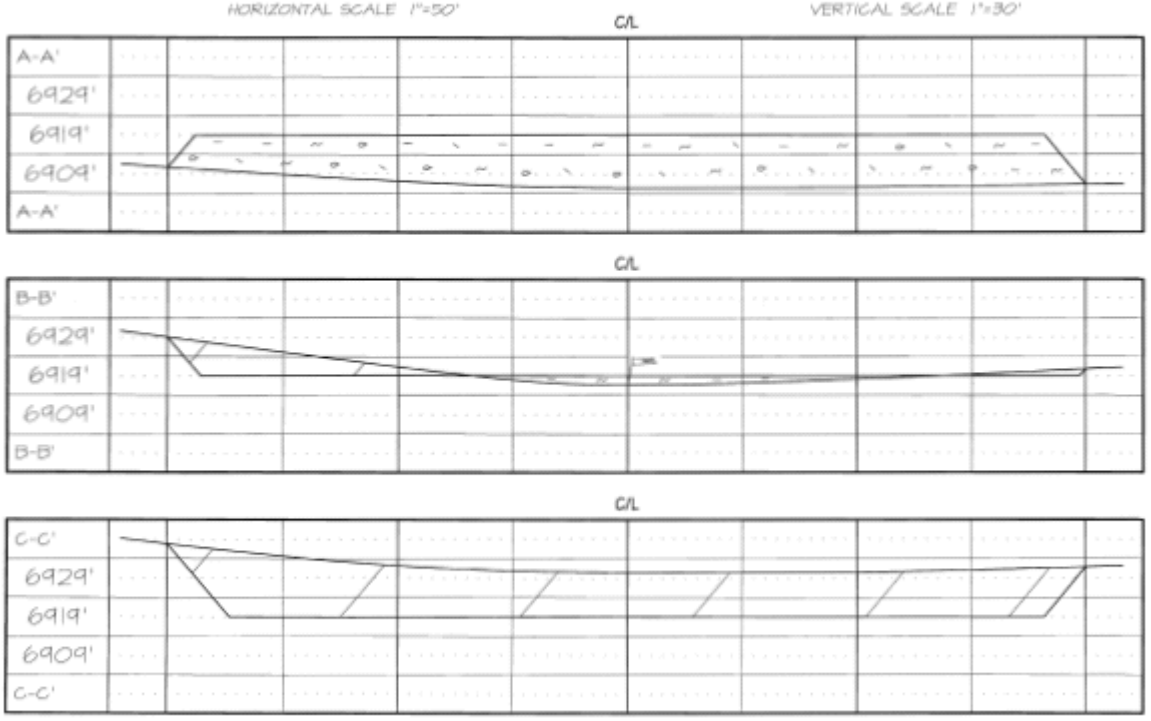
GRAPHIC SCALE 1"=80'
0 80 160

~ SURFACE OWNER ~
Bureau of Land Management

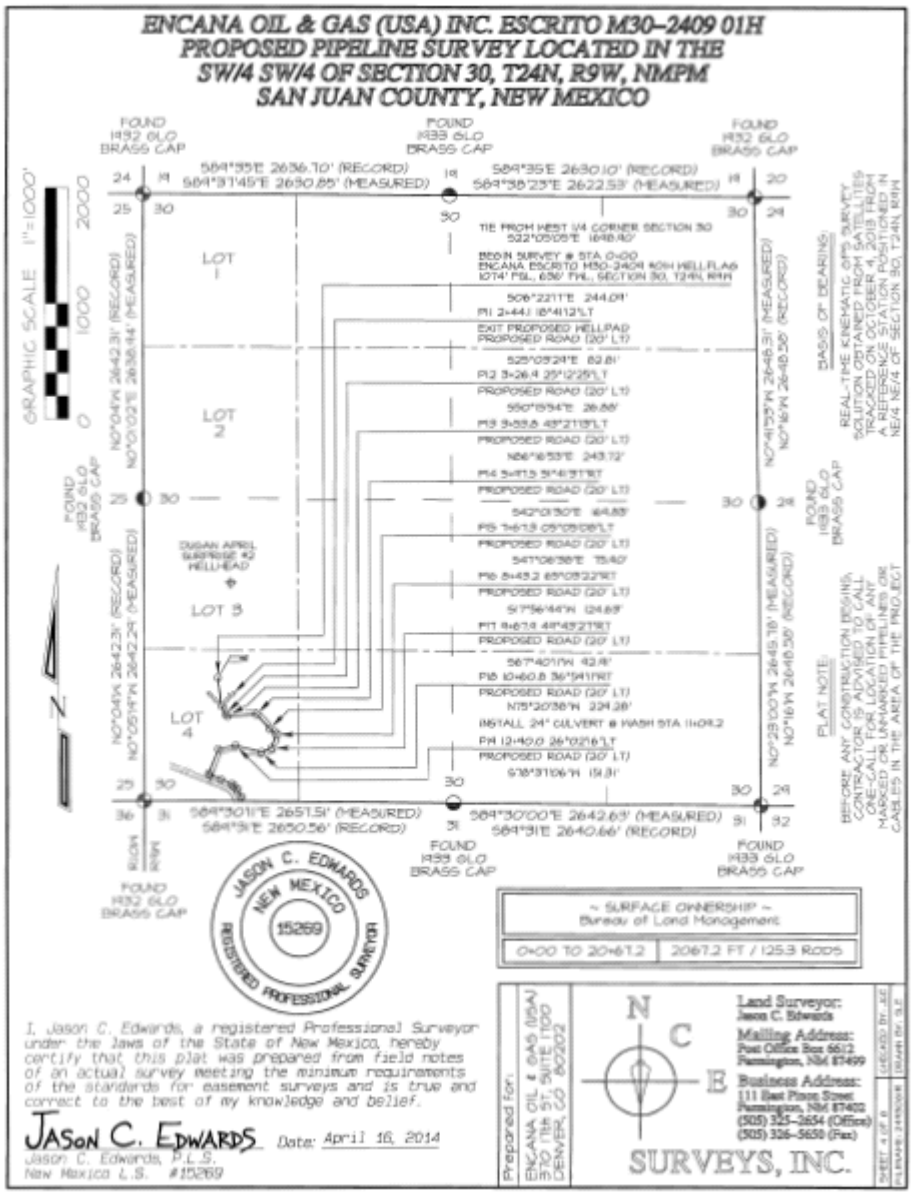
Steel T-Posts have been set to define the Edge of Disturbance Bolts which are 50' offset from the edge of the staked wellpad.

ENCANA OIL & GAS (USA) INC. ESCRITO M30–2409 01H
1074' FSL & 636' FWL, SECTION 30, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6919'

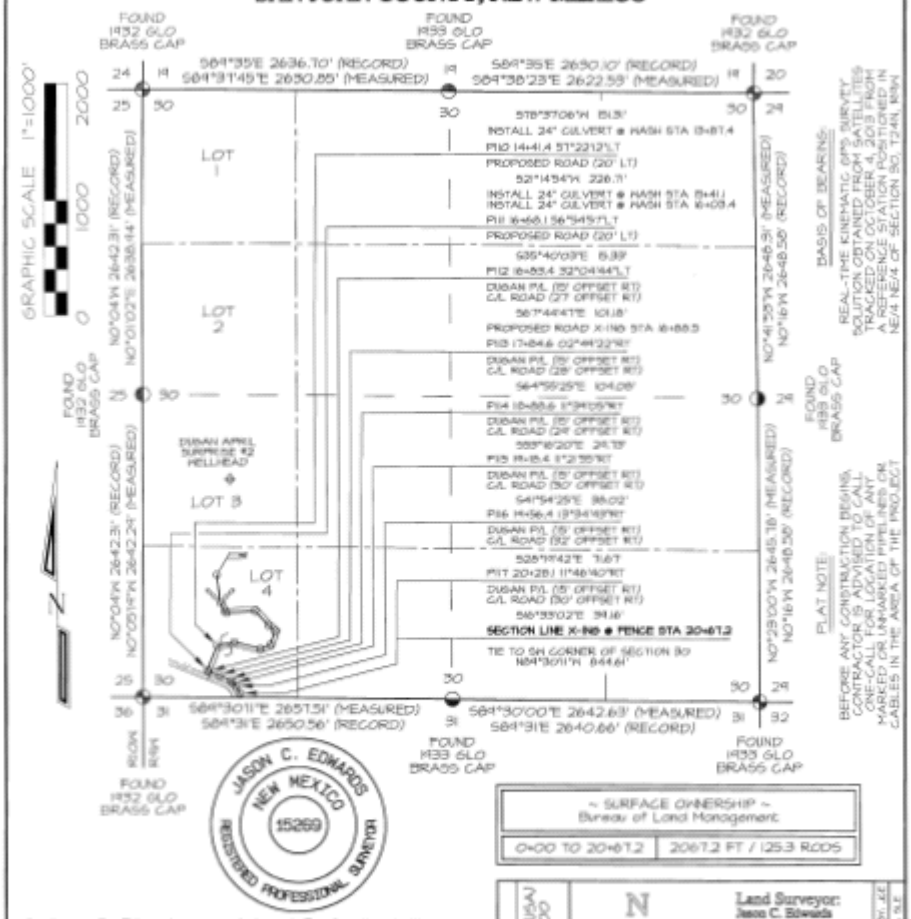
HORIZONTAL SCALE 1"=50' VERTICAL SCALE 1"=30'

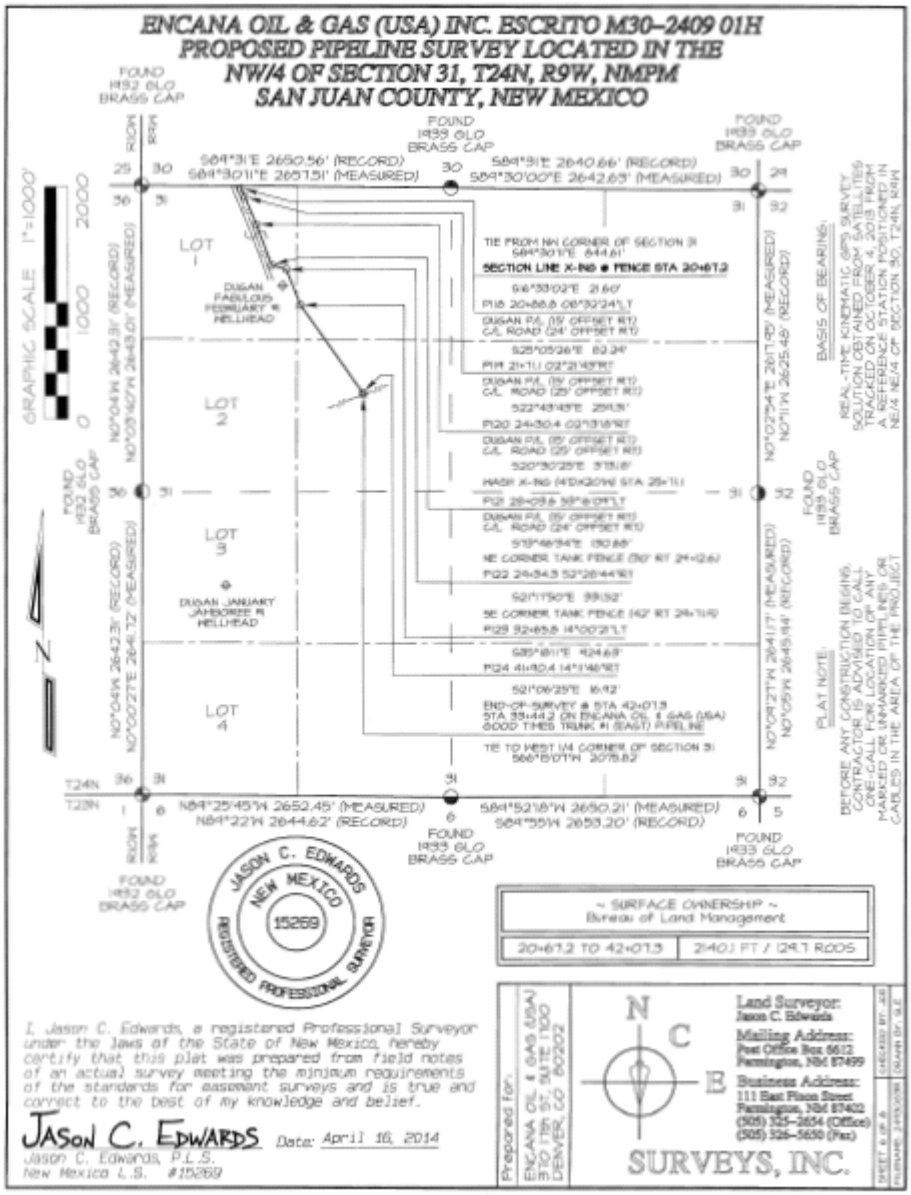


CONTRACTOR SHOULD CONTACT ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED UNDERGROUND UTILITIES OR PIPELINES ON WELLPAD AND/OR ACCESS ROAD AT LEAST TWO WORKING DAYS PRIOR TO CONSTRUCTION.


ENCANA OIL & GAS (USA) INC. ESCRITO M30-2409 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE
SW/4 SW/4 OF SECTION 30, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO
GRAPHIC SCALE 1"=1000'
LOT 1
LOT 2
LOT 3
LOT 4
DUGAN APRIL SURPRISE #2 WELLHEAD
BASIS OF BEARING:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED ON OCTOBER 4, 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NE/4 OF SECTION 30, T24N, R9W
PLAT NOTE:
BEFORE ANY CONSTRUCTION BEGINS, CONTRACTOR IS ADVISED TO CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED UTILITIES OR CABLES IN THE AREA OF THE PROJECT
~ SURFACE OWNERSHIP ~
Bureau of Land Management
0+00 TO 20+67.2
2067.2 FT / 125.3 RODS
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASON C. EDWARDS Date: April 16, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA) INC.
370 17th ST. SUITE 1700
DENVER, CO 80202
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-3654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

ENCANA OIL & GAS (USA) INC. ESCRITO M30-2409 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R9W, NMPM SAN JUAN COUNTY, NEW MEXICO




ENCANA OIL & GAS (USA) INC. ESCRITO M30-2409 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE
NW/4 OF SECTION 31, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO
GRAPHIC SCALE 1"=1000'
LOT 1
LOT 2
LOT 3
LOT 4
DUGAN FABULOUS FEBRUARY #1 WELLHEAD
DUGAN JANUARY JAMBOREE #1 WELLHEAD
BASIS OF BEARINGS:
PLAT NOTE:
~ SURFACE OWNERSHIP ~
Bureau of Land Management
20+67.2 TO 42+07.3
2140.1 FT / 129.7 RODS
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASON C. EDWARDS Date: April 16, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17TH ST. SUITE 1700
DENVER, CO 80202
Land Surveyor:
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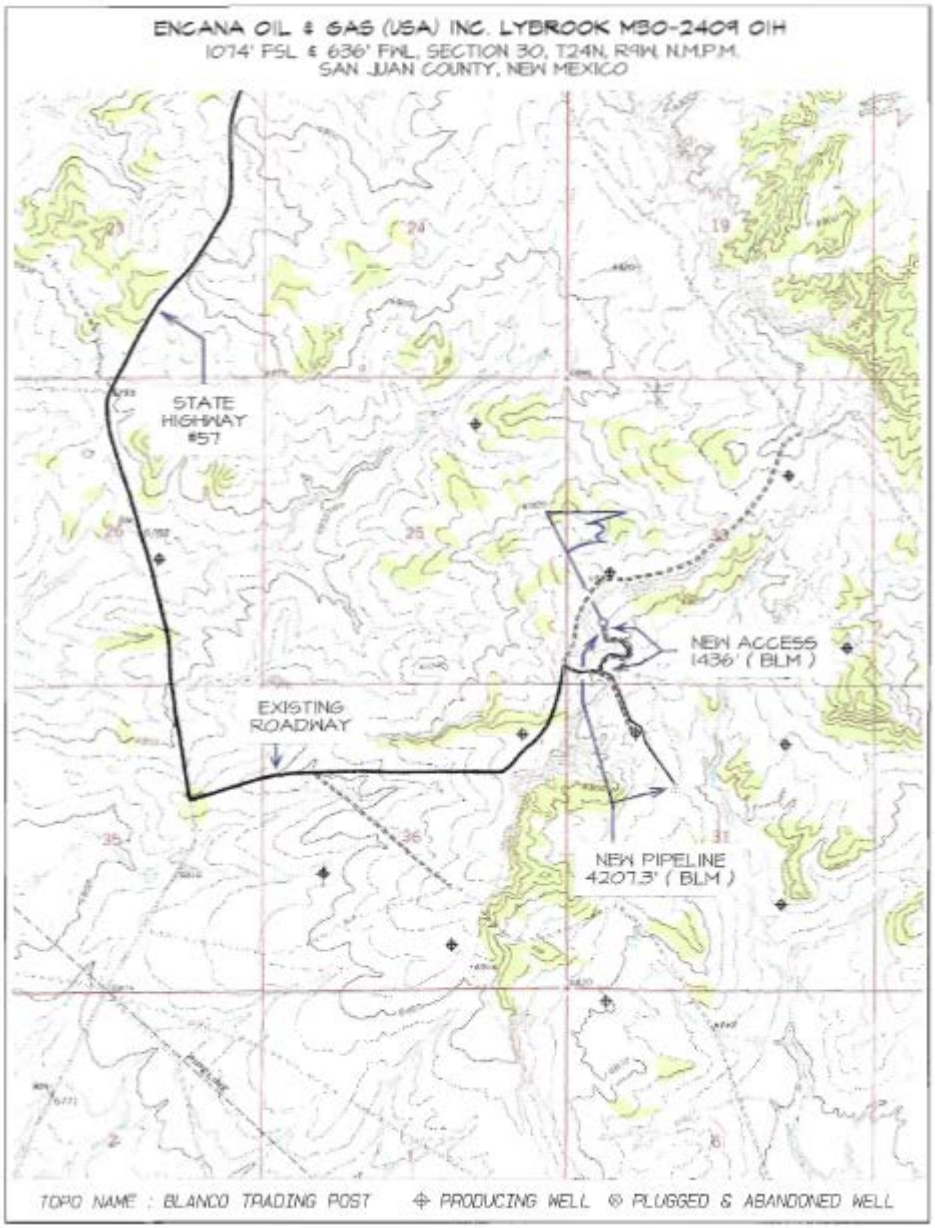
SURVEYS, INC.


ENCANA OIL & GAS (USA) INC. LYBROOK M30-2409 01H
1074' FSL & 636' FWL, SECTION 30, T24N, R9W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
STATE HIGHWAY #57
EXISTING ROADWAY
NEW ACCESS 1436' (BLM)
NEW PIPELINE 4207.3' (BLM)
TOPO NAME : BLANCO TRADING POST
PRODUCING WELL
PLUGGED & ABANDONED WELL

C.3. Alternative Good Times P25

District I
1625 N. French Drive, Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
District II
811 S. First Street, Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
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State of New Mexico
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION
1220 South St. Francis Drive
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
	GOOD TIMES P25-2410	01H

[7]OGRID No.	[8]Operator Name	[9]Elevation
282327	ENCANA OIL & GAS (USA) INC.	6947'

[10]Surface Location

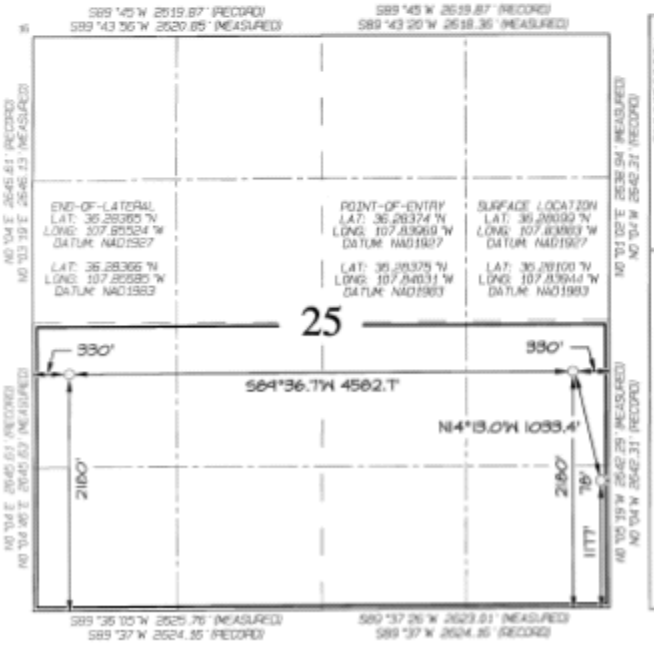
U. or Lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	25	24N	10W		1177	SOUTH	78	EAST	SAN JUAN

[11]Bottom Hole Location If Different From Surface

U. or Lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	25	24N	10W		2180	SOUTH	330	WEST	SAN JUAN

[12]Dedicated Acres	[13]Joint or Infill	[14]Consolidation Code	[15]Order No.
320.0 Acres S/2 Section 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



[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

[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.

Date Revised APRIL 17, 2014
Date of Survey: JUNE 11, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

JASON C. EDWARDS
Certificate Number 15269

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WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number	*Pool Code	*Pool Name
	97232	BASIN MANCOS

*Property Code	*Property Name	*Well Number
	GOOD TIMES P25-2410	02H

*OGRID No.	*Operator Name	*Elevation
282327	ENCANA OIL & GAS (USA) INC.	6947'

10 Surface Location

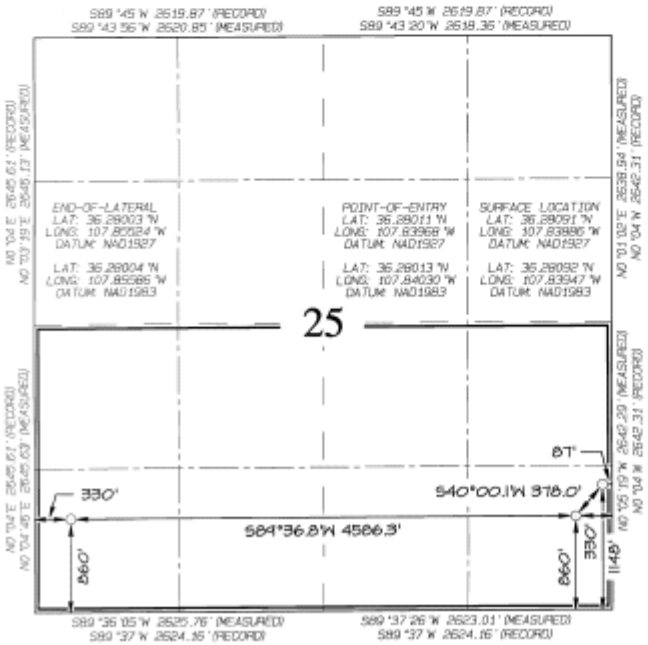
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	25	24N	10W		1148	SOUTH	87	EAST	SAN JUAN

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	25	24N	10W		860	SOUTH	330	WEST	SAN JUAN

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.
320.0 Acres S/2 Section 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



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

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.

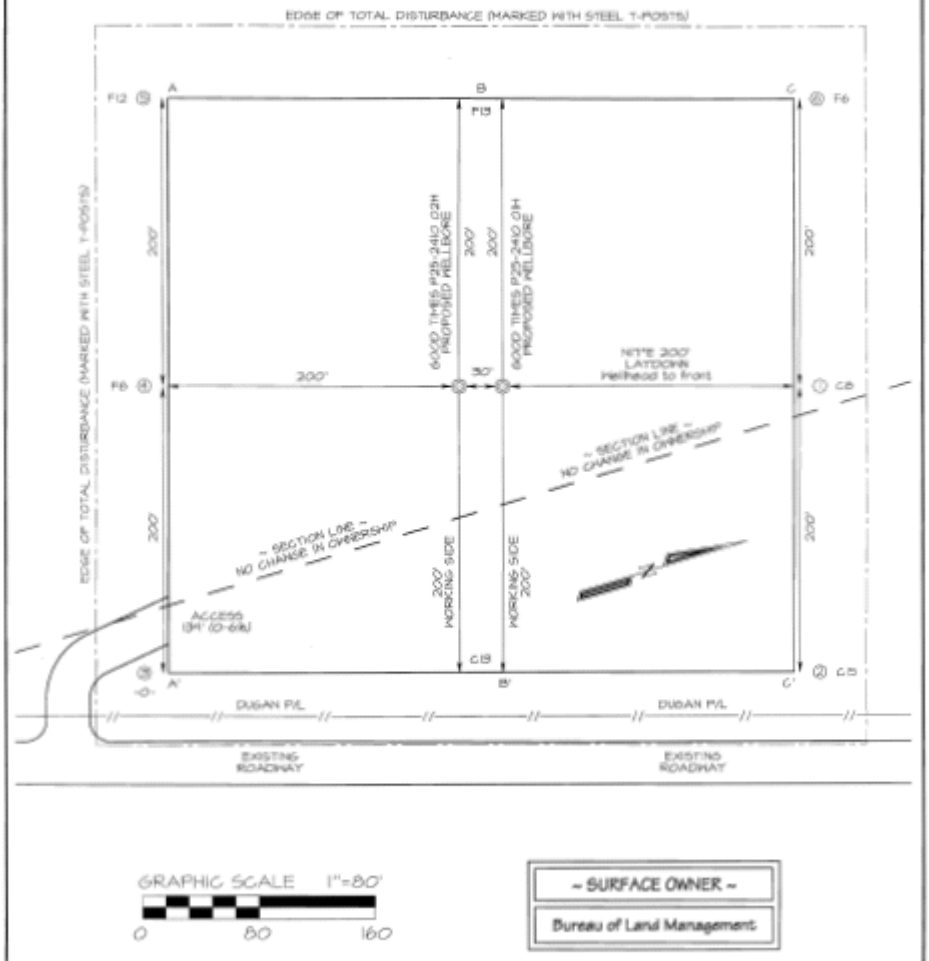
Date Revised: APRIL 21, 2014
Date of Survey: JUNE 11, 2013

Signature and Seal of Professional Surveyor

JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR

Certificate Number 15269

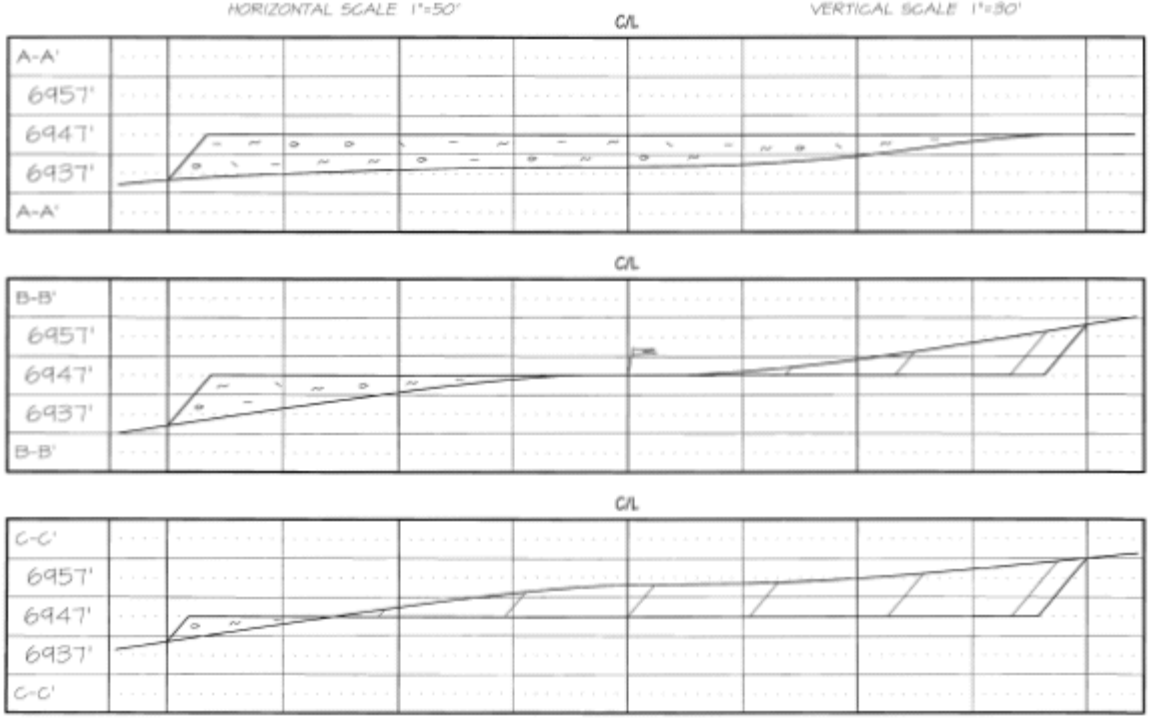
ENCANA OIL & GAS (USA) INC. GOOD TIMES P25–2410 01H
1177' FSL & 78' FEL, SECTION 25, T24N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6947'
LAT: 36.28100°N LONG: 107.83944°W DATUM: NAD1983



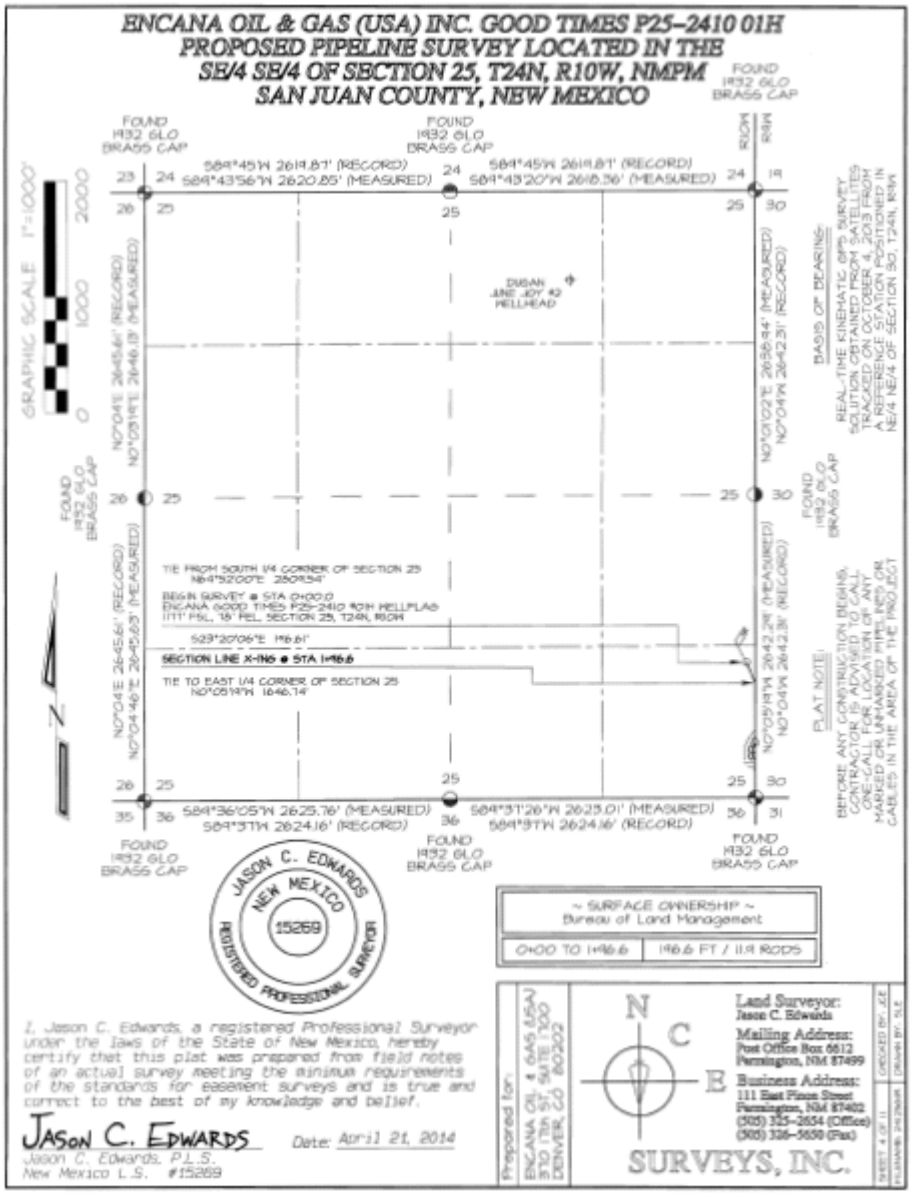
Steel T-Posts have been set to define the Edge of Disturbance limits which are 60' offset from the edge of the staked wellpad.

ENCANA OIL & GAS (USA) INC. GOOD TIMES P25–2410 01H
1177' FSL & 78' FEL, SECTION 25, T24N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO ELEVATION: 6947'

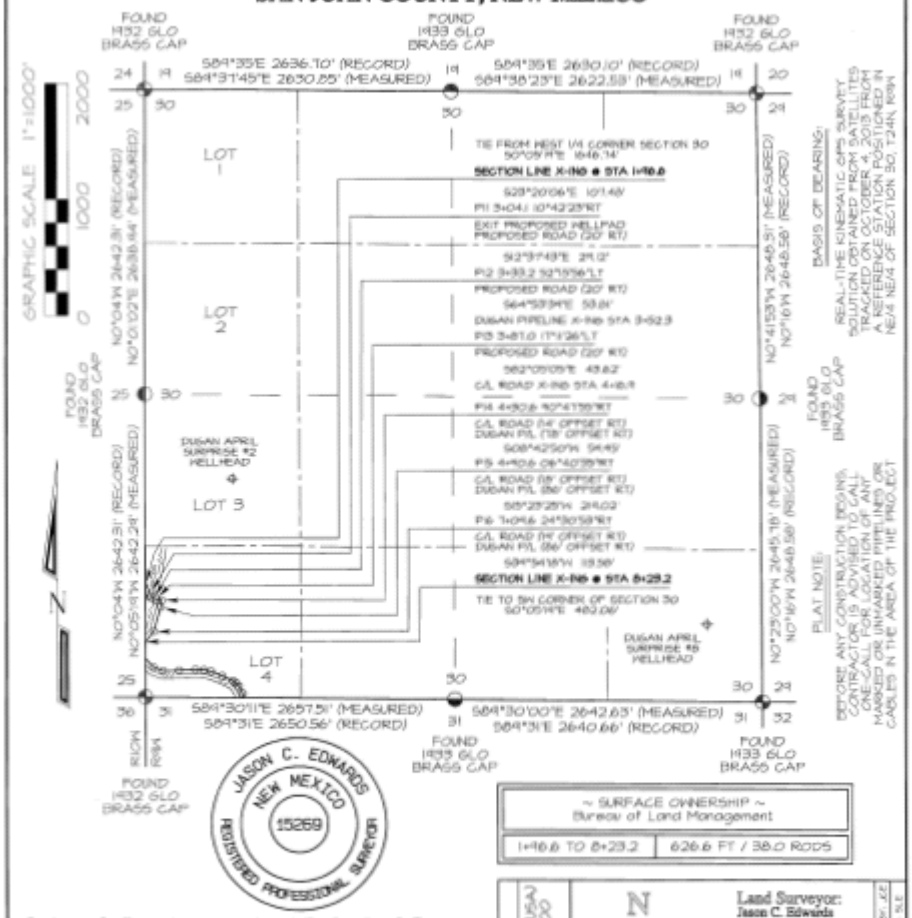
HORIZONTAL SCALE 1"=50' VERTICAL SCALE 1"=30'

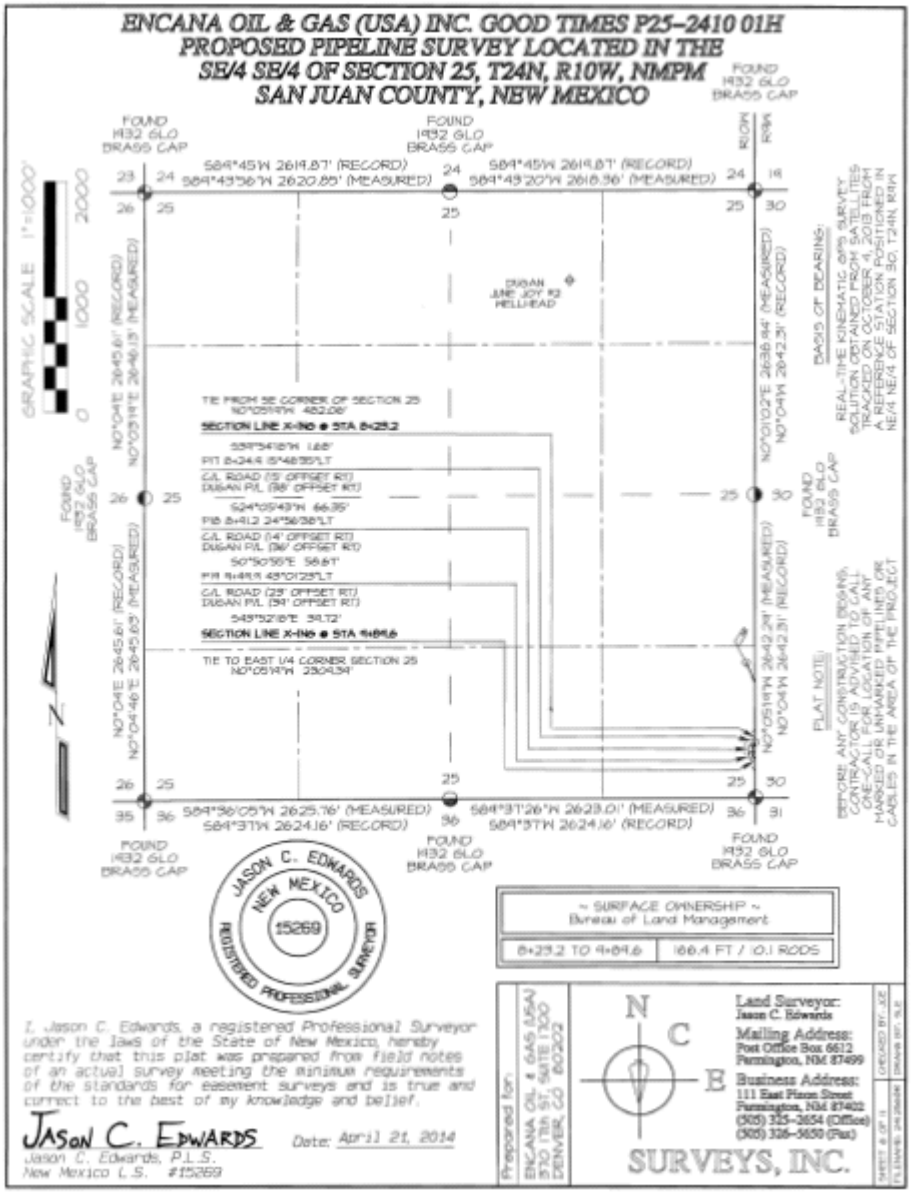


CONTRACTOR SHOULD CONTACT ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED UNDERGROUND UTILITIES OR PIPELINES ON WELLPAD AND/OR ACCESS ROAD AT LEAST TWO WORKING DAYS PRIOR TO CONSTRUCTION.

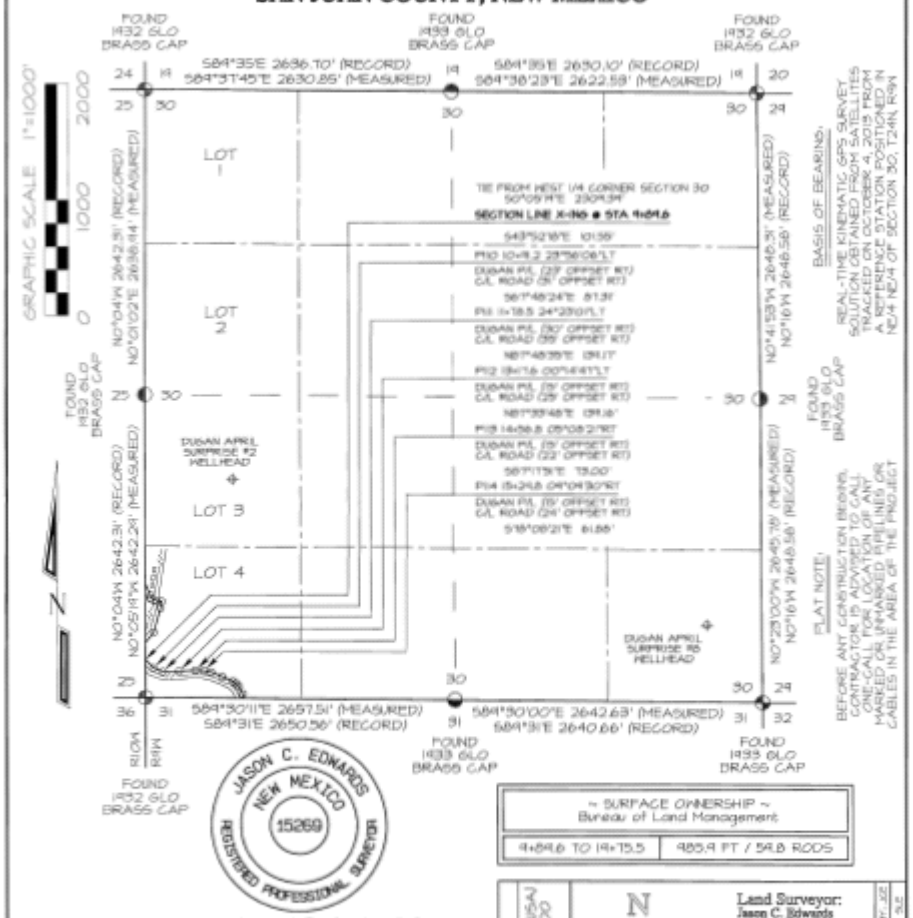

ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE
SE/4 SE/4 OF SECTION 25, T24N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO
GRAPHIC SCALE 1"=1000'
FOUND 1932 GLO BRASS CAP
S84°45'W 2619.87' (RECORD)
S84°43'56"W 2620.85' (MEASURED)
S84°45'W 2619.87' (RECORD)
S84°43'20"W 2618.36' (MEASURED)
DUGAN JANE JOY #2 WELLHEAD
N0°04'E 2645.61' (RECORD)
N0°04'46"E 2645.63' (MEASURED)
N0°01'02"E 2656.44' (MEASURED)
N0°04'W 2642.31' (RECORD)
N0°04'E 2645.61' (RECORD)
N0°04'46"E 2645.63' (MEASURED)
N0°05'19"W 2642.29' (MEASURED)
N0°04'W 2642.38' (RECORD)
TIE FROM SOUTH 1/4 CORNER OF SECTION 25
N84°52'00"E 2509.54'
BEGIN SURVEY @ STA 0+00.0
ENCANA GOOD TIMES P25-2410 #01H WELLPLAT
1117' FSL, 18' FEL, SECTION 25, T24N, R10W
S23°20'06"E 196.61'
SECTION LINE X-ING @ STA 1+96.6
TIE TO EAST 1/4 CORNER OF SECTION 25
N0°05'19"W 1646.74'
S84°36'05"W 2625.76' (MEASURED)
S84°37'W 2624.16' (RECORD)
S84°31'26"W 2623.01' (MEASURED)
S84°31'W 2624.16' (RECORD)
BASIS OF BEARINGS:
REAL-TIME KINEMATIC GPS SURVEY SOLUTION BETWEEN SATELLITES TRACKED ON OCTOBER 4, 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NE/4 OF SECTION 30, T24N, R9W
PLAT NOTE:
BEFORE ANY CONSTRUCTION BEGINS, CONTRACTOR SHOULD CONTACT LOCAL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED PIPELINES OR CABLES IN THE AREA OF THE PROJECT
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
~ SURFACE OWNERSHIP ~
Bureau of Land Management
0+00 TO 1+96.6
196.6 FT / 11.9 RODS
I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASON C. EDWARDS
Date: April 21, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST. SUITE 1700
DENVER, CO 80202
N
C
E
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.
SHEET 4 OF 11
DRAWN BY: JCE
CHECKED BY: SLE

ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R9W, NMPM SAN JUAN COUNTY, NEW MEXICO




ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE
SE/4 SE/4 OF SECTION 25, T24N, R10W, NMPM
SAN JUAN COUNTY, NEW MEXICO
FOUND 1932 GLO BRASS CAP
S84°45'W 2619.87' (RECORD)
S84°43'56"W 2620.85' (MEASURED)
S84°45'W 2619.87' (RECORD)
S84°43'20"W 2618.36' (MEASURED)
GRAPHIC SCALE 1"=1000'
DUGAN JUNE JOY #2 WELLHEAD
TIE FROM SE CORNER OF SECTION 25
SECTION LINE X-ING @ STA 8+25.2
PIT 8+24.4 15'48'35"LT
C/L ROAD (15' OFFSET RT)
DUGAN P/L (98' OFFSET RT)
S24°05'43"W 66.35'
PIB 8+91.2 24°56'38"LT
C/L ROAD (14' OFFSET RT)
DUGAN P/L (96' OFFSET RT)
S0°50'55"E 56.61'
PIR 9+49.9 43°01'23"LT
C/L ROAD (23' OFFSET RT)
DUGAN P/L (94' OFFSET RT)
S45°52'18"E 39.72'
SECTION LINE X-ING @ STA 9+89.6
TIE TO EAST 1/4 CORNER SECTION 25
S84°36'05"W 2625.76' (MEASURED)
S84°37'W 2624.16' (RECORD)
S84°37'26"W 2623.01' (MEASURED)
S84°37'W 2624.16' (RECORD)
BASIS OF BEARINGS
REAL-TIME KINEMATIC GPS SURVEY SOLUTION OBTAINED FROM SATELLITES TRACKED ON OCTOBER 4, 2013 FROM A REFERENCE STATION POSITIONED IN NE/4 NE/4 OF SECTION 30, T24N, R9W
PLAT NOTE:
REPORT ANY CONSTRUCTION SIGNS, CONTRACTOR ADVISED TO CALL ONE-CALL FOR LOCATION OF ANY MARKED OR UNMARKED PIPELINES OR CABLES IN THE AREA OF THE PROJECT
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
~ SURFACE OWNERSHIP ~
Bureau of Land Management
8+25.2 TO 9+89.6
166.4 FT / 10.1 RODS
I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASON C. EDWARDS
Date: April 21, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269
Prepared for:
ENCANA OIL & GAS USA
370 17th ST. SUITE 1700
DENVER, CO 80202
N
C
E
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87402
(505) 325-2654 (Office)
(505) 326-5650 (Fax)
SURVEYS, INC.

ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R9W, NMPM SAN JUAN COUNTY, NEW MEXICO



~ SURFACE OWNERSHIP ~ Bureau of Land Management	
9+84.6 TO 14+75.5	485.9 FT / 29.8 RODS

I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.

JASON C. EDWARDS Date: April 21, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269

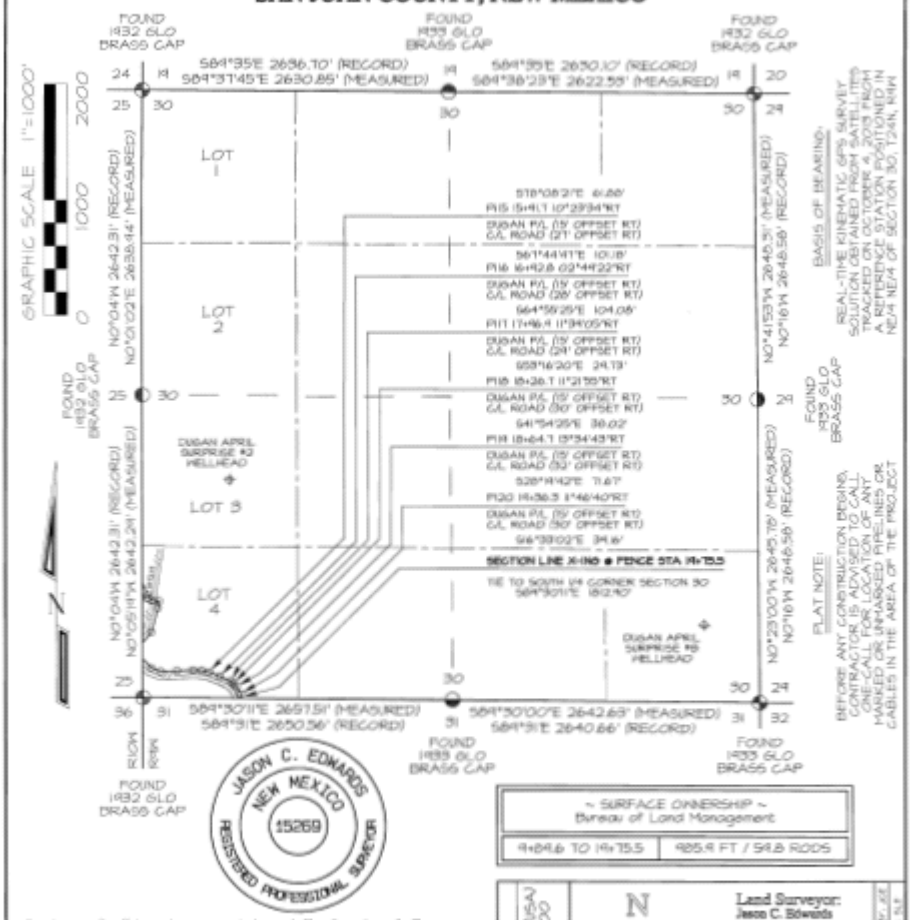
Prepared for: ENCANA OIL & GAS (USA) 370 17th ST. SUITE 1700 DENVER, CO 80202

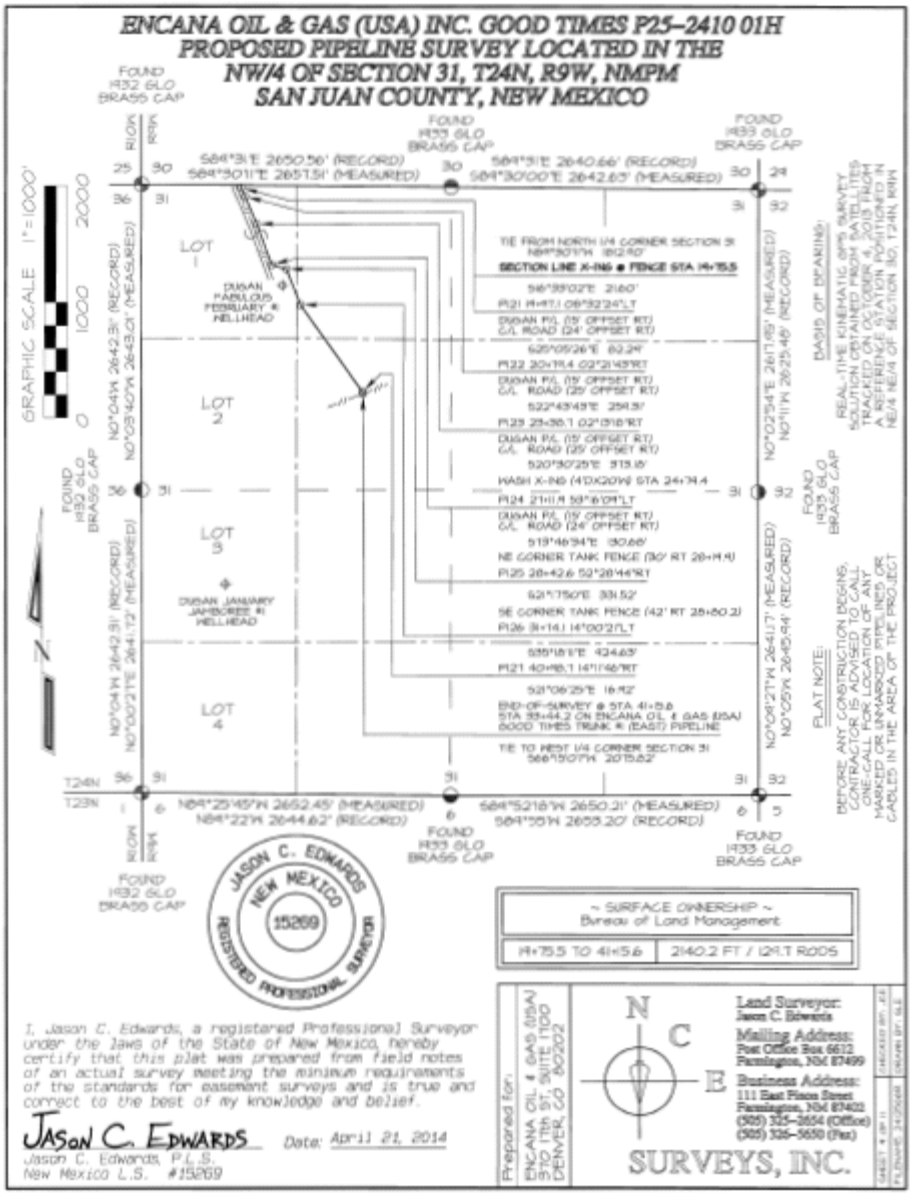
N C E SURVEYS, INC.

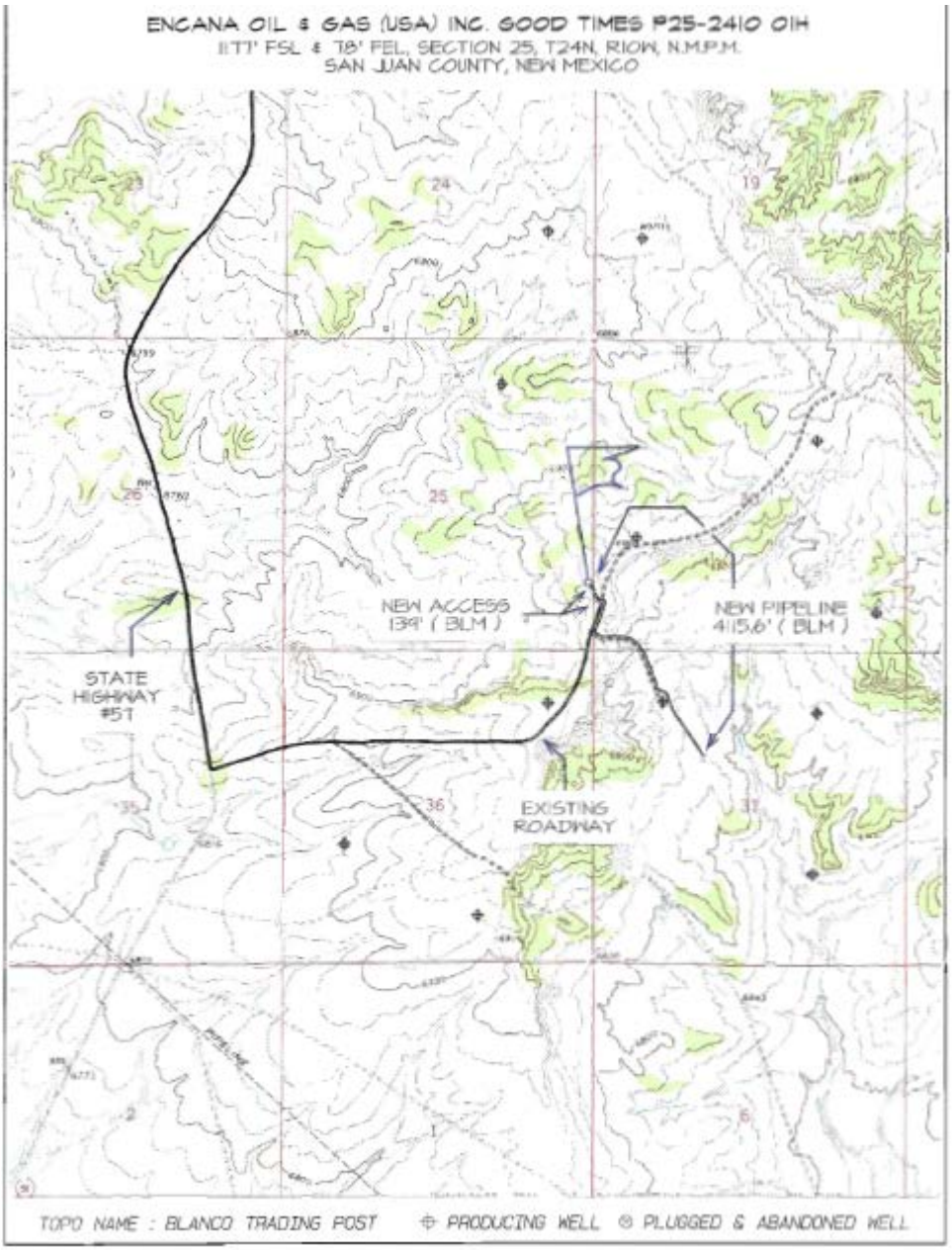
Land Surveyor: Jason C. Edwards
Mailing Address: Post Office Box 6612 Farmington, NM 87499
Business Address: 111 East Pinon Street Farmington, NM 87402 (505) 325-2654 (Office) (505) 326-5650 (Fax)

SHEET 1 OF 1 | CREATED BY: JCE | DRAWN BY: DLE | FILENAME: 24-2014-01

ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE SW/4 SW/4 OF SECTION 30, T24N, R9W, NMPM SAN JUAN COUNTY, NEW MEXICO




ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
PROPOSED PIPELINE SURVEY LOCATED IN THE
NW/4 OF SECTION 31, T24N, R9W, NMPM
SAN JUAN COUNTY, NEW MEXICO
GRAPHIC SCALE 1" = 1000'
LOT 1
LOT 2
LOT 3
LOT 4
DUGAN FABULOUS FEBRUARY #1 WELLHEAD
DUGAN JANUARY JAMBOREE #1 WELLHEAD
~ SURFACE OWNERSHIP ~
Bureau of Land Management
19+75.5 TO 41+56.6
2140.2 FT / 129.7 RODS
JASON C. EDWARDS
NEW MEXICO
15269
REGISTERED PROFESSIONAL SURVEYOR
I, Jason C. Edwards, 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 meeting the minimum requirements of the standards for easement surveys and is true and correct to the best of my knowledge and belief.
JASON C. EDWARDS
Date: April 21, 2014
Jason C. Edwards, P.L.S.
New Mexico L.S. #15269
Prepared for:
ENCANA OIL & GAS (USA)
370 17th ST, SUITE 1100
DENVER, CO 80202
Land Surveyor:
Jason C. Edwards
Mailing Address:
Post Office Box 6612
Farmington, NM 87499
Business Address:
111 East Pinon Street
Farmington, NM 87401
(505) 325-3654 (Office)
(505) 325-5650 (Fax)
SURVEYS, INC.


ENCANA OIL & GAS (USA) INC. GOOD TIMES P25-2410 01H
1177' FSL & 78' FEL, SECTION 25, T24N, R10W, N.M.P.M.
SAN JUAN COUNTY, NEW MEXICO
NEW ACCESS
139' (BLM)
NEW PIPELINE
4115.6' (BLM)
STATE
HIGHWAY
#57
EXISTING
ROADWAY
TOPO NAME : BLANCO TRADING POST
PRODUCING WELL
PLUGGED & ABANDONED WELL

APPENDIX D. PHOTOGRAPHS

D.1 Escrito A28

Proposed well pad overview, viewed from proposed well heads looking northward

Proposed well pad overview, viewed from proposed well heads looking eastward

Proposed well pad overview, viewed from proposed well heads looking southward

Proposed well pad overview, viewed from proposed well heads looking westward

TUA located along western side of access road, looking west-southwestward

TUA located along eastern side of access road, looking north-northeastward

D.2 Escrito M30 - Well Pad & Access Road

View of well pad, looking northward from wellheads

View of well pad, looking eastward from wellheads

View of well pad, looking southward from wellheads

View of well pad, looking westward from wellheads

View of well pad, from eastern corner (Corner 3) of construction zone looking westward

View of well pad, from southern corner (Corner 5) of construction zone looking northward

View of well pad, from western corner (Corner 6) looking eastward

View of access road and pipeline tie corridor, from start of access road looking northeastward

View of access road and pipeline tie corridor, from end of access road looking southeastward

D.3 Alternative Good Times P25 – Well Pad & Access Road

View of well pad, looking northward from wellheads

View of well pad, looking eastward from wellheads

View of well pad, looking southward from wellheads

View of well pad, looking westward from wellheads

View of well pad, from northwestern corner (Corner 6) of construction zone looking southeastward

View of well pad, from northeastern corner (Corner 2) of construction zone looking southwestward

View of well pad, from southeastern corner (Corner 3) of construction zone looking northwestward

View of well pad, from southwestern corner (Corner 5) of construction zone looking northeastward

View of access road and pipeline tie corridor, from end of access road looking eastward

D.4 Escrito M30 & Alternative Good Times P25 - Pipeline Tie Corridor (Shared by Both Project Alternatives)

View of pipeline tie corridor, where pipeline tie would begin paralleling existing road (approximate Escrito M30 stationing 16+83.4), looking northeastward

View of pipeline tie corridor, from approximate Escrito M30 stationing 42+07.3, looking southeastward (cross-country portion)

View of pipeline tie corridor, from approximate Escrito M30 stationing 18+88.6, looking northeastward

APPENDIX E. RECLAMATION PLANS