

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

RECEIVED

FORM APPROVED  
OMB No. 1004-0137  
Expires: July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**  
*Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.*

MAR 02 2015

5. Lease Serial No.  
NMNM 112953

6. If Indian, Allottee or Tribe Name

N/A

**SUBMIT IN TRIPLICATE** – Other instructions on page 2.

7. If Unit of CA/Agreement, Name and/or No.  
N/A

1. Type of Well

Oil Well     Gas Well     Other

8. Well Name and No.  
Lybrook D22-2306 01H

2. Name of Operator  
Encana Oil & Gas (USA) Inc.

9. API Well No.  
Pending 30-043-21252

3a. Address  
370 17th Street, Suite 1700, Denver, CO 80202

3b. Phone No. (include area code)  
720-876-3533

10. Field and Pool or Exploratory Area  
Counselors Gallup Dakota

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)  
SHL: 985' FNL, 648' FWL Section 22, Township 23N, Range 6W  
BHL: 700' FNL, 330' FWL Section 21, Township 23N, Range 6W

11. Country or Parish, State  
Rio Arriba County, New Mexico

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Fracture Treat	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other <u>Culvert Analysis</u>
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Encana Oil & Gas (USA) Inc. (Encana) wishes to submit a copy of the Culvert Analysis performed for the 36" culvert proposed along the Lybrook D22-2306 01H access road.

Per the BLM's request, Encana commissioned the environmental consulting company, SWCA, to perform an analysis for any proposed culverts included in Encana projects that are 36" or greater to determine if they are adequately sized. Please find attached a copy of the report, which confirms that the 36" culvert proposed along the Lybrook D22-2306 01H access road is adequately sized.

OIL CONS. DIV DIST. 3

JUN 15 2015

Accepted for Record

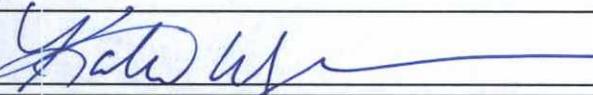
14. I hereby certify that the foregoing is true and correct.

Name (Printed/Typed)

Katie Wegner

Title Regulatory Analyst

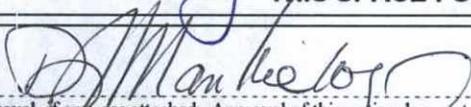
Signature



Date 02/27/2014

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by



Title AFM gpm7

Date

APR 18 2015

6/11/15

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office FFO

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

NMOCD

### **36-Inch-Diameter Culvert Analysis for Encana Oil & Gas (USA) Inc.'s (Encana's) Gallo Canyon Unit (GCU) N23-2306, GCU M23-2306, and Lybrook D22-2306 Access Roads**

SWCA Environmental Consultants performed a 36-inch-diameter culvert analysis for three culverts located along Encana's proposed GCU N23-2306, GCU M23-2306, and Lybrook D22-2306 access roads. The analysis was conducted for two culverts located along the GCU N23-2306 and GCU M23-2306 shared access road and one culvert along the Lybrook D22-2306 access road. The analysis process and results are summarized below. Maps of the GCU N23-2306/M23-2306 and Lybrook D22-2306 access road analysis areas are provided below the results summary.

#### **Analysis**

Geographic information system (GIS) software was utilized to conduct the analysis. Within GIS, the following datasets were used during the analysis:

- 10 meter Digital Elevation Model (DEM) for Sandoval County, New Mexico
- National Hydrography Dataset (NHD)
- 15 centimeter Resolution 2010 Aerial Imagery
- GCU N23-2306 and Lybrook D22-2306 access road shapefiles provided by Encana

Data was first normalized into the North American Datum (NAD) 1983, Universal Transverse Mercator (UTM) Zone 13 North projection for accurate measurement. The DEM was run thru an ArcGIS Spatial Analyst toolbox "Fill" to remove any lowspot anomalies that could effect the drainage output. The raster output was then input into the "Flow Direction" tool. This flow direction raster was then selected as the input for the "Flow Accumulation" tool. The resulting raster determined areas of highest flow accumulation probability. Pour points were then placed anywhere along the access road where flow accumulation was high and/or NHD streams crossed. This resulted in one pour point created along the east end of the Lybrook D22-2306 access road and two pour points along the GCU N23-2306/GCU M23-2306 access road. The points were then snapped to the flow accumulation raster. Using the flow direction raster and the three separate rasters where pour points (drainage crossings) were located, the "Watershed" tool was run. The resulting rasters were then converted to vector format, measured, and overlaid onto maps provided in the project plats created by Scorpion Surveying & Consulting, LLC.

The calculated hectares were cross-referenced with Table 8.1 (Drainage Structure Sizing), as accessed from page 77 in Chapter 8 (Culvert Use, Installation, and Sizing) of the Bureau of Land Management's 2003 *Low-Volume Roads Engineering: Best Management Practices Field Guide*. A copy of this table is provided below.

**Table 8.1**

**DRAINAGE STRUCTURE SIZING**

Drainage Area (Hectares)	Size of Drainage Structure Inches and Area (m <sup>2</sup> )			
	Steep Slopes		Gentle Slopes	
	Logged, Light Vegetation		Unlogged, Heavy Vegetation	
	C=0.7		C=0.2	
	Round Pipe (in)	Area (m <sup>2</sup> )	Round Pipe (in)	Area (m <sup>2</sup> )
0-4	30"	0.46	18"	0.17
4-8	42"	0.89	24"	0.29
8-15	48"	1.17	30"	0.46
15-30	72"	2.61	42"	0.89
30-50	84"	3.58	48"	1.17
50-80	96"	4.67	60"	1.82
80-120			72"	2.61
120-180			84"	3.58

Notes: If pipe size is not available, use the **next larger** pipe size for the given drainage area. For intermediate terrain, interpolate between pipe sizes.

-Pipe size is based upon the Rational Formula and Culvert Capacity curves. Assumes a rainfall intensity of 75 mm/hr. (3"/hr) to 100 mm/hr (4"/hr). Values of "C" are the Runoff Coefficients for the terrain.

-For tropical regions with frequent high intensity rainfall (over 250 mm/hr or 10"/hr), these drainage areas for each pipe size should be reduced at least in half.

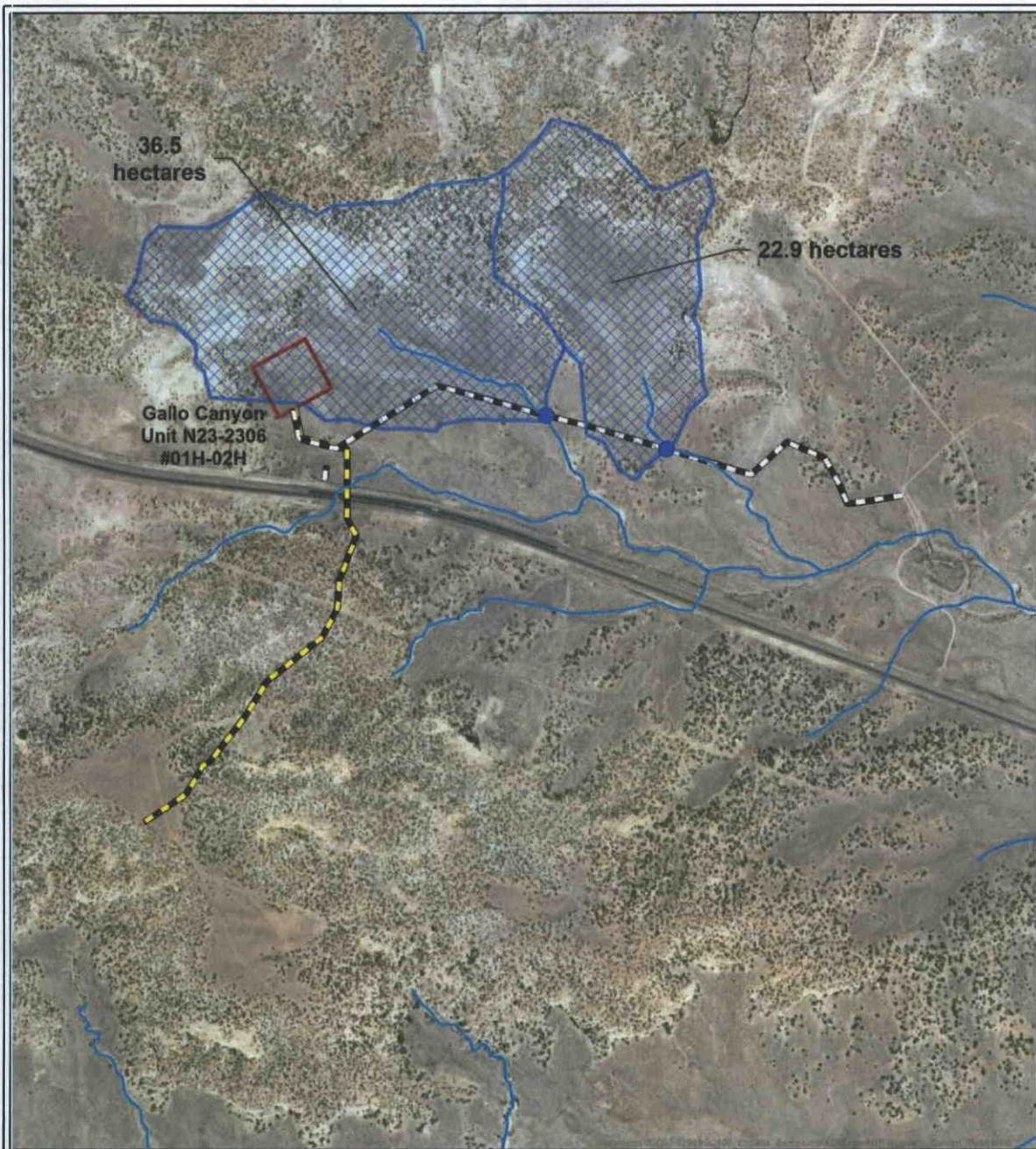
**Results Summary**

*GCU N23-2306/M23-2306 Access Road:*

The resulting two drainages along the access road calculated to areas of 36.5 and 22.9 hectares. By utilizing a Runoff Coefficient (C) of 0.2, the predicted west culvert size is 48 inches, while the predicted east culvert size is 42 inches.

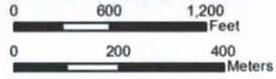
*Lybrook D23-2306 Access Road:*

The resulting drainage along the access road calculated to an area of 0.4 hectares. By utilizing a Runoff Coefficient (C) of 0.2, the predicted culvert size is 18 inches.



**Legend**

 Predicted Culvert Site	 Preliminary Access
 NHD Stream	 Preliminary Pipeline
 Drainage	 Preliminary Well Pad



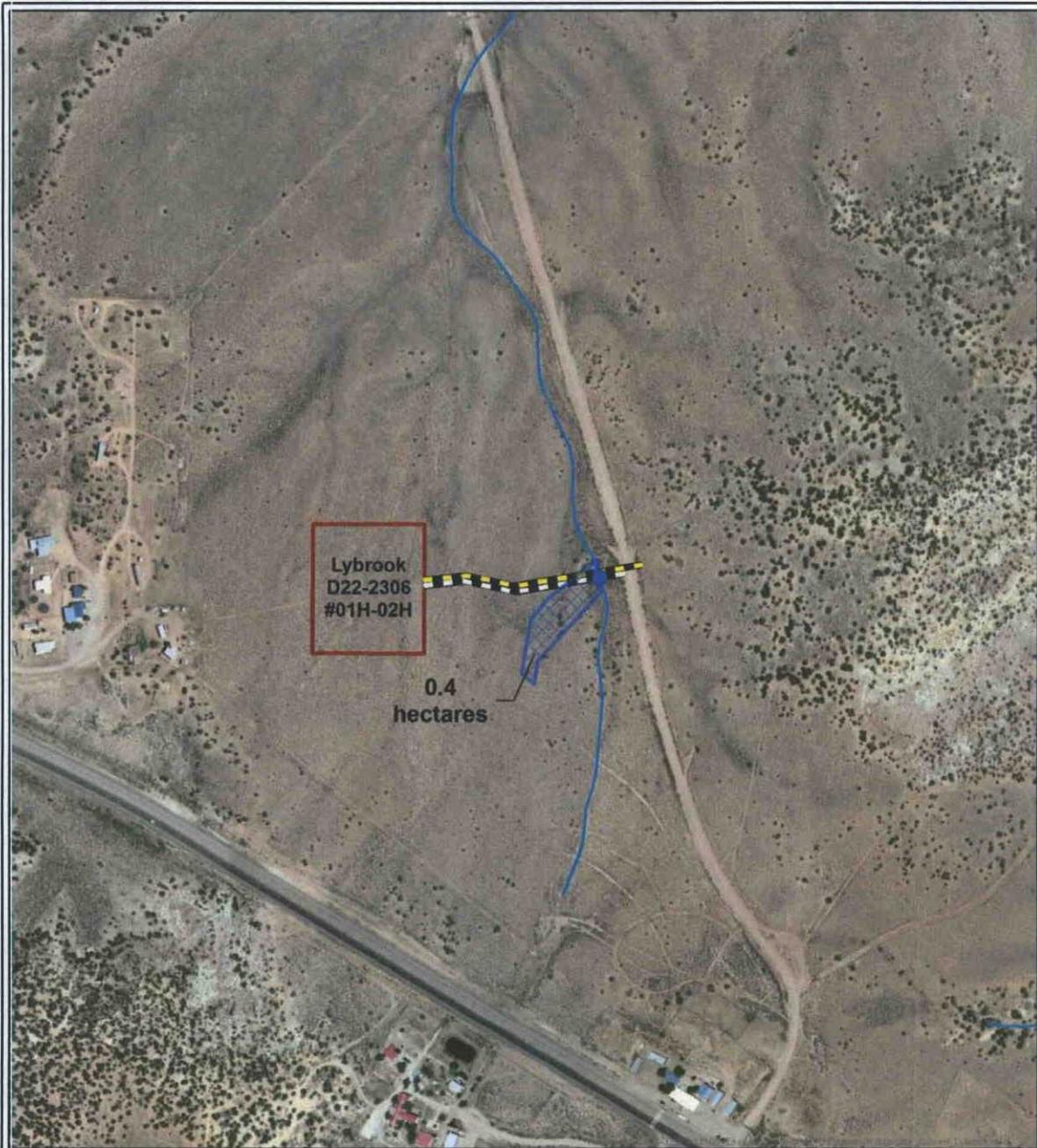
1:12,000  
 Base Map: ESRI Online Service (2010 Aerial)  
 Sandoval County, New Mexico

NAD 1983 UTM Zone 13N  
 2/20/2015



**SWCA**  
 ENVIRONMENTAL CONSULTANTS

295 Interlocken Blvd., Suite 300  
 Broomfield, CO 80021  
 Phone: 303.487.1183  
 Fax: 303.487.1245  
 www.swca.com



**Legend**

 Predicted Culvert Site	 Preliminary Access
 NHD Stream	 Preliminary Pipeline
 Drainage	 Preliminary Well Pad

0 600 1,200  
Feet

0 200 400  
Meters

1:6,000

Base Map: ESRI Online Service (2010 Aerial)  
Sandoval County, New Mexico

NAD 1983 UTM Zone 13N  
2/20/2015

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