

U.S. Department of the Interior  
 Bureau of Land Management  
 Colorado River Valley Field Office  
 2300 River Frontage Road  
 Silt, Colorado 81652

## ENVIRONMENTAL ASSESSMENT

**NUMBER:** DOI-BLM-CO-N040-2010-0057-EA

**CASEFILE NUMBER:** Federal Leases COC27743, COC34553, COC34553A, COC62163.

**PROJECT NAME:** “Lower Wheeler Gulch.” Proposal to Expand Five Existing Well Pads, Construct a Cuttings Storage Location, Construct a Centralized Storage Tank Facility and Construct a Centralized Frac Pad on Private Land in the Lower Wheeler Gulch Area Northwest of Parachute, Colorado.

**LOCATION:** Township 6 South (T6S), Range 96 West (R96W), Section 23, NW¼SW¼, Section 27, Lots 1, 9, 10, 11 and 14, SE¼SW¼, and Section 34, NW¼NE¼, Sixth Principal Meridian (Figure 1).

**LEGAL DESCRIPTIONS:** Table 1 lists the surface locations of the proposed pads supporting Fee and Federal wells addressed in this Environmental Assessment (EA).

<b>Table 1. Proposed Well Pads and Wells</b>							
<i>Well Pad</i>	<i>Surface Location Lease<sup>1</sup></i>	<i>Surface Location<sup>2</sup></i>	<i>Number of Existing Wells</i>	<i>Number of Proposed Wells</i>	<i>Number of Proposed Federal Wells</i>	<i>Number of Proposed Fee Wells</i>	<i>Federal Downhole Lease<sup>1</sup></i>
MV 10-23 Pad Expansion	Private	NWSW Sec. 23	1	19	16	3	COC34553
MV23-27 Pad Expansion	Private	Lot 1, Sec. 27	4	17	14	3	COC27743 COC34553 COC34553A
GM24-27 Pad Expansion	Private	Lot 11, SESW, Sec. 27	4	13	11	2	COC27743 COC34553A
MV29-27 Pad Expansion	Private	Lots 9 and 10 Sec. 27	1	17	6	11	COC34553A COC62163
GM331-34 Pad Expansion	Private	NWNE Sec. 34	2	5	4	1	COC27743
Well Totals			12	71	51	20	
<sup>1</sup> The project components would be located on private surface underlain with private minerals except for about 1 acre of GM24-27 pad which would be located on split estate lease (COC34553A). <sup>2</sup> All of the Project Components are located within T6S, R96W, Sixth Principal Meridian.							

**APPLICANT:** Williams Production RMT Company. Contact: Greg Davis, 1515 Arapaho Street, Tower 3, Suite 1000, Denver, CO 80202.



Figure 1. Proposed Project Components.

## **PROPOSED ACTION**

Williams Production RMT Company (“Williams”) proposes to drill and develop 71 oil and gas wells (51 Federal wells) from five existing well pads to be expanded (MV10-23, MV23-27, GM24-27, MV29-27, and GM331-34). All of the well pads would be located on private surface owned by ExxonMobil with underlying Fee mineral estate (Figure 1). The Federal wells would be directionally drilled from the Fee locations into nearby Federal leases. The northern portion of the GM24-27 pad expansion would fall onto split estate (private surface with Federal minerals). With the exception of the GM24-27 pad, the Federal lease terms are not applicable since the surface locations are located on private land with Fee mineral estate. Lease terms applicable to the GM24-27 wells are presented in the Lease Stipulations section.

The project area lies 5 miles northwest of Parachute, Garfield County, Colorado, in the lower reaches of the Wheeler Gulch watershed. Garfield County’s Parachute Creek Road (County Road 215 [CR215]) provides the direct motorized access to Wheeler Gulch. The well pads are generally situated along the existing Wheeler Gulch Road on ExxonMobil lands operated by Williams; public access into Wheeler Gulch is prohibited and monitored with a guard station near CR215.

The five proposed well pad expansions would be necessary to provide the pad working area to drill the additional wells. The centralized frac facility would be constructed to support the well completion work planned for this project; a temporary surface water line would be activated to provide the water volume supporting the well completions. A new cuttings trench would be developed near the GM24-27 pad to provide cuttings storage from the planned wells. A new centralized tank facility would be built to eventually handle the water storage needs near the base of Wheeler Gulch. There are existing gas pipelines presently serving each pad, although some gas gathering and water collection pipeline upgrades would be needed to handle the expected production capacities.

All of the proposed well pads would be situated in a salt-desert shrub/sagebrush/juniper community commonly found along the narrow Wheeler Gulch valley floor. One residence is located near the project area at the junction of CR215 and Wheeler Gulch Road.

### **Proposed Pad Expansions**

Layout sheets depicting the pad size, cuts and fills, and drainage considerations are shown in Appendix A.

**MV10-23 pad:** The existing MV10-23 pad would be expanded by no more than 3.0 acres supporting 19 wells including 16 Federal wells. A new 150-foot by 60-foot pad platform would be constructed directly south and adjacent to the MV10-23 pad that would house the drill rig power units, mud pumps and shaker system. The drill rig superstructure would set up on the existing pad and the adjacent new smaller pad would remotely provide the “power” and fluids/cuttings recycling management for the drilling process. This innovative pad layout was developed after numerous field visits and reviews of three different pad locations in an attempt to reach the planned bottomhole targets. The relatively steep eastern sideslopes at the MV10-23 pad would remain undisturbed with the exception of a small 15-foot by 35-foot area to be excavated at the eastern end of the surface hole cellars (maximum cut of 5.1 feet). This additional disturbance was the minimum needed for the rig tolerances and still provides a safe travelway around the wells. The existing well would be shut-in (hibernated) and the various production facilities on the pad would be removed to maximize the available drilling space.

The new pad platform, which remotely provides the drilling “power,” would be constructed directly west of the MV10-23 pad at the base of the steep sideslope with a maximum cut of 18.2 feet and a fillslope of 5.4 feet. The existing Highlands gas pipeline buried alongside the Lower Wheeler Gulch Access Road and across the MV10-23 pad would be located and protected from disturbance during the pad expansion,

drilling and completion work. The planned fillslope would not inhibit the traffic flow below; a near vertical wall would be built along the west edge of the pad to avoid impact to the access road. After drilling and well completion work, the MV10-23 pad and its “remote” side pad would be reshaped and seeded reducing the pad size to approximately 1.5 acres.

The advantages of this atypical pad expansion would be (1) no new disturbance to Wheeler Gulch or its riparian corridor, (2) no new disturbance to the existing man-made wetland at the north end of the MV10-23 pad, and (3) the continued use of the Lower Wheeler Gulch Access Road for 24-hour vehicle access to Williams’s Highlands gas development field on the Roan Plateau.

**MV23-27 Pad:** The existing MV23-27 pad would be expanded to 3.0 acres to accommodate the planned 17 total wells (14 Federal wells). The access road to the pad would be switched to a new route entering onto its north edge across Wheeler Gulch providing new access for this pad and the road bypass segment around the MV10-23 pad. The pad would have a maximum cut of 33.7 feet along its western edge and a maximum fill of 27.7 feet at the southeast corner. After drilling and well completion work, the pad would be reshaped and seeded reducing the pad size to approximately 1.5 acres. The cuttings trench noted on the pad layout (Appendix A) is undersized because of terrain limitations; the trench would primarily be used for mixing of cuttings with majority of the cuttings to be hauled to the offsite trench near GM24-27 pad

**GM24-27 Pad:** The existing GM24-27 pad would be expanded to 3.0 acres to accommodate the planned 13 total wells (11 Federal wells). The existing access road to the pad would be sufficient to serve the additional wells. The pad, situated between two side draws of Wheeler Gulch, would be expanded with constructed, rock-lined diversion ditches on both east and west sides of the pad to allow the draws to release their ephemeral flows of precipitation and debris during heavy thunderstorm events. The pad would have a maximum cut of 19.8 feet at the northwest corner and a maximum fill of 15.8 feet at the southeast corner. After drilling and well completion work, the pad would be reshaped and seeded reducing the pad size to approximately 1.5 acres.

**MV29-27 Pad:** The existing MV29-27 pad would be expanded to 6.5 acres to accommodate the planned 17 total wells (six Federal wells). The existing access road to the pad would be sufficient to serve the additional wells, although some of the excess material excavated for the pad expansion would be used to reduce the grade and drainage issues along the road. A sizable portion of a ridge would be excavated during the pad expansion resulting in approximately 31,600 cubic yards of excess material generated for this pad. The excess material would be stockpiled north of the proposed pad work so it can be readily incorporated into the interim reclamation design after drilling is completed. The pad would have a maximum cut of 42.7 feet at the north edge and a maximum fill of 13.9 feet at the southwest corner. Rock-lined, diversion ditches would be constructed to direct the intermittent flows from gullies around the pad’s working surface. After drilling and well completion work, the pad would be reshaped and seeded reducing the pad size to approximately 1.5 acres.

**GM331-34 Pad:** The existing GM331-34 pad would be expanded to 3.0 acres to accommodate the planned five total wells (four Federal wells). The existing access road to the pad would be sufficient to serve the additional wells. The pad would have a maximum cut of 13.8 feet at the north edge and a maximum fill of 15.6 feet at the south edge. The production facilities located at the southwest corner of the pad would be expanded to accommodate the added facilities to support the new wells. After drilling and well completion work, the pad would be reshaped and seeded reducing the pad size to approximately 1.5 acres.

The expected short-term disturbance related to pad construction amounts to 18.5 acres; long-term disturbance would be 7.5 acres for the five pads after the pad reshaping and vegetation establishment on the reclaimed pad surfaces.

### Proposed Roads

In general, the existing roads serving the pads would be adequate to handle the traffic associated with the drilling of the new wells. However, there is one new road segment that would be constructed to provide new access to the MV23-27 pad. A crossing (with 48-inch diameter culvert installation) of Wheeler Gulch would occur to provide vehicle access to the MV23-27 pad since the existing road for this pad would be inundated by the proposed fillslope of the pad expansion. This short road spur for the MV23-27 pad would be approximately 100 feet in length and 35 feet in width (disturbance area would be 0.1 acre). The final surfaced (24-foot roadway with 6-inch minimum gravel depth) spur road serving the MV23-27 pad would account for 0.1 acre of short-term road disturbance; the long-term disturbed area would be negligible (0.05 acre).

The road and pad construction work would follow the guidelines established in the BLM Gold Book, *Surface Operating Standards for Oil and Gas Exploration and Development* (USDI and USDA 2007).

Final culvert locations and sizes would be determined during the preconstruction inspection and, if necessary, further refined after the road has been pioneered. Crossing structures for Wheeler Gulch would be subject to U.S. Army Corps of Engineers permitting process and requirement. During road pioneering, topsoil would be stripped and windrowed along the upper and lower sides of the road disturbance corridor to provide enhanced reclamation opportunities.

A road maintenance program would be required during the production phase of the wells which includes, but is not limited to blading, ditching, culvert installation and cleanout, weed control, and gravel surfacing where excessive rutting or erosion may occur. Roads would be maintained in a safe and usable condition.

### Proposed Pipelines and Ancillary Facilities

Although the gas trunk pipeline running along Wheeler Gulch Access Road is sufficient to handle the planned gas production from the proposed wells, new lateral buried steel gas pipelines would be installed along the pad access roads for each of the planned pad expansions to replace existing undersized gas lines. Table 2 depicts the length of each lateral pipeline listed by pad; each steel lateral line would be eight inches in diameter. The laterals would be installed alongside the existing pad access roads requiring an average of 10 feet of additional surface disturbance throughout the collection system as shown on Figure 2. This additional disturbance, based on 2,765 feet of new pipeline laterals, would amount to 0.6 acres.

<b>Table 2. Proposed Lateral Gas Pipelines</b>	
<i>Pad Name</i>	<i>Proposed Length of Buried Pipelines</i>
MV10-23	32 feet
MV23-27	387 feet
GM24-27	50 feet
MV29-27	707 feet
GM331-34	1,587 feet
<b>Total</b>	<b>2,765 feet</b>

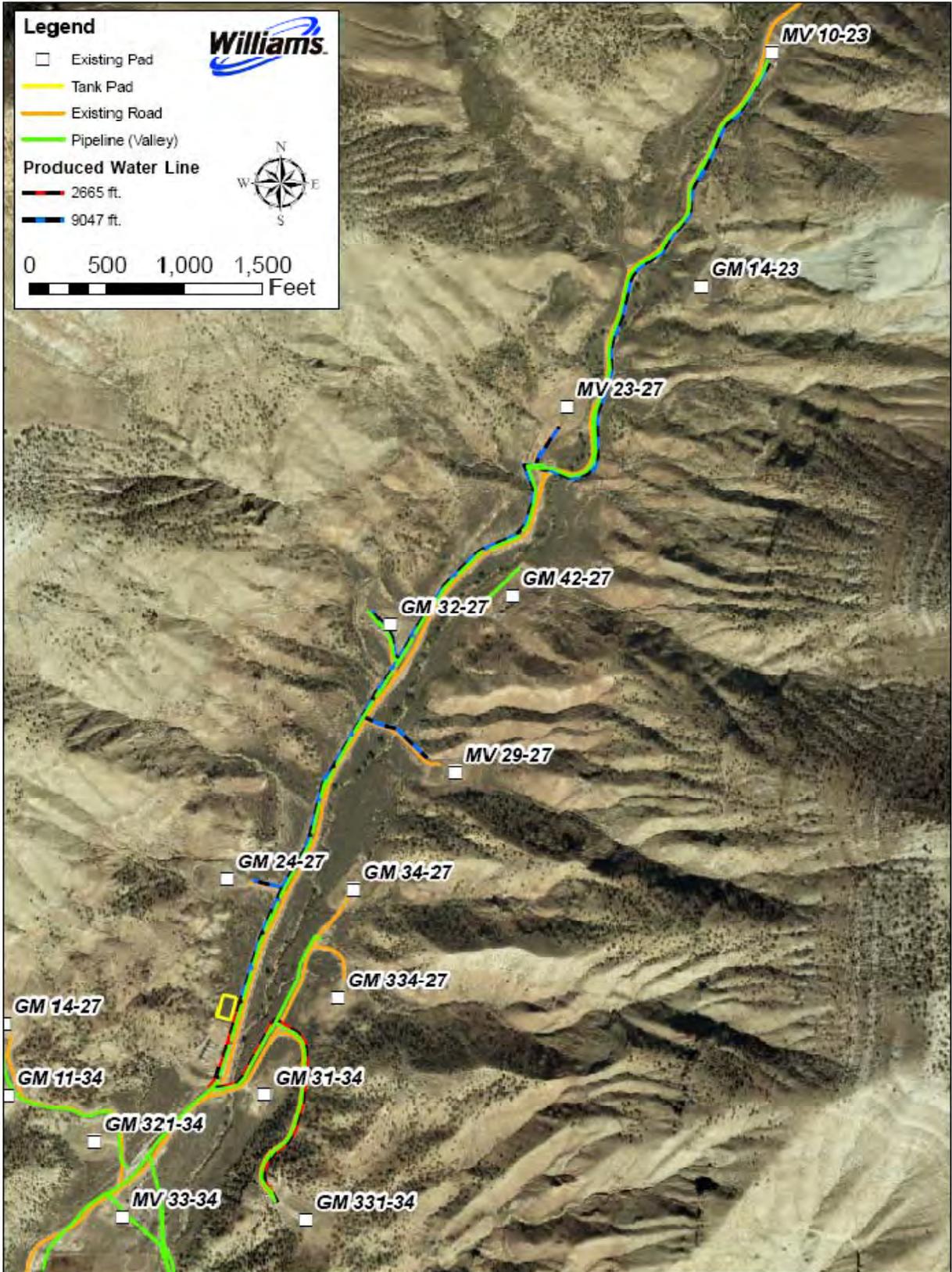


Figure 2. Proposed Wheeler Gulch Produced Water Collection System

The proposed Lower Wheeler Gulch water collection system that would gather produced water from the existing and proposed well pads would require new buried water pipeline installations along existing roads. Approximately 11,700 feet of 4-inch-diameter flexpipe would be buried directly within existing road disturbance corridors requiring an average of 10 feet of additional surface disturbance throughout the collection system as shown on Figure 2. Water lines would be installed in same trench as the identified lateral gas lines above. This additional disturbance would amount to 2.1 acres.

The new water lines described above would specifically deliver produced waters at the new centralized tank facility (1.0 acre of new disturbance) that would be constructed at the base of the Wheeler Gulch Road east of the compressor facility and guard station. This site would house all storage tanks to contain the water produced by the existing and new wells planned for the Lower Wheeler Gulch gas field. Condensate tanks would remain staged on the well pads.

A new centralized remote frac pad and pit facility and a proposed access road (amounting to 5.0 acres of disturbance) would be constructed along the eastern bank of Wheeler Gulch between MV29-27 pad and the GM331-34 pad. In addition, a temporary surface water-supply line (5,846 feet or 1.11 miles) would be laid in the existing buried pipeline corridor along Wheeler Gulch from the frac pad south to CR215 (Figure 1). No disturbance quota is attributed to the temporary surface line operation since the activities would occur within an existing corridor. The entire frac pad and pit would be reclaimed after well completion work was finished for the planned wells.

With limited space on the five existing pads for cuttings to be stored in a constructed trench, some of the cuttings volume generated from the new wells would be trucked to a proposed Cuttings Trench to be constructed directly northeast of the GM24-27 pad along Wheeler Gulch Road. The planned disturbance footprint for the new Cuttings Trench would be 2.0 acres. A yet-to-be-constructed primary cuttings trench was approved southeast of the GM24-27 pad in 2009 with the approval of the GM32-27 pad expansion. Both cuttings trenches would be needed to manage and contain the expected cuttings volume for the Lower Wheeler Gulch well development.

The total short-term disturbance totals for the ancillary facilities would be 10.7 acres. The long-term disturbance, tied to the storage tank pad only, would amount to 0.7 acre since the frac pad/pit, buried water lines, and cuttings trenches would be reclaimed.

### **Summary of Proposed Project Disturbance**

Total short-term disturbance of the project components would be 29.3 acres (18.5 acres for the pads and 0.1 acre for the MV23-27 road spur, and 10.7 acres for ancillary facilities). The long-term disturbance amounts to 8.25 acres once the reclaimed areas meet BLM's reclamation standards identified in the COAs. All of the projected surface disturbance outlined in the Proposed Action would occur on private land; approximately 1 acre of the planned disturbance on the GM24-27 pad would occur on split estate with the underlying Federal minerals addressed in lease COC34533A.

Table 3 presents a summary of the estimated surface disturbances that would result from implementation of the Proposed Action. Figures 1 and 2 depict the location of various project components.

The Proposed Action would include drilling and completion operations, production of natural gas and associated liquid condensate, proper handling and disposal of produced water, and intermediate and final reclamation. The Proposed Action would be implemented consistent with Federal oil and gas lease, Federal regulations (43 CFR 3100), and the operational measures included in the Applications for Permit to Drill (APDs). Appendix B lists the specific Surface Use Conditions of Approval (COAs) that would be

implemented as mitigation measures for this project. The operator would be responsible for continuous inspection and maintenance of the access roads, pads, wells, ancillary facilities, and pipelines.

<b>Table 3. Disturbance Associated with Well Pads, Roads &amp; Ancillary Facilities</b>					
<i>Proposed New Construction</i>	<i>Short-term Disturbance (acres)</i>			<i>Long-term Disturbance (acres)</i>	
	<i>Pads</i>	<i>Roads</i>	<i>Facilities</i>	<i>Pads</i>	<i>Other</i>
MV10-23 pad expansion	3.0			1.5	
MV23-27 pad expansion	3.0	0.1		1.5	0.05
GM24-27 pad expansion	3.0			1.5	
GM24-27 cuttings storage			2.0		
MV29-27 pad expansion	6.5			1.5	
GM331-34 pad expansion	3.0			1.5	
Centralized Tank Pad			1.0		0.7
Centralized Frac Pad			5.0		
Gas & Water Collection Pipelines*			2.7		
<b>Subtotal</b>	<b>18.5</b>	<b>0.1</b>	<b>10.7</b>	<b>7.5</b>	<b>0.75</b>
<b>TOTAL</b>	<b>29.3</b>			<b>8.25</b>	
*2765 feet of new lateral gas pipelines would be installed in same trench as water collection lines.					

**ALTERNATIVES CONSIDERED BUT DROPPED FROM FURTHER ANALYSIS**

Four other alternatives to reach the MV10-23 target bottomholes were field-reviewed.

- (1) A new GM21-23 pad location, road and pipeline were discounted from further analysis based on steep topography, landslide issues and difficult stream crossings.
- (2) Locating a new well pad adjacent to MV10-23 pad and straddling Wheeler Gulch was deleted from consideration due to potential stream impacts, loss of riparian vegetation, and concern with debris flows over the 30-year life of the well plugging the culvert system underneath the pad.
- (3) Another alternative was to locate a full-size pad in the same location as the planned MV10-23 “remote” pad expansion described in the Proposed Action; the disturbance footprint was unacceptable given the steep cutslopes to be developed and the fillslope inundating the Highlands access road. An alternate road alignment along the west side of Wheeler Gulch was reviewed to allow Highlands traffic around the expanded MV10-23 pad, but the road grades were severe and impacts to important cultural site would have occurred
- (4) A new pad was sited on the west side of Wheeler Gulch across from the existing GM14-23 pad, but the topography was too confining and the target bottomholes would not have been attainable.

**NO ACTION ALTERNATIVE**

The No Action alternative constitutes denial of the 51 Federal Applications for Permit to Drill (APDs) associated with the Proposed Action. All well pad expansions could occur under the No Action

alternative in order to drill the planned 20 Fee wells. The new road segment serving the MV23-27 pad would be constructed to drill the three Fee wells. The construction of the support facilities (frac pad/pits, produced water collection system, and centralized storage tank pad) would be implemented under the No Action alternative. It is assumed the cuttings volumes from the 20 Fee wells would be encapsulated into the previously approved Cuttings Trench staked southeast of the GM24-27 pad. However, the second cuttings trench proposed north of the GM24-27 pad (as analyzed in the Proposed Action) would not be included in the No Action alternative.

Since the only project component not needed for the drilling of the Fee wells is the GM24-27 cuttings trench, the expected short-term disturbance related to the No Action alternative would be 27.3 acres (18.5 acres for the four pads, 0.1 acre for the MV23-27 road spur, 2.7 acres for the upgraded water and natural gas pipeline system, and 6.0 acres for the frac pad and tank storage pad). The long-term disturbance attributed to the No Action alternative would be 8.25 acres. Short-term disturbance for the No Action alternative would be reduced 7% when compared with the proposed disturbance attributed to the Proposed Action.

**SUMMARY OF LEASE STIPULATIONS**

The 51 Federal wells would be directionally drilled from five private surface locations into nearby Federal leases. With the exception of the GM24-27 pad, which partially lies on Federal lease COC34553A, the Federal lease terms are not applicable since the surface locations are located on private land with Fee mineral estate. The specific Federal lease terms applicable to the GM24-27 wells are presented in Table 4. Also reference Appendix B which presents standard or site-specific Conditions of Approval (COAs) applicable to the Federal APDs.

<b>Table 4. Lease Stipulations Applicable to the Proposed Action</b>		
<i>Lease Number</i>	<i>Description of Applicable Lands</i>	<i>Lease Stipulations</i>
COC34553A (1982)	T.6S., R. 96W., Section 27: Lot 11  40.79 acres	<p><b>Timing Limitation:</b> No exploration, drilling or development activity from 1/1 – 5/14 in order to protect wildlife habitat. Limitations do not apply to maintenance and operation of producing wells. Exceptions may be granted.</p> <p><b>Surface Disturbance:</b> The plan of operation must assure adequate protection of drainages, waterbodies, springs, or fish and wildlife habitat, steep slopes or fragile soil. The lessee agrees that during periods of adverse conditions due to the climactic factors such as thawing, heavy rains, or flooding, all activities creating irreparable or extensive damage, as determined by the surface managing agency, will be suspended or the plan of operation modified and agreed upon.</p> <p><b>Protection of Cultural Resources.</b> The COAs listed in Appendix B identify the updated language for cultural resource protection.</p>

**LAND USE PLAN CONFORMANCE REVIEW**

The Proposed Action and No Action alternative are subject to and have been reviewed for conformance with the following plan (43 CFR 1610.5, BLM 1617.3):

Name of Plan: The current land use plan is the *Glenwood Springs Resource Management Plan (RMP)*, approved in 1984 and revised in 1988 (BLM 1984). Relevant amendments include the *Oil and Gas Plan Amendment to the Glenwood Springs Resource Management Plan* (BLM 1991) and the *Oil & Gas Leasing & Development Record of Decision and Resource Management Plan Amendment* (BLM 1999a).

Decision Language: The 1991 Oil and Gas Plan Amendment (BLM 1991) included the following at page 3: “697,720 acres of BLM-administered mineral estate within the Glenwood Springs Resource Area are open to oil and gas leasing and development, subject to lease terms and (as applicable) lease stipulations” (BLM 1991, page 3). This decision was carried forward unchanged in the 1999 ROD and RMP amendment at page 15 (BLM 1999b): “In areas being actively developed, the operator must submit a Geographic Area Proposal (GAP) [currently referred to as a Master Development Plan, MDP] that describes a minimum of 2 to 3 years of activity for operator controlled leases within a reasonable geographic area.”

Discussion: The Proposed Action is in conformance with the 1991 and 1999 RMP amendments cited above because the Federal mineral estate proposed for development is open to oil and gas leasing and development. The 1999 RMP amendment requires multi-year development plans known at that time as Geographic Area Plans (GAPs) for lease development over a large geographic area. However, the 1999 RMP amendment also provides exceptions to that requirement for individual or small groups of exploratory wells drilled in relatively undrilled areas outside known high production areas. The Proposed Action, as such, is in conformance with the exception to the requirement to require operators to submit Master Development Plans (MDPs), previously known as Geographic Area Plans (GAPs).

## **STANDARDS FOR PUBLIC LAND HEALTH**

In January 1997, Colorado BLM approved the Standards for Public Land Health. The five standards cover upland soils, riparian systems, plant and animal communities, threatened and endangered species, and water quality. Standards describe conditions needed to sustain public land health and relate to all uses of the public lands. The environmental analysis must address whether impacts resulting from the Proposed Action or alternatives being analyzed would maintain, improve, or deteriorate land health conditions relative to these resources.

These analyses are conducted in relation to baseline conditions described in land health assessments (LHAs) completed by the BLM. The Proposed Action would consist of activities in an area included in the Rifle West LHA (BLM 2005). However, because no BLM surface lands would be affected, this EA does not include an analysis relative to the Land Health Standards.

## **AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES**

This section provides a description of the human and natural environmental resources that could be affected by the Proposed Action and No Action alternative. In addition, the section presents comparative analyses of the direct and indirect consequences on the affected environment stemming from the implementation of the various actions.

A variety of laws, regulations, and policy directives mandate the evaluation of the effects of a Proposed Action and alternative(s) on certain critical environmental elements. Not all of the critical elements that require inclusion in this EA are present, or if they are present, would be affected by the Proposed Action or No Action alternative (Table 5). Only mandatory critical elements that are present and affected are described in the following narrative. In addition to the mandatory critical elements, there are additional resources that would be impacted by the Proposed Action and alternative. These are presented under OTHER AFFECTED RESOURCES following the section below on CRITICAL ELEMENTS.

<b>Table 5. Critical Elements of the Human Environment</b>									
<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>		<i>Critical Element</i>	<i>Present</i>		<i>Affected</i>	
	Yes	No	Yes	No		Yes	No	Yes	No
Air Quality	X		X		Prime or Unique Farmlands		X		X
Areas of Critical Environmental Concern		X		X	Special Status Species*	X		X	
Cultural Resources	X			X	Wastes, Hazardous or Solid	X		X	
Environmental Justice		X		X	Water Quality, Surface and Ground*	X		X	
Floodplains		X		X	Wetlands and Riparian Zones*		X		X
Invasive Non-native Species	X		X		Wild and Scenic Rivers		X		X
Migratory Birds	X		X		Wilderness and Wilderness Study Areas		X		X
Native American Religious Concerns		X		X					

\* Public Land Health Standard

**CRITICAL ELEMENTS**

**Air Quality**

Affected Environment

Colorado Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS) are health-based criteria for the maximum acceptable concentrations of air pollutants in areas of public use. Although specific air quality monitoring has not been conducted within the project area, regional air quality monitoring has been conducted in Rifle and elsewhere in Garfield County. Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (μ) in diameter (PM<sub>10</sub>) and less than 2.5 μ in diameter (PM<sub>2.5</sub>), and sulfur dioxide (SO<sub>2</sub>).

The project area lies within Garfield County, which has been described as an attainment area under CAAQS and NAAQS. An attainment area is an area where ambient air pollution quantities are below (i.e., better than) NAAQS standards. As shown in Table 6, regional background values are well below established standards, and all areas within the cumulative study area are designated as attainment for all criteria pollutants. Federal air quality regulations are enforced by the Colorado Department of Public Health and Environment (CDPHE). The Prevention of Significant Deterioration (PSD) Program within CDPHE is designed to limit incremental increases for specific air pollutant concentrations above a legally defined baseline level, as defined by an area’s air quality classification. Incremental increases in PSD Class I areas are strictly limited.

Air pollutants measured in the region for which ambient air quality standards exist include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (μ) in

diameter (PM10) and less than 2.5 μ in diameter (PM2.5), and sulfur dioxide (SO<sub>2</sub>). Federal air quality regulations adopted and enforced by CDPHE limit incremental emissions increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict.

The project area and surrounding areas are classified as PSD Class II. The PSD Class I areas located within 100 miles of the project area are Flat Tops Wilderness (approximately 25 miles north), Maroon Bells – Snowmass Wilderness (approximately 35 miles south), West Elk Wilderness (approximately 60 miles southeast), Black Canyon of the Gunnison National Monument (approximately 65 miles south), and Eagles Nest Wilderness (approximately 60 miles east). Dinosaur National Monument (approximately 80 miles northwest) is listed as a Federal Class II area but is regulated as a Class I area for SO<sub>2</sub> by CDPHE. Regional background pollutant concentrations and applicable standards or limits are listed in Table 6.

<b>Table 6. Air Pollutant Background Concentrations, Colorado and National Ambient Air Quality Standards, and Prevention of Significant Deterioration Increments.</b>					
<i>Pollutant/Averaging Time</i>		<i>Measured Background</i>	<i>CAAQS and/or NAAQS</i>	<i>Incremental Increase Above Legal Baseline</i>	
Carbon Monoxide (CO) <sup>1</sup>	1-hour	1,160 μg/m <sup>3</sup>	40,000 μg/m <sup>3</sup> (35 ppm)	n/a	n/a
	8-hour	1,160 μg/m <sup>3</sup>	10,000 μg/m <sup>3</sup> (9 ppm)	n/a	n/a
Nitrogen Dioxide (NO <sub>2</sub> ) <sup>2</sup>	Annual Arithmetic Mean	10 μg/m <sup>3</sup>	100 μg/m <sup>3</sup> (0.053 ppm)	2.5 μg/m <sup>3</sup>	25 μg/m <sup>3</sup>
Ozone <sup>3</sup>	8-hour	0.076 ppm (highest)	0.075 ppm	n/a	n/a
Particulate Matter (PM <sub>10</sub> ) <sup>1</sup>	24-hour	114 μg/m <sup>3</sup> (highest)	150 μg/m <sup>3</sup>	8 μg/m <sup>3</sup>	30 μg/m <sup>3</sup>
Particulate Matter (PM <sub>2.5</sub> ) <sup>4</sup>	24-hour	40 μg/m <sup>3</sup> (highest)	35 μg/m <sup>3</sup>	n/a	n/a
	Annual	11.2 μg/m <sup>3</sup>	15 μg/m <sup>3</sup>	n/a	n/a
Sulfur Dioxide (SO <sub>2</sub> ) <sup>5,6</sup>	3-hour	24 μg/m <sup>3</sup>	1,300 μg/m <sup>3</sup> (0.5 ppm)	25 μg/m <sup>3</sup>	512 μg/m <sup>3</sup>
	24-hour	13 μg/m <sup>3</sup>	365 μg/m <sup>3</sup> (0.14 ppm)	5 μg/m <sup>3</sup>	91 μg/m <sup>3</sup>
	Annual	5 μg/m <sup>3</sup>	80 μg/m <sup>3</sup> (0.03 ppm)	2 μg/m <sup>3</sup>	20 μg/m <sup>3</sup>

<sup>1</sup> Background data collected in Rifle, 2008; highest levels recorded in April (Air Resource Specialists 2009).  
<sup>2</sup> Background data collected by EnCana at site north of Parachute, 2007 (CDPHE 2008).  
<sup>3</sup> Background data collected in Rifle, 2008; highest levels recorded in July (Air Resource Specialists 2009).  
<sup>4</sup> Background data collected in Rifle, September – December 2008; highest levels recorded in December (Air Resource Specialists 2009).  
<sup>5</sup> Background data collected at Unocal site, 1983-1984 (CDPHE 2008).  
<sup>6</sup> Colorado 3-hour AAQS = 700 μg/m<sup>3</sup>.

## Environmental Consequences

### Proposed Action

CDPHE, under its EPA-approved State Implementation Plan (SIP), is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made; those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. Therefore, CDPHE has the ultimate responsibility for reviewing and permitting any project’s air quality impacts prior to its operation. Unlike the conceptual “reasonable but conservative” engineering designs used in NEPA analyses, any CDPHE air quality

preconstruction permitting required would be based on site-specific, detailed engineering values, which would be assessed in CDPHE's review of the permit application.

Air quality would decrease during construction of the access road, pad, wells and pipelines. Pollutants generated during these activities would include combustion emissions and fugitive dust associated with construction equipment and vehicles. Construction activities for the well pad, access road, and pipelines would occur between the hours of 7:00 a.m. and 6:00 p.m. each day for a period of 4 to 6 weeks. Once construction activities are complete, air quality impacts associated with these activities would also cease. Fugitive dust from mobilization and rigging up the drill rig would also occur however impacts associated would be minor and short lived.

Volatile organic compound (VOC) emissions are dependent on the characteristics of the condensate, tank operations, and production. The air impacts associated with the condensate tanks are anticipated to be minor, but VOC emissions would be controlled under CDPHE Regulation 7. This includes capture and thermal destruction of VOCs from condensate tanks.

The Roan Plateau RMPA and EIS describes potential effects from oil and gas development (BLM 2006a:4-26 to 4-37). Analysis was completed with regard to greenhouse gas emissions, a near-field and far-field analysis for "criteria pollutants" (particulate matter [PM<sub>10</sub> and PM<sub>2.5</sub>], carbon monoxide, sulfur dioxide, and nitrogen oxides) and hazardous air pollutants (benzene, ethylbenzene, formaldehyde, hydrogen sulfide, toluene, and xylenes). Sulfur and nitrogen deposition, acid neutralizing capacity, and a visibility screening analysis were also completed in the Roan Plateau RMPA and EIS. Because the visibility screening analysis showed potential impacts at one or more Class I areas, a refined visibility analysis was also completed. The refined visibility analysis indicated a "just noticeable" impact on visibility for 1 day each at two Class I areas (Black Canyon of the Gunnison National Park and the Mt. Zirkel Wilderness). For the other pollutants analyzed, the implementation of oil and gas development under the Roan Plateau RMPA and EIS was calculated as having no or negligible long-term adverse impacts on air quality. The Proposed Action is within the scale of development anticipated in the Roan Plateau RMPA and EIA.

Activities described in the Proposed Action would result in localized short-term increases in pollutant emissions from vehicles and drilling equipment and fugitive dust emissions from construction and use of the well pad and access road. Concentrations are expected to be below applicable ambient air quality standards as analyzed in the Roan Plateau RMPA and EIS. However, construction, drilling, and production activities could produce temporarily high levels of fugitive dust in dry conditions without adequate dust abatement. To mitigate dust generated by these activities, the operator would be required to implement dust abatement strategies as needed by watering the access road and construction areas and/or by applying a surfactant approved by the BLM (Appendix B). Additionally, the operator would be required to apply gravel to the access road to a compacted depth of 6 inches, further reducing fugitive dust emissions (Appendix B).

Since the current land use plan was approved BLM (1999), ongoing scientific research has identified the potential impacts of "greenhouse gases" (GHGs) and their effects on global atmospheric conditions. These GHGs include carbon dioxide, methane, nitrous oxide, water vapor, and several trace gases. Through complex interactions on a global scale, these GHG emissions are believed by many experts to cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) predicted that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2007) supports these predictions, but has acknowledged that there are

uncertainties regarding how climate change may affect different regions. In 2007, the IPCC also concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (man-made) greenhouse gas concentrations” (National Academy of Sciences 2007). Other theories about the effect of GHGs on global climate change exist.

The assessment of GHG emissions and climate change remains in its formative phase. Therefore, it is not yet possible to know with certainty the net impact to climate from GHGs produced globally over the last century or from those produced today. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts of climate change on the specific area of the Proposed Action. In addition, while any oil and gas leasing or development projects may contribute GHGs to the atmosphere, these contributions would not have a significant effect on a phenomenon occurring at the global scale believed by some to be due to more than a century of human activities.

#### *No Action Alternative*

Under the No Action alternative, only the 20 Fee wells would be drilled. However, all of the other planned improvements (frac pad/pits, produced water collection system, and centralized storage tank pad) would be constructed to serve the Fee wells except for the GM24-27 cuttings trench. Using a direct correlation, the impacts to air quality would be reduced by 7% with the implementation of the No Action alternative.

### **Cultural Resources**

#### Affected Environment

Cultural resources are fragile and nonrenewable remains of prehistoric and historic human activity, occupation, or endeavor as reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human history. Cultural resources comprise the physical remains themselves, the areas where significant human events occurred even if evidence of the event no longer remains, and the environment surrounding the actual resource. Because of the sensitive nature of cultural resources, the technical reports for this project are not included with the EA. These reports are protected from public disclosure and are exempt from the Freedom of Information Act.

Section 106 of the National Historic Preservation Act (NHPA)(P.L. 89-665; 80 Stat. 915; 16 U.S.C. 470) and its implementing regulations found at 36 CFR Part 800 require Federal agencies to take into account the effect of their actions on cultural resources for any endeavor that involves Federal monies, Federal permitting or certification, or Federal lands. Projects that extend on to private land from Federal land, or that involve Federal minerals, or that otherwise would not be feasible if all Federal involvement were eliminated, are required to consider the effects to historic properties over the entire area of potential effect of the project, regardless of surface ownership.

Four Class III (intensive pedestrian survey) cultural resource investigations (GSFO #16810-1, 1229, 1285A, and 1285) have been conducted for all areas of proposed surface disturbance.

In summary, the inventories conducted within and adjacent to the Lower Wheeler Gulch EA identified 19 localities containing cultural resources, with ten of these cultural resources within the project area. Of these ten, three are sites eligible or potentially eligible for NRHP listing as “historic properties,” two are

sites identified as not eligible for NRHP listing, and the five remaining cultural resources are isolated finds, which are by definition not eligible for NRHP listing.

Two of the historic properties (5GF906 and 5GF907) are the ruins of structures associated with early oil shale exploration and processing. These two sites, known as “Oil Shale Tramway Sites No. 1 and 2,” have been evaluated as eligible for the NRHP based on their significance to the history of the region. As these early oil shale sites are rare in this resource area, avoidance is recommended and no additional impacts are anticipated. Although the main service road through this project area goes through or near both of these sites and has impacted the sites in the past, no new road expansion in their vicinity is planned and they will not be affected by project development. The third historic property (NRHP-eligible site) would be avoided through project design.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action was designed to avoid new disturbance to all sites that are eligible for NRHP listing and would not cause removal or project-related direct disturbance to these cultural resources. As all of the identified cultural sites within the project area are on private property, there was no Federal resource protection prior to the current project. Without Federal protection, damage had occurred to several of the NRHP eligible sites. One previously eligible prehistoric site was destroyed during previous well pad construction, and the two eligible oil shale tramway sites have been disturbed over time by improvement and enlargement to the main road through Wheeler Gulch.

Although the Wheeler Gulch road is private (access controlled with a guardhouse) to limit unauthorized access, the Proposed Action would cause increased human activity in the project area in the form of project workforce and increased road traffic, particularly during construction. The Proposed Action would therefore increase the risk of disturbance, vandalism, collection, or excavation at known or undiscovered cultural resources sites in the Lower Wheeler Gulch project area.

The following mitigation measures would be implemented to minimize the potential for incidental impacts to cultural resources. A standard BLM education/discovery COA for cultural resource protection along with the Colorado State Statute CRS 24-80-1301 for Historic, Prehistoric, and Archaeological Resources, and for Unmarked Human Graves would be attached to the APD (Appendix B).

Though project activity itself may not physically affect cultural resources, construction in proximity to a cultural resource may in fact adversely affect the significance of a cultural resource by changing the setting, location, association, and Feeling particularly for culturally sensitive Native American sites and/or areas of concern. These changes may not be quantifiable at the level of individual sites, but the cumulative effects of these changes over time and over the entire Lower Wheeler Gulch project area would result in degradation of the condition and integrity of setting, location, association, and Feeling for which the surrounding landscape is a part of the site’s significance.

Formal consultation was initiated with the Colorado SHPO, due to project activity taking place within or near two historic properties identified within the Lower Wheeler Gulch EA project area. Based upon the Class III inventories, no new direct impacts anticipated to historic properties and SHPO concurrence with the BLM’s recommendations (8/2/2010), the BLM made a determination of “**No Historic Properties Affected**” as a result of the Proposed Action. This determination was made in accordance with the 2001 revised regulations [36CFR 800.4(d)(1)] for Section 106 of the National Historic Preservation Act (16U.S.C 470f), the BLM/SHPO Programmatic Agreement (1997) and Colorado Protocol (1998)].

### *No Action Alternative*

Although the 51 Federal wells would be denied under the No Action alternative, the 20 Fee wells could be drilled and all pad expansion could occur under the No Action alternative. Additionally, the proposed new road segment and support facilities (except the second cuttings trench proposed north of the GM24-27 pad) would still be implemented under this alternative. Under this alternative, there would still be potential for impact to unknown Native American resources. Although no direct impacts to known cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from accidental or inadvertent disturbance, increased illegal activities and natural processes.

## **Invasive Non-native Species**

### Affected Environment

Two annual weeds, Cheatgrass (*Anisantha tectorum*) and redstem filaree (*Erodium cicutarium*), were found throughout most of the project area with low to moderate density. Three weedy biennial forbs—houndstongue (*Cynoglossum officinale*), common burdock (*Arctium minus*), and common mullein (*Verbascum thapsus*)—were common along the riparian habitat in Wheeler Gulch. Infestations of tamarisk (*Tamarix ramosissima*), a large shrub or small tree state-listed as a noxious weed, were found along the riparian areas of Wheeler Gulch, as well as isolated seeps and springs in the upland areas. Halogeton (*Halogeton glomeratus*) was observed in a few areas, mainly around existing well pads.

### Environmental Consequences

#### *Proposed Action*

Surface-disturbing activities provide a niche for the invasion and establishment of invasive non-native species, particularly when these species are already present in the surrounding area. Because numerous invasive, non-native species are present in the project area, the potential for invasion following construction activities is high. Mitigation measures designed to minimize the spread of these species would be attached to well APDs as conditions of approval (see Appendix B).

#### *No Action Alternative*

Because the No Action alternative would cause 2 fewer acres of disturbance than the Proposed Action, the risk of weed invasion and expansion would be less. However, invasive, non-native species would be expected to spread if left untreated.

## **Migratory Birds**

### Affected Environment

The project area consists of Utah juniper (*Juniperus utahensis*) woodlands mixed with saltbush (*Atriplex* spp.) and sagebrush (*Artemisia* spp.). Narrowleaf cottonwood (*Populus angustifolia*), box-elder (*Negundo aceroides*), and tall shrubs such as Gambel's oak (*Quercus gambelii*), mountain maple (*Acer glabrum*), and serviceberry (*Amelanchier* sp.) are present within the Wheeler Gulch riparian corridor. These habitats provide cover, Feeding sites, and nesting sites for a variety of migratory birds. Habitats of the project area are suitable for use by a variety of migratory birds, which are protected by the Migratory Bird Treaty Act (MBTA). The MBTA prohibits harassing, injuring, or killing migratory birds, destroying active nests, or interfering with breeding. This includes activities that result in nest failure due to abandonment or reduced attentiveness by one or both adults.

Although essentially all migratory species—broadly defined to include most resident native species—are protected by the MBTA, particular focus for BLM oil and gas projects is placed on species identified by the U.S. Fish and Wildlife Service (USFWS 2008) as Birds of Conservation Concern (BCC). The current BCC list includes 10 species potentially present in or near the project area: the bald eagle (*Haliaeetus leucocephalus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), yellow-billed cuckoo (*Coccyzus americanus*), Lewis's woodpecker (*Melanerpes lewis*), willow flycatcher (*Empidonax traillii*), gray vireo (*Vireo vicinior*), pinyon jay (*Gymnorhinus cyanocephalus*), juniper titmouse (*Baeolophus ridgwayi*), and Brewer's sparrow (*Spizella breweri*).

None of the BCC species listed above is expected to occur in the riparian habitat of Wheeler Gulch and side drainages. The only riparian species on the BCC list for the area is the western yellow-billed cuckoo (*C. a. occidentalis*). As addressed subsequently in the section on Special Status species, riparian habitats in the project vicinity are only marginally suitable for this species. A number of other migratory birds are associated with riparian habitats such as those in the project area. These include Neotropical migrants such as the cordilleran flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), plumbeous vireo (*V. plumbeus*), house wren (*Troglodytes aedon*), MacGillivray's warbler (*Oporornis tolmiei*), orange-crowned warbler (*Vermivora celata*), Virginia's warbler (*Vermivora virginiae*), western tanager (*Piranga ludoviciana*), Bullock's oriole (*Icterus bullockii*), black-headed grosbeak (*Pheucticus melanocephalus*), spotted towhee (*Pipilo maculatus*), lazuli bunting (*Passerina amoena*), and lesser goldfinch (*Spinus psaltria*). These species are in addition to year-round resident and short-distance migrant songbirds and other bird species (see Wildlife, Terrestrial).

Nearby juniper woodlands provide marginal habitat for two BCC species—the gray vireo (outside its normal range) and pinyon jay (mostly associated with pinyon pine [*Pinus cembroides* ssp. *edulis*])—and good-quality habitat for another BCC species, the juniper titmouse. Neotropical migrants not on the BCC list but potentially present in the juniper woodlands include the gray flycatcher (*Empidonax wrightii*), Say's phoebe (*Sayornis saya*), western kingbird (*Tyrannus verticalis*), mountain bluebird (*Sialia sialis*), western bluebird (*S. mexicanus*), plumbeous vireo, black-throated gray warbler (*Dendroica nigrescens*), and chipping sparrow (*Spizella passerina*). Resident and other songbirds are described in the section titled Wildlife, Terrestrial.

Small areas of saltbush and sagebrush may support the Brewer's sparrow, a sagebrush-obligate migrant. Other migratory birds associated with this habitat type include the western meadowlark (*Sturnella neglecta*), vesper sparrow (*Pooecetes gramineus*), and lark sparrow (*Chondestes grammacus*).

A variety of raptor species may potentially inhabit the project area. These include cliff-nesting species such as the peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), and golden eagle (*Aquila chrysaetos*); tree-nesting species such as the American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), and sharp-shinned hawk (*A. striatus*); and species that nest in both types of situations, the red-tailed hawk (*Buteo jamaicensis*) and great horned owl (*Bubo virginianus*). A project-specific raptor survey resulted in identification of multiple nest structures within 0.25 mile of well pads or 0.125 mile of access roads and pipelines. These appeared to be nests of either the red-tailed hawk or Cooper's hawk, based on nest size (WWE 2008).

## Environmental Consequences

### *Proposed Action*

The Proposed Action would result in a loss of nesting, breeding, roosting, perching, and foraging habitat for migratory birds on disturbed areas and reduce habitat effectiveness adjacent to areas where disturbance-related effects could be expected. Construction of the well pad, access road, and other

surface facilities would remove 29.3 acres juniper woodlands and associated shrubland vegetation and would result in reduced habitat patch size, which could negatively affect bird species that require large expanses of intact habitat. This fragmentation could result in increased competition, increased exposure to predators, and a higher likelihood of nest parasitism. It is also possible that individual nests could be destroyed if well pads, roads, and production facilities are constructed during the nesting season.

In addition to loss of habitat and habitat fragmentation, it is possible that noise and human presence during construction activities could displace individual birds to adjacent habitats. Effects of displacement could include increased risk of predation or failure to reproduce if adjacent habitat is at carrying capacity. Furthermore, impacts to birds at the species or local population level could include a change in abundance and composition as a result of cumulative habitat fragmentation from energy development in the larger area. Impacts to migratory bird species, which nest in sagebrush, pinyon-juniper woodlands and deciduous mountain shrub habitats, can be minimized if surface-disturbing activities take place outside the nesting season. All migratory bird species are protected by Federal and Colorado statutes.

To reduce potential impacts on nesting birds, clearing of vegetation in previously undisturbed areas should take place outside of the nesting season, if practicable. Nesting season is generally considered to be between April 1 and July 31 in this area. May 1 to June 30 is the peak period when most incubation and brood rearing takes place. Consequently, a COA in Appendix B would prohibit removal of vegetation during the period May 1 to June 30 unless a survey conducted during the affected breeding confirms that no BCC species are nesting within 10 meters of areas to be cleared. This 60-day Timing Limitation (TL) period is the maximum length that BLM can apply as a COA. If practicable, adherence by Williams to avoiding vegetation clearing after April 1 and before July 15, even if BCC species are not present, would further reduce the potential for nest destruction for all bird species and not merely those on the BCC list.

To protect nesting raptors, an additional 60-day Timing Limitation COA in Appendix B would prohibit construction, drilling, or completion activities from May 1 to June 30 unless surveys during the nesting season in any year document that no active nests are present within the buffer widths specified above.

Since the area was not surveyed during nesting season, it is recommended that the area be resurveyed if work is planned to be initiated during the period February 15 to August 15 to determine whether any active raptor nests are present in proximity to the pads or access road. If any occupied nests are found, Timing Limitations may be applied to protect nests potentially affected.

#### *No Action Alternative*

Under the No Action alternative, all Federal well applications would be denied; however, all of the pads and improvements except for the GM24-27 cuttings trench would still be constructed to access privately owned minerals. Therefore, disturbance to migratory birds would be somewhat less than under the Proposed Action.

### **Native American Religious Concerns**

#### Affected Environment

The Lower Wheeler Gulch EA project area is within a larger area identified by the Ute Tribes as part of their ancestral homeland. Cultural resource inventories (see **Cultural Resources**) were conducted to determine if there were any areas that might be culturally sensitive to Native Americans.

## Environmental Consequences

### *Proposed Action*

At present, no Native American concerns are known within the Lower Wheeler Gulch EA project area. The Ute Tribe (Northern Ute), Southern Ute, and Ute Mountain Ute Tribes were notified of the proposed Lower Wheeler Gulch EA on May 25, 2010. No responses, questions, or requests for additional information were received as of June 25, 2010. If new data are disclosed by the Ute Tribes, new terms and conditions may have to be negotiated to accommodate their concerns during the implementation phase. New construction always has the potential to damage or destroy unknown culturally sensitive sites. Standard COAs that would mitigate impacts to cultural resources are included in (Appendix B).

### *No Action Alternative*

Although the 51 Federal wells would be denied under the No Action alternative, the 20 Fee wells could be drilled and all pad expansion work could occur under the No Action alternative. Additionally, the proposed new road segment and support facilities (except the second cuttings trench proposed north of the GM24-27 pad) would still be implemented under this alternative. Under this alternative, there would still be potential for impact to unknown Native American resources. Although no direct impacts to known cultural resources would occur, cultural resources in the general area would still remain vulnerable to damage from accidental or inadvertent disturbance, increased illegal activities and natural processes.

## **Special -Status Species**

### *Federally Listed, Proposed, or Candidate Plant Species*

#### Affected Environment

According to the current species list available online from the USFWS (<http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf>), the following Federally listed, proposed, or candidate plant species may occur within or be impacted by actions occurring in Garfield County: DeBeque phacelia (*Phacelia submutica*), Parachute beardtongue (*Penstemon debilis*), Colorado hookless cactus (*Sclerocactus glaucus*), Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and Cathedral Bluffs meadowrue (*Thalictrum heliophilum*).

## Environmental Consequences

### *Proposed Action*

The results of a plant survey conducted in April 2010 indicated no habitat for Federally listed, proposed, or candidate plant species in the project area. Therefore, the project would have **"No Effect"** on these species.

### *No Action Alternative*

Because of the absence of potential habitat for any Federally listed, proposed, or candidate plant species in the project area, no impacts to these species would occur under the No Action alternative.

### ***Federally Listed, Proposed, or Candidate Animal Species***

#### Affected Environment

According to the current species list available online from the USFWS (<http://www.fws.gov/mountain-prairie/endspp/CountyLists/Colorado.pdf>), the following Federally listed, proposed, or candidate animal species may occur or be impacted by the Proposed Action: razorback sucker (*Xyrauchen texanus*), Colorado pikeminnow (*Ptychocheilus lucius*), bonytail [chub] (*Gila elegans*), humpback chub (*Gila cypha*), greenback cutthroat trout (*Oncorhynchus clarki stomias*), Mexican spotted owl (*Strix occidentalis*), western yellow-billed cuckoo (*Coccyzus americanus*), and Canada lynx (*Lynx canadensis*).

Colorado River Fishes. Four species of big-river fishes that are Federally listed as Endangered occur within the Colorado River drainage basin, which is approximately 4 miles south of the project area. These endangered species are the razorback sucker, Colorado pikeminnow, humpback chub, and bonytail. Designated Critical Habitat for the razorback sucker and Colorado pikeminnow includes the Colorado River and its 100-year floodplain west (downstream) from the town of Rifle. This portion of the Colorado River includes the reach downstream from the inflow of Parachute Creek, of which Wheeler Gulch is a tributary. The nearest known habitat for the humpback chub and bonytail is within the Colorado River approximately 60 miles downstream from the project area. Only one population of humpback chub, at Black Rocks west of Grand Junction, is known to exist in Colorado.

Greenback Cutthroat Trout. The greenback cutthroat trout, Federally listed as Threatened, is a subspecies of cutthroat trout native to the Platte River drainage on the eastern slope of Colorado. Its documented presence in some Garfield County streams suggest that fish were either intentionally removed from east-slope waters or stocked in west-slope waters, or that the genetics of this species and the Colorado River cutthroat trout (subspecies native the western slope) are not clearly defined. The greenback cutthroat trout is not known or expected to occur within or near the project area.

Terrestrial Vertebrates. None of the Federally listed, proposed, or candidate terrestrial wildlife species that occur or are potentially present in Garfield County—the Mexican spotted owl, western yellow-billed cuckoo, and Canada lynx—is considered likely to occur in the project area or vicinity due to lack of habitat and/or negative results of prior surveys. Hence, these species are not considered further in this EA. The bald eagle and peregrine falcon were removed from the list of threatened or endangered species in August 2007 and August 1999, respectively, and are now classified by BLM as sensitive species. Although no longer protected by the Endangered Species Act, both species remain protected by the MBTA; the bald eagle is also protected by the Bald and Golden Eagle Protection Act.

#### Environmental Consequences

##### *Proposed Action*

Endangered Colorado River Fishes. Construction activities would increase the potential for soil erosion and sedimentation. Although a minor temporary increase in sediment transport to the Colorado River may occur, it is unlikely that the increase would be detectable above current background levels. In any case, the Federally listed, proposed, or candidate fish species associated with the Colorado River are adapted to naturally high sediment loads and would not be affected. Surface runoff of pollutants from the project area also has the potential to affect Colorado River fishes. Leaks from trucks, drilling equipment, tanks, or ancillary facilities could likely reach the river during runoff events. Additional potential impacts to the endangered Colorado River fishes would be associated with depletions in flows due to use of water from the Colorado River in drilling, hydrostatic testing of pipelines, and dust abatement of unpaved access roads. Flow reductions in the Colorado River and major tributaries have resulted from evaporative

loss from reservoirs, withdrawals for irrigation, and other consumptive uses. These depletions have affected minimum flows, as well as peak “flushing” flows needed to maintain suitable spawning habitat.

In May 2008, BLM prepared a Programmatic Biological Assessment (PBA) addressing water-depleting activities associated with BLM’s fluid minerals program in the Colorado River Basin in Colorado. In response to BLM’s PBA, the USFWS issued a Programmatic Biological Opinion (PBO) (ES/GJ-6-CO-08-F-0006) on December 19, 2008. The PBO concurred with BLM’s effects determination of “**May Affect, Likely to Adversely Affect**” the razorback sucker, Colorado pikeminnow, humpback chub, or bonytail as a result of depletions associated with oil and gas projects. To offset the impacts, the BLM has set up a Recovery Agreement, which includes a one-time Fee per well to use for site-specific mitigation projects. These funds are used to contribute to the recovery of endangered fish through the restoration of habitat, propagation, and genetics management, instream flow identification and protection, program management, non-native fish management, research and monitoring, and public education.

#### *No Action Alternative*

Under the No Action alternative, all Federal well applications would be denied. However, all of the pads and improvements except for the GM24-27 cuttings trench would still be constructed to access privately owned minerals. Therefore the disturbance to migratory birds would be somewhat less than that of the Proposed Action.

#### ***BLM Sensitive Plant Species***

##### Affected Environment

BLM sensitive plant species with habitat and/or occurrence records in the area include DeBeque milkvetch (*Astragalus debequaeus*), Naturita milkvetch (*Astragalus naturitensis*), Roan Cliffs blazing star (*Mentzelia rhizomata*), Piceance bladderpod (*Lesquerella parviflora*), and Harrington’s penstemon (*Penstemon harringtonii*).

##### Environmental Consequences

#### *Proposed Action*

Results of an April 2010 plant inventory indicate no BLM sensitive plant species or their habitats in the vicinity of the Proposed Action.

#### *No Action Alternative*

Since no BLM sensitive plant species occur in the project area, no impacts to these species are anticipated.

#### ***BLM Sensitive Animal Species***

##### Affected Environment

BLM sensitive animal species with habitat and/or occurrence records in the portion of the CRVFO that includes the project area and vicinity are listed in Table 7.

<b>Table 7. Special-Status Wildlife Species Present or Potentially Present in the Project Area</b>		
<i>Common Name</i>	<i>Habitat</i>	<i>Potential for Occurrence</i>
Fringed myotis	Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats.	Possible
Townsend's big-eared bat	Breeds and roosts in caves, trees, mines, and buildings; hunts over pinyon-juniper, montane conifer, and semi-desert shrubland habitats.	Possible
Peregrine falcon	Nests on high cliffs and hunts along rivers and lakes for waterfowl.	Unlikely
Northern goshawk	Predominantly uses spruce/fir forests but will also use Douglas-fir, various pines, and aspens.	Possible winter visitor
Bald eagle	Nests and roosts in mature cottonwood forests along rivers, large streams, and lakes.	Present along Colorado River
Brewer's sparrow	Sagebrush shrublands, mountain parks; may be found in alpine willow stands.	Unlikely
Midget faded rattlesnake	High, cold desert dominated by sagebrush and with an abundance of rock outcrops and exposed canyon walls.	Possible
Great Basin spadefoot	Seasonal pools or slow-flowing ephemeral streams, primarily in desert and semi-desert grasslands, shrublands, and pinyon-juniper.	Unlikely
Northern leopard frog	Wet meadows and the shallows of marshes, ponds, glacial kettles, beaver ponds, lakes, reservoirs, streams, and irrigation ditches.	Unlikely
Flannelmouth sucker	Generally restricted to rivers and major tributaries.	Present in Colorado River
Roundtail chub	Generally restricted to rivers and major tributaries.	Present in Colorado River

Environmental Consequences

*Proposed Action*

For the sensitive species listed in Table 7, the minor amount of direct or indirect loss of suitable habitat, the transient nature of their potential use of the area, and the brief period of construction-related activities in any given part of the project area combine to result in negligible potential for adverse impacts. The bases for this determination are summarized below. Note that another BLM sensitive species present in the CRVFO, the Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) is not addressed here because it does not occur in Wheeler Gulch. Though it does occur in Parachute Creek the managed population is found several miles upstream from Wheeler Gulch behind natural barriers. Any incidental individuals found in the lower reaches are not genetically pure due to interbreeding with other trout.

Flannelmouth Sucker and Roundtail Chub. As with the ecologically similar Colorado River endangered fishes described above, the flannelmouth sucker (*Catostomus discobolus*) and roundtail chub (*Gila robusta*) are adapted to naturally high sediment loads and therefore would not be affected by increased sediment transport to the Colorado River. Furthermore, protective COAs for water quality would minimize this potential (Appendix B). However, these species are vulnerable to alterations in flow

regimes in the Colorado River (including evaporative losses from dams and depletions from withdrawal of water for irrigation or municipal water supplies) that affect the presence of sandbars and seasonally flooded overbank areas needed for reproduction.

Great Basin Spadefoot. In Colorado, this species (*Spea intermontana*) inhabits pinyon-juniper woodlands, sagebrush, and semi-desert shrublands. It ranges from the bottoms of rocky canyons to broad dry basins and stream floodplains (CDOW 2006). Great Basin spadefoots prefer sagebrush communities below 6,000 feet in elevation, although they have been found at elevations of 9,200 feet. Habitat types required for their survival include overwintering burrow sites, temporary breeding ponds and foraging areas, and safe passages between these areas. Potentially suitable habitat in the project area occurs along Wheeler Gulch, which carries sufficient water in proximity to pinyon-juniper and sagebrush habitat types.

Northern Leopard Frog. In the CRVFO area, the northern leopard frog (*Rana pipiens*) is found in wet meadows and along the banks and shallows of marshes, ponds, lakes, streams, and irrigation ditches. While the Great Basin spadefoot typically breeds in seasonal ponds and ephemeral streams, the northern leopard frog is associated only with perennial surface waters. No northern leopard frog populations have been identified in the Wheeler Gulch area. Although Wheeler Gulch appears suitable, it is prone to going dry in some years. Although some reaches may be essentially perennial, these are too small and isolated to support frogs, and even brief or infrequent periods of no surface water would be sufficient to have eliminated any pioneering populations. Therefore, this species is not analyzed further.

Midget Faded Rattlesnake. This small viper, *Crotalus viridis concolor*, is generally considered a small, pale-colored subspecies of the common and widespread western (prairie) rattlesnake, although some authorities consider it and another western subspecies, the Great Basin rattlesnake (*C.v. nuntius*) to be genetically distinct. Although movement patterns of midget faded rattlesnakes are not well known, they are believed to be limited to a few hundred meters from den sites. The limited distribution and small home range make this snake susceptible to impacts from human disturbance. Threats include direct mortality from vehicles traveling on roads and pads, off-highway vehicle use throughout the landscape, capture by collectors, and livestock grazing. As access into previously undeveloped areas increases, so does the risk of encounters with humans, resulting in some cases of mortality or collection.

Northern Goshawk. This species (*Accipiter gentilis*) is mostly limited to spruce/fir or aspen forests, such as atop the Roan Plateau, Battlement Mesa, and other areas that reach subalpine elevations. However, goshawks may migrate to lower elevation pinyon/juniper or Douglas-fir habitats during winter and therefore could make occasional, transitory use of the project area for winter foraging. Goshawks feed primarily on small birds but also on diurnal small mammals (rabbits, chipmunks, etc.).

Peregrine Falcon. Peregrine falcons nest along the Roan Cliffs in the vicinity of Anvil Points and hunt for waterfowl along the Colorado River or other birds across open terrain. The cliffs east of the project area are not known to contain nests of this species, and the presence of golden eagles on the nearby cliffs and the availability of abundant nest sites near Anvil Points make use of the project area very unlikely, except for infrequent, transitory overflights.

Bald Eagle. Although bald eagles nest and roost along the Colorado River just south of the project area, the potential for use of the actual project area is moderate. Any such use would most likely be by an individual hunting across large expanses of open upland habitats during winter. The project area would represent a small portion of such potential winter hunting habitat, and the reclaimed grass-forb community would provide better habitat for prey than the current shrubland types.

Fringed Myotis and Townsend's Big-eared Bat. No caves or other suitable roosting sites for the fringed myotis (*Myotis thysanodes*) or Townsend's big-eared bat (*Corynorhinus townsendii*) occur in the project

area. Loss of large trees, potentially also used for roosting, would be negligible. Loss of habitat above which the bats could search for aerial prey would also be minimal, and disturbance due to construction activities would not occur at night when the bats are Feeding.

#### *No Action Alternative*

Under the No Action alternative, all Federal well applications would be denied; however, all of the pads and improvements except for the GM24-27 cuttings trench would still be constructed to access privately owned minerals. Therefore the disturbance to migratory birds would be somewhat less than that of the Proposed Action.

### **Wastes, Hazardous or Solid**

#### Affected Environment

The affected environment for hazardous materials includes air, water, soil, and biological resources that may potentially be affected by an accidental release of hazardous materials during transportation to and from the project area, storage, and use in construction and operations. Sensitive areas for hazardous materials releases include areas adjacent to water bodies, above aquifers, and areas where humans or wildlife would be directly impacted.

BLM Instruction Memoranda numbers WO-93-344 and CO-97-023 require that all National Environmental Policy Act (NEPA) documents list and describe any hazardous and/or extremely hazardous materials that would be produced, used, stored, transported, or disposed of as a result of a proposed project. The Glenwood Springs Resource Area, Oil & Gas Leasing & Development, Draft Supplemental Environmental Impact Statement (June 1998), Appendix L, Hazardous Substance Management Plan, contains a comprehensive list of materials that are commonly used for oil and gas projects. It also includes a description of the common industry practices for use of these materials and disposal of the waste products. These practices are dictated by various Federal and State laws and regulations, and the BLM standard lease terms and stipulations that would accompany any authorization resulting from this analysis. The most pertinent of the Federal laws dealing with hazardous materials contamination are as follows:

- The Oil Pollution Act (Public Law 101-380) prohibits discharge of pollutants into waters of the US, which by definition would include any tributary, including any dry wash that eventually connects with the Colorado River.
- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Public Law 96-510) provides for liability, compensation, cleanup, and emergency response for hazardous substances released into the environment. It also provides national, regional, and local contingency plans. Applicable emergency operations plans in place include the National Contingency Plan (40 CFR 300, required by section 105 of CERCLA), the Region VIII Regional Contingency Plan, the Colorado River Sub-Area Contingency Plan (these three are Environmental Protection Agency produced plans), the Mesa County Emergency Operations Plan (developed by the Mesa County Office of Emergency Management), and the BLM Grand Junction Field Office Hazardous Materials Contingency Plan.
- The Resource Conservation and Recovery Act (RCRA) (Public Law 94-580) regulates the use of hazardous substances and disposal of hazardous wastes. Note: While oil and gas lessees are exempt from RCRA, right-of-way holders are not. RCRA strictly regulates the management and disposal of hazardous wastes.

Emergency response to hazardous materials or petroleum products on BLM lands are handled through the BLM Grand Junction Field Office contingency plan. BLM would have access to regional resources if justified by the nature of an incident.

### Environmental Consequences

#### *Proposed Action*

Possible pollutants that could be released during the construction phase of this project would include diesel fuel, hydraulic fluid, and lubricants. These materials would be used during construction of the pads, roads, and pipelines, and for refueling and maintaining equipment and vehicles. Potentially harmful substances used in the construction and operation phases would be kept onsite in limited quantities and trucked to and from the site as required. No hazardous substance, as defined by 40 CFR 355 would be used, produced, stored, transported, or disposed of in amounts above threshold quantities.

Waste generated by construction activities would not be exempt from hazardous waste regulations under the oil and gas exploration and production exemption of RCRA. Exempt wastes would include those associated with well production and transmission of natural gas through the gathering lines and the natural gas itself.

With the exception of produced hydrocarbons, ethylene glycol (antifreeze), lubricants, and amine compounds, chemicals subject to reporting under Title III of the Superfund Amendments and Reauthorization Act in quantities of 10,000 pounds or more would not be used, produced, stored, transported, or disposed of during construction or operation of the facilities. None of the chemicals that would be used in construction meets the criteria for an acutely hazardous material/substance, or meet the quantities criteria per BLM Instruction Memorandum No. 93-344. In addition, no extremely hazardous substance, as defined in 40 CFR 355, in amounts above threshold planning quantities would be produced, used, stored, transported, or disposed of during construction or operation of the facilities.

Solid waste (human waste, garbage, etc.) would be generated during construction activities and, to a limited extent, during project operations. These would be removed to a landfill or water treatment facility as needed, and all would be removed prior to interim reclamation.

Surface water or groundwater could be impacted under the Proposed Action. Pollutants that might be released during the operational phase of the project could include condensate, produced water (if the wells in the area produce water) and glycol (carried to the site and used as antifreeze). While uncommon, an accident could occur that could result in a release of any of these materials. A release could result in contamination of surface water or soil. Improper casing and cementing procedures could result in the contamination of groundwater resources. In the case of any release, emergency or otherwise, the responsible party would be liable for cleanup and any damages. Depending on the scope of the accident, any of the above referenced contingency plans would be activated to provide emergency response. At a minimum, the BLM Grand Junction Field Office contingency plan would apply.

These laws, regulations, standard lease stipulations, and contingency plans and emergency response resources are expected to adequately mitigate any potential hazardous or solid waste issues associated with the Proposed Action.

#### *No Action Alternative*

Although the surface disturbance would be reduced by only 7%, the number of wells drilled would drop by 72%. As a result, potential effects on soil or surface water from hazardous wastes would be further reduced from the potential described in the Proposed Action, but would not disappear.

## Water Quality, Surface and Ground

### *Surface Water*

The proposed project would be located within the Wheeler Gulch sub-watershed within the larger (5<sup>th</sup> code) Parachute Creek Watershed. Wheeler Gulch drains the largest area within this sub-watershed. All of the existing pads, including the proposed frac pad facility, are located within 750 feet of Wheeler Gulch.

According to the *Stream Classifications and Water Quality Standards* (CDPHE, Water Quality Control Commission [WQCC] Regulation No. 37) (CDPHE 2007), Wheeler Gulch and the other ephemeral drainages within this watershed are within segment 4a that includes all tributaries to the Colorado River from the confluence with the Roaring Fork River to a point immediately below the confluence with Parachute Creek. Segment 4a has been classified aquatic life cold 2, recreation 2, water supply, and agriculture. Aquatic life cold 2 indicates that this water course is not capable of sustaining a wide variety of cold or warm water biota due to habitat, flows, or uncorrectable water quality conditions. Recreation class 2 refers to waters that are not suitable or intended to become suitable for primary contact recreation. This segment is, however, suitable or intended to become suitable for potable water supplies and agricultural purposes that include irrigation and livestock use. At this time, there are no water quality data for these unnamed ephemeral drainages.

These drainages are not currently on the State of Colorado's *Stream Classifications and Water Quality Standards* (CDPHE, WQCC Regulation No. 37) (CDPHE 2007), the State of Colorado's *303(d) List of Water Quality Limited Segments Requiring TMDLS* (CDPHE, WQCC Regulation No. 93) (CDPHE 2006a), or the State of Colorado's *Monitoring and Evaluation List* (CDPHE, WQCC Regulation No. 94) (CDPHE 2006b). At this time, no water quality data are available for these drainages.

The closest downstream sediment measuring station on the Colorado River is located near DeBeque, Colorado, a few miles downstream from the confluence with Parachute Creek. A summary of the 2 years of data collected at this station is presented in Table 8 (USGS 2007).

<b>Table 8. Sediment Yields – USGS Station 9093700 (Colorado River near DeBeque, CO)</b>				
<i>Maximum (tons/day)</i>	<i>Minimum (tons/day)</i>	<i>Mean (tons/day)</i>	<i>Median (tons/day)</i>	<i>Period of Record</i>
41,300	8.4	1,817.6	267	1974 – 1976
Source: USGS 2007.				

## Environmental Consequences

### *Proposed Action*

Potential impacts to surface water associated with the Proposed Action include increased erosion and sedimentation of streams due to changes in channel morphology due to road and pipeline crossings, and contamination by drilling fluids, produced water, or condensate. Surface waters would be most susceptible to sedimentation during construction, drilling, and completion activities, which would

collectively last approximately 30 to 45 days. After this period, reclamation activities would substantially reduce surface exposure, decreasing the risk to surface waters over the long term.

Although surface waters would be most susceptible to sedimentation over the short-term, access roads would remain in place over the life of the well (i.e., 20 to 30 years) and would channel runoff during periods of precipitation. Sedimentation and stream channel impacts associated with roads would be reduced through the implementation of Best Management Practices (BMPs) and other preventative measures. As proposed, these measures would include limiting cut slope steepness, step-cutting, limiting road grade to 10%, crowning road surfaces, installing culverts and drainage systems, and applying gravel to all new or upgraded roads in the project area to a compacted thickness of 6 inches (Appendix B).

Other elements of the Proposed Action are designed to mitigate risks to surface waters associated with the release of drilling fluids, produced water, and condensate. Tanks used to store produced water and condensate would be placed in secondary containment to prevent offsite release. In the event of an accidental release, produced water and condensate would be confined for cleanup in a containment area and would not migrate to surrounding soils or surface waters. Pipelines associated with the transport of these liquids would be pressure tested to detect leakage prior to use. Cuttings pits must be decontaminated to COGCC standards prior to pit closure; the table of applicable standards can be found at [http://cogcc.state.co.us/RR\\_docs\\_new/rules/900Series.pdf](http://cogcc.state.co.us/RR_docs_new/rules/900Series.pdf)

Refer to Appendix B for standard COAs that would be implemented to mitigate impacts to surface water. Through the use of COAs and BMPs associated with construction activities, prompt interim reclamation, and the implementation of the preventative measures associated with the treatment of fluids, impacts to surface waters would be minimized and should be minor.

#### *No Action Alternative*

Under the No Action alternative, only the 20 Fee wells would be drilled. However, all of the other planned improvements (frac pad/pits, produced water collection system, and centralized storage tank pad) would be constructed to serve the Fee wells except for the GM24-27 cuttings trench. Using a direct correlation, the impacts to water quality would be reduced by 7% with the implementation of the No Action alternative.

#### *Waters of the U.S.*

##### Affected Environment

Section 404 of the Clean Water Act requires a Department of the Army permit from the U.S. Army Corps of Engineers prior to discharging dredged or fill material into waters of the United States as defined by 33 CFR Part 328. A Department of the Army permit is required for both permanent and temporary discharges into waters of the United States.

##### Environmental Consequences

#### *Proposed Action*

One crossing for the new road access to the MV23-27 pads of Waters of the U.S. or streams that are potentially Waters of the U.S. would be included in the Proposed Action. With the planned stormwater controls and pad siting reviews conducted during field onsite, it is not anticipated that any pad construction could discharge fill into Waters of the U.S.

Improperly designed crossings of small ephemeral drainages, in particular undersized or poorly aligned culverts, could result in soil degradation that could include excessive erosion at culvert outlets, potentially supplying sediment to the Colorado River approximately 4 miles to the south. However, standard and site-specific surface-use COAs listed in Appendix B would be implemented to protect the Colorado River and any other waters of the U.S. that could be impacted by such long-distance stormflow transport.

#### *No Action Alternative*

Under this alternative, the culvert installation for the MV23-27 pad would still be implemented; there would be no change in impacts to Waters of the U.S between the Proposed Action and the No Action alternative.

### **Groundwater**

#### Affected Environment

The proposed activities are located within the Colorado Division of Water Resources (CDWR) Water Division 5, the Colorado River Basin Main Stem. The groundwater in this division is generally found in both alluvial and sedimentary aquifers. Unconsolidated alluvial aquifers are the most productive aquifers in the region and consist of boulders, cobbles, gravel, sand, silt, and clay. Alluvial well depths are generally less than 200 feet and water levels typically range between 100 to 150 feet. The thickness of the alluvium tends to be thicker in the lower reaches and basin center where it can accumulate easier but thinner at the basin margins due to increased slopes and higher flow velocities. Well yield is dependent upon the intended use of the well, well construction design, sediment type and saturated thickness. Domestic use wells are limited to 15 gallons per minute (gpm) administratively, while municipal wells are designed and constructed for maximum potential yield.

The principal bedrock aquifers of the basin are the Uinta Formation and the Parachute Creek Member of the Green River Formation, and are defined as the upper and lower Piceance Basin aquifer systems. The upper Piceance Basin aquifer is underlain by the Mahogany confining unit, and correlates with the Mahogany Zone, the principal oil shale unit of the Piceance Basin. The Mahogany Zone separates the upper aquifer from the lower. The upper aquifer consists of both the Uinta Formation and the upper portion of the Parachute Creek Member of the Green River Formation. The lower aquifer consists of the fractured marlstone of the lower part of the Parachute Creek Member. The thickness of the upper and lower aquifer units average 700 and 900 feet, respectively (CGS 2003). These two aquifer systems are bounded on the north by the White River and on the south by the Colorado River. The Colorado River delineates the northern and southern provinces of the Piceance Basin. The principal rivers that drain the Piceance Basin are the Colorado, mainstem Gunnison, North Fork of the Gunnison, and White rivers.

The existing pads are underlain by Wasatch Formation sediments. Both the upper and lower aquifer systems are found within the surrounding cliffs of the project area, but no water wells are completed within either the upper or lower bedrock aquifers units as described above. Numerous water wells are found downgradient of Wheeler Gulch, within the alluvial sediments of Parachute Creek. Wheeler Gulch is tributary to Parachute Creek.

Most of the groundwater recharge is provided by winter precipitation and stored as snowpack at the higher elevations within the basin. In the summer, little, if any rainfall infiltrates and percolates to the saturated zone (Glover et al. 1998). Most precipitation is lost to evapotranspiration, with estimates of loss as high as 98% (Taylor 1987, cited in CGS 2003). In the Piceance Basin, recharge flows from recharge areas near the margins of the basin to discharge areas near principal stream valleys. The groundwater moves laterally and/or upward discharging directly to streams, springs, and seeps.

Water quality of the upper Piceance Basin aquifer unit is relatively good, ranging in Total Dissolved Solid (TDS) levels from 500 to 1,000 milligrams per liter (mg/L). In the lower unit, TDS concentrations increase from 1,000 to 10,000 mg/L along basin flow paths. Waters with TDS values in excess of 1,000 mg/L are generally unsuitable for potable supply. Water suitable for drinking has a Federal secondary standard set at 500 mg/L or less (EPA 2006). The quality of the water in the Mesaverde aquifer is highly variable, with concentrations of dissolved solids ranging from less than 1,000 milligrams per liter in many of the basin-margin areas to more than 10,000 milligrams per liter in the central part of the Piceance Basin (EPA 2004). In general, areas of the aquifer that are recharged by infiltration from precipitation or surface water sources contain relatively fresh water. However, water quality in the Piceance Basin is generally poor overall because of nahcolite deposits and salt beds present within the basin. Only very shallow waters such as those from the surficial Wasatch Formation are used for drinking water (Graham 2001, cited in EPA 2004).

No permitted domestic water wells are located within the existing or proposed disturbance for the pad expansions or the newly proposed Highlands bypass road segment. Numerous wells are found south and southwest of the proposed activities in Sections 33 and 34, T6S, R96W, with the majority of these wells identified as monitoring wells. Analysis of well parameters indicates shallow well depths of 100 feet or less, and static water levels of 60 feet or less. Farther upstream in Parachute Creek, two municipal wells with high yield augmented flows, are the only wells in the area that are not designated as monitoring wells. Well depth and water levels for these augmented wells fall within typical well parameters, shallow well depths and water levels, as do most fresh water wells found throughout most of this part of the Piceance Basin.

### Environmental Consequences

#### *Proposed Action*

Potential impacts to groundwater resources from the Proposed Action would include contamination of the groundwater with produced water, drilling mud, and petroleum constituents. Hydraulic fracturing (fracing) would be incorporated to create additional pathways to facilitate gas production, which would otherwise be held captive within the tight gas sands of the Williams Fork. Proppants, or propping agents are mixed with both fresh and produced water, and typically include sand, aluminum, glass, or plastic beads, and minor amounts, less than 1%, of other compounds such as corrosion, friction, and scale inhibitors (EnerMax Inc. 2007). Hydrofracturing would be conducted at 5,000 feet or more below ground surface (bgs), and is unlikely to cause impacts to groundwater resources near the surface. With the use of proper construction practices, drilling practices, and BMPs, no significant adverse impact to groundwater aquifers is anticipated to result from the project (see Appendix B regarding cementing and casing programs).

#### *No Action Alternative*

Although drilling, completion, and production of the 51 Federal wells would not occur under the No Action alternative, drilling of the proposed 20 new Fee wells would continue under COGCC authority. Groundwater resources would be identified and associated mitigation for the protection of these resources would still occur. Proper casing and cementing procedures would be implemented in order to protect these resources

### **OTHER AFFECTED RESOURCES**

In addition to the critical elements, the resources presented in Table 9 were considered for impact analysis relative to the Proposed Action and No Action alternative. Resources that would be affected by the Proposed Action and No Action alternative are discussed following the table.

<b>Table 9. Other Resources Considered in the Analysis</b>			
<i>Resource</i>	<i>NA or Not Present</i>	<i>Present but Not Affected</i>	<i>Present and Affected</i>
Access and Transportation			X
Cadastral Survey	X		
Fire/Fuels Management	X		
Forest Management	X		
Geology and Minerals			X
Law Enforcement	X		
Paleontology			X
Noise			X
Range Management	X		
Realty Authorizations	X		
Recreation	X		
Socio-Economics			X
Soils			X
Vegetation			X
Visual Resources			X
Wildlife, Aquatic			X
Wildlife, Terrestrial			X

### **Access and Transportation**

#### Affected Environment

The project area lies 5 miles northwest of Parachute, Colorado in the lower reaches of the Wheeler Gulch watershed. Garfield County's Parachute Creek Road (CR215) provides the direct motorized access to Wheeler Gulch. Public access into Wheeler Gulch is prohibited and monitored with a Williams-manned guard station near CR215. Roads presently serving the proposed pad expansions are sufficient for the planned drilling development with the exception of the new road spur planned for the MV23-27 pad. The Lower Wheeler Gulch Road also is the primary vehicle route to Williams's Highlands gas field featuring a series of steep switchbacks up the side of Wheeler Gulch and a lengthy tunnel to access the top of the Roan Plateau.

#### Environmental Consequences

##### *Proposed Action*

The Proposed Action would result in a substantial increase in truck traffic. The largest increase would be during rig-up, drilling, and completion activities. Data indicate that approximately 1,160 truck trips over a 30-day period would be required to support the drilling and completion of each well (Table 10). Once the wells are producing, traffic would decrease to occasional visits for monitoring or maintenance activities,

and hauling produced water and condensate. Each well may have to be recompleted once per year, requiring three to five truck trips per day for approximately seven days.

The water pipeline system planned for Lower Wheeler Gulch area would collect produced waters generated from the existing and new wells which would drastically reduce the typical truck traffic counts. The cuttings trench(s) planned near the GM24-27 pad would require additional truck trips to haul cuttings from the five pads during the well drilling periods.

<b>Table 10. Traffic Associated with Drilling and Completion Activities</b>		
<i>Vehicle Class</i>	<i>Number of trips per well</i>	<i>Percentage of total</i>
16-wheel tractor trailers	88	7.6%
10-wheel trucks	216	18.6%
6-wheel trucks	452	39.0%
Pickup trucks	404	34.8%
<b>Total</b>	<b>1,160</b>	<b>100.0%</b>
Source: BLM 2006. Note: Trips by different vehicle types are not necessarily distributed evenly during the drilling process. Drilling and completion period can range from 30 to 45 days per well.		

Degradation of field development roads may occur due to heavy equipment travel and fugitive dust and noise would be created. Mitigation measures (Appendix B) would be required as conditions of approval to ensure adequate dust abatement and road maintenance occur.

*No Action Alternative*

Under the No Action alternative, only the 20 Fee wells would be drilled resulting in a 72% decrease in the related truck traffic supporting well drilling, completion and production.

**Geology and Minerals**

Affected Environment

The project area lies along the south-facing cliffs of the Roan Plateau, a prominent landform located just north of I-70 between Rifle and Parachute. The top of the plateau ends dramatically in 1,500 foot deep canyons carved by a drop in base level of the Colorado River. Late Cenozoic incision of the upper Colorado River led to elevational isolation of the Plateau and initiation of a wave of incision into its southern edge. Knickpoints (over-steepened reaches containing waterfalls 60 to 110 meters in height) mark the upstream extent of this headward propagating incision (Berlin and Anderson, 2007). Sedimentary strata of the Roan cliffs include the Uinta, Green River and Wasatch Formations. The youngest of these, the Uinta Formation, forms the undissected upland surfaces on top of the plateau (BLM 2006). The Uinta Formation, estimated to be greater than 400 feet thick in the area, is underlain by the lacustrine rocks of the Green River Formation. The three members of the Green River Formation, the upper Parachute Creek, the middle Garden Gulch, and the basal Douglas Creek members, can be traced in complete section along the steep walled Roan cliffs, just north of the project area. The oil shale rich Mahogany Zone of the Parachute Creek Member, a prominent marker bed, can be traced along the steep cliffs as well.

Surface exposures within the project area consist of unconsolidated alluvial and colluvial deposits, with stream gravels along Wheeler Gulch and its tributaries. Surrounding bedrock exposures of the Tertiary Wasatch and Green River Formations are evident along the upper reaches of the Wheeler Gulch canyon.

Table 11 describes the mapped geologic formations exposed within the project area and their characteristics.

<b>Table 11. Geologic Formations within the Study Area</b>				
<i>Map Symbol</i>	<i>Formation Name</i>	<i>Age</i>	<i>Characteristics</i>	<i>Location</i>
Qa	Unconsolidated Deposits	Holocene	Alluvium, gravel, sand, and silt and alluvial fans	Stream valleys
Tu	Uinta Formation	Eocene	Siltstone, sandstone, and marlstone	Top of Roan Plateau
Tgp	Parachute Creek Member of Green River Fm	Eocene	Gray and yellow-brown marlstone and tuff and Mahogany oil shale bed	Roan cliffs
M	Mahogany oil-shale bed	Eocene	Dark gray and blue-gray ledge-forming oil shale	Roan cliffs
Tgg	Garden Gulch Member of Green River Fm	Eocene	Dark –brown and gray flaky shale and brown sandstone and limestone	Roan cliffs
Tga	Anvil Points Member of Green River Fm	Eocene	Gray and brown sandstone, siltstone, and limestone and gray and green shale	Roan cliffs
Tgd	Douglas Creek Member of Green River Fm	Eocene	Gray and brown sandstone, siltstone, and limestone and green and gray shale	Lower Roan cliffs
Two	Wasatch Formation	Eocene, Paleocene	Red, gray, and brown sandstone and siltstone and red, green, and gray shale	Base of Roan cliffs and predominant surface exposures north of the Colorado River

Source: Tweto et al. 1978, Ellis and Freeman 1984, Shroba and Scott 1997

The Mesaverde Group is the target zone of the proposed drilling program. Made up of the Williams Fork and Iles Formations, sediments of the Mesaverde Group are composed of marine sandstones and transitional to nonmarine beds of coal, shale, and sandstone. These sediments were deposited marginal to the great Cretaceous seaway (Warner, 1964) that occupied much of the Western Interior region during that time. The oscillating shoreline of this sea, due to the rise and fall of sea level, left behind a complex of transgressive and regressive sedimentary sequences of nearshore and offshore sediments that define the Mesaverde Group.

### Environmental Consequences

#### *Proposed Action*

The proposed wells would penetrate the Mesaverde Group and overlying Wasatch Formation to develop natural gas resources. If recovery and production prove feasible, potential impacts to geological resources would include changes to local topography, and increased slope instability. The five well pad expansions

would be located along a narrow steep walled canyon within the lower reaches of Wheeler Gulch. Slope instability issues may be encountered during the roadway construction of the proposed Highlands road bypass, but may be mitigated with best management practices (BMPs) to address site specific conditions.

Production is derived from three reservoir intervals, which include the Wasatch Formation, the Williams Fork Formation, and Iles Formation. The latter two make up the Upper Cretaceous Mesaverde Group. Mesaverde Group reservoirs are tight throughout most of the Piceance Basin, and generally become tighter with depth of burial (Spencer 1983). Tight reservoirs are those defined as having low permeabilities, less than 0.1 millidarcy (md), and are subdivided into those having high porosity (HP) and low porosity (LP) characteristics. Mesaverde Group reservoirs of the southern Piceance Basin are LP gas reservoirs (Spencer 1988). Substantial reserves have been known to be trapped within the tight sands of these reservoirs since the late 1950s, but only within the last decade, and particularly within the last few years, has the integrated application of new technologies turned the tight gas sands into a profitable play (Kuuskraa 1997). Natural fracture detection, advanced log analysis, more rigorous well completions and recompletions, and denser spacing have increased the amount of recoverable gas within these reservoirs.

The proposed drilling program would target the sandstone sequences of the Upper Williams Fork Formation, which provide the bulk of the natural gas production (Lorenz 1989). The upper portions of the Williams Fork were deposited in a fluvial setting and include fluvial point bar, floodplain, and swamp deposits. The Lower Williams Fork Formation includes delta front, distributary channel, strandplain, lacustrine and swamp environments (Hemborg 2000), while the sandstones and coalbeds of the Iles Formation were deposited in a wave-dominated coastal setting (Johnson 1989, Lorenz 1989). The source rocks are interbedded and thermally mature gas-prone shales, mudstones, siltstones, and coals. The reservoir rocks are the fine- to medium-grained Williams Fork sandstones, varying in thickness from less than 10 feet to more than 50 feet (Spencer 1988), creating an interbedded relationship between source and reservoir. The trapping mechanism of the tight gas is both stratigraphic and diagenetic.

Initial production rates would be expected to be highest during the first few years of production, then decline during the remainder of the economic lives of the wells. Natural gas production from the proposed wells would contribute to the draining of hydrocarbon-bearing reservoirs within the Mesaverde Group in this area, an action consistent with BLM objectives for mineral production.

Casing programs have been designed to specifically prevent hydrocarbon migration from gas-producing strata penetrated by the wellbore during drilling, initial production and after completion of the well. Identification of potential fresh water bearing zones, aquifers, gas producing zones, and over- and under-pressured zones are incorporated into drilling scenarios for the proposed wells. Estimates of what depth these zones would be encountered are used to determine drilling fluids, fluid densities, surface casing depths, and production planning. If one of these identified zones is encountered during drilling, cement volumes will be adjusted to isolate that zone. This is designed to prevent accidental contamination or leakage of hydrocarbons or fracturing fluids into other productive zones within the wellbore.

### ***No Action Alternative***

Under the No Action alternative, the development of 51 Federal wells would not be approved, but the development of 20 Fee wells would proceed under COGCC authority. No new impacts to the geology and mineral resources on Federal mineral estate would occur.

## Noise

### Affected Environment

The Proposed Action would lie within a rural setting characterized by recent natural gas development activities. Noise levels in the area are presently created by traffic serving existing wells and ongoing drilling and completion, and well production activities. The proposed GM331-34 pad expansion and Wheeler Gulch water tank pad would be located within 0.25 mile of the nearest residence.

### Environmental Consequences

#### *Proposed Action*

The project would result in increased levels of noise during the construction, drilling, and completion phases. The noise would be most noticeable along the roads used to haul equipment and at the pad locations. Drilling activities are subject to noise abatement procedures as defined in the Colorado Oil and Gas Conservation Commission Rules and Regulations (Aesthetic and Noise Control Regulations), generally a limit of 80 decibels dBA during the day and 75 dBA during the night, measured at a distance of 350 feet. Operations involving pipeline or gas facility installation or maintenance, the use of a drilling rig, completion rig, workover rig, or stimulation is subject to the maximum permissible noise levels for industrial zones.

Short-term (7- to 14-day) increases in noise levels would characterize road and well pad construction. Based on the Inverse Square Law of Noise Propagation (Harris 1991) and a typical construction site noise level of 60 to 69 dBA at 500 feet (Table 12), construction noise would be 54 to 63 dBA at 1,000 feet, approximately the same as an active commercial area (EPA 1974).

Equipment	Noise Level (dBA)		
	50 feet	500 feet	1,000 feet
Air Compressor, Concrete Pump	82	62	56
Backhoe	85	65	59
Bulldozer	89	69	63
Crane	88	68	62
Front End Loader	83	63	57
Heavy Truck	88	68	62
Motor Grader	85	65	59
Road Scraper	87	67	61
Tractor, Vibrator/Roller	80	60	54
Sources: BLM (1999a), La Plata County (2002)			

Noise impacts from drilling and completion activities would last approximately 45 to 60 days at each well. Noise would occur continuously, 24 hours per day, during the drilling and completion period. Based on a measured noise level of 68 dBA at 500 feet, actions associated with drilling and completion would generate approximately 62 dBA at 1,000 feet. This level of noise approximates that associated with light industrial activities (EPA 1974). These increased noise levels would be in addition to levels of

noise that are already above background levels due to current oil and gas developments in the area. As stated above, the nearest residence is 0.5 mile away.

Traffic noise levels would also be elevated as a consequence of the Proposed Action. The greatest increase would be along access roads during the drilling and completion phases. Based on the La Plata County data presented in Table 12, approximately 68 dBA of noise (at 500 feet) would be created by each fuel and water truck that travels these roads. Less noise would be created by smaller trucks and passenger vehicles such as pickup trucks and sport utility vehicles. Although the duration of increased noise from this source would be short, it would occur repeatedly during the drilling and completion phases.

Noise impacts would decrease during the production phase. These levels would be less than during the construction phase, but greater than background noise levels. During maintenance and workovers, noise levels would increase above those associated with routine well production. Traffic noise level would impact residences located along county roads that provide primary access into the area. While exposure to these noise levels is not likely to be harmful, it is likely to be annoying to residents.

#### *No Action Alternative*

With this alternative, only the 20 Fee wells would be drilled resulting in a 72% decrease in the related noise associated with well drilling, completion and production activities.

## **Paleontology**

### Affected Environment

The predominant surface formations exposed within the Proposed Action are the Wasatch and Lower Green River Formations. All of the proposed pads are underlain by sediments of the Wasatch Formation. Just southwest of the MV 10-23 well pad is the surface formation contact of the Wasatch and Lower Green River Formations.

The Potential Fossil Yield Classification System (PFYC) used to rank geologic formations by fossil potential rates the Lower Green River Formation as a Class 3 formation. Class 3 formations are defined as having moderate or unknown potential to produce fossil resources. Fossils ranked in this class usually only occur sporadically and with very low predictability. The Lower Green River Formation has produced only minor fossil insects and plants, unlike the upper Parachute Creek Member, which has yielded over 100 species of fossil insects, plants, gar and other fish, turtles, and crocodilians (BLM 1998).

The Wasatch Formation, also known as the DeBeque Formation within this part of the Piceance Basin, is ranked under the PFYC system as a Class 4/5 formation. The probabilities of finding fossils within these units are *high* and *very high*, respectively. In Class 4 units, vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur, but may vary in occurrence and predictability. Class 5 units predictably and consistently produce significant fossils. Although the Wasatch Formation is ranked high under the PFYC system, 4 and 5 out of 5 classes, lack of bedrock exposure lowers the risk of human-caused adverse impacts and natural degradation within the proposed pad expansion area.

There is potential to find fossil resources within the bedrock exposures of the Wasatch Formation in this area. Just west of the GM 32-27 well pad, within approximately 600 feet, are two fossil discovery sites identified from the BLM fossil resource database. An additional site is found approximately 500 feet southwest of the same pad, located along the proposed frac line corridor. On-site investigation of the well pads confirmed some bedrock exposures along the stream course of Wheeler Gulch, but the relatively flat

lying soil covered valley floor is draped with colluvial material from the surrounding steep walled Roan cliffs.

### Environmental Consequences

Construction activities have the potential to uncover fossils that may be present under the soil cover, but the amount of soil that would have to be removed to expose Wasatch bedrock is unknown. In general, the accumulation of reworked sediments does not usually produce large significant fossils remains. The fossil discovery sites that are identified are most likely the result of erosional “float” that originated upstream along the exposed bedrock of the steep canyon walls surrounding Wheeler Gulch.

According to Murphey and Daitch (2007), all members of the Wasatch Formation contain vertebrate fossils in varying abundances. Identified fossils include marsupials, representatives of two extinct orders of early mammals (pantodonts and creodonts), artiodactyls (deer-like, even-toed ungulates), ancestral horses and other perissodactyls (odd-toed ungulates), carnivores, and primates. Birds, lizards, turtles, crocodilians, gars and other fishes, freshwater clams, gastropods, and other invertebrates have also be identified (BLM 1999a).

Further examination of the BLM paleontology database indicates additional fossil sites found approximately 1 mile west of the sites previously discussed. Located on Wasatch Formation sediments in SWNE Section 28 T6S, R96W, are three sites along an unnamed tributary of Parachute Creek. Additional sites have been identified farther south and southeast of the proposed activities, but no closer than a 1.5-mile radius of the proposed facilities. As a result of the onsite inspection, paleontological resources are not expected to be impacted by construction activities of this development plan. In the event that discovery sites are encountered, a standard paleontological condition of approval would be attached to the APDs submitted for the planned Federal wells (Appendix B)

### *No Action Alternative*

Under the No Action alternative, the 51 Federal wells would not be drilled, but the 20 Fee wells proposed under this development plan would continue. All well pad expansions and improvements except for the GM24-27 cuttings trench could occur under COGCC authority. There would be no impact to paleontological resources on Federal lands.

## **Socio-Economics**

### Affected Environment

The project area is located within Garfield County, Colorado. The population of Garfield County has grown by approximately 2.7% per year from 2000 to 2005, resulting in an increase from 44,000 to 51,000 residents (DOLA 2007). Population growth in Garfield County is expected to more than double over the next 20 years from over 50,000 in 2005 to 116,000 in 2025 (DOLA 2007).

In the year 2000, industry groups in Garfield County with the highest percentage of total employment were construction (20.4 percent), tourism (10.7 percent), retail trade (13.7 percent), and education and health (15.4 percent). An estimated 13.3% of the population was retired in the year 2000 and did not earn wages. Employment in agriculture, forestry, hunting, and mining accounted for 2.4% of total employment.

Personal income in Garfield County has also risen, growing 120% from \$513 million in 1990 to \$1.1 billion in 2000. Annual per capita income has grown by 50% during the same period, from about \$17,000

to \$26,000 (BLM 2006), and the average earnings per job in 2005 was approximately \$37,500 (Garfield County 2007). The communities of Parachute, Silt, and Rifle are considered the most affordable for housing; the communities of Battlement Mesa, New Castle, and Glenwood Springs the least affordable where the cost to rent or own similar housing may be 50% or more (BLM 2006).

Activities on public land in the vicinity of the project area are primarily ranching/farming, hunting, OHV travel, and the development of oil and gas resources. Hunters contribute to the economy because many require lodging, restaurants, sporting goods, guides and outfitting services, food, fuel, and other associated supplies. Big game hunting, in particular, is viewed as critical to Garfield County, and especially the local community economies that depend on BLM and National Forest System public lands where most hunting occurs (BLM 2006). Expenditures by hunters in the Roan Plateau Planning Area have been estimated to be as much as \$1 million annually, with perhaps an additional \$1 million annually of indirect and local expenditures (CDOW 1995, cited in BLM 2006).

The growth of the oil and gas industry in the past 10 years has been increasingly important to local economies (BLM 2006). Gas production in Garfield County has increased tremendously during the past eight years from 70 billion cubic feet (BCF) in 2000 to more than 376 BCF in 2008 (COGCC 2009). In addition, Garfield County is experiencing the fastest oil and gas development in Colorado with 3,000 drilling permits currently approved (COGCC 2009). While the number of workers employed in the mining and extraction industry in Garfield County has been shown to be only 1.7% , this number is considered misleading because some oil and gas employment has been incorporated as part of the construction sector statistics instead (BLM 2006). For example, in the year 2005, an estimated 4000 persons were directly employed by gas development companies and their subcontractors in Garfield County (Garfield County 2007).

The Federal government makes “Payments in Lieu of Taxes” (PILT) to County governments to help offset property tax revenue lost of nontaxable Federal lands within County boundaries (BLM 2006). Payments are based on Federal acreage in the County for all land management agencies, including BLM, U.S. Forest Service, U.S. Fish and Wildlife Service, and National Park Service. The amount may also be adjusted based on population and as appropriated by Congress. By formula, payments are decreased as other Federal funds, such as mineral royalty payments, increase. PILT received by Garfield County in the last four years has been as follows: \$1,170,205 in 2004; \$808,348 in 2005; \$1,065,158 in 2006; and \$1,078,087 in 2007 (USDI 2008).

In addition to PILT payments, BLM shares revenue generated by commercial activities on public lands with State and County governments (BLM 2006). Federal mineral royalties are levied on oil and gas production from Federal mineral leases. Oil and gas lessees pay royalties equal to 12.5% of the wellhead value of oil and gas produced from public land. Half the royalty receipts are distributed to Colorado, and the amount distributed to Garfield County in 2002 attributable to oil and gas production was \$14.1 million. In 2001, the amount was \$5.5 million (BLM 2006). These funds are then allocated to fund County services, schools, and local communities.

Property tax revenue from oil and gas development has also become the largest source of public revenue in Garfield County (BLM 2006). In the year 2007, oil and gas assessed valuation in Garfield County amounted to approximately \$1.9 billion, or about 65% of total assessed value. Total tax revenues from property taxes and special district levies were \$130 million. Tax dollar distributions in 2007 were Schools 37%, County 30%, Special Districts 13%, Fire Districts 10%, Colleges 8%, and Towns 2%.

The NEPA process requires a review of the environmental justice issues as established by Executive Order 12898 (February 11, 1994). The order established that each Federal agency identify any “disproportionately high and adverse human health or environment effects of its programs, policies, and

activities on minority and low-income populations.” The Latino community is the only minority population of note in the vicinity of the project area. In 2000, 16.7% of the residents of Garfield County identified themselves as Hispanic or Latino, and this is consistent across the State (17.1%). African Americans, American Indians, and Pacific Islanders account for less than 1% of the Garfield County population, which is below the State levels.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would positively impact the local economies of Garfield County through the creation or maintenance of job opportunities in the oil and gas industry and in supporting trades and services. In addition, local governments in Garfield County would experience an increase in tax and royalty revenues. Some minor economic loss to private landowners or guides may result from the potential displacement of big game and resulting reduction in big game hunting within the project area.

The Proposed Action could result in minor negative social impacts including (1) a negligible decrease in the recreational character of the area (see Recreation); (2) reduced scenic quality (see Visual Resources); (3) increased dust levels, especially during construction (see Air Quality); and (4) increased traffic (see Transportation).

#### *No Action Alternative*

Although surface disturbance would be reduced by only 7%, the number of wells drilled would drop by 72%. As a result, potential effects on socio-economics would be sizably reduced from the potential described in the Proposed Action, but would not disappear.

## **Soils**

### Affected Environment

According to the *Soil Survey of Rifle Area, Colorado* (USDA 1985), the proposed activities would be located on three soil complexes: Badlands, Nihill Channery loam and Torriorthents-Camborthids-Rock outcrop complex.

The MV10-23 pad expansion, MV23-27 pad expansion and new road spur, MV29-27 pad expansion, and portions of the GM24-27 pad expansion and new cuttings trench would be located on Badlands. This broadly defined soil is characterized by steep foothills and mountainsides of nearly barren lands dissected by intermittent drainage channels with outcrops of shale or sandstone. The water erosion hazard is very severe and erosion is active. These soils have sparse plant cover which provides little protection and cover for livestock and wildlife.

The new centralized frac pad/pit, produced water tank pad, and portions of the GM24-27 pad expansion and new cuttings trench would be located on the Nihill Channery loam unit. This deep, well-drained soil on moderately sloping to hilly sites is found on sides of valleys and alluvial fans at elevations from 5,000 to 6,500 feet and on slopes of 6 to 25%. This soil formed in alluvium derived from Green River shale and sandstone. Surface runoff is slow and erosion hazard is severe. Primary uses for this soil include grazing and wildlife habitat.

The GM331-34 pad expansion would be located on the Torriorthents-Camborthids-Rock outcrop complex. This broadly defined soil consists of exposed sandstone and shale bedrock, loose stones and

soils that are shallow to deep over sandstone and shale bedrock and stony basaltic alluvium. The soils are moderately steep to very steep (15 to 75%). This complex is used for grazing, wildlife habitat and recreation.

### Environmental Consequences

#### *Proposed Action*

The Proposed Action would result in approximately 29.3 acres of short-term vegetation loss and soil disturbance, with a long-term loss of approximately 8.25 acres. In general, the area contains adequate vegetation buffers that would minimize the potential for sediment transport. However, construction activities would cause slight to moderate increases in local soil loss, loss of soil productivity, and sediment available for transport to surface waters. Potential for such soil loss and transport would increase as a function of slope, feature (pad, road, or pipeline route) to be constructed, and proximity to drainages.

Most of the area to be disturbed consists of soils with high to severe risk of erosion or slope instability. However, the bulk of the proposed construction work involves expansion of existing well sites which have exhibited an ability to remain stable in this landscape. Since the project area is situated within 1-2 miles of Parachute Creek which flows into the Colorado River, particular care should be taken at these locations during construction and reclamation to ensure that proper BMPs, including the COAs listed in Appendix B, are utilized to prevent erosion and slope instability due to construction activities.

#### *No Action Alternative*

Under the No Action alternative, only the 20 Fee wells would be drilled. However, all of the other planned improvements (frac pad/pits, produced water collection system, and centralized storage tank pad) would be constructed to serve the Fee wells except for the GM24-27 cuttings trench. Using a direct correlation, the impacts to soils would only be reduced by 7% with the implementation of the No Action alternative.

### **Vegetation**

#### Affected Environment

The project area consists of Utah juniper woodlands mixed with salt-desert shrubs such as fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), and greasewood (*Sarcobatus vermiculatus*) along with rubber and green rabbitbrushes (*Chrysothamnus nauseosus*, *C. viscidiflorus*) and basin and Wyoming big sagebrush (*Artemisia tridentata* ssp. *Tridentata*, *A. t.* ssp. *wyomingensis*). In general, the sparse herbaceous layer consists of native perennial grasses such as galleta grass (*Pleuraphis jamesii*), western wheatgrass (*Pascopyrum smithii*), Indian ricegrass (*Achnatherum hymenoides*), and bottlebrush squirreltail (*Elymus elymoides*). Dominant forbs include yellow milkvetch (*Astragalus flavus*), double bladderpod (*Physaria rollinsii*), and gumweed (*Grindelia fastigiata*).

### Environmental Consequences

#### *Proposed Action*

Direct effects to vegetation under the Proposed Action would include short- and long-term losses of vegetation and long-term modification of community structure and composition. The total short-term surface disturbance resulting from the proposed development activities would be 29.3 acres, of which

8.25 acres of disturbance would remain for the life of the project. All of the proposed ground disturbance would occur on private land.

Short-term impacts would occur during construction, drilling, and completion activities and would be restored during interim reclamation. Impacts in areas of interim reclamation are considered short term because reclamation would be initiated within 2 years. However, a substantially longer period, typically more than 5 years, would be required for the establishment of a self-sustaining native plant community that meets reclamation standards for cover and species composition. For habitats dominated by shrubs, several decades may be required for restoration to suitable conditions, depending on site-specific factors such as soil type, soil moisture, topography (slope, aspect, and elevation), and exposure to grazing by wild or domestic herbivores.

Indirect effects to vegetation that may result from implementation of the Proposed Action are as follows. Surface disturbance would increase the potential for noxious weed invasion and spread. Soil erosion and sedimentation may increase at locations of pads and access roads, but soil conditions would improve in the long-term in the treated areas. Changes to habitat quantity and quality would occur throughout the project area. The Proposed Action would result in an increase in the relative proportion of herbaceous, non-woody species in the areas of disturbance. Negative impacts would be minimized by implementing mitigation measures as presented in Appendix B.

*No Action Alternative:*

Under the No Action alternative, only the 20 Fee wells would be drilled. However, all of the other planned improvements (frac pad/pits, produced water collection system, and centralized storage tank pad) would be constructed to serve the Fee wells except for the GM24-27 cuttings trench. Using a direct correlation, the impacts to vegetation would only be reduced by 7% with the implementation of the No Action alternative.

## **Visual Resources**

### Affected Environment

The project lies along the lower reaches of Wheeler Gulch within the relatively narrow valley confined by the steep oil shale-bearing cliffs of the Roan Plateau. The existing Wheeler Gulch Road runs adjacent to Wheeler Gulch and provides direct access to Williams's Highlands Field through their tunnel on top of the Roan Plateau.

The upland vegetation type within the project area is comprised of scrub juniper, greasewood, sagebrush, cheatgrass and related native grasses. The established vegetation along Wheeler Gulch consists of narrowleaf cottonwoods, willows, tamarisk and sagebrush benches. The natural landscape has been altered by historical oil shale mining along the steep cliffs and the more recent oil and gas developments including the construction of the Highlands access road with its expansive road cuts, fills, and numerous switchbacks that dominate the view.

Since the project area is located on private lands with underlying Fee mineral estate (with the exception of a portion of the GM24-27 pad expansion), there are no landscape constraints as visual resource management objectives do not apply to non-Federal land. Visual resources can be protected by landowner discretion and the siting of pads, access roads, and pipelines underwent landowner consultation during the project's field review process and landowner concerns were directly incorporated into the overall project design.

The northwestern portion of the GM24-27 pad expansion would be located on Federal lease COC34553A although the lease fails to identify any visual resource stipulations (see Table 4). The Federal oil and gas lease falls within Class II Visual Resource Management (VRM) Classification as identified in the Roan Plateau Resource Management Plan Amendment (BLM 2006).

- VRM Class II – The management objective of visual resources on Class II areas is to retain the existing character of the landscape. The level of change to the landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural features of the characteristic landscape.

### Environmental Consequences

#### *Proposed Action*

The construction of the project components would create contrast within the landscape by removing the existing vegetation, exposing bare ground, and creating distinct lines within the landscape.

The expansion of the five existing well pads would represent a modification of the viewshed varying from slight landscape changes on the MV23-27, GM24-27 and GM331-34 pads to a moderate change in the appearance of the MV10-23 and MV29-27 pads. The construction of the centralized frac pad and cuttings trench would present the most evident landscape change during the months or years these facilities would be in use, but both sites would be reclaimed, reshaped and seeded to help mitigate the long-term effects on the landscape.

- VRM Class II – Less than 2 acres of the proposed MV24-27 pad expansion would occur on Federal lease COC34553A along the north side of the pad. Originally, the operator proposed to cut into the sideslope at the northwest corner which would have been visually impairing. During the onsite review, it was agreed that the existing gully and sideslope at the northwest pad corner would remain essentially undisturbed within the viewshed. The visual impact from this pad reconstruction would not be visible from the Wheeler Gulch Road since the northwest corner lies at the back end of the pad. Although the north edge of the pad would be expanded from its present extent, the change should not be readily evident to the casual observer since the pad currently lies “open” awaiting the planned well drilling.

#### *No Action Alternative*

Under the No Action alternative, only the 20 Fee wells would be drilled. However, all of the other planned improvements (frac pad/pits, produced water collection system, and centralized storage tank pad) would be constructed to serve the Fee wells except for the GM24-27 cuttings trench. Using a direct correlation, the impacts to the visual resource would only be reduced by 7% with the implementation of the No Action alternative.

### **Wildlife, Aquatic**

#### Affected Environment

Wheeler Gulch is the only perennial stream in the project area with several ephemeral washes. Wheeler Gulch is not known to support any fish populations. Parachute Creek contains an abundance of aquatic wildlife and is located approximately 0.25 mile from the west side of the project area. No other aquatic systems are in the vicinity of the proposed project area.

## Environmental Consequences

### *Proposed Action*

Implementation of the Proposed Action could result in increases in erosion and sedimentation into Parachute Creek and eventually the Colorado River. Because the Proposed Action includes summer use of the project areas, it is likely that roads and pads would not be muddy for extended periods of time. Roads are generally drier and in better condition during the non-winter months and consequently are less prone to erosion. Vehicular use during muddy road conditions could contribute to increased erosion of sediments into nearby ephemeral washes and eventually the Colorado River. The potential increase of sedimentation into the Colorado River would likely be nominal given background sediment loads currently carried by the river. Sediment-intolerant aquatic wildlife could be negatively affected, as increased erosion potential would persist and impair water and habitat quality. Measures to minimize erosion and sedimentation of aquatic environments are included among the COAs (Appendix B).

### *No Action Alternative*

Under the No Action alternative, all Federal well applications would be denied, however all of the pads and improvements except for the GM24-27 cuttings trench would still be constructed to access privately owned minerals. Therefore the disturbance to aquatic wildlife would only be somewhat less than that of the Proposed Action.

## **Wildlife, Terrestrial**

### Affected Environment

Portions of the project area to be directly affected by vegetation clearing are dominated by Utah juniper woodlands mixed with salt-desert shrub and sagebrush species. The nearby Wheeler Gulch riparian corridor supports riparian trees and shrubs, including narrowleaf cottonwood, box-elder, mountain maple, and serviceberry. These vegetation types provides cover, forage, breeding, and nesting habitat for a variety of big game and small game species as well as nongame mammals, birds, and reptiles.

### *Large Mammals*

The project area contains winter range and severe winter range for mule deer (*Odocoileus hemionus*) and winter range for Rocky Mountain elk (*Cervus elaphus nelsoni*) as mapped by the CDOW (2009). The mule deer is a recreationally important species that are common throughout suitable habitats in the region. Although most of the area is mapped as mule deer winter range, the project area also receives use by deer during the summer. Rocky Mountain elk are also recreationally important, but the project area contains relatively little suitable habitat for this species. Most winter use by elk north of I-70 in the project vicinity is along Parachute Creek and tributary canyons to the west or along Piceance Creek, which the elk access by moving northward from summer range on the Roan Plateau.

Large carnivores potentially present in the project vicinity include the mountain lion (*Felis concolor*), which moves seasonally with its preferred prey, the mule deer, and the black bear (*Ursus americanus*). Black bears are uncommon in the lowlands north of I-70 due to the scarcity of sufficient forest cover and suitable foods (including acorns and berries). Two smaller carnivores, the coyote (*Canis latrans*) and bobcat (*Lynx rufus*) are also present throughout the region in open habitats and broken or wooded terrain, respectively, where they hunt for small mammals, reptiles, and ground-dwelling birds. Also present in the CRVFO area are secretive small carnivores, the ringtail (*Bassariscus astutus*) and spotted skunk

(*Spilogale gracilis*), primarily in rocky or wooded terrain, and the raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*) along Wheeler Gulch.

Small mammals present within the planning area include rodents such as the rock squirrel (*Spermophilus variegatus*), golden-mantled ground squirrel (*Spermophilus lateralis*), least chipmunk (*Tamias minimus*), and packrat (bushy-tailed woodrat) (*Neotoma cinerea*) and lagomorphs such as the desert cottontail (*Sylvilagus audubonii*) and black-tailed jackrabbit (*Lepus californicus*). Rodents and, to a lesser extent, lagomorphs are the primary prey base for a variety of avian and mammalian predators.

Birds. Passerine (perching) birds commonly found in the area in addition to those addressed previously under Migratory Birds and Special-Status Species include residents or short-distance migrants such as the western scrub-jay (*Aphelocoma californica*), black-billed magpie (*Pica hudsonia*), common raven (*Corvus corax*), American robin (*Turdus migratorius*), Townsend's solitaire (*Myadestes townsendi*), blue-gray gnatcatcher (*Poliophtila caerulea*), mountain chickadee (*Poecile gambeli*), and house finch (*Carpodacus mexicanus*).

A non-native upland gamebird, the chukar (*Alectoris chukar*) is common on the sideslopes of Wheeler Gulch.

Reptiles and Amphibians. The project area is potentially suitable a variety of reptile and amphibian species known to occur in the CRVFO area. Lizards likely to occur include the short-horned lizard (*Phrynosoma hernandesi*), sagebrush lizard (*Sceloporus graciosus*), plateau lizard (western fence lizard) (*S. undulatus*), tree lizard (*Urosaurus ornatus*), and plateau striped whiptail (*Cnemidophorus velox*), the last species primarily along Wheeler Gulch. Snakes potentially present include the gopher snake (bullsnake) (*Pituophis catenifer*), racer (*Coluber constrictor*), smooth green snake (*Liochlorophis vernalis*), and western terrestrial gartersnake (*Thamnophis elegans*), all but the first species primarily along Wheeler Gulch.

Amphibians potentially present along Wheeler Gulch are Woodhouse's toad (*Bufo woodhousii*) and the northern chorus frog (*Pseudacris triseriata*). Of these, the toad is much the more likely owing the ephemeral character of Wheeler Gulch and, especially, the relative lack of adjacent wetland vegetation.

## Environmental Consequences

### *Proposed Action*

Direct impacts to terrestrial wildlife from the Proposed Action may include mortality, disturbance, nest abandonment/nesting attempt failure, or site avoidance/displacement from otherwise suitable habitats. These effects could result from 29.3 acres of habitat loss or modification, increased noise from vehicles and operation of equipment, increased human presence, and collisions between wildlife and vehicles. Impacts would be more substantial during critical seasons, such as winter (deer and elk) or the spring/summer breeding season (raptors, songbirds, amphibians). Deer and elk are often restricted to smaller areas during the winter months and may expend high amounts of energy to move through snow, locate food, and maintain body temperature. Disturbance during the winter can displace wildlife, depleting much-needed energy reserves and may lead to decreased over winter survival. This impact would be mitigated by the Timing Limitation associated with the Federal lease in effect on the GM24-27 pad, which prohibits construction, drilling, and completion activities from January 1 to May 14. The remaining well pads, being located on private surface with underlying Fee minerals, would not have any enforceable timing limitation to protect wintering big game. Additional, indirect habitat loss may occur if increased human activity (e.g., traffic, noise) associated with infrastructure causes intolerant species to be displaced or alter their habitat use patterns. The extent of indirect habitat loss varies by species, the type

and duration of the disturbance, and the amount of screening provided by vegetation and topography. In general, disturbance-related impacts are temporary, with patterns of distribution and habitat use returning to pre-disturbance conditions rather quickly when the disturbance stops.

#### *No Action Alternative*

Under the No Action alternative, all Federal well applications would be denied. However, all of the pads and improvements except for the GM24-27 cuttings trench would still be constructed to access privately owned minerals. Therefore the disturbance to terrestrial wildlife would only be somewhat less than that of the Proposed Action.

### **SUMMARY OF CUMULATIVE IMPACTS**

Until relatively recently, modifications of the region have been characteristic of agricultural and ranching lands, with localized industrial impacts associated with the railroad and I-70 corridors. More recently, these changes are cumulative to the growth of residential and commercial uses, utility corridors, oil and gas developments, and other rural industrial uses. These increasing activity levels have accelerated the accumulation of impacts in the area. Cumulative impacts have included: (1) direct habitat losses; (2) habitat fragmentation and losses in habitat effectiveness; (3) elevated potential for runoff, erosion, and sedimentation; (4) expansion of noxious weeds and other invasive species; and (5) increased noise and traffic and reductions in the scenic quality of the area (BLM 1999a: 4-1 to 4-68).

Although none of the cumulative impacts described in the 1999 FSEIS was characterized as significant, and while new technologies and regulatory requirements have reduced the impacts of some land uses, it is nonetheless clear that past, present, and reasonably foreseeable future actions has had and would continue to have adverse affects on various elements of the human environment. The anticipated impact levels for existing and future actions range from negligible to locally major, and primarily negative, for specific resources. The primary reasons for this assessment are twofold: (1) the rate of development, particularly oil and gas development, has until recently been increasing in the area, resulting in an accelerated accumulation of individually nominal effects; and (2) residential and commercial expansion, as well as most of the oil and gas development, has occurred private holdings lands where mitigation measures designed to protect and conserve resources are not in effect.

It is clear that the Proposed Action would contribute to the collective adverse impact for some resources. Although the contribution would be very minor, the Proposed Action would contribute incrementally to the collective impact to air quality, vegetation, migratory birds, terrestrial wildlife, and other resources.

### **PERSONS AND AGENCIES CONSULTED**

Williams Production RMT Company: April Mestas, Mike Shoemaker, Dan Collette, Bryan Hotard, Joe Weaver, Sr., Joe Weaver, Jr.

Colorado Oil and Gas Conservation Commission: Dave Kubeczko

Garfield County Oil and Gas Liaison: Nikki Reckles

### **INTERDISCIPLINARY REVIEW**

BLM participants in preparation of this EA are listed in Table 13.

**Table 13. BLM Interdisciplinary Team Authors and Reviewers**

<i>Name</i>	<i>Title</i>	<i>Areas of Participation</i>
Jim Byers	Natural Resource Specialist	EA Project Lead, Access and Transportation, Air Quality, Noise, Range Management, Socio-Economics, Soil, Surface Water, Visual Resources, Waters of the U.S.
Allen Crockett	Supervisory Nat. Res. Spec./Phys. Sci.	NEPA Review
Beth Brenneman	Ecologist	Invasive Non-native Species, Special Status Species (Plants), Vegetation
Sylvia Ringer	Wildlife Biologist	Migratory Birds, Special Status Species (Animals), Wildlife, Aquatic and Terrestrial
John Brogan	Archaeologist	Cultural Resources, Native American Religious Concerns
Karen Conrath	Geologist	Groundwater, Paleontology, Geology and Minerals
Dane Geyer	Petroleum Engineer	Downhole COAs

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**FONSI**  
**DOI-BLM-CO-N040-2010-0057-EA**

The Environmental Assessment analyzing the environmental effects of the Proposed Action has been reviewed. The approved mitigation measures result in a Finding of No Significant Impact on the human environment. Therefore, an Environmental Impact Statement is not necessary to further analyze the environmental effects of the Proposed Action.

**DECISION RECORD**

DECISION: It is my decision to approve the Proposed Action for the Williams Production RMT Company Wheeler Gulch development project, which includes expansion, construction, and associated maintenance of the MV10-23 well pad, MV23-27 pad and access road, GM24-27 pad and cuttings trench, MV29-27 pad, and GM331-34 pad as shown on the plats in the Applications for Permit to Drill (APDs) and the drilling, completion, and production of the Federal wells planned on the MV10-23 pad, MV23-27 pad, GM24-27 pad, MV29-27 pad, and GM331-34 pad. The project also includes the Wheeler Gulch storage tank facility, the gas and water pipeline gathering systems, the centralized frac pad and pits, and the associated surface water lines supporting the frac facility. This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

This decision does not authorize initiation of any surface disturbance on BLM-administered land or drilling and related activities of any Federal oil and gas wells. Such authorization will occur only upon approval by BLM of the APDs submitted by Williams Production RMT Company.

This decision will provide for the orderly, economical, and environmentally sound exploration and development of oil and gas resources on valid oil and gas leases.

RATIONALE: The bases for this decision are as follows:

1. Approval of the Proposed Action is validating the rights granted with the Federal oil and gas leases to develop the leasehold to provide commercial commodities of oil and gas.
2. The environmental impacts have been mitigated with measures included in the attached Conditions of Approval (COAs).

MITIGATION MEASURES: Mitigation measures to be applied as COAs are presented in Appendices A and B will be incorporated any future approvals of surface and drilling operations.

NAME OF PREPARER: Jim Byers

SIGNATURE OF AUTHORIZED OFFICIAL:

  
\_\_\_\_\_  
Supervisory Natural Resource Specialist

DATE SIGNED: August 16, 2010

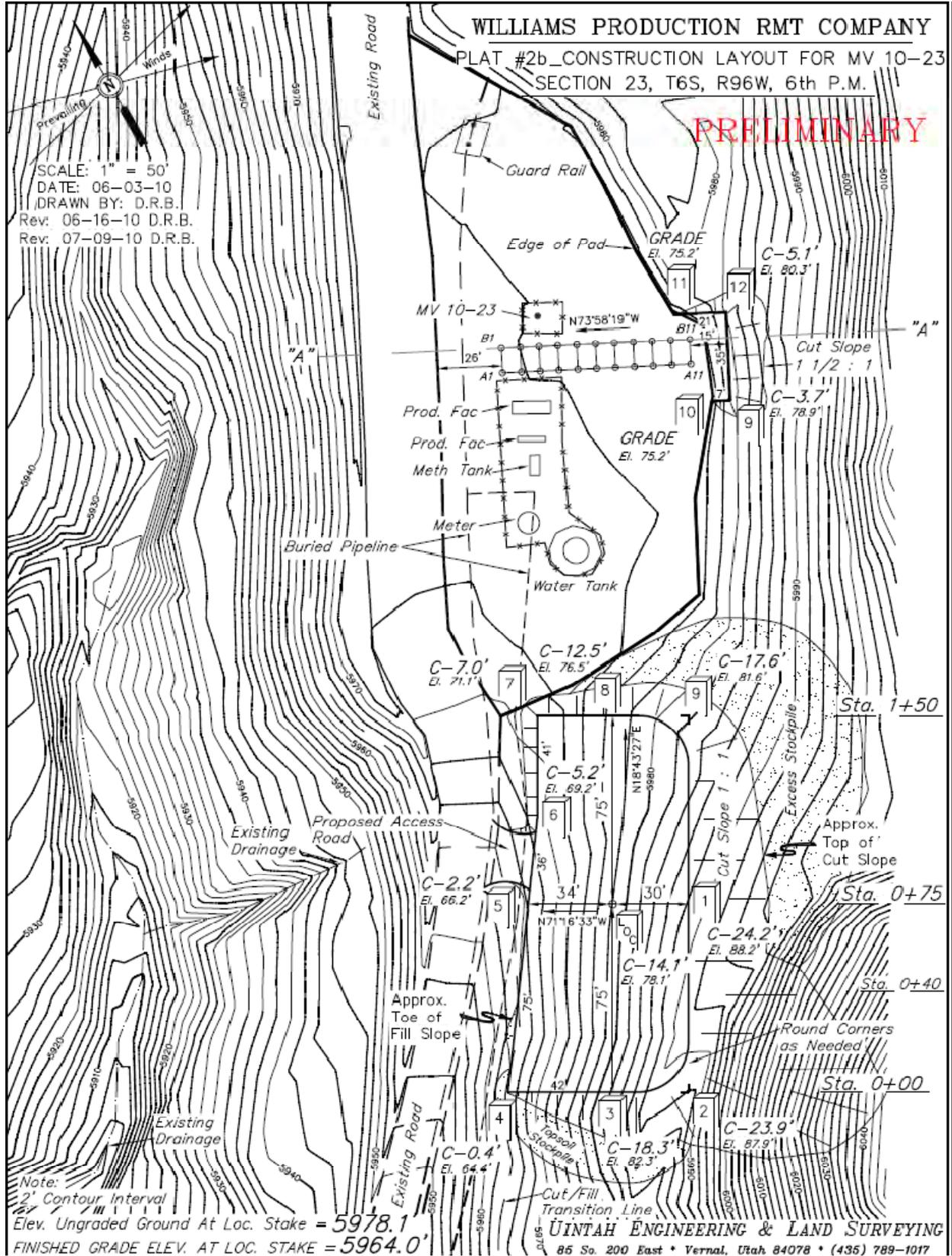
Left blank for two-sided copying.

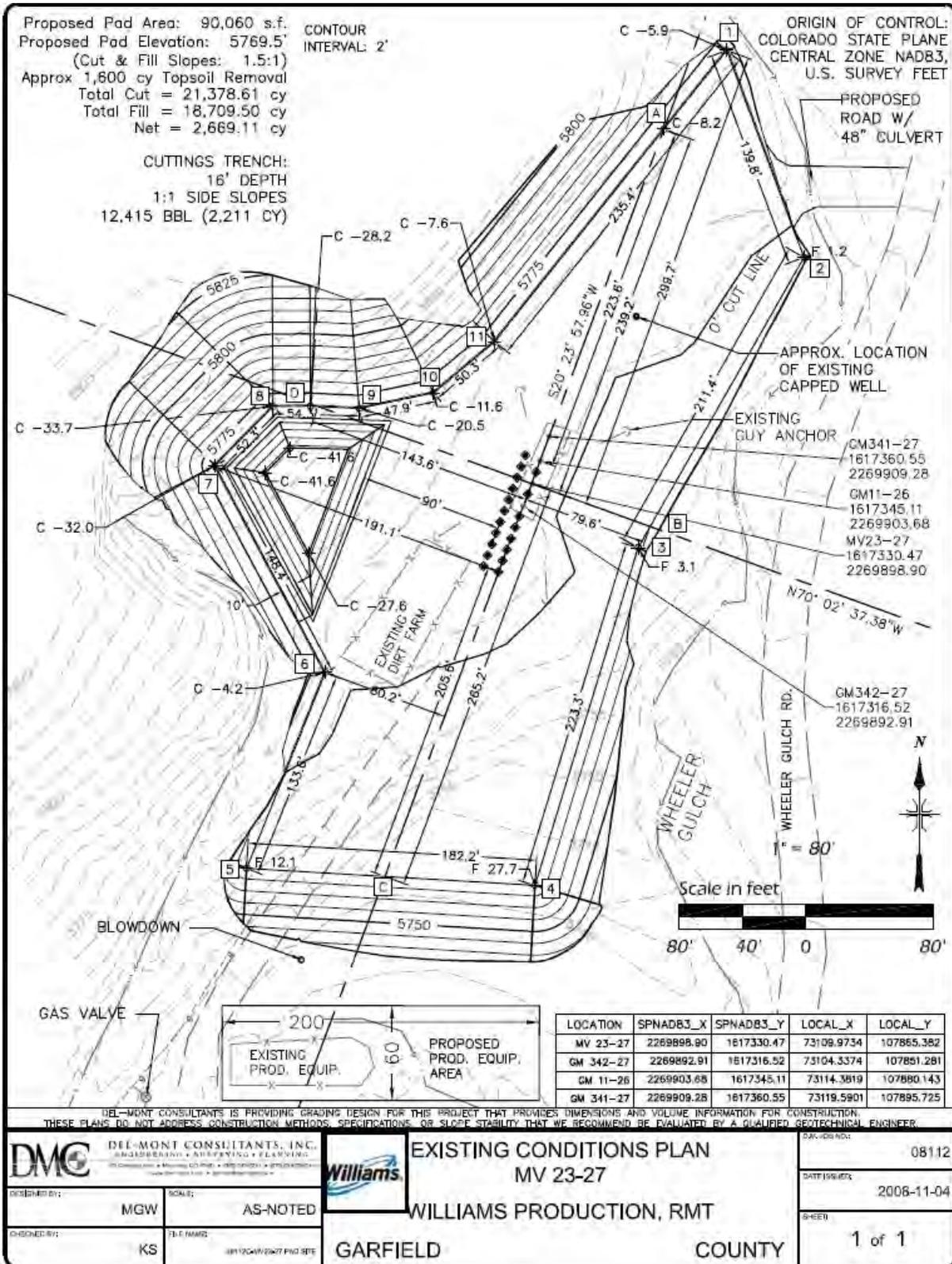
## **APPENDIX A**

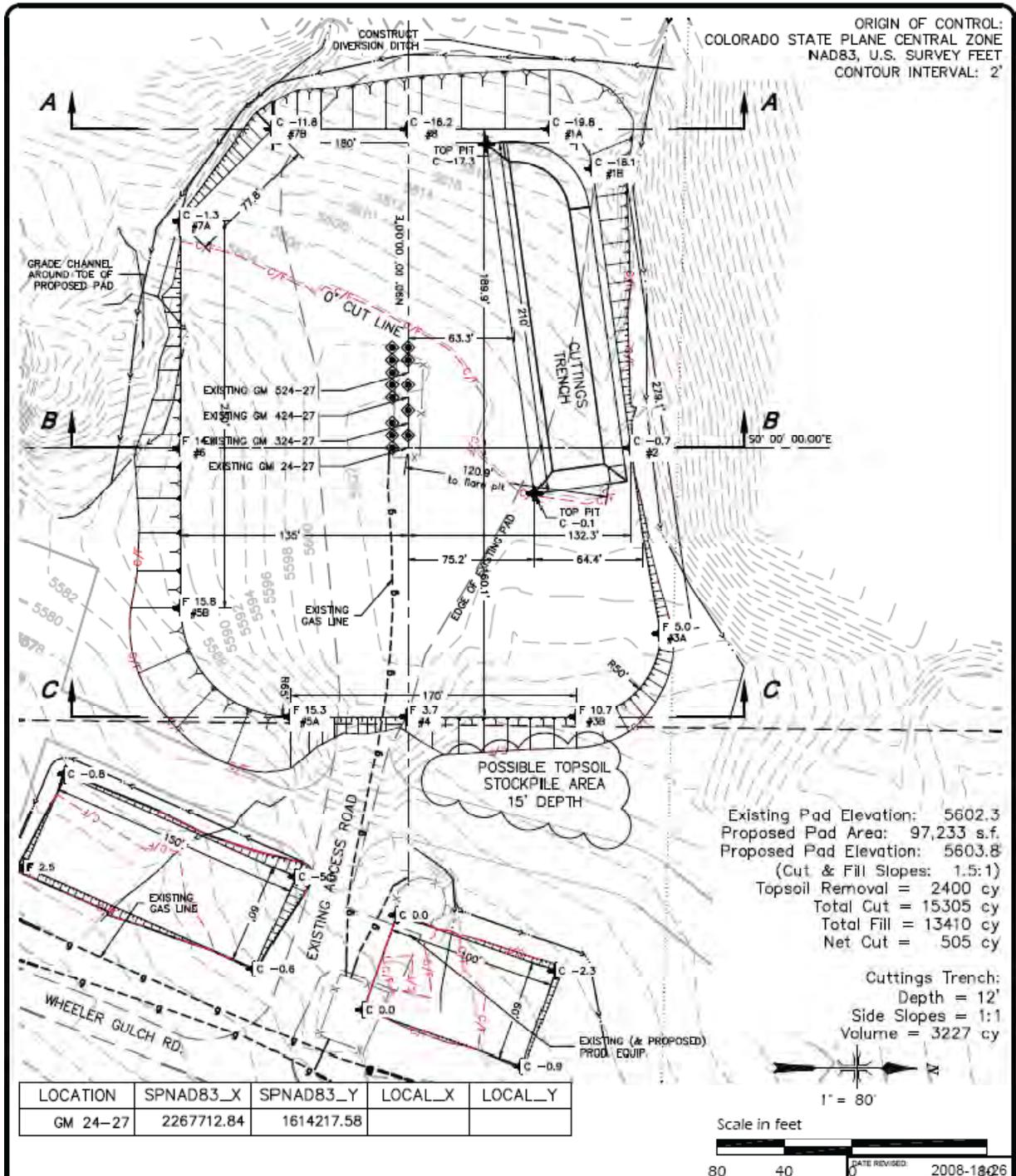
### **Pad Layout Sheets**

**MV10-23 pad**  
**MV23-27 pad**  
**GM24-27 pad**  
**MV29-27 pad**  
**GM331-34 pad**









DEL-MONT CONSULTANTS IS PROVIDING GRADING DESIGN FOR THIS PROJECT THAT PROVIDES DIMENSIONS AND VOLUME INFORMATION FOR CONSTRUCTION.

**DMC** DEL-MONT CONSULTANTS, INC.  
ENGINEERING - SURVEYING - PLANNING

DESIGNED BY: MGW  
CHECKED BY: SNS

SCALE: 1"=80'  
FILE NAME: 08112C-GM24-27\_PAD\_SITE

SE SW, S27, T6S, R96W, 6TH P.M.  
EXISTING SITE MAP & PPL

**Williams**

WELL PAD GM 24-27  
GARFIELD COUNTY, CO  
WILLIAMS PRODUCTION, RMT

DMC JOB NO: 08112  
DATE ISSUED: 2010-04-14  
DATE SURVEYED: 2008-11-15  
SHEET: 1 of 9

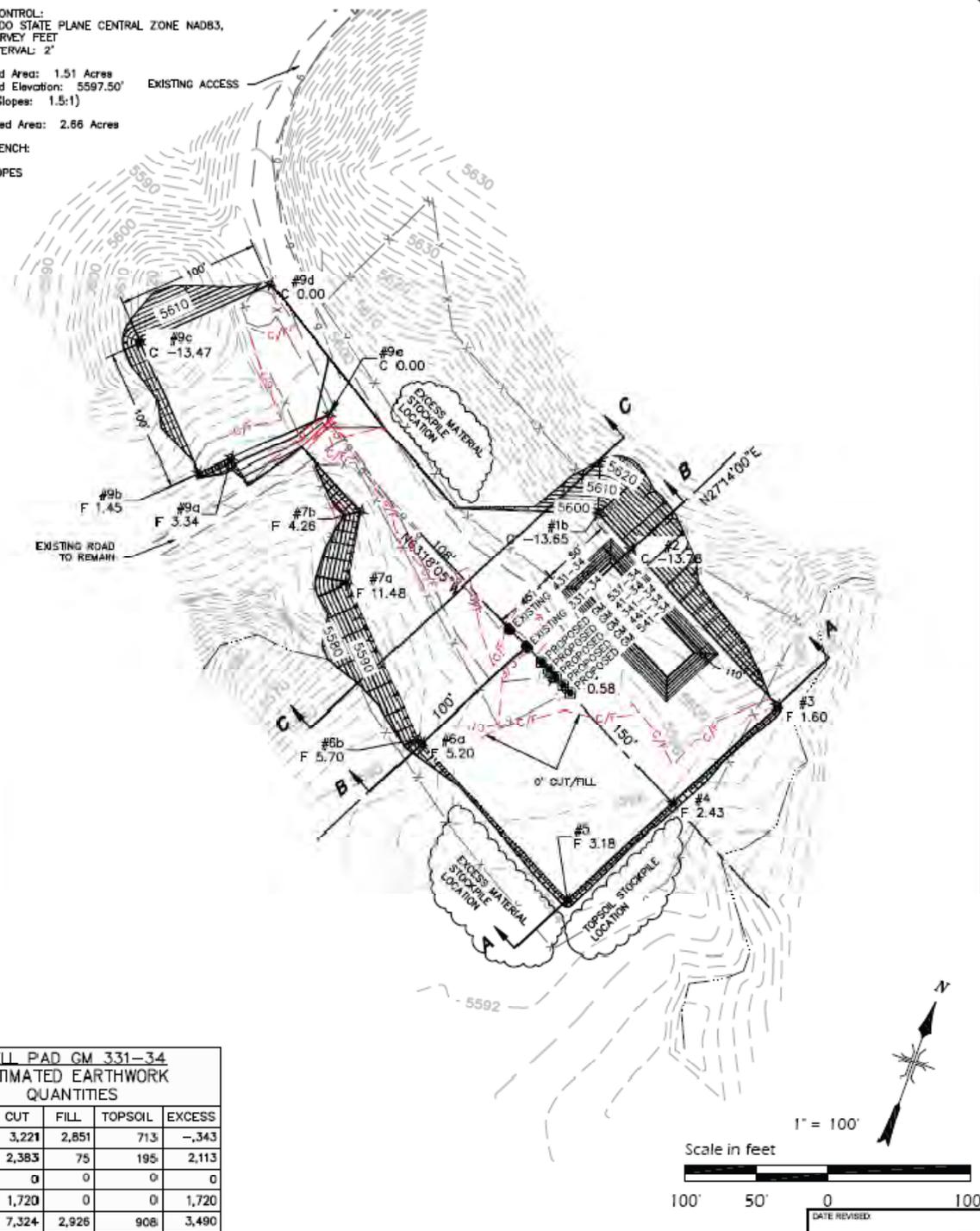


ORIGIN OF CONTROL:  
 COLORADO STATE PLANE CENTRAL ZONE NAD83,  
 U.S. SURVEY FEET  
 CONTOUR INTERVAL: 2'

Proposed Pad Area: 1.51 Acres  
 Proposed Pad Elevation: 5597.50'  
 (Cut & Fill Slopes: 1.5:1)

Total Disturbed Area: 2.66 Acres

CUTTINGS TRENCH:  
 12' DEPTH  
 1:1 SIDE SLOPES



WELL PAD GM 331-34 ESTIMATED EARTHWORK QUANTITIES				
ITEM	CUT	FILL	TOPSOIL	EXCESS
PAD	3,221	2,851	713	-,343
P.U. PADS	2,383	75	195	2,113
ROAD	0	0	0	0
PIT	1,720	0	0	1,720
TOTALS	7,324	2,926	908	3,490

DEL-MONT CONSULTANTS IS PROVIDING GRADING DESIGN FOR THIS PROJECT THAT PROVIDES DIMENSIONS AND VOLUME INFORMATION FOR CONSTRUCTION.

**DMC** DEL-MONT CONSULTANTS, INC.  
 ENGINEERING • SURVEYING • PLANNING  
 1180 Ardenway, Suite 100, Williams, CO 80550 • (970) 824-8881 • (970) 824-8882  
 www.delmont.com • www.delmont.com

DESIGNED BY: MGW  
 SCALE: 1" = 100'  
 CHECKED BY: KS  
 ESTIMATE: 100324W\_331-34-817E

NW NE S34, T6S, R96W, 6TH P.M.  
 CONSTRUCTION LAYOUT

**Williams**

WELL PAD GM 331-34  
 GARFIELD COUNTY, CO  
 WILLIAMS PRODUCTION, RMT

DMC JOB NO:	10030
DATE ISSUED:	2010-05-17
DATE SURVEYED:	2008-11-19
SHEET:	2 of 9



## **APPENDIX B**

### **Surface-Use and Downhole Conditions of Approval**



## STANDARD SURFACE-USE CONDITIONS OF APPROVAL DOI-BLM-CO-N040-2010-0057-EA

### STANDARD COAS APPLICABLE TO ALL ACTIVITIES WITHIN LOWER WHEELER GULCH.

The following standard surface-use COAs are in addition to all stipulations attached to the respective Federal leases and to any site-specific COAs for individual well pads. Wording and numbering of these COAs may differ from those included in the EA. In cases of discrepancies, the following COAs supersede earlier versions.

1. Administrative Notification. The operator shall notify the BLM representative at least 48 hours prior to initiation of construction and earthwork related to interim pad reclamation.
2. Road Construction and Maintenance. Roads shall be crowned, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Initial gravel application shall be a minimum of 6 inches. The operator shall provide timely year-round road maintenance and cleanup on the access roads. A regular schedule for maintenance shall include, but not be limited to, blading, ditch and culvert cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than 6 inches, blading and/or gravelling shall be conducted as approved by the BLM.
3. Dust Abatement. The operator shall implement dust abatement measures as needed to prevent fugitive dust from vehicular traffic, equipment operations, or wind events. The BLM may direct the operator to change the level and type of treatment (watering or application of various dust agents, surfactants, and road surfacing material) if dust abatement measures are observed to be insufficient to prevent fugitive dust.
4. Drainage Crossings and Culverts. Construction activities at perennial, intermittent, and ephemeral drainage crossings (e.g. burying pipelines, installing culverts) shall be timed to avoid high flow conditions. Construction that disturbs any flowing stream shall utilize either a piped stream diversion or a cofferdam and pump to divert flow around the disturbed area.

Culverts at drainage crossings shall be designed and installed to pass a 25-year or greater storm event. On perennial and intermittent streams, culverts shall be designed to allow for passage of aquatic biota. The minimum culvert diameter in any installation for a drainage crossing or road drainage shall be 24 inches. Crossings of drainages deemed to be jurisdictional waters of the U.S. pursuant to Section 404 of the Clean Water Act may require additional culvert design capacity. Due to the flashy nature of area drainages and anticipated culvert maintenance, the U.S. Army Corps of Engineers (USACE) recommends designing drainage crossings for the 100-year event. Contact the USACE Western Colorado Regulatory Branch at 970-243-1199.

Pipelines installed beneath stream crossings shall be buried at a minimum depth of 4 feet below the channel substrate to avoid exposure by channel scour and degradation. Following burial, the channel grade and substrate composition shall be returned to pre-construction conditions.

5. Jurisdictional Waters of the U.S. The operator shall obtain appropriate permits from the U.S. Army Corps of Engineers (USACE) prior to discharging fill material into waters of the U.S. in accordance with Section 404 of the Clean Water Act. Waters of the U.S. are defined in 33 CFR Section 328.3 and may include wetlands as well as perennial, intermittent, and ephemeral streams. Permanent

impacts to waters of the U.S. may require mitigation. Contact the USACE Western Colorado Regulatory Branch at 970-243-1199. Copies of any printed or emailed approved USACE permits or verification letters shall be forwarded to the BLM.

6. Wetlands and Riparian Zones. The operator shall restore temporarily disturbed wetlands or riparian areas. The operator shall consult with the BLM Colorado River Valley Field Office to determine appropriate mitigation, including verification of native plant species to be used in restoration.
7. Reclamation. The goals, objectives, timelines, measures, and monitoring methods for final reclamation of oil and gas disturbances are described in Appendix I (Surface Reclamation) of the 1998 Draft Supplemental EIS (DSEIS). Specific measures to follow during interim and temporary (pre-interim) reclamation are described below.
  - a. Reclamation Plans. In areas that have low reclamation potential or are especially challenging to restore, reclamation plans will be required prior to APD approval. The plan shall contain the following components: detailed reclamation plans, which include contours and indicate irregular rather than smooth contours as appropriate for visual and ecological benefit; timeline for drilling completion, interim reclamation earthwork, and seeding; soil test results and/or a soil profile description; amendments to be used; soil treatment techniques such as roughening, pocking, and terracing; erosion control techniques such as hydromulch, blankets/matting, and wattles; and visual mitigations if in a sensitive VRM area.
  - b. Deadline for Interim Reclamation Earthwork and Seeding. Interim reclamation to reduce a well pad to the maximum size needed for production, including earthwork and seeding of the interim reclaimed areas, shall be completed within 6 months following completion of the last well planned for the pad. Reclamation, including seeding, of temporarily disturbed areas along roads, pipelines, and topsoil piles and berms, shall be completed within 30 days following completion of construction.

If requested by the project lead NRS for a specific pad or group of pads, the operator shall contact the NRS by telephone or email approximately 72 hours before reclamation and reseeding begin. This will allow the NRS to schedule a pre-reclamation field visit if needed to ensure that all parties are in agreement and provide time for adjustments to the plan before work is initiated.

The deadlines for seeding described above are subject to extension upon approval of the BLM based on season, timing limitations, or other constraints on a case-by-case basis. If the BLM approves an extension for seeding, the operator may be required to stabilize the reclaimed surfaces using hydromulch, erosion matting, or other method until seeding is implemented.
  - c. Topsoil Stripping, Storage, and Replacement. All topsoil shall be stripped following removal of vegetation during construction of well pads, pipelines, roads, or other surface facilities. In areas of thin soil, a minimum of the upper 6 inches of surficial material shall be stripped. The BLM may specify a stripping depth during the onsite visit or based on subsequent information regarding soil thickness and suitability. The stripped topsoil shall be stored separately from subsoil or other excavated material and replaced prior to final seedbed preparation. The BLM best management practice (BMP) for the Windrowing of Topsoil (COA number 17) shall be implemented for well pad construction whenever topography allows.
  - d. Seedbed Preparation. For cut-and-fill slopes, initial seedbed preparation shall consist of backfilling and recontouring to achieve the configuration specified in the reclamation plan. For compacted areas, initial seedbed preparation shall include ripping to a minimum depth of 18

inches, with a maximum furrow spacing of 2 feet. Where practicable, ripping shall be conducted in two passes at perpendicular directions. Following final contouring, the backfilled or ripped surfaces shall be covered evenly with topsoil.

Final seedbed preparation shall consist of scarifying (raking or harrowing) the spread topsoil prior to seeding. If more than one season has elapsed between final seedbed preparation and seeding, and if the area is to be broadcast-seeded or hydroseeded, this step shall be repeated no more than 1 day prior to seeding to break up any crust that has formed.

Seedbed preparation is not required for topsoil storage piles or other areas of temporary seeding.

Requests for use of soil amendments, including basic product information, shall be submitted to the BLM for approval.

- e. Seed Mixes. A seed mix consistent with BLM standards in terms of species and seeding rate for the specific habitat type shall be used on all BLM lands affected by the project (see Attachments 1 and 2 of the letter provided to operators dated May 1, 2008). Note that temporary seeding no longer allows the use of sterile hybrid non-native species.

For private surfaces, the menu-based seed mixes are recommended, but the surface landowner has ultimate authority over the seed mix to be used in reclamation. The seed shall contain no noxious, prohibited, or restricted weed seeds and shall contain no more than 0.5% by weight of other weed seeds. Seed may contain up to 2.0% of "other crop" seed by weight, including the seed of other agronomic crops and native plants; however, a lower percentage of other crop seed is recommended. Seed tags or other official documentation shall be submitted to BLM at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands.

- f. Seeding Procedures. Seeding shall be conducted no more than 24 hours following completion of final seedbed preparation.

Where practicable, seed shall be installed by drill-seeding to a depth of 0.25 to 0.5 inch. Where drill-seeding is impracticable, seed may be installed by broadcast-seeding at twice the drill-seeding rate, followed by raking or harrowing to provide 0.25 to 0.5 inch of soil cover or by hydroseeding and hydromulching. Hydroseeding and hydromulching shall be conducted in two separate applications to ensure adequate contact of seeds with the soil.

If interim revegetation is unsuccessful, the operator shall implement subsequent reseeding until interim reclamation standards are met.

- g. Mulch. Mulch shall be applied within 24 hours following completion of seeding. Mulch may consist of either hydromulch or of certified weed-free straw or certified weed-free native grass hay crimped into the soil.

NOTE: Mulch is not required in areas where erosion potential mandates use of a biodegradable erosion-control blanket (straw matting).

- h. Erosion Control. Cut-and-fill slopes shall be protected against erosion with the use of water bars, lateral furrows, or other measures approved by the BLM. Cut-and-fill slopes along drainages or in areas with high erosion potential shall also be protected from erosion using hydromulch designed specifically for erosion control or biodegradable blankets/matting, bales, or wattles of

weed-free straw or weed-free native grass hay. A well-anchored fabric silt fence shall also be placed at the toe of cut-and-fill slopes along drainages or to protect other sensitive areas from deposition of soils eroded off the slopes. Additional BMPs shall be employed as necessary to reduce soil erosion and offsite transport of sediments.

- i. Site Protection. The pad shall be fenced to BLM standards to exclude livestock grazing for the first two growing seasons or until seeded species are firmly established, whichever comes later. The seeded species will be considered firmly established when at least 50% of the new plants are producing seed. The BLM will approve the type of fencing.
  - j. Monitoring. The operator shall conduct annual monitoring surveys of all sites categorized as “operator reclamation in progress” and shall submit an annual monitoring report of these sites to the BLM by **December 31** of each year. The monitoring program shall use the four Reclamation Categories defined in Appendix I of the 1998 DSEIS to assess progress toward reclamation objectives. The annual report shall document whether attainment of reclamation objectives appears likely. If one or more objectives appear unlikely to be achieved, the report shall identify appropriate corrective actions. Upon review and approval of the report by the BLM, the operator shall be responsible for implementing the corrective actions or other measures specified by the BLM.
8. Weed Control. The operator shall regularly monitor and promptly control noxious weeds or other undesirable plant species as set forth in the Glenwood Springs Field Office *Noxious and Invasive Weed Management Plan for Oil and Gas Operators*, dated March 2007. A Pesticide Use Proposal (PUP) must be approved by the BLM prior to the use of herbicides. Annual weed monitoring reports shall be submitted to BLM by **December 1**.
  9. Bald and Golden Eagles. It shall be the responsibility of the operator to comply with the Bald and Golden Eagle Protection Act (Eagle Act) with respect to “take” of either eagle species. Under the Eagle Act, “take” includes to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest and disturb. “Disturb” means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, Feeding, or sheltering behavior; or (3) nest abandonment by substantially interfering with normal breeding, Feeding, or sheltering behavior. Avoidance of eagle nest sites, particularly during the nesting season, is the primary and preferred method to avoid a take. Any oil or gas construction, drilling, or completion activities planned within 0.5 mile of a bald or golden eagle nest, or other associated activities greater than 0.5 mile from a nest that may disturb eagles, should be coordinated with the BLM project lead and BLM wildlife biologist and the USFWS representative in the BLM Field Office (970-876-9051).
  10. Raptor Nesting. Raptor nest surveys in the project vicinity resulted in the location of one or more raptor nest structures within 0.25 mile of a well pad or 0.125 mile of an access road, pipeline, or other surface facility. Therefore, a 60-day Timing Limitations shall be applied to prohibit construction, drilling, or completion activities from **May 1 to June 30**. This TL will not apply to activities initiated before February 15 and extending continuously into the TL period. An exception to this TL may be granted for any year in which a subsequent survey determines one of the following: (a) the nest is in a severely dilapidated condition or has been destroyed due to natural causes, (b) the nest is not occupied during the normal nesting period for that species, (c) the nest was occupied but subsequently failed due to natural causes, or (d) the nest was occupied but the nestlings have fledged and dispersed from the nest. In the case of a dilapidated nest or one that was destroyed due to natural causes, the TL shall apply to any alternate or replacement nest within the buffer widths specified above, unless an exception is granted for the alternate or replacement nest for one of the reasons listed.

11. Migratory Birds. It shall be the responsibility of the operator to comply with the Migratory Bird Treaty Act (MBTA) with respect to “take” of migratory bird species. Under the MBTA, “take” means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The operator shall prevent use by migratory birds of any pit containing fluids associated with oil or gas operations, including but not limited to reserve pits, produced water pits, frac-water pits, cuttings trenches (if covered by water/fluid), and evaporation pits. Fluids in these pits may pose a risk to migratory birds (e.g., waterfowl, shorebirds, wading birds, songbirds, and raptors) as a result of ingestion, absorption through the skin, or interference with buoyancy and temperature regulation. Regardless of the method used, it shall be in place within 24 hours following the placement of fluids into a pit. Because of high toxicity to birds, oil slicks and oil sheens should immediately be skimmed off the surface of any pit that is not netted. The most effective way to eliminate risk to migratory birds is prompt drainage, closure, and reclamation of pits, which is strongly encouraged. All mortality or injury to species protected by the MBTA shall be reported immediately to the BLM project lead and to the USFWS representative in the BLM Field Office at 970-876-9051 and visit <http://www.fws.gov/mountain-prairie/contaminants/oilpits.htm>.
12. Birds of Conservation Concern. Pursuant to BLM Instruction Memorandum 2008-050, all surface-disturbing activities are prohibited from **May 1 to June 30** to reduce impacts to Birds of Conservation Concern (BCC). An exception to this COA will be granted if nesting surveys conducted no more than one week prior to surface-disturbing activities indicate that no BCC species are nesting or otherwise present within 10 meters of the area to be disturbed. Nesting surveys shall include an aural survey for diagnostic vocalizations in conjunction with a visual survey for adults and nests. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 AM under favorable conditions for detecting and identifying a BCC species. This provision does not apply to ongoing construction, drilling, or completion activities that are initiated prior to May 15 and continue into the 60-day period at the same location.
13. Range Management. Range improvements (fences, gates, reservoirs, pipelines, etc) shall be avoided during development of natural gas resources to the maximum extent possible. If range improvements are damaged during exploration and development, the operator will be responsible for repairing or replacing the damaged range improvements. If a new or improved access road bisects an existing livestock fence, steel frame gate(s) or a cattleguard with associated bypass gate shall be installed across the roadway to control grazing livestock.
14. Paleontological Resources. All persons associated with operations under this authorization shall be informed that any objects or sites of paleontological or scientific value, such as vertebrate or scientifically important invertebrate fossils, shall not be damaged, destroyed, removed, moved, or disturbed. If in connection with operations under this authorization any of the above resources are encountered the operator shall immediately suspend all activities in the immediate vicinity of the discovery that might further disturb such materials and notify the BLM of the findings. The discovery must be protected until notified to proceed by the BLM.

Where feasible, the operator shall suspend ground-disturbing activities at the discovery site and immediately notify the BLM of any finds. The BLM will, as soon as feasible, have a BLM-permitted paleontologist check out the find and record and collect it if warranted. If ground-disturbing activities cannot be immediately suspended, the operator shall work around or set the discovery aside in a safe place to be accessed by the BLM-permitted paleontologist.
15. Cultural Education/Discovery. All persons in the area who are associated with this project shall be informed that if anyone is found disturbing historic, archaeological, or scientific resources, including collecting artifacts, the person or persons will be subject to prosecution.

Pursuant to 43 CFR 10.4(g), the BLM shall be notified by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4 (c) and (d), activities shall stop in the vicinity of the discovery, and the discovery shall be protected for 30 days or until notified by the BLM to proceed.

If in connection with operations under this contract, the operator, its contractors, their subcontractors, or the employees of any of them discovers, encounters, or becomes aware of any objects or sites of cultural value or scientific interest such as historic ruins or prehistoric ruins, graves or grave markers, fossils, or artifacts, the operator shall immediately suspend all operations in the vicinity of the cultural resource and shall notify the BLM of the findings (16 USC 470h-3, 36 CFR 800.112). Operations may resume at the discovery site upon receipt of written instructions and authorization by the BLM. Approval to proceed will be based upon evaluation of the resource. Evaluation shall be by a qualified professional selected by the BLM from a Federal agency insofar as practicable. When not practicable, the operator shall bear the cost of the services of a non-Federal professional.

Within five working days, the BLM will inform the operator as to:

- whether the materials appear eligible for the National Register of Historic Places
- what mitigation measures the holder will likely have to undertake before the site can be used (assuming that *in-situ* preservation is not necessary)
- the timeframe for the BLM to complete an expedited review under 36 CFR 800.11, or any agreements in lieu thereof, to confirm through the SHPO State Historic Preservation Officer that the findings of the BLM are correct and that mitigation is appropriate

The operator may relocate activities to avoid the expense of mitigation and delays associated with this process, as long as the new area has been appropriately cleared of resources and the exposed materials are recorded and stabilized. Otherwise, the operator shall be responsible for mitigation costs. The BLM will provide technical and procedural guidelines for relocation and/or to conduct mitigation. Upon verification from the BLM that the required mitigation has been completed, the operator will be allowed to resume construction.

Antiquities, historic ruins, prehistoric ruins, and other cultural or paleontological objects of scientific interest that are outside the authorization boundaries but potentially affected, either directly or indirectly, by the Proposed Action shall also be included in this evaluation or mitigation. Impacts that occur to such resources as a result of the authorized activities shall be mitigated at the operator's cost, including the cost of consultation with Native American groups.

Any person who, without a permit, injures, destroys, excavates, appropriates or removes any historic or prehistoric ruin, artifact, object of antiquity, Native American remains, Native American cultural item, or archaeological resources on public lands is subject to arrest and penalty of law (16 USC 433, 16 USC 470, 18 USC 641, 18 USC 1170, and 18 USC 1361).

16. Visual Resources. Production facilities shall be placed to maximize reshaping of cut-and-fill slopes and interim reclamation of the pad. Production facilities shall be placed as indicated on the plans attached to the APD, unless an alternative placement is approved by the BLM.

To the extent practicable, existing vegetation shall be preserved when clearing and grading for pads, roads, and pipelines. The BLM may direct that cleared trees and rocks be salvaged and redistributed over reshaped cut-and-fill slopes or along linear features.

Above-ground facilities shall be painted **Shadow Gray** to minimize contrast with adjacent vegetation or rock outcrops. The color shall be specified by the BLM and attached as a COA to individual APDs.

17. Windrowing of Topsoil. Where possible, topsoil shall be windrowed around the pad perimeter to create a berm that limits and redirects stormwater runoff and extends the viability of the topsoil per BLM Topsoil Best Management Practices (BLM 2009 PowerPoint presentation available upon request from Glenwood Springs Field Office). Topsoil shall also be windrowed, segregated, and stored along pipelines and roads for later spreading across the disturbed corridor during final reclamation. Topsoil berms shall be promptly seeded to maintain soil microbial activity, reduce erosion, and minimize weed establishment.
18. Reserve Pit. A minimum of 2 feet of freeboard shall be maintained in the reserve pit. Freeboard is measured from the highest level of drilling fluids and cuttings in the reserve pit to the lowest surface elevation of ground at the reserve pit perimeter.
19. Soils. Cuts and fills shall be minimized when working on erosive soils and slopes in excess of 30 percent. Cut-and-fill slopes shall be stabilized through revegetation practices with an approved seed mix shortly following construction activities to minimize the potential for slope failures and excessive erosion. Fill slopes adjacent to drainages shall be protected with well-anchored silt fences, straw wattles, or other acceptable BMPs designed to minimize the potential for sediment transport. On slopes greater than 50 percent, BLM personnel may request a professional geotechnical analysis prior to construction.

**SITE-SPECIFIC SURFACE USE CONDITIONS OF APPROVAL**  
**DOI-BLM-CO-N040-2010-0057 EA**

**MV10-23 Pad**

1. The existing wetland at the north edge of the existing pad near the Wheeler Gulch Access Road shall be protected from surface disturbance.
2. The existing Highlands pipeline along the Wheeler Gulch Access Road and the west side of the proposed pad expansion shall be located prior to any construction work and protected from any disturbance during that work. If necessary, the line shall be barricaded to avoid any damage during the construction, drilling and completion work.

**MV23-27 Pad**

1. The pad construction particularly along the east edge of pad shall be conducted with appropriate stormwater BMPs to avoid soil loss or create water quality impacts to Wheeler Gulch.
2. The sandstone ledge directly along the west edge of pad shall not be undercut during pad construction so the integrity of ledge is maintained.
3. The proposed new road shall be realigned 20-25 feet upstream at north end of pad to avoid loss or damage to the existing cottonwood trees and riparian vegetation. The narrowleaf cottonwood tree near corner #2 shall be protected from any disturbance by equipment.

**GM24-27 Pad**

1. Big Game Winter Range Timing Limitation. Since a portion of the disturbance footprint for this pad falls within Federal Lease COC34553A, no construction, drilling or completion activities shall occur on the GM24-27 pad during a Timing Limitation (TL) period from **January 1 to May 14 annually** to minimize impacts to wintering big game. The winter TL would not apply to the construction or use of the cuttings trenches, as they are located on Fee surface/Fee minerals.
2. Both gullies at NW pad corner (from Cor #1A to Cor #2) and SW pad corner (STA #7B to #7A) shall generally be left undisturbed in their natural streamcourses. By protecting the north gully, sufficient room for the cuttings trench is not available. Cuttings shall be removed by truck to the trenches to be created at the base of pad.

**MV29-27 Pad**

1. The excess material from the pad excavation shall be placed in gully directly north and west of Corner #7a and #7b and stockpiled along that gully that slopes down toward the access road. The large draw north of the proposed excess material stockpile shall remain undisturbed. A relatively small portion of the excess material volume shall be used to raise the road grade across the existing Wheeler Gulch culvert.
2. The final location of production facilities shall be jointly determined by Williams and BLM personnel after the pad has been constructed. Objective is to locate the facilities so that interim reclamation on the expanded cutslope can be enhanced. Another key consideration in facility placement is the final location of the redirected man-made channel during the life of the producing wells.

### **GM331-34 Pad**

1. Topsoil shall be windrowed along south and east edges of proposed pad disturbance and generally remain within the existing reclaimed disturbed area. Topsoil at NW pad corner shall be segregated from the planned cuttings trench excess material pile.
2. No disturbance shall encroach closer than 10 feet to the edge of box canyon (rock wall) at SW pad corner.
3. No disturbance shall encroach closer than 10 feet to the edge of the gully on the east end of pad.
4. Existing reclamation fencing shall be removed prior to pad construction.
5. The cutslope along north side of pad shall be changed to 1:1 slope to minimize disturbance impacts to the existing rock ledge and live juniper trees.
6. Flare pit shall be dug at east edge of trench.

### **MV24-27 North Cuttings Trench**

1. A Sundry Notice shall be submitted showing the realignment of the cuttings trench so the disturbance would take place between the 2 gullies in the area and the west edge of trench would be allowed to run to the base of the slope.

### **Centralized Frac Pit/Pad Facility**

1. A sundry notice shall be submitted providing the results of the investigations regarding the surface-ground water issues related to the site's construction in proximity to Wheeler Gulch.
2. The frac pad and any pits shall be constructed to conform to state regulations for stormwater protections and pit containments.
3. Pits, if used, shall be lined, fenced, and netted for wildlife protection.
4. The proposed surface water line serving the frac pad shall be aligned within the existing gas pipeline corridor or along existing roads wherever possible.

### **Centralized Water Tank Storage Facility**

1. Protect the existing juniper trees and sandstone ledge along the west side of the pad from disturbance during pad construction. The proposed topsoil to be stripped for this pad shall be incorporated into the existing topsoil stockpile for the nearby compressor pad to minimize overall surface disturbance.
2. The drainage flow from the gully north of the proposed pad shall be redirected around the pad and, if necessary, ditched to existing culverts and drained under the Wheeler Gulch Access Road.

**DOWNHOLE CONDITIONS OF APPROVAL**  
**Applications for Permit to Drill**  
**MV29-27 Pad**

**Company/Operator:** Williams Production RMT Company

**Surface Location:** NWSE, Section 27, Township 6 South, Range 96 West, 6<sup>th</sup> P.M.

<u>Well Name</u>	<u>Well No.</u>	<u>Bottomhole Location</u>	<u>Lease</u>
GM	544-27	SESE Sec. 27, T. 6S, R. 96W.	COC34553A
GM	514-26	SESW Sec. 26, T. 6S, R. 96W.	COC67283
GM	444-27	SESE Sec. 27, T. 6S, R. 96W.	COC34553A
GM	414-26	SESW Sec. 26, T. 6S, R. 96W.	COC62163
GM	344-27	SESE Sec. 27, T. 6S, R. 96W.	COC34553A
GM	44-27	SESE Sec. 27, T. 6S, R. 96W.	COC34553A

1. Twenty-four hours prior to (a) spudding, (b) conducting BOPE tests, (c) running casing strings, and (d) within twenty-four hours after spudding, the CRVFO shall be notified. One of the following CRVFO inspectors shall be notified by phone: Steve Ficklin at 970-879-9036, David Giboo at 970-876-9038, and Todd Sieber at 970-876-9044.
2. A CRVFO petroleum engineer shall be contacted for a verbal approval prior to commencing remedial work, plugging operations on newly drilled boreholes, changes within the drilling plan, changes or variances to the BOPE, deviating from conditions of approval, and conducting other operations not specified within the APD. Contact Dane Geyer at 970-876-9048 (office) or 970-589-6887 (cell) for verbal approvals. The secondary contact is William Howell at 970-876-9049 (office) or 970-319-5837 (cell).
3. If a well control issue arises (e.g. kick, blowout, or water flow), casing failure occurs, or an increase in bradenhead pressure occurs during fracturing operations, Dane Geyer shall be notified within 24 hours from the time of the event.
4. The BOPE shall be tested and conform to Onshore Order #2 for a 3M system.
5. A casinghead rated to 3,000 psi or greater shall be utilized.
6. An electrical/mechanical mud monitoring equipment shall be functional prior to drilling out the next shoe. As a minimum, this shall include a pit volume totalizer, stroke counter, and flow sensor.
7. Gas detecting equipment shall be installed in the mud return system, prior to drilling out the next shoe, and hydrocarbon gas shall be monitored for pore pressure changes.
8. A gas buster shall be functional and all flare lines effectively anchored in place, prior to drilling out the next shoe. The discharge of the flare lines shall be a minimum of 100 feet from the wellhead and targeted at bends. The panic line shall be a separate line (not open inside the buffer tank) and effectively anchored. All lines shall be downwind of the prevailing wind direction and directed into a flare pit, which cannot be the reserve pit. The flare system shall use an automatic ignition. Where

noncombustible gas is likely or expected to be vented, the system shall be provided supplemental fuel for ignition and maintain a continuous flare.

9. Prior to commencing fracturing operations, the production casing shall be tested to the maximum anticipated surface fracture pressure and held for 15 minutes. If leak-off is found, Dane Geyer shall be notified within 24 hours of the failed test, but prior to proceeding with fracturing operations. The test shall be charted and set to a time increment as to take up no less than a quarter of the chart per test. The chart shall be submitted with the well completion report.
- 10. On the first well drilled on this pad, a triple combo (open hole logs) shall be run from the base of the surface borehole to surface, and another run from TD to the surface casing shoe. Each open hole log shall be submitted to the CRVFO within 24 hours after running. These logs shall be submitted digitally in LAS. format. Contact Todd Sieber at 970-876-9044 or anthony\_sieber@blm.gov for clarification.**
11. As a minimum, cement shall be brought to 200 feet above the Mesaverde. Prior to commencing fracturing operations, a CBL shall be run (from TD to 200 feet above the TOC) and an electronic copy submitted to the CRVFO. If the TOC is lower than required or the cement sheath of poor quality, then, within 48 hours from running the CBL and prior to commencing fracturing operations, a CRVFO petroleum engineer shall be notified for further instruction.
12. Submit the (a) mud/drilling log (e.g. Pason disc), (b) driller's event log/operations summary report, (c) production test volumes, (d) directional survey, and (e) Formation Integrity Test results with the well completion report. Contact Dane Geyer at 970-876-9048 for clarification.