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## 2.0 PROPOSED ACTION AND ALTERNATIVES

As discussed in Chapter 1, this EIS evaluates the potential environmental impacts from implementing the Proposed Action and its alternatives as outlined in this chapter. Decisions on the Proposed Action and its alternatives will be documented in a separate ROD. The five fully analyzed alternatives within this EIS include:

**Alternative A – Proposed Action;**

**Alternative B – No Action Alternative;**

**Alternative C – Transportation Impact Reduction Alternative;**

**Alternative D – Conservation Alternative; and**

**Alternative E – Agency Preferred Alternative**

A brief, narrative introduction to each of the five alternatives is provided below. Throughout this chapter, the letter designations for the alternatives and the descriptive alternative names (e.g., Alternative C and the Transportation Impact Reduction Alternative) are used synonymously and interchangeably.

The majority of the proposed wells under each alternative would be drilled within existing Federal or State oil and gas leases. However, each of the alternatives includes some number of proposed wells and well pads on currently unleased lands. Any decision to offer the unleased lands for leasing would be made by the BLM during its regular lease sale process and not in the ROD for this EIS. **Table 2.1-1** summarizes the key features of each alternative.

**Section 2.2 – Section 2.6** of this chapter provide detailed descriptions of the five fully analyzed alternatives. All figures referenced within this chapter are found in **Appendix A**.

Under **Alternative A**, the Proposed Action, BBC and other operators would develop up to 807 natural gas wells from up to 538 well pads in the WTP Project Area. Of the 538 well pads proposed, approximately half of those pads would have more than one well (hence, the 807 wells). For the purpose of analysis, it is assumed that during the first year of development (the assumed peak year of development) BBC would operate six drill rigs year-round and other WTP Project Area operators would operate three rigs year-round. Following the first or peak year of development, drilling activity would likely begin to decline as other operators begin to exhaust their well locations. Drilling activities would occur for approximately 8 years. The anticipated life of an individual well is 20 years. The anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP under the Proposed Action would be approximately 33 years. **Figure 2.2-1** provides the Proposed Action map on which BBC and other operators have indicated conceptual locations of potential well pads over geologic formations currently thought to be most prospective for natural gas development.

<b>Table 2.1-1 Summary Comparison of Alternatives</b>										
<b>Proposed Features<sup>1</sup></b>	<b>Alternative A – Proposed Action</b>		<b>Alternative B – No Action Alternative</b>		<b>Alternative C – Transportation Impact Reduction Alternative</b>		<b>Alternative D – Conservation Alternative</b>		<b>Alternative E – Agency Preferred Alternative</b>	
Wells	807		81		807		558		807	
<i>Wells on Leased/Unleased Lands</i>	588	219	60	21 <sup>1</sup>	588	219	537	21	588	219
Well Pads	538		54		538		348		488	
<i>Well Pads on Leased/Unleased Lands</i>	392	146	40	14	392	146	336	12	348	140
Number of Drilling Rigs	9		3		6		7		7 <sup>2</sup> (assumed for the purpose of analysis)	
Drilling Season	9 rigs Year-round		3 rigs Year-round		2 rigs Year-round, Remaining 4 rigs allowed 5/16 – 10/31 (approval of winter drilling would be subject to annual review requirements)  6 rigs		7 rigs 5/16 – 10/31  (No winter drilling 11/1 – 5/15)		7 <sup>2</sup> rigs Year-round (approval of winter drilling would be subject to annual review requirements)	
Wells per year	168		60		62		40		128 <sup>2</sup> (assumed for the purpose of analysis)	
Drilling Duration (years)	8		2		15		21		9	
Life of Well (years)	20		20		20		20		20	

<sup>1</sup> Under the No Action Alternative BBC and other operators have proposed some development on unleased State lands within the WTP Project Area.

<b>Table 2.1-1 Summary Comparison of Alternatives</b>					
<b>Proposed Features<sup>1</sup></b>	<b>Alternative A – Proposed Action</b>	<b>Alternative B – No Action Alternative</b>	<b>Alternative C – Transportation Impact Reduction Alternative</b>	<b>Alternative D – Conservation Alternative</b>	<b>Alternative E – Agency Preferred Alternative</b>
Field Abandonment and Final Reclamation	5	5	5	5	5
Life of Project (years)	33	27	40	46	34
New Access Road (miles)	178	32	179	127	164
Existing Road Improvements (miles)	21.5	6.2	53.3	46.6	46.6
Proposed Road Reroutes (miles)	8.9	0	6.0	0	6.0
Alternative Access Routes (miles)	0	0	2.85	0	0
Pipeline (miles)	165 co-located w/ proposed road 19.5 along existing road 10 cross-country	29 co-located w/ proposed road 6.7 along existing road 10 cross-country	169 co-located w/ proposed road 24 along existing road 10 cross-country	120 co-located w/ proposed road 19 along existing road 10 cross-country	155 co-located w/ proposed road 24 along existing road 10 cross-country
Buried Pipelines	No	No	62 percent	No	62 percent
Surface Pipelines	Yes	Yes	38 percent	Yes	38 percent
Number of Pump Stations	4	0	4	3	4
Number of Equipment Storage Areas	3	2	3	3	3
Airstrip improvements/New Construction	Yes	No	Yes	Yes	Yes

<b>Table 2.1-1 Summary Comparison of Alternatives</b>					
<b>Proposed Features<sup>1</sup></b>	<b>Alternative A – Proposed Action</b>	<b>Alternative B – No Action Alternative</b>	<b>Alternative C – Transportation Impact Reduction Alternative</b>	<b>Alternative D – Conservation Alternative</b>	<b>Alternative E – Agency Preferred Alternative</b>
Number of Temporary Worker Housing Locations	3	2	3	None	3
New Compressor Stations (associated hp)	3 (24K)	2 (17.6K)	3 (24K)	3 (20.8K)	3 (24K)
Estimated Short-term Surface Disturbance	3,656	626	3,640	2,510	3,339
Estimated Long-term Surface Disturbance (after successful interim reclamation)	1,864	279	1,839	1,237	1,678
Maximum New Annual Surface Disturbance Allowed (acres)	NA	NA	280	180	540
Total Unreclaimed Surface Disturbance Allowed At Any Time (acres)	NA	NA	2,250	1,440	2,310

<sup>1</sup>All numbers and units of measure should be considered approximations.

<sup>2</sup>The Agency Preferred Alternative would allow year-round drilling in the WTP Project Area without imposing rig limitations or well number limitations. However, for the purpose of analysis, Alternative E assumes that a maximum of 7 rigs would be drilling at any time.

In order to mitigate the impacts of winter drilling, BBC has included a detailed Wildlife Mitigation Plan (see **Section 2.2.2.2** and **Appendix B**) as part of their Proposed Action. The goal of BBC's Wildlife Mitigation Plan is to improve habitats for sage-grouse, mule deer, elk, and raptors, in an effort to offset the effects of winter drilling and other potential impacts of the project.

Under **Alternative B**, the No Action Alternative, proposed natural gas development on the BLM lands as described in the Proposed Action would not be implemented; however, natural gas development would likely continue to occur on State of Utah and private lands, subject to the approval of UDOGM or the appropriate private land owner. In addition, production and maintenance activities would continue for all existing wells and infrastructure that have been developed on Federal lands. Reasonable access across Federal lands to proposed well pads and facilities on State and private lands would occur under the No Action Alternative.

Under the No Action Alternative, approximately 81 natural gas wells would be developed from up to 54 well pads on State and private lands in the WTP Project Area. Three drill rigs would operate year-round for approximately 2 years. The anticipated life of an individual well would be approximately 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be about 27 years. Because BBC and other operators are proposing directional drilling when technically and economically practicable, there is a possibility that wells drilled from State or private surface would extract minerals from below Federal surface. All proposed wells targeting Federal minerals would be required to go through the BLM APD process. Conceptual locations for the approximately 54 well pads on State and private lands under the No Action Alternative are illustrated on **Figure 2.3-1**.

**Alternative C**, the Transportation Impact Reduction Alternative, so named because of its focus on resolving issues related to transportation, was developed to address specific concerns raised by the public during the scoping process, while also considering a variety of measures to reduce environmental effects. The primary transportation-related concerns identified by the public during scoping were increased traffic on existing roads, safety hazards created by increased traffic volumes, and adverse impacts that traffic could have on recreation and natural and cultural resources. Under Alternative C, natural gas development on Federal leases would occur in a phased manner by limiting the number of rigs allowed and imposing surface disturbance restrictions. Of the six rigs allowed under Alternative C, only two would operate during the winter season (November 1- May 15); the remaining four rigs would operate on a seasonal basis. When compared to the Proposed Action, the implementation of Alternative C would increase the overall LOP by approximately 7 years, but would decrease traffic-related impacts and annual surface disturbance.

In addition to limiting the number of rigs, transportation impacts would be reduced under Alternative C by implementation of the following:

- Construction and use of an alternative access route through Trail Canyon.
- Daily use of the existing Peter's Point air strip, and proposed Flat Iron and Prickly Pear Mesa airstrips, for transport of drilling workforce and/or supplies (reduction of approximately eight vehicle roundtrips per well/day).

- Transporting produced water and condensate via water/condensate transfer pipelines to proposed SWD wells or water management facilities.
- Administrative access only (i.e., closed to the general public) on Cottonwood Canyon Road, Harmon Canyon Road, and Prickly Pear Road during the winter season (December 1 - April 15).
- Prohibited use of Prickly Pear Canyon Road (i.e., from Nine Mile Canyon to the top of Prickly Pear Mesa) by all project-related trailer traffic or vehicles with truck-load capacity of 1-ton or larger.
- Requiring transportation of routine drilling and completion supplies to the storage areas during hours of low use (7:00 PM to 10:00 AM) during the non-winter period (May 16 – October 31).
- Limiting transportation of routine drilling and completion supplies on weekends and holidays.
- Administrative access on Horse Bench Road (i.e., closed to the general public).
- Gating all proposed roads longer than 2 miles after drilling and completion activities are completed.
- Gating all roads that provide access to proposed wells in the WSAs (i.e., limited administrative access only).
- Reclaiming redundant roads, roads that create unnecessary loops, or roads determined to be detrimental to sensitive natural and cultural resources.

In addition to reducing transportation impacts, if Alternative C were selected, impacts to sensitive resources throughout the WTP Project Area would be reduced by the implementation of special protection measures for wildlife and water resources. These special protection measures would help ensure the stability of sensitive resources and were developed by the BLM and its cooperating agencies. The BLM would evaluate the effectiveness of these measures annually and would optimize resource protection through an adaptive management approach.

Under Alternative C, the special protection measures and the measures in **Tables 2.6-7** and **2.6-8** would be implemented and would allow development activities to occur throughout the WTP Project Area as proposed by BBC and other operators. Thus, under the phased development of Alternative C, it is assumed that BBC and other operators would develop up to 807 natural gas wells from up to 538 well pads over a 15-year period. The anticipated life of an individual well would be approximately 20 years. The anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be approximately 40 years.

In addition to limiting the number of rigs and the inclusion of special protection measures, under Alternative C, maximum new annual surface disturbance would be limited to approximately 280 acres per year, and the total unreclaimed surface disturbance allowed under this EIS would be limited to approximately 2,250 acres at any given time. Site-specific disturbed acreages would be removed from the total unreclaimed surface disturbance calculation once the site-specific surface disturbance meets successful interim reclamation standards. Assumptions for surface disturbance thresholds are addressed in **Appendix C**.

The effectiveness of the special protection measures for sensitive resources and transportation impact reduction measures, as well as compliance with interim reclamation standards and disturbance thresholds would be monitored by a third-party contractor selected by the BLM and funded by the operators. Additional information on the proposed third-party monitoring plan can be found **Appendix D**.

Under Alternative C, the BLM and UDWR have also included an Agency Wildlife Mitigation Plan, which is a modification of BBC's Wildlife Mitigation Plan (see **Section 2.4.1.3** and **Appendix E**). The agencies' mitigation plan emphasizes the importance of offsetting, to the extent reasonable, the impacts of the full field development in its entirety. The agencies' plan gives priority to compensating for potential effects to greater sage-grouse, deer, elk, and raptors.

**Alternative D**, the Conservation Alternative, generically named because of its focus on protecting certain surface resources, is developed in response to public concerns and opposition to oil and gas development and production activity within the Jack Canyon and Desolation Canyon WSAs, the proposed Nine Mile Canyon and Desolation Canyon Areas of Critical Environmental Concern (ACECs), and other sensitive areas (e.g., canyon bottoms, non-WSA lands with wilderness characteristics, crucial wildlife habitat, and high-country watersheds). Under Alternative D, impacts to these resource areas would be reduced by implementation of the measures outlined in **Tables 2.6-7** and **2.6-8** and by implementation of the following measures:

- NSO by new well pads or other facilities on Federal lands within Jack Canyon and Desolation Canyon WSAs.
- NSO on Federal lands within the Desolation Canyon NHL.
- No leasing of currently unleased lands with wilderness characteristics.
- NSO on unleased Federal lands within the potential Nine Mile Canyon and Desolation Canyon ACECs, as illustrated in the Conservation Alternative (Alternative D) of the *Draft Price Resource Management Plan and Environmental Impact Statement* (BLM 2004b) and the *Supplemental Information and Analysis to the Price Draft Resource Management Plan/Environmental Impact Statement for Areas of Critical Environmental Concern* (BLM 2006a)<sup>2</sup>.
- As feasible (where to do so would not preclude the development of valid and existing lease rights), NSO on Federal lands within canyon bottoms.
- Administrative access only on Horse Bench Road, Jack Canyon, Jack Ridge, and Cedar Ridge Roads.
- No temporary worker housing locations to reduce the potential for worker-related impacts to cultural resources.
- No exceptions, waivers, or modifications to existing lease stipulations.

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<sup>2</sup>The analysis of no surface occupancy within the proposed ACECs is based upon the Conservation Alternative (Alternative D) of Draft Price Resource Management Plan and Environmental Impact Statement (BLM 2004b) and the Supplemental Information and Analysis to the Price Draft Resource Management Plan/Environmental Impact Statement for Areas of Critical Environmental Concern (Federal Register May 2006), which provides the most conservative protection of the relevant and important values of the proposed ACECs and helps satisfy CEQ requirements to analyze a reasonable range of alternatives as required under CFR 1502.14.

If Alternative D were selected, natural gas development on Federal leases would be implemented in a phased manner through limitations on the number of rigs, seasonal restrictions, and surface disturbance restrictions imposed by the BLM. Thus, it is assumed that if Alternative D were implemented BBC and other operators would develop up to 558 natural gas wells from up to 348 well pads over a 21-year period. The anticipated life of an individual well would be approximately 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be approximately 46 years.

In addition to the limitations and restrictions described above, the maximum new annual surface disturbance would be limited to approximately 180 acres per year on Federal land, and the total unreclaimed surface disturbance allowed under this EIS would be limited to approximately 1,440 acres at any given time. Acreages would be removed from the total unreclaimed surface disturbance calculations once the site-specific surface disturbance meets successful interim reclamation standards. Assuming successful interim reclamation, the maximum long-term disturbance under Alternative D would be approximately 1,237 acres.

The effectiveness of the special protection measures for sensitive resources and transportation impact reduction measures, as well as compliance with interim reclamation standards and disturbance thresholds would be monitored by a third-party contractor selected by the BLM and funded by the operators. Additional information on the proposed third-party monitoring plan can be found in **Appendix D**.

**Alternative E** was designated by the BLM in the DEIS as the Agency Preferred Alternative. The Agency Preferred Alternative incorporates components of the Proposed Action, Alternative C, and Alternative D, as well as additional cultural resource protection measures included within the WTP PA. Some of the additional mitigation and environmental protection measures included under the Agency Preferred Alternative and **Tables 2.6-7** and **2.6-8** have been voluntarily agreed to by BBC since the publication of the DEIS, and in light of public comments received on the DEIS. As some of these measures go beyond those required by the Approved RMP, regulation, or statute, and/or are not required under the operators' valid and existing leases, the operators' voluntary agreement to these components of the alternative would enhance the BLM's ability to include the measures as COAs in the ROD. Under the Agency Preferred Alternative, it is assumed that BBC and other operators would develop up to 807 natural gas wells from approximately 494 well pads over a 9-year period.

The Agency Preferred Alternative would allow year-round drilling in the WTP Project Area without imposing rig limitations.

If Alternative E were selected, the BLM would require implementation of additional special protective measures for wildlife and water resources in the WTP Project Area, as well as the following transportation impact reduction measures:

- Transporting produced water and condensate via water/condensate transfer pipelines to proposed SWD wells or water management facilities;
- Prohibited use of Prickly Pear Canyon Road (i.e., from Nine Mile Canyon to the top of Prickly Pear Mesa) by all project-related trailer traffic or vehicles with truck-load capacity of 1-ton or larger.

- Limiting transportation of routine drilling and completion supplies on weekends and holidays;
- Requiring the use of storage areas for casing material and pipeline material to reduce project-related traffic;
- Gating proposed new roads longer than 2 miles after drilling and completion activities are completed in sensitive resource areas;
- Gating all roads that provide access to proposed well pads in the WSAs (i.e., limited administrative access only); and
- Reclaiming redundant roads, roads that create unnecessary loops, or roads determined to be detrimental to sensitive natural and cultural resources.

In an effort to minimize impacts to sensitive resource areas, the Agency Preferred Alternative also contains several components from Alternative D. The following measures would reduce the impacts of development within WSAs, canyon bottoms, the Desolation Canyon NHL, and the Nine Mile Canyon ACEC:

- As feasible (where to do so would not preclude the development of valid and existing lease rights), NSO by new well pads or other facilities on Federal lands within Jack Canyon and Desolation Canyon WSAs;
- NSO on Federal lands within the Desolation Canyon NHL; and
- As feasible (where to do so would not preclude the development of valid and existing lease rights), NSO on Federal lands within canyon bottoms.
- NSO on Federal lands within the Nine Mile Canyon ACEC as illustrated in the Proposed RMP of the *Price Field Office Proposed Resources Management Plan and Final Environmental Impact Statement* (BLM 2008a).

As with Alternatives C and D, under the Agency Preferred Alternative impacts to resources would also be reduced by limiting annual surface disturbance and total unreclaimed surface disturbance allowed at any given time. Under Alternative E, BBC and other operators would be limited to approximately 540 acres of surface disturbance per year (see **Section 2.6.1.1**). Total unreclaimed surface disturbance allowed at any given time under this EIS would be limited to approximately 2,310 acres. To accommodate these surface disturbance thresholds, BBC and other operators would be required to initiate interim reclamation measures as soon after development as practicable. Acreages of disturbance would be removed from the unreclaimed surface disturbance totals upon meeting successful interim reclamation standards.

Under Alternative E, the BLM and UDWR have also included an Agency Wildlife Mitigation Plan (see **Section 2.6.1.5**). The agencies' alternative mitigation plan emphasizes the importance of offsetting, to the extent reasonable, the effects of the full field development in its entirety. The agencies' plan gives priority to compensating for potential impacts to greater sage-grouse, deer, elk, and raptors.

Finally, a unique component of the Agency Preferred Alternative is that BBC and other operators would be required to carry out cultural resource mitigation measures as specified in the WTP PA (**Appendix T**). These measures include, but are not limited to:

- Providing funding for a Class II cultural resource inventory;
- Providing funding for a cultural resource monitoring plan;
- Providing funding for conservation treatments and continuing research;
- Expansion of current dust suppression efforts and dust monitoring;
- Increasing personnel training; and
- Development of visitor interpretation/enhancement sites.

The effectiveness of special protection measures for wildlife, water resources, transportation impact reduction measures, compliance with interim reclamation standards and disturbance thresholds, the Agency Wildlife Mitigation Plan, compliance with public safety/recreation mitigation, and compliance with the measures in **Tables 2.6-7** and **2.6-8** would be monitored by a third party contractor selected by the BLM and funded by the operators. Additional information on the proposed third-party monitoring plan can be found in **Appendix D**.

Because the five alternatives share several common features, **Section 2.1** provides information on the details generally common to Alternatives A through E. Differences between the alternatives, or features unique to an individual alternative, are provided within the alternative-specific discussions in **Sections 2.2** through **2.6**.

**Section 2.7** of this chapter provides a brief side-by-side comparison of the primary potential impacts from each alternative.

**Section 2.8** of this chapter provides brief descriptions of alternatives considered but eliminated from detailed analysis.

## **2.1 DETAILS COMMON TO ALL ALTERNATIVES**

BBC and other operators propose to develop the natural gas resources of the WTP Project Area. On the various alternative maps (**Figures 2.2-1 – 2.6-1**) BBC and other operators have indicated conceptual locations of potential well pads from which natural gas resources could be developed. The extent of such development and prospective nature of the resources is based on three-dimensional (3D) seismic data, geologic information, data derived from wells drilled to date, and economic factors. These data are limited for large portions of the WTP Project Area. BBC and other operators expect that a significant proportion of the proposed development area would ultimately produce enough natural gas to be economically viable. BBC and other operators also expect that development of certain areas currently identified for development, would not be economically viable, and thus, some of the proposed well pads and wells conceptually illustrated and analyzed in this EIS may not be constructed and drilled.

Wells would be drilled to develop potentially productive formations in the WTP Project Area including the Wasatch, North Horn, Mesaverde, Dakota, Cedar Mountain, Navajo, and Wingate Formations, and other formations found to be productive. The formations above the Blackhawk (shallow horizons) would be produced using a single wellbore. The Mancos and deeper formations (deep horizons) would similarly be produced using a shared wellbore.

The well density needed to develop the resources is expected to vary depending on the formation being developed. The geologic characteristics of the individual formations in the WTP Project Area would dictate this density. The range of downhole well densities expected at this time is one well per 20 acres (some areas of Wasatch and Mesaverde formations) to one well per 160 acres. The ultimate well density would be defined through future drilling. Again, these well densities refer to downhole/bottomhole wellbore densities. The operators would use directional drilling and multiple well pad drilling techniques to develop these resources that would limit the number of well pads or surface locations (i.e., surface density) to one well pad per 80 acres.

The number of wells per well pad would vary depending on the required downhole well density and how many directional wells can be drilled from the location, whether or not both shallow and deep horizons are being developed, and topographic considerations. Some well pad locations would therefore host a single well and others may have up to 24 wells drilled from a single well pad. For example, well pads used for drilling to shallow horizons where the required downhole density is limited by regulation to one well per 80 acres would have only one well. In contrast, in circumstances where the well pad location would be used to drill to both shallow and deep horizons, where proposed downhole well densities are one well per 20 acres, and/or the well pad would be used to drill to locations beneath inaccessible canyons, up to 24 wells might be drilled from an individual well pad.

The locations of proposed well pads, access roads, pipelines, compressor stations, salt water disposal wells, water supply wells, temporary worker housing, aggregate borrow areas, equipment storage areas, pump stations, and other surface facilities illustrated on **Figures 2.2-1 – 2.6-1** are conceptual in nature. The proposed locations illustrated on these maps have not been individually inspected; they have only been conceptually identified considering topography, land features, vegetation, and operational constraints. Onsite inspections of individual well pads, access roads, pipelines, and other surface facility locations by the BLM and operator personnel would occur during the permitting process for individual wells or ROWs, and site-specific adjustments to location and orientation would be made at that time. The process for site-specific determinations is discussed in detail in **Section 1.4**. In general, where reasonably practicable, the onsite determinations would conform to Best Management Practices (BMPs) for selecting locations, as described in the *BLM Instruction Memorandum No. 2004-194: Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Rights of Way* and the BLM/U.S. Forest Service (USFS) publication *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development – The Gold Book* (The Gold Book) (DOI-USDA 2007). Such site-specific BMPs could include, e.g., avoidance of topographic features, protection of vegetation or wildlife habitats, and visual resource mitigation.

The life cycle of an individual well and its associated facilities/required infrastructure (e.g., roads, pipelines, and compressor stations) is composed of six primary phases: construction, drilling, completion, interim reclamation, production and maintenance, and final reclamation and abandonment. Specific details of the six primary phases are described in the following sections.

**2.1.1 Construction**

Implementation of the Proposed Action or alternatives would require the construction of well pads, pipelines, roads, and ancillary facilities. **Table 2.1-2** provides ROW widths, surface disturbance corridor widths, and areas of surface disturbance for the various proposed project features and facilities. Each of these components is discussed in detail in subsequent sections.

<b>Table 2.1-2 ROW Widths, Disturbance Widths, and Facility Surface Disturbance Sizes Common to All Alternatives</b>			
<b>Project Feature</b>	<b>Proposed ROW Width<sup>1</sup> (feet)</b>	<b>Estimated Disturbance Width</b>	
		<b>Short-term (feet)<sup>2</sup></b>	<b>Long-term (feet)</b>
Proposed Road and Pipeline (co-located)	100	80	30
Proposed Road	50	40	30
Proposed Pipeline along Existing Road (buried or surface)	50	40	0-2
Cross-country Pipeline (buried or surface)	50	40	0-2
Proposed Road Reroutes	50	40	30
Alternative Access Routes	50	40	30
<b>Project Facility</b>	<b>Estimated Area of Disturbance Per Facility</b>		
	<b>Short-term (acres)</b>	<b>Long-term (acres)</b>	
Proposed Well Pads (includes gas wells, SWD wells, and water supply wells)	2.85 <sup>3</sup>	1.85 <sup>3</sup>	
Pump Stations	0.5	0.5	
Equipment Storage Areas	5	5	
Compressor Stations	5	5	
Aggregate Borrow Areas	2	2	
Water Management Facilities	5	5	
Temporary Worker Housing Locations	10	10	

<sup>1</sup>For this EIS the proposed ROW width is defined as the actual width of the ROW that would be permitted by the BLM or UDOGM as appropriate. The disturbance width/corridor represents the area of surface disturbance within the permitted ROW that would be needed to construct/install road and/or pipeline.

<sup>2</sup>Short-term disturbance estimates are based on assumption that 80 percent of the ROW would be disturbed. Short-term disturbance for a well pad hosting an individual well would be approximately 2.85 acres. Actual short- and long-term disturbance for well pads would depend upon number of directionally drilled wells that would be drilled from a single well pad as discussed in **Section 2.1.1.1**. Well pads hosting the maximum potential number of well bores (i.e., up to 24 wells) would be initially constructed to approximately 7.65 acres in size.

### **2.1.1.1 Well Pad Construction**

Prior to individual well pad construction, BBC and other operators would obtain approval of an APD by the BLM and/or the UDOGM as appropriate. Each APD would contain site-specific COAs that apply to construction and well operations.

Construction of a typical well pad would entail the use of crawler tractors, motor graders, Class 125 or larger track hoes, backhoes, 10- to 20-yard dump trucks, and Class 988 loaders. Well pad construction equipment needs would vary depending on site-specific conditions.

Within the approved well pad location, a crawler tractor would strip whatever topsoil is present and stockpile it along the edge of the well pad for use during reclamation. Vegetation would be distributed along the sides of the well pad. In general, for well pads hosting a single vertical well, an industry standard reserve pit would be excavated adjacent to the working area of the well pad by a crawler tractor or track hoe and used for storing cuttings and drilling fluid. For well pads hosting multiple wells and/or where closed-loop drilling is employed, the operators may utilize larger completion pits to store completion water to be recycled and used for multiple wells. The reserve pit or completion pit would be lined with an impermeable geosynthetic liner so as not to leak, break, or allow discharge. The reserve pit or completion pit would be fenced on three sides during drilling and on the fourth side immediately after the removal of the drilling rig. The well pad itself would not be fenced. Fill from the pit would be stockpiled along the edge of the pit and the adjacent edge of the well pad. Use of erosion control measures, including proper grading to minimize slopes, diversion terraces and ditches, mulching, terracing, riprap, fiber matting, temporary sediment traps, and broad-based drainage dips or low water crossings would be employed by the operators as necessary and appropriate to minimize erosion and surface runoff during well pad construction and operation. In locations where drilling occurs within close proximity to surface water or near canyon rims, closed-loop drilling systems would be employed at the discretion of the BLM.

On average, five personnel, mostly equipment operators, would work on the construction of an individual well pad. Construction of an individual well pad could take from 1 to 3 weeks depending on the features of each particular site.

A well pad for a single vertical well would initially disturb about 2.85 acres, with possible additional, non-excavation related disturbance for cut and fill slopes / storage of topsoil and spoil piles. The exact size of the excavation area at each well pad would vary depending on the amount of cut and fill required to construct the pad. Well pads for multiple, directionally drilled wells would be constructed using the same techniques as the well pads for single, vertical wells but enlarged by approximately 0.2 acres for each additional directional well to be drilled. Well pads with up to 24 wells would be constructed to approximately 7.65 acres. Additional well bores on multi-well pads would be offset in a line 8 to 20 feet from the previous well bore. This additional disturbance would accommodate the drilling equipment while providing a safe offset from the existing well bore. If more than approximately 4 wells are to be drilled from a well pad, or if both

deep and shallow wells are to be drilled on the same location, parallel lines of wells spaced up to 140 feet apart may be employed.<sup>3</sup>

### 2.1.1.2 Access Road Construction and Associated Tasks and Facilities

#### ***General Road Construction Guidelines***

Implementation of any alternative would require the construction and improvement of multiple access roads on the BLM, State, and private surface. Road improvements and new road construction would only occur on an as-needed basis to facilitate access to well pads and other facilities. Site-specific plans for road construction and upgrades would be included as part of individual APDs or ROW applications and would be subject to approval from the appropriate surface management agency. All roads would be constructed or improved to facilitate drainage and control erosion. In addition, intervisible turnouts would be constructed along narrow canyon roads to improve traffic safety. Road construction or upgrades are addressed under each alternative and in **Appendix F** (*West Tavaputs Plateau Natural Gas Full Field Development Transportation Plan*).

New road construction and improvements of existing roads would typically require the use of motor graders, crawler tractors, 10-yard end dump trucks, and water trucks. The standard methodology for building new roads involves the use of a crawler tractor or track hoe to windrow the vegetation to one side of the ROW, remove topsoil to the opposing side of the ROW, and rough-in the roadway. This is followed by a grader or bulldozer to establish barrow ditches and crown the road surface. Where culverts are required, a track hoe or backhoe would trench the road and install the culverts. Some hand labor would be required when installing and armoring culverts. Road base or gravel needed would be hauled in and a grader used to smooth the running surface.

The majority of the proposed access roads would be paralleled by pipelines (i.e., co-located roads and pipelines). Where new pipelines are proposed adjacent to new access roads, a 100-foot wide ROW would initially be needed. Of the 100 feet, on average, about 80 feet would be disturbed during road and pipeline construction. The ROW width for an access road alone would be approximately 50 feet. The estimated initial surface disturbance width within the ROW would be approximately 40 feet.

Aggregate for road surfacing would be obtained from quarries on State of Utah or private lands or new aggregate borrow areas on Federal land. Aggregate would be of sufficient size, type, and amount to allow all weather access and alleviate dust. Each new aggregate borrow area constructed within the WTP Project Area would be approximately 2 acres in size. Upon completion of road construction or expiration of available aggregate material, the quarry areas would be re-contoured and reclaimed.

Roads on the top of the mesas would be constructed at a rate of approximately 1.5 miles per day. Roads constructed or upgraded in steep terrain would require more time to complete, approximately 1.5 miles per every 2 to 3 days. Spur roads to individual well pads would be constructed immediately prior to well pad construction. Each spur road workforce would include an average of five personnel to operate the equipment. For

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<sup>3</sup> For surface disturbance calculations it was assumed that the average well pad size would be approximately 2.85 acres (see **Table 2.1-2**).

trunk roads (i.e., those providing access through the WTP Project Area or to multiple well pads), several crews could operate simultaneously on different roads or different portions of the same road. Total personnel working on trunk road construction or improvements could range in size from 10 to 25 individuals.

For the purpose of analysis, it is assumed that following interim reclamation, access roads (including roads co-located with pipeline) would be reduced to approximately 30 feet of disturbance. The actual disturbance width of individual roads would depend upon site-specific conditions (e.g., topography) and the road standard applied (e.g., travel surface width).

### ***Primary Access Roads within the WTP Project Area***

As part of the scoping process the following BLM and county system roads were identified as primary access roads within the WTP Project Area: Nine Mile Canyon, Gate Canyon, Harmon Canyon, Prickly Pear Canyon, Dry Canyon, Cottonwood Canyon, the dugways from Cottonwood Canyon to Peter's Point and to Flat Iron Mesa, Horse Bench, Cedar Ridge, and Jack Canyon. Each of these routes is discussed in detail in **Appendix F**.

#### **2.1.1.3 Pipeline Construction and Associated Tasks and Facilities**

Pipelines would be necessary to transport gas from producing wells to the existing sales gas pipeline operated by Questar Pipeline (Questar), to transport produced water to proposed SWD wells and/or proposed water management facilities, and to transport condensate to holding tanks or condensate management facilities. For purposes of analysis, pipelines are classified as trunk lines or gathering lines. Trunk lines service multiple wells and gathering lines service individual wells or small groups of wells on a multi-well pad.

Each trunk line corridor could include high and low pressure gas pipelines, produced water, and condensate pipelines. The existing gas gathering system within the WTP Project Area would be expanded to convey the gas production volumes from proposed wells. This expansion would be accomplished both by installing new pipelines within existing and new pipeline corridors, and installing additional pipelines within or adjacent and parallel to existing pipeline corridors. New pipelines installed within existing pipeline ROWs could potentially result in the temporary re-disturbance of areas currently undergoing reclamation. Gathering line corridors could include a gas line, a condensate line, and a produced water line. **Figures 2.2-1 – 2.6-1** display existing pipeline corridors and conceptual routes for proposed pipeline corridors for each alternative.

The proposed gas gathering system, including compression, would be designed for expandability and to accommodate peak field production. Expansion would typically be accomplished by looping, or paralleling, existing lines with additional lines and by adding compressors within the existing and planned facilities. A loop pipeline is defined as a pipeline that is constructed near an existing pipeline, which is placed in service concurrently for the purpose of adding additional capacity to the existing system.

New gathering and condensate pipelines would be constructed of steel. Water pipelines would be constructed of steel or polyethylene. In general, gathering pipelines for individual wells would consist of 6- to 8-inch outer diameter (OD) pipeline. Each

gathering line would tie into a larger trunk line with a 10- to 16-inch OD, which would eventually transport the gas to the Questar gas sales pipeline. The dimensions of the pipe used would be dependent on the number of wells served and production estimates.

The decision to bury a segment of pipeline versus lay it on the surface would depend upon the alternative selected, requirements of the appropriate surface management agency, and site-specific topographic and soil conditions. Techniques for surface pipeline installation and pipeline burial are described in detail within each alternative-specific pipeline construction discussion.

In limited situations, for example to significantly reduce total pipeline length, a proposed pipeline ROW could be installed independent of an access road. Pipelines installed independent of roads (i.e., cross-country pipelines) could total approximately 10 miles under any of the alternatives (conceptual locations for cross-country pipelines are not illustrated on **Figures 2.2-1 – 2.6-1**). The decision to bury a cross-country pipeline versus laying it on the surface would depend upon the alternative selected. New cross-country pipeline would require a 50-foot wide construction ROW. Each cross-country pipeline ROW would be reclaimed within 6 months of pipeline installation with the exception of the immediate area of disturbance underneath surface pipelines. Cross-country pipelines would be up to 16-inch OD.

Between 10 and 25 construction and supply-related personnel would be needed to install new sections of pipeline gathering system. All gas pipelines would be constructed to applicable American Petroleum Institute (API)/industry standards.

In order to prevent surface-laid water pipelines from freezing, the operators would insulate the pipelines, heat trace the lines, and/or build the pipelines so that they are graded to drain when not in use. Pipelines would be insulated and covered with a metal wrap. Wrap material would either be grey galvanized or painted tan.

#### **2.1.1.4 Storage Areas**

Depending on the alternative, BBC and other operators would construct between one and three 5-acre equipment storage areas that would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, CO<sub>2</sub> tanks, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figures 2.2-1 – 2.6-1**). Equipment storage areas would be constructed using techniques similar to those described for well pad construction, and each location would essentially consist of a level open space adjacent to an access road.

The storage areas would be used continuously throughout the project development phase. Storage of sensitive or hazardous materials (e.g., CO<sub>2</sub>) would be handled in compliance with all applicable Federal and State of Utah regulations. Equipment storage on each storage area would be strategically planned to accommodate nearby construction, drilling, and completion activities. Upon completion of the development phase of the project, or when storage areas are no longer needed, all remaining equipment would be removed and the storage areas would be reclaimed according to standards of the appropriate surface management agency.

## 2.1.2 Drilling

### *Drilling Procedures*

Drilling operations would be conducted in compliance with all Federal regulations, all UDOGM rules and regulations, and all applicable local rules and regulations.

Following construction of the access road and well pad, a drilling rig would be transported to the well pad (along with other necessary equipment). The operators may employ purpose built drilling rigs with top drives and self skidding systems in most instances, however conventional mud rotary platform drill rigs may be utilized in certain situations such as if one of few additional wells are to be drilled on the location.

The rig used for shallow wells would typically be smaller than the rig used for deeper wells, incorporating a smaller substructure and mast, and thus, will have a smaller surface disturbance footprint. Occasionally, due to rig availability and/or scheduling conflicts, a big rig may be utilized for shallower borings and would create the larger footprint. Drilling would commence with spud in<sup>4</sup> of a well. Drilling operations would include: adding new joints of pipe at the surface as the hole deepens; circulating drilling mud to cool the drill bit and remove the cuttings; removing the drill string from the hole to replace worn drill bits; and setting production casing and cementing it in place.

For the surface hole interval (i.e., surface to the surface casing shoe) BBC and other operators intend to utilize fresh water, adding clay as necessary to aid in hole cleaning. Water use during drilling operations would vary in accordance with the formations to be drilled, but would average approximately 1 acre-foot (7,758 barrels bbl) per shallow well and 2.5 acre-feet (19,395 bbl) per deep well. A low solids, non dispersed (LSND) fresh water mud system is planned for use in the production hole section of the wellbore (i.e., below the surface casing to total well depth), however in some instances, where borehole stability requires it, a mud typically consisting of potassium chloride substitute and commercial clay stabilizer (such as Di-Ammonium phosphate [DAP]) would be used to drill the production hole section. This mud formulation inhibits potentially reactive shales to prevent shale swelling and hole sloughing. In the case of directionally drilled wells, diesel may be used as a component of the drilling fluids in amounts of less than 5 percent volume. Diesel would only be used as a component of the drilling fluid in the production hole section of a well.

Where drilling occurs in close proximity to canyon rims, BBC and other operators intend to either drill the surface hole section with a fresh water only system (with additions of bentonite to aid in viscosity for hole cleaning), or drill the surface hole section with air to further minimize the potential for the escape of drilling fluids through subsurface fractures into nearby canyons.

In the conventional or semi-closed loop system that would be used for the remainder of the locations, a small amount of fluid is retained in the cuttings and the cuttings are placed in a reserve pit. The reserve pit would also store water to make up losses and store any excess drilling fluids. Drilling fluid would be circulated by means of pump pressure from the reserve pit down the drill pipe, through jets in the bit, and up the

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<sup>4</sup> "Spud In" means the first boring of a hole in the drilling of a well by any type of rig.

annulus (i.e., the space between the well bore and the drill pipe). Drilling fluids would flow through a series of equipment and tanks in order to recondition it. A small amount of fluid and the cuttings from the well bore would be placed in the reserve pit. The reserve pit would also be needed to store make-up water and excess drilling fluids. No hazardous substances would be placed in the reserve pit. Each reserve pit would be constructed with an impermeable liner so as to prevent releases. Reserve pit fences would be constructed and maintained according to the BLM or UDOGM requirements as appropriate.

BBC and other operators would also use closed-loop drilling techniques in canyon bottoms and potentially other sensitive areas<sup>6</sup>. A reserve pit is not used with closed-loop drilling systems. Closed-loop systems are also more applicable to locations where many downhole locations will be drilled from a single pad. In a closed-loop system, drilling fluid would be circulated by means of pump pressure from tanks storing drill fluid, down the drill pipe, through jets in the bit, and up the annulus (i.e., the space between the well bore and the drill pipe). Drill cuttings would be processed to remove excess drilling fluids. The cuttings would be stored on location in segregated piles or in a storage trench/pit. Cuttings would be buried on site, tested and further processed for surface management, or transported to a permitted disposal/waste management facility<sup>5</sup>. As determined appropriate by the BLM and other permitting agencies, drill cuttings may potentially be used for other approved applications such as constructing roads or well pads subject to appropriate Federal and State regulations. Prior to surface use, the cuttings would be tested for the parameters described in the 1996 UDOGM Environmental Handbook (version 1.0, 1-96) (Environmental Regulations for the Oil & Gas Exploration & Production Industry).

The types of casing used, and the depths to which they are set, would depend upon the physical characteristics of the formations that are drilled and would be specified in the APD for each well. All casing would be new or inspected. Surface casing would be installed to protect the shallow well bore integrity and near-surface groundwater bearing zones, prevent well bore communication with canyons, and to provide a structural platform to attach well control equipment. Where necessary, intermediate and/or production casing would subsequently be run to total depth.

Surface casing would be set to a depth not less than the equivalent of the lowest point of elevation within one mile of the well's surface location. After the surface casing is cemented into place, a blow out preventer (a manifold mounted below the rig floor consisting of manual and hydraulic rams) would be installed and used to seal the well bore in the event that down-hole pressure exceeds the drilling mud's hydrostatic pressure, which would allow reservoir fluids (e.g., oil, gas, and water from the producing formation) to enter the well bore (i.e., in the event of uncontrolled flow from the well).

Prior to setting the production casing, open-hole well logs may be run to identify potentially productive horizons. If the evaluation concludes that sufficient natural gas and oil is present and recoverable, steel production casing would be installed and cemented in place in accordance with the well design, as specified in the APD and COAs. Logs may also be run subsequent to setting and cementing production casing.

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<sup>5</sup> For the purposes of analysis it is assumed that all drill cuttings will be disposed of within the WTP Project Area.

Drilling rig engines would be muffled in accordance with Federal and State laws to minimize noise. Generator-driven lights would be installed on the rig substructure and mast to light each well pad for night drilling and safety of workers.

Site-specific descriptions of drilling procedures would be included in each APD submitted to the BLM or UDOGM for each proposed well. Information relative to the size of bore, depth of drilling, casing, cementing, etc. would be available in the APDs at the Price Field Office or UDOGM.

Drilling activities on individual wells would typically occur 24 hours per day, 7 days per week, and would require approximately 12 workers. Shallow vertical wells would require approximately 13 days per well to drill. Deep vertical wells would require approximately 46 to 60 days per well to drill. Directionally drilled wells, both shallow and deep, could take up to twice as long to drill.

### ***Directional Drilling***

Under all alternatives well pad density would be limited to a maximum of approximately one surface location (well pad) per 80 acres. In the events that downhole well density exceeds one well per 80 acres, multiple wells are necessary to develop vertically stacked formations, or the surface location over a downhole location is not accessible, directional drilling would be used. Additional requirements for directional drilling are presented under each alternative-specific discussion.

### **2.1.3 Completion**

Once a well has been drilled, completion operations would begin. Well completion involves setting casing to depth and perforating the casing in target production zones, followed by fracturing (fracing) the formation by injecting an agent (e.g., water and liquid CO<sub>2</sub>) into the formation under pressure. The fracing material would likely contain sand or other proppant to keep the fractures from closing, thereby allowing gas to be produced from the formation. The next phase of completion would be to flow and test the well to determine rates of production. Water use during completion operations would vary in accordance with the formations the wells are completed in, but would average approximately 1 acre-foot per well (7,758 bbl per well), regardless of whether a shallow or deep well. Depending upon the concentration of water and proppant in the flow from the well, and the availability of a gas transportation pipeline, this “test” gas would either be vented, flared, or sold down the pipeline.

Typical equipment and vehicles used during completion activities include CO<sub>2</sub> tanker trucks; sand transport trucks; water trucks; oil service trucks used to transport pumps and equipment for fracs; flat beds and gin trucks to move water tanks, rigs, tubing, and frac chemicals; logging trucks (cased hole wireline trucks); and pickup trucks to haul personnel and miscellaneous small materials.

Completion activities on individual wells would occur 24 hours per day, 7 days per week, and would require approximately 15 workers. For shallow wells, completion of an individual well would generally take 29 days, depending on conditions at the individual well. Completion procedures on deeper wells would require an average of 54 days depending on the number of completion zones.

Flare lines would be directed so as to avoid damage to surrounding vegetation, adjacent rock faces, or other resources, and as required by regulations. Flare lines would be in place on all well locations. In the event it becomes necessary to flare a well, a deflector and/or directional orifice would also be used to safeguard both personnel and adjacent natural rock faces.

In situations where several wells will be drilled from a single pad, water for completion activities would be stored in a "completion" pit. Completion pits would be constructed with an impermeable liner so as to prevent releases. Completion pits would be fenced and constructed and maintained according to the BLM or UDOGM requirements as appropriate. Typically, when a closed loop drilling system is used, a completion pit would be required. However, in sensitive areas where closed loop drilling is employed, the operator may elect or the BLM may require the use of tanks for water storage rather than a completion pit. In certain circumstances, in order to minimize the size of the pit, temporary high density polyethylene (HDPE) would be laid between nearby adjacent locations to distribute the needed water capacity.

#### **2.1.4 Interim Reclamation**

Portions of the disturbed area within a construction ROW or portions of well pads not needed for production would be reclaimed according to specifications of the BLM or UDOGM as appropriate. For example, following construction, the average disturbance width for co-located access roads and pipelines would be reclaimed to a 30-foot wide disturbance corridor or an appropriate minimum standard (0-2 feet in the case of pipelines along existing roads). Weather permitting; earthwork for interim reclamation would be completed within 6 months of completion of the final well on the pad or plugging. Following site preparation, reseeding would be completed during either the spring or fall planting season, when weather conditions are most favorable.

For the purpose of analysis, it is assumed that approximately 75 percent of the well pads would be reduced in size to between 1 and 2 acres (average of 1.5 acres), approximately 15 percent of the pads would be reduced in size to between 2 and 3 acres (average of 2.5 acres), and the remaining 10 percent of the well pads would be reduced in size to approximately 3.5 acres. The number of wells and associated production equipment needs on each pad would primarily dictate the size of an individual production pad. The percentage of well pad locations that can be successfully reclaimed is also dependant on the steepness of the slope on which it is built (i.e., well pads on steeper slopes generally allow for lesser interim reclamation because larger working surfaces are needed to compensate for the steep slopes)<sup>6</sup>.

Prior to interim reclamation activities, all solid wastes and refuse would be removed and placed at approved landfills in Carbon, Duchesne, and Uintah Counties. Reserve pit closure would be subject to COAs determined through the APD process. Upon termination of drilling and completion operations, the liquid contents of reserve pits would be used at the next drill site. Immediately upon well completion, any saleable hydrocarbons in the pit shall be removed in accordance with Federal Onshore Oil and Gas Operations regulations (43 CFR 3162.7-1). The portion of the pit liner above grade would be cut and removed. The reserve pits and those portions of the well pad not

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<sup>6</sup> For surface disturbance calculations it was assumed that following successful interim reclamation the average well pad would be approximately 1.85 acres (see **Table 2.1-2**).

needed for production would then be re-contoured to promote proper drainage, salvaged topsoil would be replaced, and side slopes would be ripped or disked. The re-contoured area would then be fertilized and reseeded. Seed mixtures for reclaimed areas would be site-specific and would require approval by the BLM or UDOGM as appropriate.

Interim reclamation for the WTP Project Area would be adaptive to changing physical environmental conditions and responsive to changes in trends and/or degree of success following reclamation. As part of this process, an evaluation of existing well pads and their current reclamation status, as well as adjacent native sites, would be undertaken. Information from these evaluations would be used as a planning tool for new surface disturbance and future reclamation activities. Reclamation activities may be revised to incorporate continued advances in reclamation techniques and methodologies.

Interim vegetation reclamation would be completed consistent with the Green River District Reclamation Guidelines for Reclamation Plans (BLM 2009a). Reclamation would be considered successful when 75 percent of pre-disturbance plant density (basal cover), by desirable ground cover/understory species, is reestablished over the entire reclaimed area. This metric would require monitoring to determine compliance and success. Consistent with the Green River District Reclamation Guidelines for Reclamation Plans, reclamation success would be monitored by comparing the plant density of the reclaimed area with the undisturbed ground cover/understory plant density in adjacent areas. The objective is to attain 75 percent basal cover based on similar undisturbed adjacent native vegetative community, and comprised of desired species and/or seeded species within 5 years of initial reclamation action. Under alternatives where surface disturbance thresholds have been established (Alternatives C, D, and E), once determined successful, successfully reclaimed acreage would be credited toward the sum of the operator's total existing disturbance on a one-to-one acreage basis.

Interim reclamation would also include repair of range management facilities and improvements that had been altered by project-related activities, for example, the installation of cattle guards where new access roads crossed allotment fences.

During the productive life of the well, topsoil would be spread to a pile less than 2 feet deep and a seed mix would be applied to preserve the viability of the soil until final reclamation occurs.

## **2.1.5 Production and Maintenance**

Production and maintenance activities and facilities are discussed in the following sections.

### **2.1.5.1 Production**

#### ***Production Facilities***

If a well is determined to be commercially productive, production facilities would be installed on the well pad. Typically, one or two 200- to 400-barrel (bbl) storage tanks would be installed per well if formation water or condensate were produced. The fluids would be transferred to trucks as necessary and transported for sale or to an approved disposal site as described in **Section 2.1.5.3**. Produced water would either be trucked from each well location in 80 bbl loads on dual-axle trucks to water disposal locations on

each mesa, or transported via pipeline (see **Section 2.1.1.3**). Typically, a heated three-phase separator, rated at 0.5 million Btu per hour (mmBtu/hour), would be necessary to separate fluids associated with each well bore. Depending on the alternative selected and the site-specific conditions of an individual well pad, protective barriers would be installed around the production facilities (including tanks) in sensitive areas, or the facilities would be relocated to a less sensitive site. Regardless of the alternative selected, the appropriate location of facilities would be determined during the APD process and the necessary BMPs would be specified.

Dehydration facilities to separate water from natural gas would generally be centralized at compression facilities. However, approximately 25 percent of the well pads may have an individual heated dehydrator reboiler rated at 0.5-1.0 mmBtu/hour.

Most wells would be fitted with plunger lift systems to assist liquid production. Up to 10 percent of the wells may use pump jacks if liquid volumes and/or low formation pressures require it. Plunger lift systems do not require any outside source of energy. The prime mover for pump jacks would be small (50 horsepower [hp] or less), natural gas-fired internal combustion engines.

Production facilities for well pads that include multiple directionally drilled wells would be similar to those at single well pads. Additional production equipment and holding tanks would likely be required for multi-well pads. However, production from directionally drilled wells would use the same gathering pipeline installed for the original well unless the total gas production requires additional pipe capacity. In addition, in order to reduce production equipment at individual well pads and reduce water truck traffic to individual well pads, the operators may eventually employ the use of centralized tank batteries (CTBs) as multiple wells are brought into production within a given area. Each CTB would “centrally” locate the production equipment for multiple wells; thereby reducing surface facilities on individual pads. As CTBs are constructed and become operational, daily well maintenance traffic would be reduced. The number of and locations of potential CTBs would be highly dependent upon the surrounding topography and proximity to the wells contemplated for inclusion at the individual CTB. In some cases, a stand-alone CTB would be necessary. It is estimated that 15 CTBs would need to be constructed for full field development. For the purposes of analysis, it is assumed that all CTBs would be located on proposed or existing well pads.

All site security guidelines would be followed as identified in 43 CFR 3162.7-5 and Onshore Oil and Gas Order No. 3. All permanent structures would be painted a flat, non-reflective standard environmental color as determined by the Authorized Officer (AO). Facilities would be painted within 6 months of being located on site. As required by the Occupational Safety and Health Administration (OSHA), some equipment would not be painted for safety considerations (i.e., some parts of equipment would retain its safety coloration such that it does not blend with the surroundings).

### ***Daily Well Maintenance***

As practicably feasible, meters at all producing gas wells would be equipped with remote telemetry monitoring systems, which could reduce the number of pumper visits. For the purposes of analyses, the alternatives assume that during production, 75 percent of the wells would typically be visited on a daily basis by one worker (pumper) driving a standard pick-up truck to the well pads for visual inspection of equipment, gauges, etc.

Well maintenance activities would occur on a year-round basis. However, in reality, pumper traffic would likely be less based on ongoing and foreseeable successful use of remote telemetry monitoring of well conditions.

### ***Production***

Existing shallow wells in the WTP Project Area initially produce between 2 and 4 million cubic feet of gas per day (MMscf/day). Deep wells typically produce approximately 8 MMscf/day. Production on shallow wells quickly declines to less than 1 MMscf/day within a year or two. Production continues to decline for the life of the well, albeit at a lower rate in later years. Existing gas wells in the WTP Project Area typically produce 1 to 2 (an average of 1.5) bbl/day of condensate, and approximately 8 bbl/day of water.

#### **2.1.5.2 Compressor Stations**

The existing Dry Canyon Compressor Facility has ten 1,600-hp units. Therefore, total existing compression at the facility is approximately 16,000 hp.

Under Alternatives A – E, one to three new compressor stations would be constructed. Actual horsepower requirements would depend on the production of the proposed wells.

Each new compressor station would occupy a site approximately 5 acres in area. Typical layouts for four-unit and seven-unit compressors stations are illustrated in **Figures 2.1-1a** and **2.1-1b**. BBC and other operators are proposing to use natural gas-fired internal combustion engines to power the compressors. Emissions from natural gas-fired compressors at the compressor facilities would typically be less than 2 grams per hp/hour of carbon monoxide (CO) and nitrous oxides (NO<sub>x</sub>), and less than 1 gram per hp/hour of volatile organic compounds (VOCs). In accordance with appropriate Federal and State regulations, flares would be used to reduce VOC emissions from dehydrators and condensate tanks by at least 95 percent. Each compressor station could include one gas conditioning refrigeration unit, which would be constructed using current low-NO<sub>x</sub> fuel burner technology. The compressors would use hospital grade mufflers (an industry standard within the oil and gas industry) and would be enclosed in buildings or portable structures in an effort to abate noise from the compressor engines.

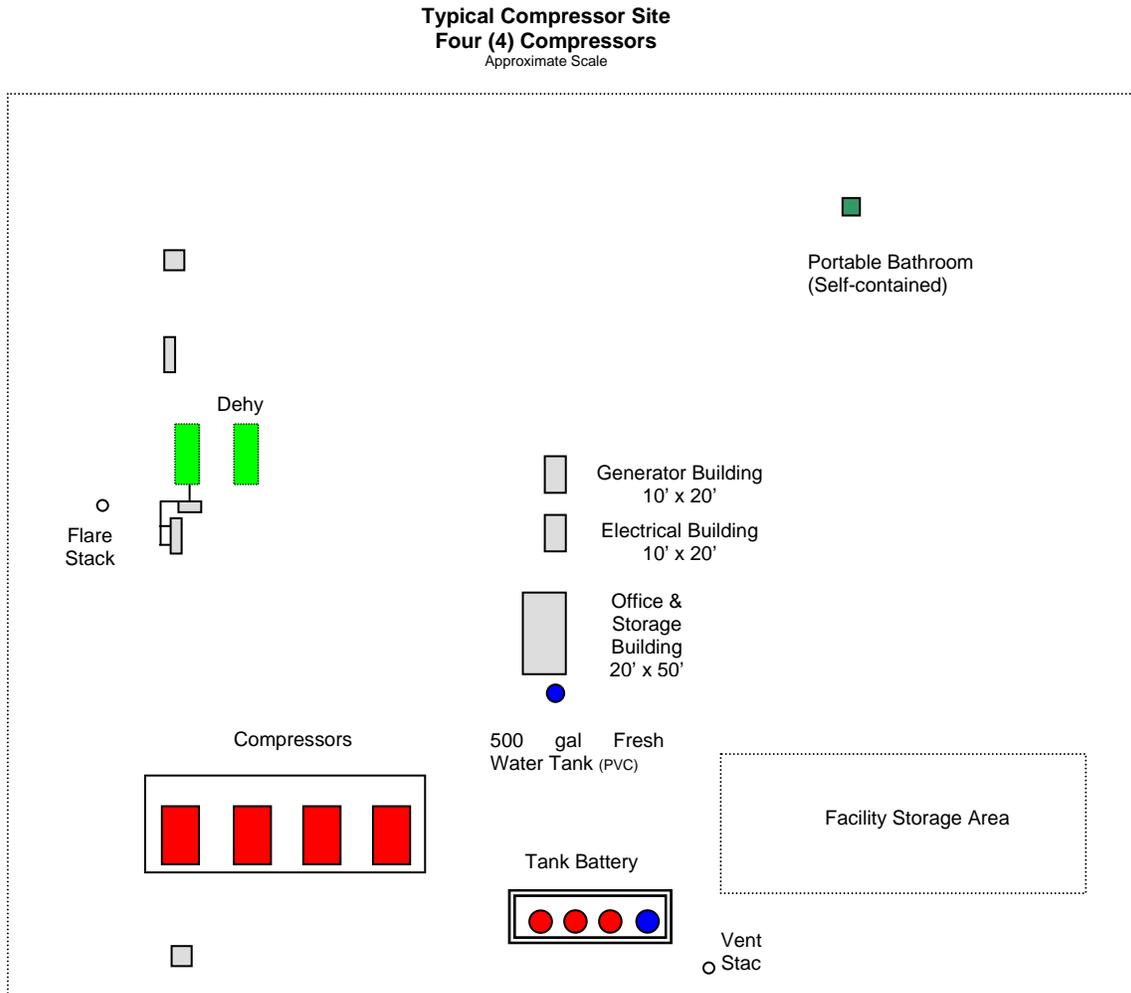
Up to 20 personnel may be involved in compressor station construction with an average of five personnel on site at any one time.

#### **2.1.5.3 Produced Water Management**

Produced water from newly completed wells may be temporarily disposed of and confined within lined pits or storage tanks for a period not to exceed 360 days after initial production on State or private land (per UDOGM regulations) and 90 days on BLM-administered lands (per Onshore Order #7). On BLM-administered lands, pits may be reused if additional wells are drilled from the same well pad within a 1-year time frame. The decision to re-use a pit would be determined on a site-specific basis. Within the 90- or 360-day period (as appropriate), produced water pits and tanks would be drained and the water transported to either a central water management facility or directly out of the WTP Project Area to an approved disposal site. Produced water would either be trucked from each well location in 80-bbl loads on dual-axle trucks or transported via pipeline.

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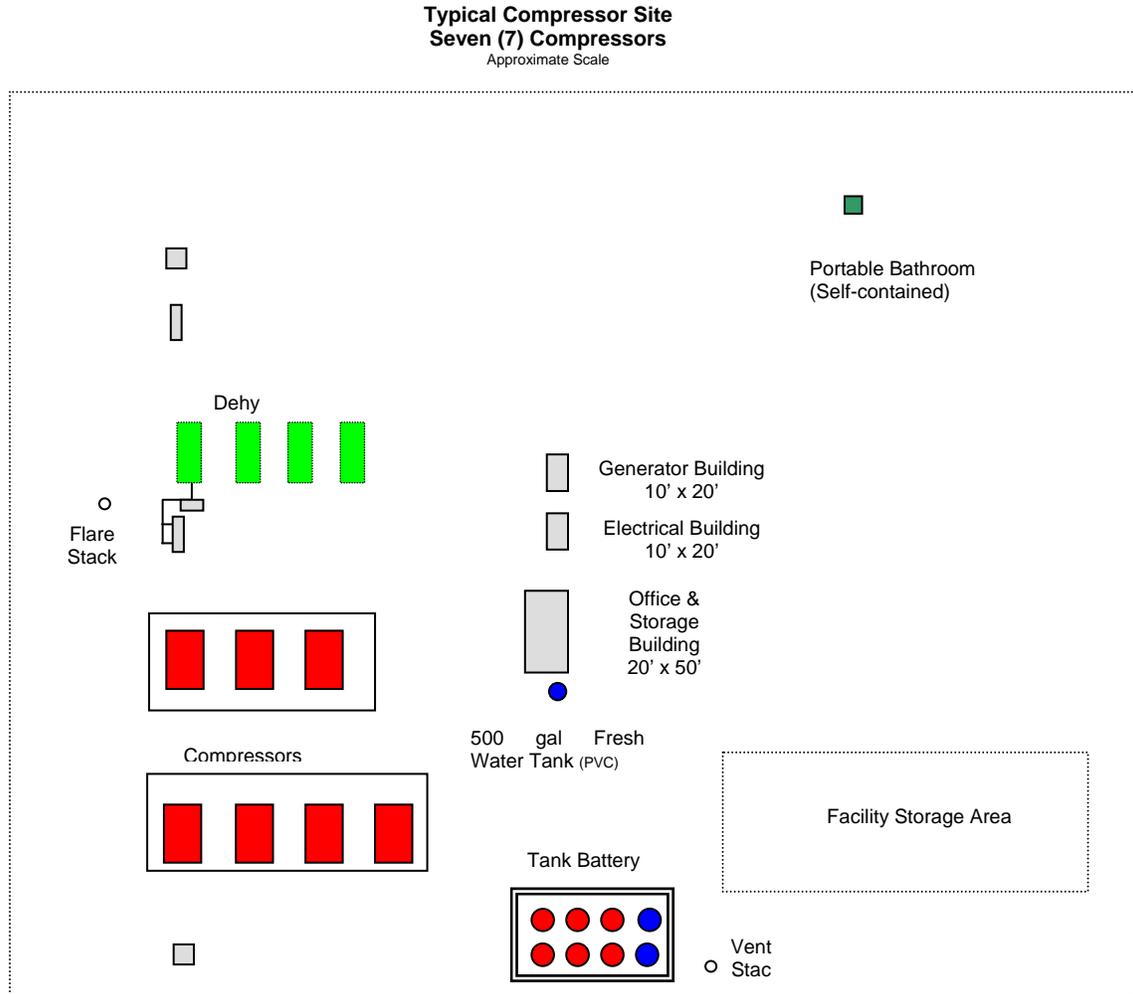
Figure 2.1-1a. Typical Compressor Station Layout



The locations of structures are estimated and may be adjusted.

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Figure 2.1-1b. Typical Compressor Station Layout



The locations of structures are estimated and may be adjusted.

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Depending on the alternative selected, one to three water management facilities would be constructed. Produced water not reused or transported to commercial disposal sites outside the WTP Project Area would be managed at these sites. Water to be used for drilling and completion and water recycled from drilling and completion operations would also be managed at these facilities. Each water management facility would be approximately 5 acres in size. The facilities would typically include one or more lined storage ponds, which would be constructed in accordance with applicable regulations. Other equipment at the water management facilities would include truck loading and unloading facilities, oil separation and water treatment equipment, tanks, and pumps. A spray system may be constructed over the ponds to enhance evaporation. If a spray system is used, operator personnel would monitor the system to make sure overspray would not leave the water management facility.

All alternatives include subsurface injection of water via SWD wells. Depending on the location, salt water disposal wells would be drilled to either the North Horn/Price River formations or the Colton Formation (or other non-producing, non-potable water bearing, formations capable of accepting water). These formations do not produce gas, contain no potable water, and are capable of accepting large quantities of injected water. SWD wells have not been previously used in the immediate WTP Project Area, therefore the feasibility, and thus, numbers and locations of SWD wells are not predictable. Conceptual locations for SWD wells have been illustrated on each alternative map (**Figures 2.2-1 – 2.6-1**). In some cases, non-producing gas wells may also be converted for SWD use. All SWD wells would be permitted through the appropriate authority. SWD facilities would include natural gas-fired internal combustion engines to drive injection pumps directly or via a generator powering an electric motor.

Water and condensate pipelines from the tops of mesas to loading and pump stations in the canyon bottoms may also be constructed. The water lines would be two-way, that is, water may either be pumped up to the mesa tops or down to the canyon bottoms, depending on water balance needs. The condensate lines would be used to transport condensate from the mesa tops to the loading facilities. Depending on the alternative selected, as many as four approximately 0.5-acre loading and pump facilities would be constructed. Surface facilities at each pump station would include one water pump with a maximum 400-hp natural-gas fired generator and up five 400-bbl water storage tanks (see **Figure 2.1-2**). All pump station engines would be fitted with at least residential grade mufflers for noise abatement. In addition, all pumps and generators located in canyon bottoms would be enclosed in acoustically insulated buildings, which would be painted to match the surrounding environment. As feasible, pump stations would also be constructed so as to take advantage of visual and topographic screening. Conceptual locations for some pump stations are illustrated on **Figures 2.2-1 to 2.6-1**.

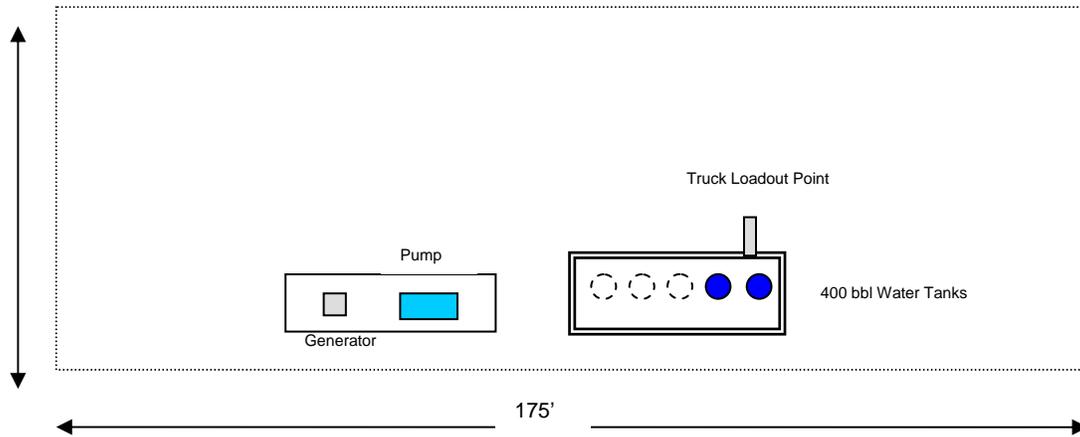
#### **2.1.5.4 Workovers**

Periodic workovers would be required to correct downhole problems in a producing well and to return the well to production. Generally, workovers are not undertaken on a set schedule, but rather on an as-needed basis to increase or maintain production from downhole-producing zones or to re-complete a well in a new zone.

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**Figure 2.1-2. Typical Pump Station Layout**

**Typical Pump Station Site**  
Approximate Scale



The locations of structures are estimated and may be adjusted.

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A well would require a workover for any of several typical reasons including:

- Refracturing the producing formation(s) using advanced techniques designed to stimulate additional production;
- Cleaning out the well bore and perforations to stimulate/facilitate production;
- “Re-completing” in another potentially productive zone that was not originally completed at the time the well was drilled; and
- Repairing casing and other downhole equipment.

A workover would generally require three to five workers for 4 days. Workover activities would typically be implemented during daylight hours only.

#### **2.1.5.5 Road Maintenance**

Project roads would require routine year-round maintenance to provide year-round access. BBC and other operators would be required to prepare and implement a road maintenance plan for all roads used for project-related purposes. Maintenance would include inspections, reduction of ruts and holes, maintenance to keep water off the road, replacement of surfacing materials, and clearing of sediment blocking ditches and culverts. Should snow removal be necessary, roads would be cleared with a scraper and snow would be stored along the down gradient side to prohibit runoff onto the road. Road maintenance agreements and requirements would vary depending on the owner of a given road in the WTP Project Area. The operators have committed to adherence with county road maintenance and encroachment ordinance requirements. Maintenance of the BLM and county system roads are discussed in more detail within **Appendix F**. Aggregate would be used as necessary to maintain a solid running surface and minimize dust generation.

Following publication of the DEIS, the Nine Mile Canyon Road Cooperative Board was formed. The Nine Mile Canyon Road Cooperative Board was created and is chaired by Carbon County. Other participating entities include Duchesne County, representatives of the State of Utah, the BLM, Operator(s), and historic preservation organizations (i.e., Nine Mile Canyon Coalition). The cooperative goal of the Nine Mile Canyon Road Cooperative Board is to develop and recommend a long-term implementation plan to improve and maintain the Nine Mile Canyon Road. Per the Nine Mile Canyon Road Cooperative Board’s charter, meetings will be held every 3 months.

#### **2.1.5.6 Dust Suppression**

In response to public comments received on the DEIS, and at the request of the Nine Mile Canyon Road Cooperative Board, BBC has prepared a dust suppression plan for the WTP Project Area (see **Appendix R**). As described in the dust suppression plan, testing was conducted on sections of roadway using various dust suppressant materials. Each of the tested materials was non-toxic, non-corrosive, and non-carcinogenic according to published data. Based on concerns that use of magnesium chloride on canyon roads in the WTP Project Area could damage rock art (see **Appendix G**), both the proponent and Carbon County have agreed to discontinue use of this suppressant in Nine Mile Canyon between Harmon and Cottonwood Canyons (12 miles), in Harmon Canyon (1 mile), in Gate Canyon (1 mile) and in Cottonwood Canyon (8 miles).

Magnesium chloride, which has proven to be an effective dust suppressant, may be used to contain dust on roads elsewhere within the WTP Project Area where there are no cultural sites with a rock art component.

According to the dust suppression plan, tested suppressant materials would effectively reduce dust generation to a level that would be in conformance with the BLM's current dust suppressant performance standards. Namely, dust would be considered controlled when:

- 1) No dust is generated above the cab of the vehicle; or
- 2) There are no hanging dust plumes.

Based on the performance of tested materials as well as other variables (e.g., availability and overall cost), the project proponent has recommended use of Lignin Sulfonate or a Soluble Polymer, such as TerraLOC, in Nine Mile Canyon between Harmon and Cottonwood Canyons (12 miles), in Harmon Canyon (1 mile), in Gate Canyon (1 mile) and in Cottonwood Canyon (8 miles).

Application methods on segments of road would be contingent on site conditions, but in accordance with supplier recommendations. Maintenance requirements would be based on the loss of effective suppression, which will depend on factors such as traffic volumes. As an alternative to ongoing dust suppression or due to safety consideration, certain road sections may be improved with hard surfacing, such as asphalt or chip-seal, or other materials approved by the BLM or counties as appropriate.

The aforementioned dust suppressants would be limited to certain road segments; other major WTP Project Area roads would be treated with water or other dust suppressants as necessary.

### **2.1.6 Final Reclamation and Abandonment**

When a well is to be plugged and abandoned, the operator would submit a Notice of Intent to Abandon (NOA) to the BLM or UDOGM as appropriate. The BLM or UDOGM would then attach the appropriate surface rehabilitation COAs for the well pad, and as appropriate, for the associated access road, pipeline, and ancillary facilities. During plugging and abandonment, all structures and equipment would be removed from the well pad. Backfilling, leveling, and re-contouring would then be performed according to the BLM or UDOGM order. Seed mixtures for reclaimed areas would be site-specific and would require approval by the BLM or UDOGM as appropriate. The *BLM Manual Section 1745, Introduction, Transplant, Augmentation, and Reestablishment of Fish, Wildlife, and Plants*, and Executive Order No. 11987 - Exotic Organisms, would be used as guidance for determining appropriate seed mixtures.

### **2.1.7 Water Use and Water Sources**

Over the LOP, it is estimated that approximately 75 percent of project water would be obtained from local surface water sources. The remaining 25 percent of water needs would be supplied by new water supply wells in the WTP Project Area, municipal sources, existing private water wells in the field, recycled water, or other permitted sources. Use of surface water from Nine Mile Creek, Dry Creek, and Cottonwood Creek would be contingent upon the proper authorizations and permissions by the State of

Utah and water right holder(s). However, as specific water sources have not yet been identified by the operators, it is assumed for the purposes of analysis and Section 7 Consultation that the entire depletion associated with this project would be a new depletion from the Colorado River, and thus would be subject to recovery fees as appropriate. Depending on the alternative selected, between one and six new water supply wells would be constructed. New water supply wells would typically be sited on well pads, and conceptual locations are illustrated on **Figures 2.2-1 – 2.6-1**. Rights to groundwater would be obtained through application to the Utah State Division of Water Rights. Water from all of these sources would be distributed by truck to the point of use. Re-use of produced water and water from drilling and completion of other wells would be conducted to the maximum extent practical. Water volume needs for drilling, completion, and dust abatement are discussed under each alternative.

### 2.1.8 Hazardous Materials and Solid Waste

Upon completion of drilling, drilling fluids would be stored in the reserve pit. Chemicals on the EPA's *Consolidated List of Chemicals Subject to Reporting Under Title III of the Superfund Amendments and Reauthorization Act of 1986* (SARA Title III) may be used or stored in quantities over reportable quantities. In the course of drilling, BBC and other operators could potentially store and use diesel fuel, sand (silica), hydrochloric acid, and CO<sub>2</sub> gas, all described as hazardous substances in 40 CFR Part 302, Section 302.4, in quantities exceeding 10,000 pounds. In addition, natural gas condensate<sup>7</sup> and crude oil, described as hazardous substances in 40 CFR Part 302, Section 302.4, may be stored or used in reportable quantities. During production operations, triethylene glycol, ethylene glycol mix (50 percent), and methanol, all described as hazardous substances in 40 CFR Part 302, Section 302.4, may be stored or used on site. Small quantities of retail products (paint/spray paint, solvents [e.g., WD-40], and lubrication oil) containing non-reportable volumes of hazardous substances may be stored and used on site at any time. No extremely hazardous substances, as defined in 40 CFR Part 355, would be used, produced, stored, transported, or disposed of under any of the alternatives.

Any spills of oil, condensate, produced or frac water, drilling fluids, or other potentially deleterious substances would be recovered and either returned to its origin or disposed of at an approved disposal site, most likely in Duchesne, Utah.

Drilling and production operations would require preparation of an emergency Spill Prevention, Control, and Countermeasure (SPCC) Plan that outlines the methodology to be used in the event of a spill. The SPCC Plan describes spill control, reporting, and cleanup procedures to help prevent impacts to surface and subsurface waters. A copy of the drilling company's SPCC plan would be kept on site during drilling operations.

According to the 2002 Federal Register, Volume 67, Number 137, produced liquid hydrocarbons and condensates would be stored in tanks surrounded by a secondary containment berm of sufficient capacity to contain the entire capacity of the largest single container and sufficient freeboard to contain precipitation. All loading lines and valves would be placed inside the berm surrounding the tank or would utilize catchment basins to contain spills. The tanks would be emptied as necessary, and the liquids transported to market via trucks and/or pipelines.

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<sup>7</sup> Natural gas condensate is a low-density mixture of hydrocarbon liquids that are present as gaseous components in the raw natural gas produced from many natural gas fields.

Portable toilets and trash containers would be located on active construction sites as well as at temporary worker housing locations (see **Section 2.1.9**). A commercial supplier would install and maintain portable toilets and equipment and would be responsible for removing sanitary waste. Sanitary waste facilities (i.e., toilet holding tanks) would be regularly pumped and their contents disposed of at approved sewage disposal facilities in Carbon, Duchesne, and/or Uintah Counties, in accordance with applicable rules and regulations regarding sewage treatment and disposal. Accumulated trash and nonflammable waste materials would be hauled to an approved landfill once a week or as often as necessary. All debris and waste materials not contained in the trash containers would be cleaned up, removed from the construction ROW, well pad, or worker housing location, and disposed of at an approved landfill. Trash would be cleaned up every day.

Sanitary waste equipment and trash bins would be removed from the WTP Project Area upon completion of access road or pipeline construction; following drilling and completion operations at an individual well pad; when worker housing is no longer needed; or as required.

## **2.1.9 Workforce and Worker Housing**

### **2.1.9.1 Workforce Requirements**

The number of employees working in the WTP Project Area during the construction, drilling, and completion phases would depend on the number of drilling rigs operating at any one time. This number would vary depending on the alternative selected. In addition to the workforce associated with well pad construction and drilling and completion operations, personnel and contractors could be in the WTP Project Area during the construction or improvement of roads, installation of pipelines, and construction of new compressor stations or other surface facilities. These employment numbers would also vary depending on the amount of infrastructure proposed under each alternative and the pace and level of development.

Employment for production operations and well service would depend on the number of producing wells at any one time. The number of operations and service personnel would grow over time as the number of producing wells increased, but employment for production operations and well force would amount to a small percentage of the total workforce.

If the current employment patterns are maintained, approximately 90 percent of the workforce associated with the project would be stationed in the areas of Vernal and Roosevelt, Utah. The remaining 10 percent of the workforce would likely be located in Carbon County, Utah, primarily in the towns of Wellington and Price.

#### ***Temporary Worker Housing***

Under Alternatives A, B, C, and E, BBC and other operators would construct up to three temporary worker housing locations for persons employed within the WTP Project Area. Temporary housing would be strategically located to promote use by the most personnel at any given time during the development phase of the project (see conceptual new locations illustrated on **Figures 2.2-1, 2.3-1, 2.4-1, and 2.6-1**). Each temporary housing

location would generally include up to fifteen 60-foot by 15-foot sleeping trailers, a kitchen, a recreational facility, portable toilets, trash containers, generators, and fresh water tanks. All wastewater would be fully contained on site and disposed of at approved locations. The size and facility layout for temporary worker housing locations would depend on the alternative that is selected and the site-specific conditions of the location(s). Temporary worker housing is not proposed under Alternative D (see **Section 2.5.9**).

On well pads where active drilling and completion is occurring, temporary housing would be provided for the well pad supervisor, geologist, tool pusher, and others that are required to be on location at all times. Active drilling locations could include up to five single-wide mobile homes or fifth wheel campers/trailers.

### **2.1.10 Access and Traffic**

Carbon County Road 53 (Nine Mile Canyon Road) would be the primary access from Wellington, whereas Duchesne County Road 32 (Gate Canyon Road) to its junction at Nine Mile Canyon would serve as the primary access from Vernal.

The alternative-specific discussions include estimates of potential daily traffic volumes that could occur during the construction, drilling, and completion phases of Alternatives A, B, C, D, and E. Actual traffic volumes would vary depending on the level of drilling activity, the specific operations that might be underway at a well pad and the maturity of the project at any particular time. For example, traffic for completing an individual well would average 11 round trips per day, but on any single day might require 22 round trips between the WTP Project Area and nearby cities and towns. Additional traffic would occur periodically when new sections of the pipeline gathering system are under construction, at which time an additional 10 to 25 round trips daily would take place.

Traffic associated with production and well service would depend on the number of producing wells at any one time and the associated volumes of water and condensate being produced. Production traffic would grow over time as the number of producing wells increase to peak production and would then decline relative to development and production declines. In general, wells would be equipped with telemetry equipment, making daily visits unnecessary. However, in limited circumstances, daily well inspections may still be necessary even though telemetry is in place. Therefore, to provide a conservative analysis, it is assumed that 75 percent of the wells would be visited by a pumper once per day. On average, an individual pumper would be able to inspect approximately 20 wells per day.

During construction, there would be times when public traffic would be controlled on sections of road out of operational necessity, for example, during rig moves when there is heavy equipment transportation on steep canyon roads. Traffic would be controlled using roadside signs, flagmen, and barricades as appropriate. In addition, depending on the alternative selected, WTP Project Area roads could be temporarily closed to the public due to safety concerns, for example, while drilling wells in narrow canyon bottoms within close proximity of roads or while laying gathering line adjacent to an existing road. Temporary road closures would be approved by the appropriate surface management agency, and temporary road closure signs would be posted in appropriate locations at least 48 hours prior to the temporary closure.

To address safety-related traffic concerns, all drivers and rig crews would be advised of the hazards to recreational traffic along the access roads, as well as hazards present due to blind corners, cars parked on the road, pedestrian traffic, and mountain bikers. In addition, appropriate signs would be erected to warn non-project personnel about traffic hazards associated with project-related activities. Dust suppression (discussed in **Section 2.1.5.6**) would also be used as appropriate to improve driver visibility during project-related activities such as when there is rig or heavy equipment transportation.

## **2.2 ALTERNATIVE A – PROPOSED ACTION**

Under the Proposed Action, BBC and other operators propose to develop up to 807 natural gas wells from up to 538 well pads in the WTP Project Area. As discussed more in **Section 2.2.2**, well pad density would be limited to approximately one surface location per 80 acres. In the event that downhole well density exceeds one well per 80 acres, multiple wells are necessary to develop vertically stacked formations, or the surface location over a downhole location is not accessible, directional drilling would be used. For the purpose of analysis, it is assumed that of the 538 well pads proposed, approximately half would have directionally drilled wells (hence, the 807 wells).

Under the Proposed Action, it is assumed that during the first year of development or peak year of development, BBC would operate six drill rigs year-round and other WTP operators would operate the remaining three rigs year-round. Following the first or peak year of development, drilling activity would likely begin to decline as other operators begin to exhaust their well locations. Under this drilling scenario, drilling activities would occur for approximately 8 years. The anticipated life of an individual well is 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP under the Proposed Action would be approximately 33 years.

On the Proposed Action map, (**Figure 2.2-1**) BBC and other operators have indicated conceptual locations of potential well pads over areas currently thought to be most prospective for natural gas development.

Additional information on target geologic formations and downhole spacing is provided in **Section 2.1**, Details Common to All Alternatives.

The mitigation and environmental protection measures included in BBC's Wildlife Mitigation Plan and other applicant-committed environmental protection measures under the Proposed Action (see **Table 2.2-6**) have been voluntarily adopted by BBC. As some of these measures go beyond those required by the Approved RMP, regulation, or statute, and/or are not required under the operator's valid and existing leases, the operators' voluntary agreement to these components of the Proposed Action would enhance the BLM's ability to include the measures as COAs in the ROD.

### **2.2.1 Construction**

#### **2.2.1.1 Well Pad Construction**

Initial surface disturbance resulting from the construction of 538 well pads would be approximately 1,479 acres. Assuming at least half (269) of the proposed well pads would have at least two wells, an additional 54 acres of surface disturbance would occur

as a result of multi-well pads. Therefore, the total short-term surface disturbance for 538 well pads would be approximately 1,532 acres.

Following well completion(s), portions of the well pad not needed for production would be reseeded and reclaimed according to specifications of the BLM or UDOGM as appropriate. Long-term well pad disturbance from the 538 well pads would be reduced to 994 acres following successful interim reclamation.

### 2.2.1.2 Access Road Construction

Implementation of the Proposed Action would require the construction of 178 miles of new access roads on the BLM, State, and private surface. The majority (i.e., 165 miles) of the proposed access roads would be paralleled by pipelines (i.e., co-located roads and pipelines). Where new pipelines are proposed adjacent to new access roads, a 100-foot wide ROW would be needed. Of the 100 feet, on average, about 80 feet would be disturbed during road and pipeline construction. The ROW width for an access road alone would be approximately 50 feet. Estimated initial surface disturbance width within the ROW would be approximately 40 feet.

Initial surface disturbance resulting from the construction of new access roads would be approximately 1,700 acres (includes 1,597 acres for co-located access roads and pipelines, 30 acres for proposed access roads alone, and 73 acres for new roads that could be constructed in proposed wildlife mitigation areas (see **Section 2.2.2.2**)). Following interim reclamation, all access roads, including those co-located with proposed pipeline, would be reduced to a 30-foot wide disturbance. After interim reclamation, long-term surface disturbance from the approximately 178 miles of access road would be approximately 648 acres.

Under the Proposed Action, BBC and other operators are proposing two road classifications for new and improved roads in the WTP Project Area. The two classifications would be “primary roads” and “secondary roads”. Primary roads would have an average travel width of 22 feet and provide access to areas with multiple operations and major facilities. Primary roads would be constructed (or existing roads upgraded) where there are a combination of more than 10 proposed well locations and/or other facilities. Primary roads would be constructed to minimize environmental impacts. Where necessary to maintain a durable running surface and minimize dust generation, road surfaces would be graveled. Secondary roads would have an average travel width of 16 feet. Secondary roads would be constructed (or existing roads upgraded) where fewer than 10 proposed well locations and/or other facilities would be accessed.

As illustrated on **Figure 2.2-1**, BBC and other operators would make significant road improvements to and/or reroute a number of existing roads within the WTP Project Area. A brief description of the proposed improvements/reroutes is discussed below. Details are contained in the *West Tavaputs Plateau Access Road Report Assessment*, which is included in **Appendix F**. Additional surface disturbance could occur along existing access roads (i.e., routes shown as “Existing Access Roads” on **Figure 2.2-1**) where site-specific upgrades or improvements could require slight expansion or modification of the existing road corridor. The roads that would be improved include:

- Approximately 2.1 miles of the Harmon Canyon Road. Road improvements would improve drainage, eliminate blind curves, and remove dangerous sidewalls.
- Approximately 6.2 miles of the existing Horse Bench Road. The proposed improvements would improve drainage, decrease exposure to steep canyons, and reduce the present grade. Under the Proposed Action, BBC and other operators would also realign approximately 1,000 feet of existing road.
- Approximately 1.2 miles of dugway from Cottonwood Canyon to Flat Iron Mesa. The road improvement would reduce the present grade and improve drainage. In addition, BBC and other operators are proposing to construct 1.9 miles of new road to Flat Iron Mesa across the drainage to the slope located directly to the north of the existing route. Under the Proposed Action, the new road would be used as an uphill route and the existing dugway as a downhill route during drilling operations. Following the development phase, the existing road would be reclaimed.
- Approximately 3.4 miles of existing road in Jack Canyon. The road would be positioned above the existing drainage to prevent road damage during flood events. As an alternative, BBC and other operators could potentially reroute the upper section of the road. The new route would intersect with the existing road in a tributary before it enters Jack Canyon. In either case, BBC and other operators would improve the road in the lower portion of Jack Canyon. Positioning the road outside of the drainage would involve construction outside of the existing 65-foot ROW. Thus, under the Proposed Action, a new ROW would be required providing access to and within the WSA.

**Figure 2.2-1** illustrates wildlife mitigation areas on Peter's Point and Prickly Pear mesas where BBC is proposing to close existing roads in order to reduce traffic-related impacts to sage-grouse wintering habitats (see also **Section 2.2.2.2** and **Appendix B**)<sup>8</sup>. Ten conceptual well pads are still illustrated in these road closure/realignment areas. However, BBC has committed that if they construct the well pads and drill the proposed wells within these mitigation areas, they would work with the BLM, UDWR, and other members of the West Tavaputs Plateau Mitigation Oversight Committee (WTPMOC) to identify surface locations and road/pipeline ROWs that would not undermine the value of the road closures/road realignment in terms of their benefits to sage-grouse. The BLM, UDWR, SITLA, UDOGM, and the affected gas industry companies would comprise the WTPMOC. For purposes of disturbances calculations, it is assumed that each of the conceptual well pads illustrated within the Prickly Pear and Peter's Point mitigation areas could require approximately 0.75 miles of new access road co-located with pipeline, for a total of approximately 7.5 miles of co-located roads and pipeline. Thus, short-term surface disturbance from access roads and pipelines within these mitigation areas could be approximately 73 acres.

In total, under the Proposed Action, BBC proposes to significantly improve approximately 21.5 miles of existing road within the WTP Project Area. Short-term surface disturbance associated with road improvement activities would be approximately 134 acres. BBC also proposes to reroute approximately 8.9 miles of existing roads.

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<sup>8</sup> **Figure 2.2-1** also illustrates wildlife mitigation areas where BBC is proposing to fund pinyon-juniper reductions.

Short-term disturbance associated with rerouting existing roads would be approximately 43 acres.

Aggregate for road surfacing would be obtained from existing quarries on State of Utah lands or new aggregate borrow areas on Federal land. For new aggregate borrow areas, three approximately 2-acre quarries would be developed (one quarry per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point, and Flat Iron), for a total of 6 acres of disturbance due to quarries. Upon completion of road construction or expiration of available aggregate, the quarry areas would be re-contoured and reclaimed. No more than one aggregate borrow area on each of the three primary mesas would be open at any one time.

Additional information on access road construction is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.2.1.3 Pipeline Construction**

Under the Proposed Action, pipelines would be installed on the surface. Approximately 165 miles of pipeline would be installed adjacent to proposed access roads (co-located), and would not result in additional surface disturbance beyond the 1,597 acres previously disclosed in **Section 2.2.1.2**. Approximately 19.5 miles of surface-laid pipeline would be installed along existing roads. Installation of proposed pipeline along existing roads would result in approximately 95 acres of short-term disturbance. Following interim reclamation, long-term surface disturbance from independent surface-laid pipeline would be approximately 5 acres. Cross-country pipelines (not illustrated on alternative maps) would initially result in the disturbance of approximately 48 acres, which would be reduced to approximately 2 acres following interim reclamation.

Additional information on pipeline construction is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.2.1.4 Storage Areas**

Under the Proposed Action, BBC and other operators would construct a maximum of three approximately 5-acre equipment storage locations (one per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point and Flat Iron), which would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, mud supplies, CO<sub>2</sub> tanks, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figure 2.2-1**).

Additional information on equipment storage areas is provided in **Section 2.1**, Details Common to All Alternatives.

## **2.2.2 Drilling**

### **2.2.2.1 Drilling Procedures**

Based upon current technology and drilling rates in the WTP Project Area, BBC and other operators have indicated that they could drill approximately 20 wells per year per

drill rig. For the purpose of analysis, it is assumed that all WTP operators would have similar capabilities.

As depicted in **Table 2.2.1**, during the first year of development, it is assumed BBC and other operators would operate six drill rigs year-round within the WTP Project Area. In addition, other operators would operate three rigs year-round. During the second and third year of development, drilling activity would likely begin to decline as the other operators fully develop their drilling locations and finish drilling their proposed wells. Following the first approximately three years of drilling activity, BBC and other operators would likely slow their pace of drilling. From approximately years 4 through 8, BBC anticipates operating four rigs year-round until they have fully developed their resources.

Of the 807 proposed wells, approximately 70 would be deep wells and the remaining 737 would be shallow wells. Under the Proposed Action, BBC and other operators would employ closed-loop drilling systems in canyon bottom locations.

Year	Number of Rigs			Number of Wells	
	BBC	Other operators	Total	Annual	Total
1	6	3	9	168	168
2	6	1	7	127	295
3	6	0	6	120	415
4	4	0	4	80	495
5	4	0	4	80	575
6	4	0	4	80	655
7	4	0	4	80	735
8	4	0	4	72	807

**2.2.2.2 Year-Round Drilling and Completion and Wildlife Mitigation**

In order to more efficiently develop resources within the WTP Project Area, BBC and other operators are proposing to conduct drilling and/or completion activities during the winter closure period (November 1-May 15). In addition to implementing applicant-committed environmental protection measures that would minimize on site impacts (see **Table 2.2-6**), BBC and other operators are proposing to implement an adaptive wildlife mitigation plan to offset the impacts of year-round drilling.

Under the Proposed Action, BBC and other operators are proposing to implement a Wildlife Mitigation Plan on public, private, and State lands. The BLM, in conjunction with the UDWR, would lead the mitigation planning efforts, involving where applicable SITLA, UDOGM, and the affected gas industry companies (the other entities of the WTPMOC). Other entities that would be kept informed of the intentions and progress of the WTPMOC include other affected private landowners where development or mitigation is proposed to occur, local governments, and applicable wildlife groups (e.g., the Sage-Grouse Working Group, Mule Deer Foundation). Input from these other groups would be encouraged and considered by the operators and the WTPMOC in adaptively managing this plan for the benefit of wildlife. The operators would be responsible for carrying out the approved mitigation, working with the BLM and UDWR in implementation of appropriate activities.

The goal of BBC's Wildlife Mitigation Plan, described in detail in **Appendix B**, is to improve habitats for sage-grouse, mule deer, elk, and raptors, in an effort to offset the effects of winter drilling and other impacts of the project. In brief, BBC's Wildlife Mitigation Plan commits to:

- Fund and implement road realignment measures designed to reduce traffic-related impacts in sage-grouse wintering habitats;
- Implement habitat improvement and connectivity projects that are designed to convert existing pinyon-juniper habitats into sagebrush in order to benefit sage-grouse and other wildlife species;
- Implement off site wet meadow and sage-grouse summer range enhancement projects; manage grazing rights on both public and private lands such that grazing management is used as a valuable tool in vegetation manipulation and habitat mitigation (the goal of the grazing program would be to develop the range site to its full potential while keeping succession at its desired seral stage); and
- Fund an ongoing, annual monitoring project whereby basic information on various mitigation projects, as well as limited information on wildlife populations and use areas, would be collected for use by the WTPMOC in planning future mitigation projects.

The mitigation plan commits to a 4:1 acre mitigation ratio based on total potential long-term surface disturbance. However, as some of the proposed mitigation measures committed to by the operators include measures beyond an acreage-defined habitat enhancement, the mitigation plan also includes information on how the relative value of each mitigation measure would be computed. The Wildlife Mitigation Plan in **Appendix B** outlines BBC's plans for the first 3 years of mitigation, which would offset approximately 30 percent of the total potential development, and would be initiated after issuance of the EIS ROD.

**Figure 2.2-1** illustrates areas of proposed wildlife mitigation, including on Peter's Point and Prickly Pear mesas, where the operators would close existing roads to all traffic in order to reduce traffic-related impacts in sage-grouse habitats.<sup>9</sup> While conceptual well pads may still be illustrated in these road closure/realignment areas, BBC has committed that should they drill wells within these areas, they would work with the BLM, UDWR, and other members of the WTPMOC to identify surface locations and road/pipeline ROWs that would not undermine the value of the road closures/road realignment in terms of their benefits to sage-grouse.

### 2.2.3 Completion

Information on completion is provided in **Section 2.1**, Details Common to All Alternatives.

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<sup>9</sup> **Figure 2.2-1** also illustrates wildlife mitigation areas where BBC is proposing to fund pinyon-juniper reductions.

## **2.2.4 Interim Reclamation**

Information on interim reclamation is provided in **Section 2.1**, Details Common to All Alternatives.

## **2.2.5 Production and Maintenance**

This section describes activities and facilities that would be needed for production and maintenance under the Proposed Action.

### **2.2.5.1 Production**

Under the Proposed Action, if a well is located in a sensitive area, protective barriers would be installed around the production facilities (including tanks) or they would be moved off site. Additional information on production is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.2.5.2 Compressor Stations**

Under the Proposed Action, two new 6,400-hp stations and one new 11,200-hp compressor stations would be constructed (see conceptual compressor station locations on **Figure 2.2-1**). Including the existing and expected compression at the Dry Canyon Compressor Facility and new compression at proposed stations, total compression within the WTP Project Area would be approximately 40,000 hp. Actual horsepower requirements would depend on the production of the proposed wells.

Each new compressor station would cover approximately 5 acres, resulting in approximately 15 acres of new disturbance for compressor stations.

Additional information on compressor stations is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.2.5.3 Produced Water Management**

Under the Proposed Action, a maximum of three water management facilities and six SWD wells could be constructed. Surface disturbance from the three proposed water management facilities would be approximately 15 acres. Surface disturbance from construction and drilling of the SWD wells would equal surface disturbance associated with the construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.2-5**. In addition, up to four pump stations would be constructed, disturbing a total of approximately 2 acres.

While SWD wells are proposed under the Proposed Action, the feasibility of drilling SWD wells in the WTP Project Area is not known at this time. Therefore, for the purpose of disclosing the most conservative water truck traffic estimates, it is assumed that 100 percent of the produced water would be trucked to either water management facilities within the WTP Project Area or to commercial disposal sites outside the WTP Project Area.

Additional information on produced water management, including details on SWD wells, water management facilities, and pump stations is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.2.5.4 Workovers**

Information on workovers is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.2.5.5 Road Maintenance**

In general, dust abatement on the BLM roads under the Proposed Action would be implemented using fresh water. However, depending on road moisture conditions, surface ownership, and the applicable State and county maintenance requirements, the WTP Project Area roadways could also be treated with magnesium chloride<sup>10</sup>, enzymes, or other approved dust suppressants to control dust and to facilitate grading.

As discussed in **Section 2.1.5.6**, as an alternative to using dust suppressants or due to safety consideration certain road sections may be improved with hard surfacing, such as asphalt or chip-seal, or other materials as approved by the BLM.

#### **2.2.6 Final Reclamation and Abandonment**

Information on final reclamation and abandonment is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.2.7 Water Use and Water Sources**

Under the Proposed Action, drilling and completion would require an average of approximately 2.0 acre-feet of water per shallow well and 3.5 acre-feet of water per deep well. Because approximately 90 percent of the proposed wells would be shallow wells, water volume calculations are based on water needs for shallow wells. As depicted in **Table 2.2-1**, during the first/peak year of development it is assumed that BBC and other operators would drill and complete approximately 168 wells. Thus, assuming an average of 2.0 acre-feet of water per shallow well, 372 acre-feet (2,886,112 bbl) of water would be used for drilling and completion activities during the peak year of development.

As previously discussed in **Section 2.2.2**, drilling and completion activities would decline during the remainder of the approximately 8-year development phase. Thus, assuming that BBC and other operators drill and complete an average of 101 wells per year over an 8-year period, approximately 202 acre-feet/year (1,567,190 bbl/year) would be used annually for drilling and completion activities.

Estimates of annual water use for dust suppression are based on 10 dust abatement trips per day using 4,200-gallon trucks for 100 days per year, for a total of approximately 12.8 acre-feet/year (99,307 bbl/year). An additional 10 dust abatement trips per rig move could be required when moving drill rigs. Assuming that BBC and other operators

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<sup>10</sup> As part of the WTP PA (Appendix T), the Operator(s), as well as Carbon and Duchesne Counties, have agreed to discontinue the use of magnesium chloride as a form of dust suppression within canyon bottoms in the APE unless scientific research demonstrates there are no negative effects on rock art from its use. However, magnesium chloride may still be utilized on WTP Project Area roads on the mesas.

would drill and complete approximately 168 wells during the first/peak year of development, an additional 21.7 acre-feet/year (168,357 bbl/year) would be used for rig moves. Therefore, estimated water use for dust suppression during the peak year of development would be approximately 34.5 acre-feet (267,663 bbl).

Assuming that BBC and other operators would drill and complete an average of 101 wells per year over an 8-year development phase, average annual water use for dust suppression would be approximately 25.8 acre-feet/year (200,165 bbl/year).

In summary, the total annual water use for drilling, completion, and dust suppression during peak development would be approximately 406.5 acre-feet/year (3,153,776 bbl/year). Average annual water use for drilling, completion, and dust suppression over the approximately 8-year development phase would be approximately 227.8 acre-feet/year (1,767,356 bbl/year).

Under the Proposed Action, it is assumed that there would be a maximum of two water supply wells on each of the three primary mesas (i.e., Prickly Pear, Peter's Point, and Flat Iron) in the WTP Project Area, for a total of up to six new water wells. New water supply wells would likely be sited on well pads, and locations are conceptually illustrated on **Figure 2.2-1**. Surface disturbance from construction and drilling of the water supply wells is included in the surface disturbance summarized for well pads in **Table 2.2-5**.

## **2.2.8 Hazardous Materials and Solid Waste**

Information on hazardous materials and solid waste handling is provided in **Section 2.1**, Details Common to All Alternatives.

## **2.2.9 Workforce and Worker Housing**

Information on workforce needs is provided in **Section 2.1**, Details Common to All Alternatives.

Under the Proposed Action, as many as three 10-acre locations could be needed for temporary worker housing, for a total of 30 acres of new disturbance. Each temporary housing location would generally include up to fifteen 60-foot by 15-foot sleeping trailers, a kitchen, a recreational facility, portable toilets, trash containers, generators, and fresh water tanks. As practicably feasible, temporary worker housing sites would be located on producing well pads. However, to promote employee use of the temporary housing (and therefore, potentially decrease daily traffic between the WTP Project Area and surrounding communities), temporary housing could be sited on new locations away from producing well pads. Each temporary worker housing site would be capable of housing approximately 100 personnel. Temporary housing within the WTP Project Area could be used on a year-round basis.

Because the majority of the development is proposed on top of the mesas, the three temporary worker housing sites are conceptually located on top of Prickly Pear Mesa, Peter's Point Mesa, and Flat Iron Mesa respectively (see conceptual new locations illustrated on **Figure 2.2-1**).

On well pads where active drilling and completion is occurring, temporary housing would be provided for the well pad supervisor, geologist, tool pusher, and others that are

required to be on location at all times. Active drilling locations could include up to five single-wide mobile homes or fifth wheel campers/trailers.

Additional information on worker housing is also provided in **Section 2.1**, Details Common to All Alternatives.

### 2.2.10 Access and Traffic

Under the Proposed Action, the operators would likely make use of air travel to the WTP in order to reduce employee-related traffic between surrounding municipalities and the WTP. BBC and other operators are proposing to upgrade the existing “Interplanetary” and Peter’s Point landing strips by expanding each landing strip to a 62-foot width by an approximately 1 mile length, and by installing a 100- to 200-hp diesel engine generator, pilot-operated runway lights, and a helicopter landing pad within each of the upgraded landing strips. On Flat Iron Mesa, BBC and other operators would construct a new 62-foot wide by 1 mile long landing strip, which would also include a 100- to 200-hp, diesel engine generator, pilot-operated runway lights, and a helicopter landing pad within the upgraded landing strip. Air travel to and from the WTP Project Area could substantially reduce daily traffic volumes that could occur during the construction, drilling, and completion phases of the Proposed Action. However, since air travel would likely be a voluntary option for project-related personnel and contractors, it is assumed that the majority of workers would use vehicles to commute to and from the WTP Project Area. The traffic estimates below reflect this conservative assumption.

Improvement or construction of landing strips in the WTP Project Area would require approximately a 70-foot wide construction ROW (actual runways would be approximately 62 feet wide by 1 mile long). Total disturbance from landing strip improvements and new landing strip construction would be approximately 21 acres.

**Table 2.2-2** shows the total traffic that could occur during the LOP. Actual traffic volumes would vary depending on the specific operations that might be underway at a well pad. For example, traffic for completing an individual well would typically average 11 round trips per day but on any single day might require up to 22 round trips or more (e.g., if problems occur during drilling or fracing activities) between the WTP Project Area and nearby cities and towns.

Project Phase	Vehicle Type	Average Weight (lbs)	Daily Round Trips per Well/Pad	Total Round Trips per Well/Pad <sup>1</sup>	Total Round Trips During Development <sup>2</sup>	Total Vehicle Traffic <sup>4</sup>
<b>Construction</b>	Haul Trucks	80,000	1	7	3,766	7,532
	Light Trucks	20,000	4	28	15,064	30,128
	<b>Total</b>		<b>5</b>	<b>35</b>	<b>18,830</b>	<b>37,660</b>
<b>Drilling (Vertical wells)</b>	Haul Trucks <sup>5</sup>	80,000	2	26	13,988	27,976
	Logging/Mud Trucks	70,000	0.5	6.5	3,497	6,994
	Water Trucks	60,000	1.5	19.5	10,491	20,982

Project Phase	Vehicle Type	Average Weight (lbs)	Daily Round Trips per Well/Pad	Total Round Trips per Well/Pad <sup>1</sup>	Total Round Trips During Development <sup>2</sup>	Total Vehicle Traffic <sup>4</sup>
	Light Trucks	8,000	4	52	27,976	55,952
	<b>Total</b>		<b>8</b>	<b>104</b>	<b>55,952</b>	<b>111,904</b>
<b>Drilling (Directional wells)</b>	Haul Trucks	80,000	2	52	13,988	27,976
	Logging/Mud Trucks	70,000	0.5	13	3,497	6,994
	Water Trucks	60,000	1.5	39	10,491	20,982
	Light Trucks	8,000	4	104	27,976	55,952
	<b>Total</b>		<b>8</b>	<b>208</b>	<b>55,952</b>	<b>111,904</b>
<b>Completion</b>	Semi/Transport/Water/Sand	80,000	7	203	163,821	327,642
	Haul Trucks <sup>5</sup>	80,000	1	29	23,403	46,806
	Light Trucks	8,000	4	116	93,612	187,224
	<b>Total</b>		<b>12</b>	<b>348</b>	<b>280,836</b>	<b>561,672</b>
<b>Reclamation</b>	Haul Trucks	80,000	1	6	4,842	9,684
	Light Trucks	8,000	3	18	14,526	29,052
	<b>Total</b>		<b>4</b>	<b>24</b>	<b>19,368</b>	<b>38,736</b>
<b>Infrastructure Development<sup>3</sup></b>	NA	NA	NA	NA	<b>73,000</b>	<b>146,000</b>
<b>Total Development Traffic</b>	NA	NA	NA	NA	<b>503,938</b>	<b>1,007,876</b>
<b>Total Production Traffic</b>	NA	NA	NA	NA	<b>922,747</b>	<b>1,845,494</b>
<b>Total Traffic LOP</b>	NA	NA	NA	NA	<b>1,426,685</b>	<b>2,853,370</b>

<sup>1</sup>Traffic Estimates are based upon an approximately 7-day construction period, 13-day drilling period at vertical locations (shallow wells), 26-day drilling period at directional wells (shallow wells), 29-day completion period, and 6-day reclamation period per well or well pad as appropriate.

<sup>2</sup>Traffic estimates are based upon approximately 807 gas wells drilled from up to 538 well pads.

<sup>3</sup> Infrastructure development includes approximately 25 vehicles per day for pipeline installation, road construction, compressor station, worker housing construction, etc over an approximately 8-year period.

<sup>4</sup>Total vehicle traffic equals number of round trips multiplied by two (inbound and outbound traffic).

<sup>5</sup>Haul trucks include drill and completion rigs.

NA = Not Available

**Table 2.2-3** includes approximations of annual average daily traffic (AADT) during each year of development under the Proposed Action. Traffic volumes would be highest during the first or peak year of development and would likely decline relative to development decline.

Year	Number of Wells	Total Annual Vehicle Traffic	AADT
1	168	209,818	575
2	127	158,612	435
3	120	149,870	411
4	80	99,913	274
5	80	99,913	274
6	80	99,913	274
7	80	99,913	274
8	72	89,922	246

**Table 2.2-4** illustrates pumper traffic and other traffic associated with the collection of produced water and condensate during the production phase. Production traffic estimates are based upon the drilling schedule discussed in **Section 2.2.2**. As discussed in **Section 2.1**, the anticipated life of an individual well is approximately 20 years. Thus, as the project reaches its 20<sup>th</sup> year, initial wells would begin the abandonment phase and production traffic would begin to decrease accordingly.

Year	Approximate Number of Producing Wells	Approximate Daily Round Trips by Pumpers <sup>1</sup>	Approximate Daily Round Trips for Produced Water Disposal <sup>1</sup>	Approximate Daily Round Trips for Condensate Removal <sup>1</sup>	Approximate Total Daily Round Trips During Production
1	168	6	17	3	<b>26</b>
2	295	11	30	6	<b>47</b>
3	415	16	42	8	<b>66</b>
4	495	19	50	9	<b>78</b>
5	575	22	58	11	<b>91</b>
6	655	25	66	12	<b>103</b>
7	745	28	75	14	<b>117</b>
8	807	30	81	15	<b>126</b>
9	807	30	81	15	<b>126</b>
10	807	30	81	15	<b>126</b>
11	807	30	81	15	<b>126</b>
12	807	30	81	15	<b>126</b>
13	807	30	81	15	<b>126</b>
14	807	30	81	15	<b>126</b>
15	807	30	81	15	<b>126</b>

Year	Approximate Number of Producing Wells	Approximate Daily Round Trips by Pumpers <sup>1</sup>	Approximate Daily Round Trips for Produced Water Disposal <sup>1</sup>	Approximate Daily Round Trips for Condensate Removal <sup>1</sup>	Approximate Total Daily Round Trips During Production
16	807	30	81	15	<b>126</b>
17	807	30	81	15	<b>126</b>
18	807	30	81	15	<b>126</b>
19	807	30	81	15	<b>126</b>
20	807	30	81	15	<b>126</b>
21	641	24	64	12	<b>100</b>
22	514	19	51	10	<b>80</b>
23	394	15	39	7	<b>61</b>
24	314	12	31	6	<b>49</b>
25	234	9	23	4	<b>36</b>
26	154	6	15	3	<b>24</b>
27	72	3	7	1	<b>11</b>

<sup>1</sup>This table assumes that pumpers would visit approximately 75 percent of producing wells on a daily basis and that an individual pumper could service approximately 20 wells each day. The table also assumes that an average of 8 bbl of water and 1.5 bbl of condensate would be produced per day per well.

**2.2.11 Surface Disturbance under the Proposed Action**

Surface disturbance anticipated under the Proposed Action is shown in **Table 2.2-5**. Short-term surface disturbance impacts would occur during and immediately after the construction, drilling, completion, and testing activities. Prior to interim reclamation, short-term disturbance for well pads, access roads, pipeline ROWs, and other surface facilities would equal approximately 3,656 acres. Those portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons following completion of the respective well, access road, or pipeline. What remains would be a “long-term” disturbance of approximately 1,864 acres for the 33-year LOP.

Project Feature	Surface Disturbance Width (feet)		Surface Disturbance Acreage <sup>3</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-Term (acres)
Proposed Well Pads (includes gas wells, SWD wells, and water wells)	NA	NA	1,532	994
Proposed Road and Pipeline (co-located)	80	30	1,597	599
Proposed Road and Pipeline (co-	80	30	73	27

Project Feature	Surface Disturbance Width (feet)		Surface Disturbance Acreage <sup>3</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-Term (acres)
located) in Wildlife Mitigation Areas (not illustrated on map)				
Proposed Road	40	30	30	22
Proposed Pipeline along Existing Road	40	2	95	5
Cross-country Pipeline <sup>2</sup>	40	2	48	2
Proposed Road Reroutes (from road report and Wildlife Mitigation Plan)	40	30	43	32
Existing Roads Needing Improvement (from road report and Wildlife Mitigation Plan)	40	30	74	56
Existing Roads and Pipeline (co-located) Needing Improvement	80	30	60	23
Equipment Storage Areas	NA	NA	15	15
Compressor Stations	NA	NA	15	15
Aggregate Borrow Areas (Quarries)	NA	NA	6	6
Water Management Facilities	NA	NA	15	15
Temporary Worker Housing Locations	NA	NA	30	30
Pump Stations	NA	NA	2	2
Airstrips	NA	NA	21	21
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>3,656</b>	<b>1,864</b>

<sup>1</sup> It is important to note that the well pads, access roads, pipelines, and other facilities illustrated in **Figure 2.2-1** and associated disturbance levels in this table represent a conceptual maximum level of development that would not likely be realized by the actual development. However, for the purposes of conservative impact analysis, all 538 well pad locations and their associated access roads, pipelines, and other surface facilities have been used for surface disturbance calculations.

<sup>2</sup> Potential locations for cross-country pipeline are currently unknown, and would not be decided on until the APD process. Therefore, cross-country pipelines are not illustrated on **Figure 2.2-1**, however, surface disturbance estimates for cross country pipeline are accounted for within **Table 2.2-5**. Cross-country pipelines could total approximately 10 miles and would likely require an average of 40 feet of disturbance within a 50-foot wide construction ROW, hence, the 48-acre initial surface disturbance estimate.

<sup>3</sup> Minor discrepancies due to rounding.  
NA = Not Applicable.

## 2.2.12 Additional Applicant-Committed Measures

**Table 2.2-6** includes a description of the applicant-committed environmental protection measures that would be applied under the Proposed Action. These measures are in addition to those required by non-discretionary regulations. As these mitigation measures are generally specific to a stage of oil and gas development, the table is subdivided by commitments specific to pre-drilling, construction, completion, and final reclamation and abandonment.

<b>Table 2.2-6 Applicant-Committed Environmental Protection Measures</b>
<b>Pre-Drilling</b>
Pipeline construction methods and practices would be planned and conducted by the operators with the objective of enhancing reclamation and fostering the re-establishment of the native plant community.
The operators would require their personnel, contractors, and subcontractors to comply with Federal regulations intended to protect archeological and cultural resources.
The operators would require that their personnel, contractors, and subcontractors abide by all State and Federal laws and regulations regarding hunting.
<b>Construction</b>
BBC and other operators would fund Mexican spotted owl (MSO) surveys within the WTP Project Area in accordance with USFWS MSO survey guidelines prior to any surface disturbing activities within “fair” or “good” MSO habitats or 0.5-mile buffer of those habitats.
In order to avoid potential noise-related impacts to potential MSO habitats, new compressor stations would not be located within approximately 0.5 miles of canyon rims.
The operators would use existing crowned and ditched roads for access where reasonably practical to minimize new surface disturbances.
The operators would construct roads on private surface to essentially the same specifications as those on Federal surface, considering the specifications of landowners, topography, subsurface bedrock, etc.
Where topsoil removal is necessary, it would be windrowed (i.e., stockpiled/accumulated along the edge of the ROW and in a low row/pile parallel with the ROW) and re-spread over the disturbed area after construction and backfilling are completed. Vegetation removed from the disturbed area would also be re-spread to provide protection, nutrient recycling, and a seed source for reclamation.
The operators would construct roads to minimize visual impacts by following natural contours, utilizing curves, where reasonably practical, etc.
No unnecessary side-casting of material would occur on steep slopes.
Unnecessary topographic alterations would be mitigated by avoiding road construction, when practicably feasible, on steep slopes, rugged topography, and perennial and ephemeral/intermittent drainages.
To minimize pipeline ROW disturbance, pipeline ROWs would be located adjacent to access roads or would be constructed along the most direct route as practicably feasible.
Pipelines within the channel crossings or in mapped flood hazard areas would be constructed such that the pipeline is buried at least 3 feet below the channel bottom and in conformance with hydrological design practices.
To limit erosion potential, backfill over pipeline trenches would be compacted so as not to extend above the original ground level after the fill has settled. Wheel or other methods of compacting backfill would be utilized as practicably feasible to reduce trench settling and water channeling.
Where practicably feasible, areas where proposed activities do not require major excavation (e.g., where small diameter surface-laid pipelines are proposed) would be stripped of vegetation to ground level using mechanical treatment, leaving topsoil intact and root masses relatively undisturbed.
The operators would use water and other dust suppressants, as necessary, to abate fugitive dust.

<b>Table 2.2-6 Applicant-Committed Environmental Protection Measures</b>
Removal and disturbance of vegetation would be kept to a minimum through construction site management (e.g., using previously disturbed areas and existing easements, limiting equipment/materials storage yard and staging area size, to that required etc.)
Surface disturbance within significant erosion-prone or high salinity areas would be avoided where practical. Necessary construction in these areas would be completed to minimize erosion.
The operators would restrict OHV activity by personnel and contract workers to the immediate area of authorized activity or existing roads and trails.
<b>Final Reclamation and Abandonment</b>
All reclamation would be accomplished as soon as practical after the disturbance occurs with efforts continuing until satisfactory revegetation cover is established. Inter-seeding (i.e., seeding into existing vegetation), secondary seeding, or staggered seeding may be used to accomplish revegetation objectives. During rehabilitation of areas in important wildlife habitat, provisions would be made for the establishment of native browse and forb species. Follow-up seeding or corrective erosion control measures would occur on areas where initial reclamation efforts are unsuccessful, as determined by the BLM or the appropriate Surface Management Agency.
Any mulch used by the operators would be weed-free and free from mold, fungi, or noxious weed seeds. Mulch may include native hay, small grain straw, wood fiber, live mulch, cotton, jute, synthetic netting, or rock.
The operators would reshape disturbed channel beds to their approximate original configuration.
Reclamation of abandoned roads may include reshaping, recontouring, resurfacing with topsoil, installation of water bars, and seeding on the contours. Road beds, well pads, and other compacted areas would be ripped to a depth of approximately 1.0 feet on 1.5-foot centers to reduce compaction prior to spreading the topsoil across the disturbed area. Stripped vegetation would be spread over the disturbance area for nutrient recycling, where practical. Additional erosion control measures (e.g., fiber matting) and road barriers to discourage travel may be constructed if appropriate. Graveled roads, well pads, and other sites would be stripped of usable gravel prior to ripping as deemed necessary. Culverts, cattle guards, and signs would be removed as roads are abandoned.
<b>Common to All Project Phases</b>
Project personnel and contractors would be educated on and subject to the following requirements: <ul style="list-style-type: none"> <li>• No dogs within the WTP Project Area;</li> <li>• No firearms within the WTP Project Area;</li> <li>• No littering within the WTP Project Area;</li> <li>• Smoking within the WTP Project Area would only be allowed in off-operator active locations or in specifically designated smoking areas. All cigarette butts would be placed in appropriate containers and not thrown on the ground or out windows of vehicles; personnel and contractors would abide by all fire restriction orders.</li> <li>• Campfires or uncontained fires of any kind would be prohibited within the WTP Project Area;</li> <li>• Portable generators used in the WTP Project Area would have spark arrestors.</li> </ul>

The operators would be responsible for necessary preventative and corrective road maintenance for the duration of the project. Maintenance responsibilities may include, but are not limited to, blading, gravel surfacing, cleaning ditches and drainage facilities, dust abatement, noxious weed control, or other measures as deemed appropriate.

## 2.3 ALTERNATIVE B – NO ACTION

Under the No Action Alternative, the proposed natural gas development on the BLM lands as described in the Proposed Action would not be implemented; however, natural gas development would likely continue to occur on State of Utah and private lands, subject to the approval of UDOGM or the appropriate private land owner. Reasonable access across public lands to proposed well pads and facilities on State and private lands could also occur under the No Action Alternative, as allowed by Federal regulations. In addition, production and maintenance activities would continue for all existing wells and infrastructure that have been developed on Federal lands.

Under the No Action Alternative, approximately 81 natural gas wells would be developed from up to 54 well pads on State and private lands in the WTP Project Area. Three drill rigs would operate year-round for approximately 2 years, drilling at a typical rate of 60 wells per year. The anticipated life of an individual well would be approximately 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be about 27 years.

Conceptual locations for the approximately 54 well pads on State and private lands are illustrated on **Figure 2.3-1**. Development methods on State and private lands would be essentially identical to those used to develop Federal minerals, subject to landowner requirements.

Additional information on target geologic formations and downhole spacing is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.3.1 Construction

#### 2.3.1.1 Well Pad Construction

Initial surface disturbance resulting from the construction of 54 well pads would be 149 acres on State and private lands. Assuming at least half (27) of the well pads would have at least two directionally drilled wells, an additional 5 acres of surface disturbance would occur as a result of multi-well pads. Therefore, total short-term surface disturbance for well pads would be approximately 154 acres.

Following well completion(s), portions of the well pad not needed for production would be reseeded and reclaimed according to specifications of the appropriate surface management agency. Assuming successful interim reclamation, long-term well pad disturbance under the No Action Alternative would be reduced to approximately 100 acres.

Additional information on well pad construction is provided in **Section 2.1**, Details Common to All Alternatives.

#### 2.3.1.2 Access Road Construction

Implementation of the No Action Alternative would require the construction and improvement of up to 32 miles of access road on Federal, State, and private surface. Initial surface disturbance resulting from the construction or improvement of access

roads would be up to 297 acres (includes 280 acres for co-located proposed access roads and proposed pipelines, and 17 acres for proposed access roads alone).

New road construction and improvement of existing roads on Federal land would follow the guidelines established for oil and gas exploration and development activities in the Gold Book (DOI-USDA 2007); the *BLM Manual 9113* (BLM 1985); and in the *Price Field Office's Hydrological Modification Standards for Roads* (Appendix 19 – Draft Price RMP EIS [BLM 2004b]).

Under the No Action Alternative, aggregate for road surfacing would be obtained from existing quarries on State of Utah lands outside the WTP Project Area.

Assuming successful interim reclamation, long-term surface disturbance from the 32 miles of new access roads would be reduced to approximately 118 acres.

As illustrated on **Figure 2.3-1**, BBC and other operators would make extensive road improvements to approximately 6.2 miles of the existing Horse Bench Road. The improved road would provide access to approximately 15 proposed well pads on State land. The upgrades would increase width, improve drainage, decrease exposure, and reduce the present grade. Details are contained in the *West Tavaputs Plateau Access Road Report Assessment*, which is included in **Appendix F**.

Short-term disturbance related to road improvements would be approximately 60 acres. Following interim reclamation, long-term disturbance related to road improvements would be approximately 23 acres.

Additional information on access road construction is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.1.3 Pipeline Construction**

Under the No Action Alternative, approximately 29 miles of pipeline would be installed adjacent to proposed access roads (co-located), and would not result in additional surface disturbance beyond the 280 acres previously disclosed in **Section 2.3.1.2**. Approximately 6.7 miles of pipeline would be installed along existing roads. Installation of pipeline along existing roads would require use of a 50-foot wide construction ROW and would result in approximately 32 acres of short-term disturbance, and 2 acres of long-term disturbance following interim reclamation. Each pipeline ROW could include up to two gas pipelines (both low and high pressure systems) as well as produced water and condensate transfer pipelines.

In limited situations, for example to significantly reduce total pipeline length, a proposed pipeline ROW could be installed independent of an access road. Pipelines installed independent of roads (i.e., cross-country pipelines) could total approximately 10 miles under any of the alternatives. New cross-country pipeline would require a 50-foot wide construction ROW, and would initially disturb approximately 48 acres. Following interim reclamation, long-term disturbance would be reduced to approximately 2 acres.

Under the No Action Alternative, it is assumed that the majority of the proposed pipelines would be installed on the surface. However, site-specific decisions to bury or lay

pipelines on the surface would depend upon the surface conditions and requirements of the appropriate surface management agency.

Surface pipelines adjacent to roads would be assembled on the roadway or within the construction ROW, lifted, and placed in the existing vegetation using a side-boom truck.

Buried pipelines would be installed using one of two general construction sequences, as described below.

In areas where sufficient soil is present such that blasting would not be required, the following techniques would be employed to bury pipelines:

- On BLM-administered lands, a brush-hog would be used to remove shrubs and small trees from the ROW.
- A trench approximately 4 feet deep would be excavated using a track hoe and the soil stockpiled to one side, making sure the topsoil and spoil do not mix together. As practicably feasible, topsoil removal would not occur except directly over the trench.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench.
- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

In areas where compacted sandstone or bedrock exists, the following techniques would be employed to bury pipelines:

- On State or private lands, vegetation would be scalped and windrowed to one side of the ROW and a total of 6 to 8 inches of topsoil, if present, would be removed and windrowed to one side. As practicably feasible, topsoil removal would not occur except directly over the trench.
- On BLM-administered lands, a brush-hog would be used to remove shrubs and small trees from the ROW.
- In most areas where pipelines would be buried, chain trenchers and/or rock saws (also known as wheel or disc trenchers) would be used to excavate trenches.
- In areas where blasting is required in order to excavate pipeline trenches, the following techniques would be used (e.g., on slopes or other areas where use of chain trencher and/or rock saws are not feasible):
  - A track hoe-mounted air drill would drill detonation holes at an interval of approximately every 4 feet along the trench route to be blasted.
  - An approved granular explosive would be placed in the holes with primers and then wired together for detonation.

- As needed, roads along areas to be blasted may temporarily be closed for safety purposes.
- The charges would be detonated in accordance with relevant safety regulations.
- Following excavation of the pipeline trenches (whether by chain trencher and/or rock saw or detonation), a track hoe and bulldozer would be used to remove debris from the trench.
- Spoil would be used to pad the bottom of the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

Additional information on pipeline construction is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.1.4 Storage Areas**

Under the No Action Alternative, BBC and other operators would construct up to two approximately 5-acre equipment storage locations that would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, CO<sub>2</sub> tanks, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figure 2.3-1**).

Additional information on equipment storage areas is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.2 Drilling**

Under the No Action Alternative, a maximum of three drill rigs would be operating in the WTP Project Area at any one time. All 81 wells would likely be shallow wells.

Under the No Action Alternative, BBC and other operators would employ closed-loop drilling systems in canyon bottoms.

Additional information on drilling procedures is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.3 Completion**

Information on completion is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.4 Interim Reclamation**

Information on interim reclamation is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.5 Production and Maintenance**

#### **2.3.5.1 Production**

Information on production is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.5.2 Compressor Stations**

Under the No Action Alternative, one 6,400-hp compressor station and one 11,200-hp compressor station would be constructed (see conceptual compressor station locations on **Figure 2.3-1**). Including the existing and expected compression at the Dry Canyon compressor station and new compression at proposed stations, total compression within the WTP Project Area would be up to approximately 33,600 hp. Actual horsepower requirements would depend on the production of the proposed wells.

Each new compressor station would occupy an approximately 5-acre site, resulting in up to 10 acres of new disturbance for compressor stations.

Additional information on compressor stations is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.5.3 Produced Water Management**

Under the No Action Alternative, one water management facility and two SWD wells could be constructed. Surface disturbance from the proposed water management facility would be approximately 5 acres. Surface disturbance from construction and drilling of the SWD wells would equal surface disturbance due to the construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.3-3**.

While SWD wells are proposed under the No Action Alternative, the feasibility of drilling SWD wells in the WTP Project Area is not known at this time. Therefore, for the purpose of disclosing the most-conservative water truck traffic estimates, it is assumed that under the No Action Alternative 100 percent of the produced water would be trucked to either water management facilities within the WTP Project Area or to commercial disposal sites outside the WTP Project Area.

Additional information on produced water management, including details on SWD wells and water management facilities, is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.5.4 Workovers**

Information on workovers is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.3.5.5 Road Maintenance**

Information on road maintenance is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.6 Final Reclamation and Abandonment**

Information on final reclamation and abandonment is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.7 Water Use and Water Sources**

Under the No Action Alternative, drilling and completion would require an average of approximately 2.0 acre-feet of water per shallow well. As discussed in **Section 2.3**, BBC and other operators anticipate drilling and completing at a typical rate of 60 wells per year. Assuming 60 wells per year, approximately 120 acre-feet (931,004 bbl) would be used annually for drilling and completion activities under the No Action Alternative.

Estimates of annual water use for dust suppression are based on 10 dust abatement trips per day using 4,200-gallon trucks for 100 days per year, or 12.8 acre-feet/year (99,307 bbl/year) over a 1.2-year development period. An additional 10 dust abatement trips per rig move could be required when moving drill rigs. Assuming a typical drilling rate of 60 wells per year, an additional 7.7 acre-feet/year (59,739 bbl/year) would be used for rig moves. Therefore, estimated annual water use for dust suppression would be approximately 20.5 acre-feet/year (159,046 bbl/year).

In summary, the total annual water use for drilling, completion, and dust suppression would be approximately 140.5 acre-feet/year (1,090,050 bbl/year) under the No Action Alternative.

Under the No Action Alternative, it is assumed that there would be a maximum of two water supply wells. New water supply wells would be sited on well pads, and these locations are conceptually illustrated on **Figure 2.3-1**. Surface disturbance from construction and drilling of the water supply wells would equal surface disturbance associated with the construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.3-3**.

Additional information on water use and water sources is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.3.8 Hazardous Materials and Solid Waste**

Information on hazardous materials and solid waste handling is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.3.9 Workforce and Worker Housing

Information on workforce needs is provided in **Section 2.1**, Details Common to All Alternatives.

Under the No Action Alternative, as many as two temporary worker housing locations would be utilized in order to reduce traffic between the WTP Project Area and surrounding communities during the construction, drilling, and completion phases. Each temporary worker housing site would be capable of housing approximately 30 personnel. Assuming that both temporary housing sites are occupied, approximately 60 personnel would be located on site. Temporary housing within the WTP Project Area would be used on a year-round basis. Conceptual locations for worker housing sites are illustrated on **Figure 2.3-1**. Surface disturbance from the two worker housing locations would be approximately 10 acres.

Additional information on worker housing is also provided in **Section 2.1**, Details Common to All Alternatives.

### 2.3.10 Access and Traffic

**Table 2.3-1** shows the total traffic that could occur during the LOP assuming that approximately 81 gas wells would be drilled from up to 54 locations. Actual traffic volumes would vary depending on the level of drilling activity, the specific operations that might be underway at a well pad and the maturity of the project at any particular time.

<b>Table 2.3-1 Traffic Estimates under Alternative B</b>						
<b>Project Phase</b>	<b>Vehicle Type</b>	<b>Average Weight (lbs)</b>	<b>Daily Round Trips per Well/Pad</b>	<b>Total Round Trips per Well/Pad<sup>1</sup></b>	<b>Total Round Trips During Development<sup>2</sup></b>	<b>Total Vehicle Traffic<sup>4</sup></b>
Construction	Haul Trucks	80,000	1	7	378	756
	Light Trucks	20,000	4	28	1,512	3,024
	<b>Total</b>		<b>5</b>	<b>35</b>	<b>1,890</b>	<b>3,780</b>
Drilling (Vertical wells)	Haul Trucks <sup>5</sup>	80,000	2	26	1,404	2,808
	Logging/Mud Trucks	70,000	0.5	6.5	351	702
	Water Trucks	60,000	1.5	19.5	1,053	2,106
	Light Trucks	8,000	4	52	2,808	5,616
	<b>Total</b>		<b>8</b>	<b>104</b>	<b>5,616</b>	<b>11,232</b>
Drilling (Directional wells)	Haul Trucks <sup>5</sup>	80,000	2	52	1,404	2,808
	Logging/Mud Trucks	70,000	0.5	13	351	702
	Water Trucks	60,000	1.5	39	1,053	2,106
	Light Trucks	8,000	4	104	2,808	5,616
	<b>Total</b>		<b>8</b>	<b>208</b>	<b>5,616</b>	<b>11,232</b>
Completion	Semi/Transport/Water/Sand	80,000	7	203	16,443	32,886
	Haul Trucks <sup>5</sup>	80,000	1	29	2,349	4,698

Project Phase	Vehicle Type	Average Weight (lbs)	Daily Round Trips per Well/Pad	Total Round Trips per Well/Pad <sup>1</sup>	Total Round Trips During Development <sup>2</sup>	Total Vehicle Traffic <sup>4</sup>
	Light Trucks	8,000	4	116	9,396	18,792
	<b>Total</b>		<b>12</b>	<b>348</b>	<b>28,188</b>	<b>56,376</b>
Reclamation	Haul Trucks	80,000	1	6	486	972
	Light Trucks	8,000	3	18	1,458	2,916
	<b>Total</b>		<b>4</b>	<b>24</b>	<b>1,944</b>	<b>3,888</b>
Infrastructure Development <sup>3</sup>		NA	NA	NA	<b>7,327</b>	<b>14,654</b>
Total Development Traffic		NA	NA	NA	<b>50,581</b>	<b>101,162</b>
Total Production Traffic		NA	NA	NA	<b>80,939</b>	<b>161,878</b>
Total Round Trips LOP		NA	NA	NA	<b>131,520</b>	<b>263,040</b>

<sup>1</sup>Traffic Estimates are based upon an approximately 7-day construction period, 13-day drilling period at vertical locations (shallow wells), 26-day drilling period at direction wells (shallow wells), 29-day completion period, and 6-days reclamation period per well or well pad as appropriate.

<sup>2</sup>Traffic estimates are based upon approximately 81 gas wells drilled from up to 54 well pads.

<sup>3</sup> Infrastructure development includes approximately 25 vehicles per day for pipeline installation, road construction, compressor station, worker housing construction, etc.

<sup>4</sup>Total vehicle traffic equals number of round trips multiplied by two (inbound and outbound traffic).

<sup>5</sup>Haul trucks include drill and completion rigs.

NA = Not Available

**Table 2.3-2** illustrates typical pumper traffic, and traffic associated with the collection of produced water and condensate during the production phase. Production traffic estimates are based upon a typical drilling rate of 60 wells per year under Alternative B. As previously discussed, the anticipated life of an individual well is approximately 20 years.

Year	Approximate Number of Producing Wells	Approximate Daily Round Trips by Pumpers	Approximate Daily Round Trips for Produced Water Disposal	Approximate Daily Round Trips for Condensate Disposal Removal	Approximate Total Daily Round Trips During Production
1	60	2	6	1	<b>9</b>
2	81	3	7	1	<b>11</b>
3	81	3	7	1	<b>11</b>
4	81	3	7	1	<b>11</b>
5	81	3	7	1	<b>11</b>
6	81	3	7	1	<b>11</b>
7	81	3	7	1	<b>11</b>
8	81	3	7	1	<b>11</b>

Year	Approximate Number of Producing Wells	Approximate Daily Round Trips by Pumps	Approximate Daily Round Trips for Produced Water Disposal	Approximate Daily Round Trips for Condensate Disposal Removal	Approximate Total Daily Round Trips During Production
9	81	3	7	1	11
10	81	3	7	1	11
11	81	3	7	1	11
12	81	3	7	1	11
13	81	3	7	1	11
14	81	3	7	1	11
15	81	3	7	1	11
16	81	3	7	1	11
17	81	3	7	1	11
18	81	3	7	1	11
19	81	3	7	1	11
20	81	3	7	1	11
21	21	1	1	1	3

### 2.3.11 Surface Disturbance under the No Action Alternative

Surface disturbance anticipated under the No Action Alternative is shown in **Table 2.3-3**. Short-term surface disturbance would occur during and immediately after the construction, drilling, completion, and testing activities. Prior to interim reclamation, short-term disturbance for well pads, access roads, pipelines ROWs, and other surface facilities would equal approximately 626 acres. Those portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons following completion of the respective well, access road, or pipeline. What remains would be a “long-term” disturbance of approximately 279 acres for the 27-year LOP.

Project Feature	Surface Disturbance Width		Surface Disturbance Acreage <sup>2</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-term (acres)
Proposed Well Pads (includes gas wells, SWD wells, and water wells)	NA	NA	154	100
Proposed Road and Pipeline (co-located)	80	30	280	105
Proposed Road	40	30	17	13
Proposed Pipeline along Existing Road	40	2	32	2
Cross-country Pipeline <sup>1</sup>	40	2	48	2

Project Feature	Surface Disturbance Width		Surface Disturbance Acreage <sup>2</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-term (acres)
Existing Roads and Pipeline (co-located) Needing Extensive Improvement	80	30	60	23
Equipment Storage Areas	NA	NA	10	10
Compressor Stations	NA	NA	10	10
Water Management Facilities	NA	NA	5	5
Temporary Worker Housing Locations	NA	NA	10	10
<b>Total</b>			<b>626</b>	<b>279</b>

<sup>1</sup> Site-specific locations for cross-country pipeline are currently unknown, and would not be decided on until the APD process. Therefore, cross-country pipelines are not illustrated on **Figure 2.3-1**. However, surface disturbance for cross-country pipelines is accounted for within **Table 2.3-3**. Cross-country pipelines could total approximately 10 miles and would likely require an average of 40 feet of disturbance within a 50-foot wide construction ROW, hence, the 48-acre initial surface disturbance estimate.

<sup>2</sup> Minor discrepancies due to rounding.  
 NA = Not Applicable

## **2.4 ALTERNATIVE C – TRANSPORTATION IMPACT REDUCTION**

Alternative C was developed in part to address transportation concerns that were expressed by the public during the scoping process. The primary concerns identified were increased traffic on existing roads, safety hazards created by increased traffic volumes, and adverse impacts that traffic could have on recreation and natural and cultural resources.

### **2.4.1 Introduction**

Under Alternative C, natural gas development on Federal leases would be done in a phased manner through limitations on the number of rigs allowed, transportation-related restrictions, and surface disturbance restrictions imposed by the BLM.

#### **2.4.1.1 Drilling Rig, Transportation, and Surface Disturbance Restrictions**

In order to limit the intensity of development and reduce the impacts of transportation, a maximum of six rigs would operate in the WTP Project Area at any one time. Of the six rigs, only two would operate during the winter season (November 1 – May 15), and the remaining four rigs would operate on a seasonal basis.

When compared to the Proposed Action, the implementation of Alternative C would increase the overall life of the project by approximately 7 years, but would decrease traffic-related impacts and annual surface disturbance. In addition to limiting the number of rigs, under Alternative C transportation impacts would be reduced by implementation of the following:

- Daily use of the existing Peter's Point air strip, and proposed Flat Iron Mesa and Prickly Pear Mesa airstrips for transport of drilling workforce or supplies (reduction of 8 vehicle round trips per rig per day).
- Construction and use of an alternative access route through Trail Canyon.
- Mandatory transport of produced water and condensate via water/condensate transfer pipelines to proposed SWD wells or water management facilities.
- Allowing administrative access only (i.e., closed to the general public) in Cottonwood Canyon Road, Harmon Canyon Road, and on Prickly Pear Road during the winter season (December 1<sup>st</sup> - April 15<sup>th</sup>).
- Prohibited use of Prickly Pear Canyon Road (i.e., from Nine Mile Canyon to the top of Prickly Pear Mesa) by all project-related trailer traffic or vehicles with truck-load capacity of 1-ton or larger.
- Requiring transportation of routine drilling and completion supplies to the storage areas during hours of low use (7:00 PM to 10:00 AM) during the non-winter period (May 16 – October 31).
- Limiting transportation of routine drilling and completion supplies on weekends and holidays.
- Allowing administrative access on Horse Bench (i.e., closed to the general public).
- Gating all new roads longer than 2 miles after drilling and completion activities are completed.
- Gating all roads that provide access to proposed well locations in WSAs (i.e., limited administrative access only).
- Reclaiming redundant roads, roads that create unnecessary loops, or roads determined to be detrimental to sensitive natural and cultural resources.

Under the phased development components of Alternative C, it is assumed that BBC and other operators would develop up to 807 natural gas wells from up to 538 well pads over a 15-year period. The anticipated life of an individual well would be approximately 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be approximately 40 years.

In addition to the limitations and restrictions described above, under Alternative C, maximum new annual surface disturbance would be limited to approximately 280 acres per year, and the total unreclaimed surface disturbance allowed under this EIS would be limited to approximately 2,250 acres at any given time (see **Appendix C**). Site-specific disturbed acreages would be removed from the total unreclaimed surface disturbance calculation once the site-specific surface disturbance meets successful interim reclamation standards. Assuming successful interim reclamation, the maximum long-term disturbance would be approximately 1,839 acres.

### **2.4.1.2 Special Protective Measures for Resources in the WTP Project Area**

The special protective measures developed for Alternative C were designed to address certain sensitive resource issues, of which only some have been identified through land use planning.

It is important to recognize that full field development of natural gas in the WTP Project Area would occur on a patchwork of oil and gas leases. Leases predating the BLM land use planning, issued as early as the 1950s, do not contain resource protection stipulations, while others, issued subsequent to planning, may contain multiple stipulations. Future leases, if approved, would be based on plan revisions currently underway and could be subject to yet a different, though similar, set of stipulations.

Although full field development on this patchwork of oil and gas leases and associated stipulations would present a complex management challenge for the Price Field Office, the BLM believes that special measures are needed to address certain sensitive resource issues. Because these resources are predominant throughout the WTP Project Area, resource protection measures need to be applied consistently, regardless of varying lease terms.

To accommodate this need for consistency, the BLM would, depending on the lease terms, use these special protection measures as criteria by which a waiver or exception of lease stipulations, including those on future leases, may be granted, or as COAs for actions on leases which have no stipulations. Either application of the measures, presented in more detail below, would ensure sensitive resource issues are sufficiently mitigated throughout the WTP Project Area:

- The BLM would grant a waiver or exception to the lease stipulations in the WTP Project Area on a lease-by-lease basis as specific applications for development on the affected lease are submitted, under the condition that operators comply with the special protection measures outlined below and carryout wildlife mitigation measures (see **Section 2.4.1.3**). An annual review would be completed by the BLM in coordination with other appropriate agencies to evaluate operator compliance with conditions of waivers or exceptions, resource conditions, and effectiveness of mitigation measures, particularly those addressing wildlife.
- On leases that have no stipulations attached, the special protective measures outlined below would be applied to APDs (and other individual applications) as COAs to ensure sensitive resource issues present within the WTP Project Area are sufficiently mitigated.

#### ***Special Protective Measures for Wildlife***

The special protective measures presented below were developed by the BLM and its cooperating agencies to address the effects of winter development on wildlife. The BLM and its cooperating agencies would conduct an annual review to evaluate operator compliance with conditions of waivers or exceptions, resource conditions, and effectiveness of mitigation measures, particularly those addressing wildlife. The BLM would apply wildlife mitigation measures consistent with adaptive management practices

as necessary to achieve its resource objectives. As part of the review of resource conditions the following information would be considered:

- Annual report on reclaimed versus unreclaimed surface disturbance.
- Range trend studies, including evaluation of phenology<sup>11</sup>, endangered plants, and noxious weeds, would be submitted for review every three years.
- Annual survey results would be submitted on mule deer herd populations while their numbers are below objectives; if population objectives are exceeded, population survey results would be submitted every three years. Annual surveys would supplement those conducted by UDWR as necessary.
- Survey results on elk populations would be submitted every three years while populations exceed their objective numbers; if population numbers are below their objective, surveys would be submitted annually. Annual surveys would supplement those conducted by UDWR as necessary.
- Annual report on sage-grouse winter use monitoring to determine the effectiveness of sage-grouse mitigation and to provide useful information for potentially modifying the winter drilling exceptions through the adaptive management process.

#### General Measures

- The operator would be responsible to coordinate with the BLM and appropriate agencies on an annual basis (prior to September 1 of each year) to plan for winter drilling activities.
- All coordination on winter drilling between the appropriate agencies must be completed and all respective APDs must be submitted prior to September 1 each year.
- As part of the annual review and planning process for winter drilling, the BLM and cooperating agencies would coordinate with the operators to concentrate the locations of winter drilling activities to limited or confined areas (e.g., on one or two mesas only).

#### Measures for Big Game Species

- The following travel restrictions would be adhered to by all types of vehicles in order to minimize disturbances during periods of major animal movement (6:00-8:00 AM and 5:00-7:00 PM or 6:00-8:00 AM and 6:00-8:00 PM during daylight savings time). These restrictions would be contingent on the presence of elk and deer in the areas.
  - Contractors and vendors for non-critical rig visits would not travel during these periods.
  - Rig shift changes would be adjusted so that they would not coincide with these periods.

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<sup>11</sup> Phenology is a branch of science dealing with the relationship between climate and periodic biologic phenomena. flowering.

- Normal delivery of drilling supplies would not occur during these periods. These restrictions would not apply to vehicles directly involved in casing, cementing, and/or emergency operations necessary to maintain viable hole conditions.
- During snow depths of 16 inches or greater, openings would be created at the edges of plowed roads at intervals of approximately ¼ mile to create wildlife exit points and crossing areas when snow walls develop. Exits would extend to approximately 15 feet from the roadway and to the top of vegetation, and would remain within the ROW.

#### Measures for Sage-Grouse

- Disturbance would be minimized in and around core winter use areas through strategic planning for optimal realignment of existing roads and placement of new roads, well pads and other infrastructure, thereby reducing habitat fragmentation (see **Figure 2.4-1**). Strategic planning would include cooperation with the UDWR to determine appropriate locations for road realignments and other surface activities so as to minimize impacts on sage-grouse.
- No surface disturbance would be authorized in core winter use areas until the operator submits a site-specific, engineered plan of development for proposed roads, wells, pipelines, and/or other project features that would be constructed within those areas.
- No winter development (i.e., construction, drilling, or completion activities) would be allowed in core winter use areas on Prickly Pear Bench and in the Peters Point area (see **Figure 2.4-1**).
- Development (i.e., construction, drilling, and completion activities) would be precluded within two miles of known leks between March 15 and July 15. In addition, regardless of season, development would be prohibited within ½ mile of known leks.
- Upgrades to or use of the Interplanetary airstrip for project-related activities would be prohibited.

#### **Special Protective Measures for Water Resources**

The following special protective measures were developed by the BLM and its cooperating agencies to address the effects of development on water resources including high country watersheds.

- Well pads and access roads within high-country watershed areas (areas above 7,000 feet in elevation) would be fully constructed or upgraded during the period between April 15 and December 1.
- Throughout the WTP Project Area, snow must be removed within 48 hours of cessation of each winter storm producing greater than 4 inches of snowfall; snow removal would occur only on those roads necessary to access wells and production facilities.
- The operators would be required to fund an annual water quality monitoring program as outlined in **Appendix Q**. If samples and monitoring detect or

determine any degradation of water quality as a result of the WTP project the BLM would reevaluate the effectiveness of the BMPs and mitigation measures in **Tables 2.6-7 and 2.6-8.**

#### **2.4.1.3 Agency Wildlife Mitigation Plan**

The Price Field Office in coordination with the UDWR has developed a Wildlife Mitigation Plan, which outlines proposed mitigation for natural gas full field development in the WTP Project Area. The agencies' mitigation plan, which is a modified version of BBC's Wildlife Mitigation Plan, emphasizes the importance of offsetting, to the extent reasonable, the effects of the full field development in its entirety. The agencies' plan gives priority to compensating for potential effects to greater sage-grouse, deer, raptors, and elk.

The Agency Wildlife Mitigation Plan would require mitigation at a 4:1 acre ratio based on total potential long-term surface disturbance. This ratio generally serves as the limitation on the extent to which operators would be required to mitigate.

Under the Agency Wildlife Mitigation Plan, 30 percent of the total potential long-term surface disturbance (approximately 552 acres under Alternative C) would be mitigated during the first 3 years following a decision to authorize the full field development project. As part of this initial effort, the following measures<sup>12</sup> would be implemented:

- Habitat improvement and connectivity as described in the operators' plan. This would be implemented at a 4:1 acre ratio as indicated above.
- Wet meadow/summer range enhancement as described in the operators' plan. Up to six projects would be implemented. Acres enhanced would be counted under the habitat improvement tally at an equal or greater acreage value based on the qualitative benefits of the enhancement as determined appropriate by the WTPMOC.
- The operators would contribute to UDWR for monitoring greater sage-grouse, whether through continued telemetry study or other, more aggressive means of monitoring, if necessary, including experimental designs.

The Agency Wildlife Mitigation Plan would also establish an oversight committee to be led by the BLM, in coordination with UDWR, and other agencies. The WTPMOC would evaluate the implementation and effectiveness of mitigation measures, provide direction on effective means of mitigating planned development activities, and develop adaptive strategies and projects to mitigate beyond the initial 30 percent commitment. All mitigation commitments (i.e., the remaining 70%) under the Agency Wildlife Mitigation Plan would be initiated within one year from completion of drilling operations. The WTPMOC would complete evaluations and make determinations on on-going and planned mitigation activities on an annual basis, in advance of considerations for winter activities (as is outlined under Alternative C), and prepare a report on its findings.

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<sup>11</sup> Some of the measures proposed by the operators' Wildlife Mitigation Plan not carried forward into the Agency's wildlife mitigation plan are incorporated elsewhere in the alternative as general alternative components.

Adaptive strategies beyond the initial mitigation effort could include a broad menu of mitigation options. The relative value of the various options would be determined by the WTPMOC such that their value can be applied toward the operators' 4:1 mitigation requirement.

Mitigation options which would be considered by the WTPMOC for implementation of the plan include, but are not limited to, the following actions:

- Additional habitat improvement and connectivity projects. A variety of methods could be used, targeting a range of vegetative communities and habitats, including wet meadow/summer range.
- Continued or more aggressive monitoring of greater sage-grouse, including experimental designs.
- Conversions of grazing allotments around Nine Mile Canyon from domestic sheep to cattle (this could provide for the reintroduction of big horn sheep into Nine Mile Canyon and would help mitigate the loss of bighorn sheep habitats).
- The purchase of conservation easements on private lands.
- Management of private lands for the benefit of wildlife.

The WTPMOC would recognize, within the 4:1 parameter, mitigation activities on Federal, State, and private lands, including those which build upon or complement past commitments by operators to mitigate activities authorized under previous analyses and associated decisions. However, credit for previous project mitigation would not be allowed within the 4:1 parameter.

## **2.4.2 Construction**

Under Alternative C, BBC and other operators would develop up to 807 natural gas wells from up to 538 well pads in the WTP Project Area (see **Figure 2.4-1**).

### **2.4.2.1 Well Pad Construction**

Initial surface disturbance resulting from the construction of up to 538 well pads would be up to 1,479 acres. Assuming approximately half (269) of the well pads would have at least two directionally drilled wells, an additional 54 acres of surface disturbance would occur on multi-well pads. Therefore, the total short-term surface disturbance for well pads would be approximately 1,532 acres.

Following well completion(s), portions of the well pad not needed for production would be reseeded and reclaimed according to specifications of the appropriate surface management agency. Long-term well pad disturbance from the 538 well pads would be reduced to approximately 994 acres following successful interim reclamation.

### **2.4.2.2 Access Road Construction**

Implementation of Alternative C would require the construction of approximately 179 miles of new access roads on the BLM, State, and private land. The majority of the proposed access roads (169 miles) would be paralleled by new pipelines (i.e., co-located roads and pipelines). Where new pipelines are proposed adjacent to new access roads,

a 100-foot wide ROW would initially be needed. Of the 100 feet, on average, about 80 feet would be initially disturbed during road and pipeline construction. The ROW width for a new access road alone (i.e., without co-located pipeline) would be approximately 50 feet. Estimated initial surface disturbance width within the ROW would be approximately 40 feet.

Initial surface disturbance resulting from the construction of new access roads would be approximately 1,689 acres (includes 1,642 acres for co-located proposed access roads and proposed pipelines, 33 acres for proposed access roads along existing pipeline ROWs, and approximately 14 acres for construction of new route in Trail Canyon).

For disturbance calculations, it is assumed that following interim reclamation proposed access roads co-located with pipelines as well as proposed access roads alone would be reduced to a 30-foot wide corridor. Assuming successful interim reclamation, long-term surface disturbance from the 179 miles of access roads would be approximately 651 acres.

Under Alternative C, existing roads would be upgraded to achieve the following objectives:

- Accommodate future road use needs (increased traffic volumes);
- Ensure and improve public safety;
- Allow year-round access for oil and gas operations and improve travel safety;
- Facilitate drainage and reduce erosion and sedimentation;
- Alleviate dust; and
- Prevent stream degradation.

These objectives would be met by upgrading existing roads on Federal land to standards established in the Gold Book (DOI-USDA 2007); the *BLM Manual Figure 9113* (BLM 1985); and in the *Price Field Office's Hydrological Modification Standards for Roads* (Appendix 19 - Draft Price RMP EIS [BLM 2004b]).

As discussed in the BLM roads report, *West Tavaputs Analysis of Selected Roads (Appendix F)*, most of the existing BLM system roads in the WTP Project Area were not constructed to meet the BLM design standards. Nevertheless, in their current condition, the majority of roads could appropriately be labeled as either primitive roads or BLM resource roads. For the purpose of analysis, it is assumed that the average width of existing roads is approximately 14 feet; however, it should be noted that actual road widths, which are dependant upon variables such as current use and topography, vary substantially across the WTP Project Area. In order to accommodate increased traffic anticipated as a result of the project, BBC and other operators would be required to widen and improve many existing roads so that they would meet either a local or collector road standard (see Tentative Road Classifications in **Appendix F**). In accordance with the BLM guidelines, local and collector roads require a minimum travel width of 20 feet. For existing roads that occur on slopes less than 30 percent, it is assumed that increasing the travel width to meet local or collector road standards would require an approximate 15-foot surface disturbance width. For existing roads that occur on slopes greater than 30 percent, it is assumed that increasing the travel width to meet

local or collector road standards would require an approximate 30-foot surface disturbance width.

Actual surface disturbance caused by improving existing roads would vary substantially depending on the site-specific conditions (e.g., existing width, grade, side slopes, and drainage patterns). However, for analysis purposes, the assumptions discussed above have been applied. Thus, if Alternative C were implemented, BBC and other operators would be required to improve approximately 53 miles of existing road. Anticipated short-term disturbance associated with road improvements would be approximately 124 acres. Roads needing improvement are illustrated on **Figure 2.4-1**.

In some instances BBC and other operators would be allowed to reroute roads as an alternative to improving existing roads. Proposed reroutes for the existing dugways from Cottonwood Canyon to Flat Iron Mesa and Peter's Point, the Jack Canyon road, and Horse Bench road are illustrated on **Figure 2.4-1**. If BBC and other operators select to reroute a road segment, the existing road would be closed and reclaimed upon completion of the new road. Anticipated short-term disturbance from road reroutes would be approximately 29 acres.

Prior to upgrading or rerouting a road, BBC and other operators would submit to the BLM for approval appropriate road plans and profiles that would demonstrate that compliance with the established BLM road standards associated with each road classification would be met. Conformance with the BLM road standards could entail improving or rerouting additional road segments beyond those that are illustrated on **Figure 2.4-1**. This decision would be at the discretion of the AO.

With respect to Jack Canyon, if Alternative C were selected, BBC and other operators would be required to submit a plan of development for the proposed wells, roads, and pipelines that would be constructed in the bottom of the canyon prior to improving the existing road or constructing a new road. Improvement of the existing road or construction of new road would likely require authorization of a new ROW. If approved, the new ROW would be gated (i.e., limited to administrative access only).

Where environmental conditions and/or economic considerations make road construction or upgrades to the BLM standards infeasible, BBC and other operators would be required to obtain a waiver to these standards from the AO. A waiver may be granted if BBC and other operators can demonstrate that roads open to the public would not compromise safety and one or more of the following:

- Road construction or improvements would require extensive economic resources;
- Road construction or upgrade to the BLM standards would cause undue or unnecessary degradation to sensitive environmental resources (e.g., visual and wildlife resources); and
- Road construction to the BLM standards would cause environmental harm, erosion, or stream degradation.

Aggregate for road surfacing would be obtained from quarries on State of Utah or private lands or new aggregate borrow areas on Federal land. For new aggregate borrow areas, three approximately 2-acre quarries would be developed at any one time (one

quarry per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point, and Flat Iron), for a total of 6 acres of disturbance due to quarries. Upon completion of road construction or expiration of available aggregate, the quarry areas would be re-contoured and reclaimed. No more than one aggregate borrow area on each of the three primary mesas would be open at any one time.

Additional road construction guidelines are provided in **Section 2.1**, Details Common to All Alternatives and in **Appendix F**.

### ***Reclamation of Existing Roads***

To partially mitigate the impacts of an increased number of access roads, approximately 19 miles of road within the WTP Project Area would be permanently closed and reclaimed (including approximately 6 miles in crucial sage-grouse winter habitat).

In general, roads that are redundant, create an unnecessary loop, or are determined to unnecessarily compromise sensitive natural and cultural resources would be reclaimed.

An inventory of roads within the WTP Project Area, including those roads that could possibly be reclaimed, is depicted on **Figure 2.4-1**. Additional roads could be reclaimed as determined by the BLM during the APD process. No existing routes would be reclaimed that are the sole access to State trust lands without consultation with the SITLA.

#### **2.4.2.3 Pipeline Construction**

As previously discussed, the majority of the proposed pipelines (169 miles) would be installed adjacent to (i.e., co-located with) the proposed access roads. The construction of co-located pipelines, and produced water/condensate transfer pipelines would not result in additional surface disturbance beyond the 1,642 acres previously disclosed in **Section 2.4.2.2**.

Under Alternative C, approximately 24 miles of pipeline would be installed along existing roads. Short-term disturbance from the construction of pipelines along existing roads would be approximately 115 acres. Following interim reclamation, disturbance from surface-laid pipeline along existing roads would be reduced to 2 acres. Installation of surface-laid cross-country pipelines would initially disturb approximately 48 acres, and would be reduced to 2 acres of long-term disturbance following interim reclamation. Each pipeline ROW could include up to two gas pipelines (both low and high pressure systems) as well as produced water and condensate transfer pipelines.

In accordance with WO IM-2007-021 (Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way), under Alternative C, the BLM would require the burial of proposed pipelines except in limited circumstances where locally established criteria would allow to surface lay the pipe. Surface-laid pipeline would be allowed:

- where very shallow topsoil occurs over bedrock (5-20 inches);
- where the pipeline does not follow an access road (cross-country);
- over cliffs where there is no other viable route available; and/or

- in sensitive areas as determined during the onsite process.

A determination as to whether one or more of these exceptions apply would be made on a site-specific basis. In the circumstances where the operator proposes to construct a new pipeline adjacent to an existing surface pipeline, the proposed pipeline and existing pipeline would be buried subject to the exception criteria listed above.

A Geographic Information System-based (GIS) analysis was conducted to determine the amount of pipeline that could potentially be surface-laid. If Alternative C were implemented, approximately 62 percent of pipelines would be buried and 38 percent would be surface-laid. GIS-based estimates were calculated by using the depth classification and slope of various soil types within the WTP Project Area.

Buried pipelines would be installed using one of two general construction sequences, as described below.

In areas where sufficient soil is present such that blasting would not be required, the following techniques would be employed to bury pipelines:

- A brush-hog would be used to remove shrubs and small trees from the ROW. Topsoil removal would not occur except directly over the trench.
- A trench approximately 4 feet deep would be excavated using a track hoe and the soil stockpiled to one side, making sure the topsoil and spoil do not mix together.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench.
- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

In areas where compacted sandstone or bedrock exists, the following techniques would be employed to bury pipelines:

- A brush-hog would be used to remove shrubs and small trees from the ROW. Topsoil removal would not occur except directly over the trench.
- In most areas where pipelines would be buried, chain trenchers and/or rocks saws (also known as wheel or disc trenchers) would be used to excavate trenches.
- In areas where blasting is required in order to excavate pipeline trenches, the following techniques would be used (e.g., on slopes or other areas where use of chain trenchers and/or rock saws are not feasible):
  - A track hoe-mounted air drill would drill detonation holes at an interval of approximately every 4 feet along the trench route to be blasted.

- A granular explosive would be placed in the holes with primers and then wired together for detonation.
- As needed, roads along areas to be blasted may be temporarily closed for safety purposes.
- The charges would be detonated in accordance with relevant safety regulations.
- Following excavation of the pipeline trenches (whether by chain trencher and/or rock saw or detonation), a track hoe and bulldozer would be used to remove debris from the trench.
- Spoil would be used to pad the bottom of the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

Where surface-laid pipelines are approved, ROW stipulations would include painting to match the surrounding environment, bonding, and a strict liability clause. Surface pipelines adjacent to roads would be assembled on the roadway or construction ROW, lifted, and placed in the existing vegetation using a side-boom. Pipeline markers would be strategically placed at intervals along all buried and surface pipelines.

Additional information on the construction of pipelines is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.4.2.4 Storage Areas and Project Supplies**

Under Alternative C, BBC and other operators would construct up to three approximately 5-acre equipment storage locations (one per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point and Flat Iron), which would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, CO<sub>2</sub> tanks, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figure 2.4-1**).

To reduce oil and gas traffic in the canyon bottoms during hours of higher public use, routine deliveries of drilling and completion supplies to these storage areas would be limited to hours of low use (7:00 PM to 10:00 AM) between May 16<sup>th</sup> and November 1<sup>st</sup>. BBC and other operators would also avoid rig mobilization and transportation of routine drilling and completion supplies on weekends and holidays.

Additional information on equipment storage areas is provided in **Section 2.1**, Details Common to All Alternatives.

**2.4.3 Drilling**

As previously mentioned, under Alternative C, in order to reduce the impacts of transportation, a maximum of six rigs would operate in the WTP Project Area at one time. Of the six rigs, only two would operate during the winter season (November 1 – May 15), and the remaining four rigs would operate on a seasonal basis.

During the first 3 years of development, the number of rigs would be distributed among BBC and other operators as shown in **Table 2.4.1**. As the other operators fully develop their resources and drill their proposed wells, those rigs would become available for use by BBC. By year 4, BBC would likely be operating between two and six rigs within the WTP Project Area. During year 6 BBC would likely decrease the number of rigs operating within the WTP Project Area to between two and four rigs.

Under Alternative C, closed-loop drilling would be employed in sensitive areas such as locations proposed within or near 100-year floodplains<sup>13</sup> or drainages, near cultural resource or archaeological sites, and in the WSAs. The designation of a proposed location as a sensitive location requiring closed-loop drilling would generally be determined on a site-specific basis during the APD process.

Additional information on drilling is contained in **Section 2.1**, Details Common to All Alternatives.

Year	Number of Rigs			Number of Wells	
	BBC	Other operators*	Total	Annual	Total
1	3	3	2-6	62	62
2	3	3	2-6	62	124
3	4	2	2-6	62	186
4	4	2	2-6	62	248
5	5	1	2-6	62	310
6	5	1	2-6	62	372
7	4	0	2-4	52	424
8	4	0	2-4	52	476
9	4	0	2-4	52	528
10	4	0	2-4	52	580
11	4	0	2-4	52	632
12	4	0	2-4	52	684
13	4	0	2-4	52	736

<sup>13</sup> Environmental protection measures would be applied to all 100-year floodplains, as requested by the USFWS. However, it should be noted that 100-year floodplains have not yet been mapped for the Price Field Office or the WTP Project Area. Therefore, within the affected environment and environmental consequences sections floodplains refer to those areas that coincide with the Quaternary alluvium as depicted in **Figure 3.2-1**.

Year	Number of Rigs			Number of Wells	
	BBC	Other operators*	Total	Annual	Total
14	4	0	2-4	52	788
15	4	0	2-4	19	807

\*For the purpose of analysis, it is assumed that winter wildlife restrictions would limit BBC and other operators' drilling activities to approximately 4 months per year (6.5-month restrictions plus an additional 6 weeks to allow time for activities such as completion and rig mobilization). Assuming that the other operators have drilling capabilities similar to BBC, it can be assumed that they would drill six wells per year during 4 months of operation.

## 2.4.4 Completion

Information on completion is provided in **Section 2.1**, Details Common to All Alternatives.

## 2.4.5 Interim Reclamation

Information on interim reclamation is provided in **Section 2.1**, Details Common to All Alternatives.

## 2.4.6 Production and Maintenance

### 2.4.6.1 Production

Information on production is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.4.6.2 Compressor Stations

Under Alternative C, up to two new 6,400-hp and one new 11,200-hp compressor stations would be constructed (see conceptual compressor station locations on **Figure 2.4-1**). Including the existing and expected compression at the Dry Canyon Compressor Facility and new compression at proposed stations, total compression within the WTP Project Area would be approximately 40,000 hp. Actual horsepower requirements would depend on the production of the proposed wells.

Each new compressor station would occupy an approximate 5-acre site, resulting in up to 15 acres of new disturbance for compressor stations.

Additional information on compressor stations is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.4.6.3 Produced Water Management

Under Alternative C, up to three water management facilities and six SWD wells could be constructed within the WTP Project Area. Surface disturbance from three water management facilities would be approximately 15 acres. Surface disturbance from construction and drilling of the SWD wells would equal surface disturbance due to the

construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.4-5**.

The exact number of SWD wells would depend upon the operators' ability to obtain the necessary permits and produced water volumes. Salt water disposal wells would be drilled to non-producing, non-potable water-bearing formations that are capable of accepting water. Exact locations of SWD wells are not yet known. However, conceptual locations for six SWD wells are illustrated on **Figure 2.4-1**.

Produced water not reused or injected into SWD wells would be disposed of at the proposed water management facilities.

Under Alternative C, produced water would be transported to the proposed SWD wells or water management facilities via pipeline where feasible if not limited by topographic constraints. For the purposes of calculating traffic reduction, it is assumed that all produced water would be piped to disposal sites within the WTP Project Area.

Additional information on produced water management, including details on SWD wells, water management facilities, and pump stations, is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.4.6.4 Workovers**

Information on workovers is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.4.6.5 Road Maintenance**

BBC and other operators would be required to maintain transportation corridors, which they construct or use, to the standards specified in their use authorization, and in accordance with road standards established in the *BLM/U.S. Forest Service (USFS) publication Surface Operating Standards for Oil and Gas Exploration and Development – The Gold Book (Fourth Edition)* (DOI-USDA 2007); *BLM Manual 9113- Roads*; and Appendix 19 of the *Price Field Office's Hydrological Modification Standards for Roads* (BLM 2004a). These standards are discussed in detail within **Appendix F – West Tavaputs Plateau Natural Gas Full Field Development Transportation Plan**.

Additional information on road maintenance is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.4.7 Final Reclamation and Abandonment**

Information on final reclamation and abandonment is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.4.8 Water Use and Water Sources**

Under Alternative C, drilling and completion would require an average of approximately 2.0 acre-feet of water per shallow well and 3.5 acre-feet of water per deep well. As approximately 90 percent of the proposed wells would be shallow wells, water volume calculations are based on water needs for shallow wells. Thus, assuming 62 shallow wells would be drilled and completed during the peak year of development,

approximately 124 acre-feet (962,037 bbl) would be used for drilling and completion activities.

As shown in **Table 2.4.1**, drilling and completion activities would gradually decline during the approximately 15-year development phase. Thus, assuming that BBC and other operators would drill and complete an average of 54 wells per year over a 15-year period, approximately 108 acre-feet/year (837,903 bbl/year) would be used annually for drilling and completion activities.

Estimates of annual water use for dust suppression are based on 10 dust abatement trips per day using 4,200-gallon trucks for 100 days per year, or 12.8 acre-feet/year (99,307 bbl/year). An additional 10 dust abatement trips per rig move could be required when moving drill rigs. Assuming 62 wells per year would be drilled and completed during the peak year development, an additional 8 acre-feet/year (62,066 bbl) would be used for rig moves. Therefore, estimated annual water use for dust suppression would be approximately 20.8 acre-feet/year (161,374 bbl/year).

Assuming that BBC and other operators would drill and complete an average of 54 wells per year over a 15-year development phase, average annual water use for dust suppression would be approximately 21.4 acre-feet/year (153,305 bbl/year).

In summary, the total water use for drilling, completion, and dust suppression during the peak year of development would be approximately 144.8 acre-feet (1,123,411 bbl). Average annual water use for drilling, completion, and dust suppression over an approximately 15-year development phase would be approximately 129.4 acre-feet/year (1,003,932 bbl/year).

Under Alternative C, it is assumed that there would be a maximum of two water supply wells on each of the three primary mesas (i.e., Prickly Pear, Peter's Point and Flat Iron) in the WTP Project Area for a total of six new water wells. New water supply wells would be sited on well pads, and locations are conceptually illustrated on **Figure 2.4-1**. Surface disturbance from construction and drilling of the water supply wells would equal surface disturbance associated with the construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.4-5**.

## **2.4.9 Hazardous Materials and Solid Waste**

Information on hazardous materials and solid waste handling is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.4.10 Workforce and Worker Housing**

Under Alternative C, a maximum of three 10-acre locations would be needed for temporary worker housing. Each temporary housing location would generally include up to fifteen 60-foot by 15-foot sleeping trailers, a kitchen, a recreational facility, portable toilets, trash containers, generators, and fresh water tanks. Each location would be capable of housing approximately 100 personnel. The facility layout for temporary worker housing locations would be highly site-dependant. Temporary housing within the WTP Project Area could be used on a year-round basis.

Because the majority of the development is proposed on top of the mesas, temporary worker housing sites are conceptually located on top of Prickly Pear Mesa, Peter's Point Mesa, and Flat Iron Mesa, respectively (see conceptual locations illustrated on **Figure 2.4-1**).

Additional information on workforce and worker housing is also provided in **Section 2.1**, Details Common to All Alternatives.

### **2.4.11 Access and Traffic**

Access and traffic under Alternative C are discussed in the following sections.

#### **2.4.11.1 Access Restrictions**

##### ***Alternative Access Routes***

Under Alternative C, BBC and other operators would be required to construct a new access route through Trail Canyon. Trail Canyon is located directly north of Harmon Canyon, which serves as the primary access route to Prickly Pear Mesa. From State Road (SR)/US 40/191, the proposed Trail Canyon route would be accessed via Gate Canyon to the existing Rye Patch Road (approximately 3.5 miles north of the Gate Canyon/Nine Mile Canyon intersection). A conceptual location of this alternative access route is shown on **Figure 2.4-1**. Construction and use of a new route in Trail Canyon would reduce the total amount of industrial traffic in Nine Mile Canyon by approximately 22 percent. It would also substantially reduce project-related traffic on the stretch of road in Nine Mile Canyon between Gate and Harmon Canyons.

##### ***Year-Round Restrictions***

As illustrated on **Figure 2.4-1**, under Alternative C, all proposed roads longer than 2 miles would be gated and closed to the public year-round. In addition, all roads that provide access to proposed well locations within the Jack Canyon and Desolation Canyon WSAs and the road to Horse Bench would be gated. Use of these roads would be limited to those with administrative access. In addition to the BLM and permitted oil and gas operators, other groups or individuals that may need winter access, and qualify for administrative access include Carbon County emergency services, grazing allottees, and SITLA, its permittees, grantees, and successors-in-interest.

Based upon this criterion, 13 gates would be located on non-WSA land within the WTP Project Area. Through the use of these 13 gates, access to approximately 92 miles of proposed roads would be closed to the general public. In addition, approximately 28.4 miles of existing roads (predominately on Horse Bench and in Jack Canyon) would be closed to the general public. An additional 6 gates would limit access to approximately 11 miles of proposed roads within the WSAs.

In total, approximately 103 miles of the 179 miles of proposed road would be closed to the general public. Gate locations would be strategically determined on a site-specific basis. The operators would be required to maintain road closures using gating until the final removal of roads after the life of the project. Conceptual locations for gates are illustrated on **Figure 2.4-1**.

### ***Seasonal Restrictions***

Under Alternative C, gates would be placed at the bottom of Prickly Pear and Harmon Canyon. In addition, a gate would be placed in Cottonwood Canyon below the dugways that provide access to Flat Iron Mesa and Peter's Point. Gates within these three canyons would be used to limit access to the WTP between December 1 and April 15. As previously explained, gates would limit road use to those that have been granted administrative access. The conceptual locations of gates that would be closed on a seasonal basis are illustrated on **Figure 2.4-1**.

In total, approximately 155 miles of existing roads (many of which would not be used for development) and 69 miles of proposed roads within the WTP Project Area would be closed during the winter season. Approximately 34.7 miles of existing roads including (Nine Mile Canyon, Dry Canyon, and portions of Cottonwood Canyon) and 6.3 miles of proposed roads would remain open throughout the year.

### ***Industry Restrictions***

Under Alternative C, oil and gas trailer traffic or vehicles with truck-load capacity larger than 1-ton would be prohibited from using Prickly Pear Road as an access route to or from the Prickly Pear Mesa. In its current condition, Prickly Pear Road does not meet the BLM standards for slope, turn radius, road width, sight distance, or turnouts. Upgrades that would improve the road to a BLM standard capable of handling heavy traffic (as identified in the Gold Book [DOI-USDA 2007]) would likely cause substantial impacts to visual resources.

Engineering and environmental constraints associated with Prickly Pear Road are discussed in detail in **Appendix F**.

#### **2.4.11.2 Traffic Reductions**

##### ***Aerial Transportation of Drilling Workforce***

Under Alternative C, the operators would be required to make use of air travel to reduce employee-related traffic between surrounding municipalities and the WTP Project Area. Upgrades could potentially be made to the existing Peter's Point landing strip by expanding the landing strip to a width of approximately 62 feet and a length of approximately 1 mile. In addition, the operators could install an approximately 100- to 200-hp diesel engine generator, pilot-operated runway lights, and a helicopter landing pad within the upgraded landing strip. On Flat Iron and Prickly Pear Mesas, BBC and other operators would construct new 62-foot wide by 1-mile long landing strips, which would also likely include 100- to 200-hp diesel engine generators, pilot-operated runway lights, and helicopter landing pads within the upgraded landing strips. The exact location for a new airstrip on Prickly Pear Mesa has not yet been determined by the BLM, thus, it is not illustrated on **Figure 2.4-1**.

Aerial transportation of the workforce or supplies would reduce light truck traffic between the WTP Project Area and Vernal by approximately eight round trips per day per drill rig. Assuming that between two and six drill rigs would be operating at all times in the WTP Project Area, light truck traffic would be reduced by 16 to 64 round trips per day. During the development phase the use of aerial transportation would reduce traffic by more than

10 percent. **Table 2.4-2** shows the estimated total traffic that could occur during the LOP.

<b>Table 2.4-2 Traffic Estimates under Alternative C</b>						
<b>Project Phase</b>	<b>Vehicle Type</b>	<b>Average Weight (lbs)</b>	<b>Daily Round Trips per Well/Pad</b>	<b>Total Round Trips per Well/Pad<sup>1</sup></b>	<b>Total Round Trips During Development<sup>2</sup></b>	<b>Total Vehicle Traffic<sup>4</sup></b>
Construction	Haul Trucks	80,000	1	7	3,766	7,532
	Light Trucks	20,000	4	28	15,064	30,128
	<b>Total</b>		<b>5</b>	<b>35</b>	<b>18,830</b>	<b>37,660</b>
Drilling (Vertical wells)	Haul Trucks <sup>5</sup>	80,000	2	26	13,988	27,976
	Logging/Mud Trucks	70,000	0.5	6.5	3,497	6,994
	Water Trucks	60,000	1.5	19.5	10,491	20,982
	Light Trucks	8,000	4	52	27,976	55,952
	<b>Total</b>		<b>8</b>	<b>104</b>	<b>55,952</b>	<b>111,904</b>
Drilling (Directional wells)	Haul Trucks <sup>5</sup>	80,000	2	52	13,988	27,976
	Logging/Mud Trucks	70,000	0.5	13	3,497	6,994
	Water Trucks	60,000	1.5	39	10,491	20,982
	Light Trucks	8,000	4	104	27,976	55,952
	<b>Total</b>		<b>8</b>	<b>208</b>	<b>55,952</b>	<b>111,904</b>
Completion	Semi/Transport/Water/Sand	80,000	7	203	163,821	327,642
	Haul Trucks <sup>5</sup>	80,000	1	29	23,403	46,806
	Light Trucks	8,000	4	116	93,612	187,224
	<b>Total</b>		<b>12</b>	<b>348</b>	<b>280,836</b>	<b>561,672</b>
Reclamation	Haul Trucks	80,000	1	6	4,842	9,684
	Light Trucks	8,000	3	18	14,526	29,052
	<b>Total</b>		<b>4</b>	<b>24</b>	<b>19,368</b>	<b>38,736</b>
Infrastructure Development <sup>3</sup>		NA	NA	NA	<b>73,000</b>	<b>146,000</b>
Total Development Traffic		NA	NA	NA	<b>503,938</b>	<b>1,007,876</b>
Aerial Transportation		NA	NA	NA	<b>-55,952</b>	<b>-111,904</b>
Actual Traffic		NA	NA	NA	<b>447,986</b>	<b>895,972</b>
Total Production Traffic		NA	NA	NA	<b>331,374</b>	<b>662,748</b>
Total Traffic LOP		NA	NA	NA	<b>779,360</b>	<b>1,558,720</b>

<sup>1</sup>Traffic Estimates are based upon an approximately 7-day construction period, 13-day period drilling at vertical locations (shallow wells), 26-day period drilling at direction wells (shallow wells), 29-day completion period, and 6-days reclamation period per well or well pad as a appropriate.

<sup>2</sup>Traffic estimates are based upon approximately 807 gas wells drilled from up to 538 well pads.

<sup>3</sup> Infrastructure development includes approximately 25 vehicles per day for pipeline installation, road construction, compressor station, worker housing construction, etc.

<sup>4</sup>Total vehicle traffic equals number of roundtrips multiplied by two (inbound and outbound traffic).

<sup>5</sup>Haul trucks include drill and completion rigs.

NA = Not available

**Reduced Number of Operating Drill Rigs**

As previously mentioned, under Alternative C, the number of drill rigs operating during the spring, summer, and fall seasons in the WTP Project Area would be limited to six at any one time. During the winter season, the operators would be limited to operating two drill rigs in the WTP Project Area at any one time. **Table 2.4-3** depicts traffic estimates during winter and other seasons during each year of development within the WTP Project Area.

<b>Table 2.4-3 Annual Average Daily Traffic during the Development Phase under Alternative C</b>					
<b>Year</b>	<b>Number of Wells</b>	<b>Total Annual Vehicle Trips</b>	<b>Winter ADT<sup>1</sup></b>	<b>Other ADT</b>	<b>AADT</b>
1	62	68,836	125	261	189
2	62	68,836	125	261	189
3	62	68,836	125	261	189
4	62	68,836	125	261	189
5	62	68,836	125	261	189
6	62	68,836	125	261	189
7	52	57,733	125	196	158
8	52	57,733	125	196	158
9	52	57,733	125	196	158
10	52	57,733	125	196	158
11	52	57,733	125	196	158
12	52	57,733	125	196	158
13	52	57,733	125	196	158
14	52	57,733	125	196	158
15	19	21,095	45	71	58

<sup>1</sup>Winter season is considered December 1 – April 15

**Produced Water/Condensate Transfer Pipelines**

Traffic associated with production and well service would depend on the number of producing wells at any one time and the associated volumes of water and condensate being produced. Where, feasible, under Alternative C, produced water and condensate would be transported via produced water/condensate transfer pipelines from well locations to the nearest SWD well, water management facility, or CTB where production facilities from several wells locations (especially in sensitive areas) would be at a centralized location. Use of centralized production facilities/CTBs would be limited in areas where topography constraints exist. Condensate would be collected by trucks and taken from the centralized tank battery to a processing and treatment facility outside the WTP Project Area.

**Table 2.4-4** illustrates typical pumper traffic and other traffic associated with the collection of condensate over the LOP. Production traffic estimates are based upon the drilling schedule shown in **Table 2.4-1**.

As discussed in **Section 2.1**, the anticipated life of an individual well is approximately 20 years. Thus, as the project reaches its 20<sup>th</sup> year, initial wells would begin the abandonment phase, and production traffic would begin to decrease accordingly.

<b>Year</b>	<b>Approximate Number of Producing Wells</b>	<b>Approximate Round Trips Traffic by Pumpers</b>	<b>Approximate Daily Round Trips for Produced Water Disposal</b>	<b>Approximate Daily Round Trips for Condensate Removal</b>	<b>Approximate Total Daily Round Trips During Production</b>
1	62	2	0	1	3
2	124	5	0	2	7
3	186	7	0	3	10
4	248	9	0	5	14
5	310	12	0	6	17
6	372	14	0	7	21
7	424	16	0	8	24
8	476	18	0	9	27
9	528	20	0	10	30
10	580	22	0	11	33
11	632	24	0	12	36
12	684	26	0	13	38
13	736	28	0	14	41
14	788	30	0	15	44
15	807	30	0	15	45
16	807	30	0	15	45
17	807	30	0	15	45
18	807	30	0	15	45
19	807	30	0	15	45
20	807	30	0	15	45
21	745	28	0	14	42
22	683	26	0	13	38
23	621	23	0	12	35
24	559	21	0	10	31
25	497	19	0	9	28
26	435	16	0	8	24
27	383	14	0	7	22
28	331	12	0	6	19
29	279	10	0	5	16
30	227	9	0	4	13
31	175	7	0	3	10
32	123	5	0	2	7
33	71	3	0	1	4
34	19	1	0	0	1

**2.4.12 Surface Disturbance under Alternative C**

**Surface Disturbance**

Surface disturbance anticipated under Alternative C is shown in **Table 2.4-5**. Short-term surface disturbance impacts would occur during and immediately after the construction, drilling, completion, and testing activities. Total short-term disturbance for well pads, access roads, pipelines, and other surface facilities would equal approximately 3,640 acres. However, as discussed in **Section 2.4**, total unreclaimed surface disturbance allowed under this EIS would be limited to 2,250 acres at any given time.

Portions of the well pads, and access roads and pipeline ROWs, not needed for production operations would be reclaimed within one to two growing seasons following completion of the respective well, access road, or pipeline. Successful reclamation would be expected within approximately a 5-year period, as discussed in **Section 2.1.4**. What remains following successful interim reclamation would be a “long-term” disturbance of approximately 1,839 acres. Long-term disturbance includes the 35 year development and production phases plus the estimated 5 years it would take to successfully abandon and reclaim the well pads, access roads, pipelines, and other surface facilities.

<b>Table 2.4-5 Surface Disturbance Anticipated under Alternative C</b>				
<b>Project Feature</b>	<b>Surface Disturbance Width</b>		<b>Surface Disturbance Acreage<sup>3</sup></b>	
	<b>Short-term (feet)</b>	<b>Long-term (feet)</b>	<b>Short-term (acres)</b>	<b>Long-Term (acres)</b>
Proposed Well Pads (includes gas wells, SWD wells, and water wells)	NA	NA	1,532	994
Proposed Road and Pipeline (co-located)	80	30	1,642	616
Proposed Road (along existing pipeline)	40	30	33	25
Proposed Pipeline along Existing Road	40	0.8	115	2
Cross-country Pipeline <sup>2</sup>	40	0.8	48	2
Proposed Road Reroutes	40	30	29	22
Alternative Access Routes	40	30	14	10
Roads Needing Extensive Improvement (on slopes less than 30 percent)	15	10	69	46
Roads Needing Extensive Improvement (on slopes greater than 30 percent)	30	10	55	18
Equipment Storage Areas	NA	NA	15	15
Pump Stations	NA	NA	2	2
Compressor Stations	NA	NA	15	15

Project Feature	Surface Disturbance Width		Surface Disturbance Acreage <sup>3</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-Term (acres)
Aggregate Borrow Areas (Quarries)	NA	NA	6	6
Water Management Facilities	NA	NA	15	15
Temporary Worker Housing Locations	NA	NA	30	30
Airstrips	70	70	20	20
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>3,640</b>	<b>1,839</b>

<sup>1</sup> It is important to note that the well pads, access roads, pipelines, and other facilities illustrated on **Figures 2.2-1** or **2.4-1** and associated disturbance levels in this table represent a conceptual maximum level of development that would not likely be realized by the actual development. However, for the purposes of conservative impact analysis, all 538 well pad locations and their associated access roads, pipelines, and other surface facilities have been used for surface disturbance calculations.

<sup>2</sup> Potential locations for cross-country pipelines are currently unknown, and would not be decided on until the APD process. Therefore, cross-country pipelines are not illustrated on **Figures 2.2-1** or **2.4-1**. However, surface disturbance for cross-country pipelines is accounted for within **Table 2.4-5**. Cross-country pipelines could total approximately 10 miles and would likely require 40 feet of disturbance within a 50-foot wide construction ROW, hence, the 48-acre initial surface disturbance estimate.

<sup>3</sup> Slight discrepancies due to rounding.

NA = Not Applicable

### 2.4.13 Mitigating Measures

In compliance with the BLM policy, **Table 2.6-7** includes additional environmental BMPs contained in WO IM 2007-021 and the latest version of the Gold Book (DOI-USDA 2007). The BMPs included in the table have been tailored to and would be uniformly applied across the WTP Project Area under Alternatives C. As these mitigation measures are also generally specific to a stage of oil and gas development, the table is subdivided by requirements specific to pre-drilling, construction, drilling, completion, production and maintenance, final reclamation and abandonment. It is important to note that the list of BMPs included in **Table 2.6-7** is not comprehensive; additional BMPs in the Gold Book and available on the BLM's BMP website could be implemented on a site-specific basis.

**Table 2.6-8** contains environmental protection measures and mitigating measures identified by the BLM and its cooperators during preparation of the EIS. Mitigating measures identified in **Table 2.6-8** would be in addition to those mentioned in WO IM 2007-021 and the Gold Book. These mitigation measures are generally specific to individual resources or values within the WTP Project Area. Thus, the measures are subdivided by resources of concern. While the BLM only has the authority to enforce compliance with these measures on Federal lands in the WTP Project Area, it is recommended that other surface management or permitting agencies consider applying the BMPs and environmental protection measures discussed in **Tables 2.6-7** and **2.6-8** to State and private lands.

As previously discussed, some development would occur within the Jack Canyon and Desolation Canyon WSAs. The IMP and Guidelines for Lands Under Wilderness Review (H-8550-1) recognizes valid and existing rights with a provision that efforts be

made to minimize unnecessary or undue degradation to wilderness values (BLM 1995b). Although mitigation measures for construction in WSAs are not explicitly disclosed, numerous mitigation measures for various resource values contained within **Tables 2.6-7** and **2.6-8** would serve to minimize impacts.

## 2.5 ALTERNATIVE D – CONSERVATION ALTERNATIVE

Alternative D, the Conservation Alternative, was developed to respond to public concerns and opposition to oil and gas development and production activity within the Jack Canyon and Desolation Canyon WSAs, the potential Nine Mile Canyon and Desolation Canyon ACECs, and other sensitive areas (e.g., canyon bottoms, Non-WSA lands with wilderness characteristics, crucial wildlife habitat, and high-country watersheds).

Under Alternative D, natural gas development on Federal leases would be implemented in a phased manner through rig number limitations, seasonal restrictions, and surface disturbance restrictions imposed by the BLM.

Under Alternative D, conservation of resources would be accomplished by observing land use plan-developed stipulations field-wide (e.g., adherence to seasonal closures within crucial winter range and high-country watersheds). Conservation of resources under Alternative D would be further enhanced by the following project requirements and limitations:

- NSO by new well pads or other facilities on Federal lands within Jack Canyon and Desolation Canyon WSAs;
- NSO on Federal lands within the Desolation Canyon NHL;
- No leasing of unleased Non-WSA lands with wilderness characteristics;
- NSO on unleased Federal lands within the potential Nine Mile Canyon and Desolation Canyon ACECs, as illustrated in the Conservation Alternative (Alternative C) of the *Draft Price Resource Management Plan and Environmental Impact Statement* (BLM 2004b) and the *Supplemental Information and Analysis to the Price Draft Resource Management Plan/Environmental Impact Statement for Areas of Critical Environmental Concern* (BLM 2006a)<sup>14</sup>;
- As feasible (where to do so would not preclude the development of valid and existing lease rights), NSO on Federal lands within canyon bottoms;
- Allowing administrative access only on Horse Bench Road, Jack Canyon, Jack Ridge, and Cedar Ridge Roads;
- No temporary worker housing locations to reduce potential for worker-related impacts on cultural resources.

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<sup>14</sup>The analysis of no surface occupancy within the proposed ACECs is based upon the Conservation Alternative (Alternative C) of Draft Price Resource Management Plan and Environmental Impact Statement (BLM 2004b) and the Supplemental Information and Analysis to the Price Draft Resource Management Plan/Environmental Impact Statement for Areas of Critical Environmental Concern (Federal Register May 2006), which provides the most conservative protection of the relevant and important values of the proposed ACECs and helps satisfy CEQ requirements to analyze a reasonable range of alternatives as required under CFR 1502.14.

Under Alternative D, it is assumed that BBC and other operators would develop up to 558 natural gas wells from up to 348 well pads over a 21-year period. The anticipated life of an individual well would be approximately 20 years, and the anticipated time it would take for field abandonment and final reclamation is 5 years. Therefore, the anticipated LOP would be approximately 46 years.

Under Alternative D, maximum new annual surface disturbance would be limited to approximately 180 acres per year on Federal land. Total unreclaimed surface disturbance allowed by this EIS would be limited to approximately 1,440 acres at any given time. Acreages would be removed from the total unreclaimed surface disturbance calculations once the site-specific surface disturbance meets successful interim reclamation standards. Assuming successful interim reclamation, the maximum long-term disturbance would be approximately 1,237 acres. Surface disturbance thresholds are described more in **Appendix C**.

## **2.5.1 Construction**

Under the Conservation Alternative, BBC and other operators would develop up to 558 natural gas wells from up to 348 well pads in the WTP Project Area (see **Figure 2.5-1**).

### **2.5.1.1 Well Pad Construction**

Initial surface disturbance resulting from the construction of 348 well pads would be approximately 991 acres.

Following well completion(s), portions of the well pad not needed for production would be reseeded and reclaimed according to specifications of the appropriate surface management agency. Long-term well pad disturbance under the Conservation Alternative would be approximately 643 acres following successful interim reclamation.

### **2.5.1.2 Access Road Construction**

Implementation of the Conservation Alternative would require the construction of up to 127 miles of new access roads on the BLM, State, and private surface. The majority of the proposed access roads (120 miles) would be paralleled by new pipelines (i.e., co-located roads and pipelines). Where new pipelines are proposed adjacent to new access roads, a 100-foot wide ROW would initially be needed. Of the 100 feet, on average, about 80 feet would be disturbed during road and pipeline construction. The ROW width for a new access road alone (i.e., without co-located pipeline) would be approximately 50 feet. The estimated surface disturbance width within the ROW would be approximately 40 feet.

Initial surface disturbance resulting from the construction or improvement of access roads would be up to 1,198 acres (includes 1,168 acres for co-located proposed access roads and proposed pipelines, and 30 acres for proposed access roads along existing pipeline ROW).

Following interim reclamation, long-term surface disturbance from the approximately 127 miles of access roads would be approximately 460 acres.

Under the Conservation Alternative, roads on Federal lands would be upgraded to achieve the following objectives:

- Accommodate future road use needs (increased traffic volumes);
- Ensure and improve public safety;
- Allow year-round access for oil and gas operations and improve travel safety;
- Facilitate drainage and reduce erosion and sedimentation;
- Alleviate dust; and
- Prevent stream degradation.

These objectives would be met by constructing or upgrading roads on Federal land to standards established in the Gold Book (DOI-USDA 2007); the *BLM Manual 9113* (BLM 1985); and in the *Price Field Office's Hydrological Modification Standards for Roads* (Appendix 19 of Draft Price RMP EIS [BLM 2004b]).

As discussed in the BLM roads report (**Appendix F**), most of the existing BLM system roads in the WTP Project Area were not constructed to meet the BLM design standards. Nevertheless, in their current condition, the majority of roads could appropriately be labeled as either primitive roads or the BLM resource roads. For the purpose of analysis, it is assumed that the average width of existing roads is approximately 14 feet; however, it should be noted that actual road widths, which are dependant upon variables such as current use and topography, vary substantially across the WTP Project Area. In order to accommodate increased traffic anticipated as a result of the WTP project, BBC and other operators would be required to widen and improve many existing roads so that they would meet either a local or collector road standard (See Tentative Road Classifications in **Appendix F**). In accordance with the BLM guidelines, local and collector roads require a minimum travel width of 20 feet. For existing roads that occur on slopes less than 30 percent, it is assumed that increasing the travel width to meet local or collector road standards would require an approximate 15-foot surface disturbance width. For existing roads that occur on slopes greater than 30 percent it is assumed that increasing the travel width to meet local or collector road standards would require an approximate 30-foot surface disturbance width.

Actual surface disturbance caused by improving existing roads would vary substantially depending on the site-specific conditions (e.g., existing width, grade, side slopes, and drainage patterns). However, for analysis purposes, the assumptions discussed above have been applied. Thus, if Alternative D were implemented, it is assumed that BBC and other operators would be required to improve approximately 47 miles of road. Estimated short-term surface disturbance from extensive road improvements would be approximately 109 acres. Roads needing extensive improvements are illustrated on **Figure 2.5-1**.

Prior to upgrade, BBC and other operators would submit to the BLM for approval appropriate road plans and profiles that would demonstrate that these objectives would be met. Where environmental conditions and/or economic considerations make road construction or upgrades to the BLM standards infeasible, BBC and other operators would be required to obtain a waiver to these standards from the AO. A waiver could be granted provided BBC and other operators can demonstrate that roads open to the

public would not compromise safety, as well as demonstrate one or more of the following criteria:

- Road construction or improvements would require extensive economic resources;
- Road construction or upgrade to the BLM standards would cause undue or unnecessary degradation to sensitive environmental resources (e.g., visual and wildlife resources);
- Road construction to the BLM standards would cause environmental harm, erosion, or stream degradation.

Conformance with the BLM road standards could entail improving additional road segments beyond those illustrated on **Figure 2.5-1**. This decision would be made by the AO as APDs are submitted.

Aggregate for road surfacing would be obtained from existing quarries on State of Utah lands or new aggregate borrow areas on Federal land.

Additional information on access road construction is also provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.1.3 Pipeline Construction**

Under the Conservation Alternative, it is assumed that all pipelines would be installed on the surface. Approximately 120 miles of pipeline ROW would be installed adjacent to proposed access roads (co-located), and would not result in additional surface disturbance beyond the 1,168 acres previously disclosed in **Section 2.5.1.2**.

Approximately 19 miles of pipeline would be installed along existing roads. Installation of pipeline along existing roads would require an average of 40 feet of disturbance within a 50-foot wide ROW and would result in approximately 94 acres of short-term disturbance. Following interim reclamation, long-term surface disturbance from surface-laid pipeline along existing roads would be reduced to approximately 5 acres. Installation of surface-laid cross-country pipelines would initially disturb approximately 48 acres, and would be reduced to 2 acres of long-term disturbance following interim reclamation.

Additional information on pipeline construction is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.1.4 Storage Areas and Project Supplies**

Under the Conservation Alternative, BBC and other operators would construct up to three approximately 5-acre equipment storage locations (one per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point and Flat Iron), which would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, CO<sub>2</sub> tanks, mud supplies, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figure 2.5-1**).

Additional information on equipment storage areas is provided in **Section 2.1**, Details Common to All Alternatives.

## 2.5.2 Drilling

Prior to publication of the EIS, an independent technical support document was prepared by New Tech Engineering and independently reviewed by the BLM engineers to evaluate the technical and economic limits of directional drilling in the WTP Project Area (see **Appendix H - Directional Drilling Analysis West Tavaputs Plateau**). The directional drilling analysis and report indicates that current technology provides for a maximum horizontal offset of about 3,000 feet within the WTP Project Area. This information suggests that it is feasible to directionally reach bottomhole locations provided the targeted bottom holes are within 3,000 feet of adjacent well pads. In terms of the WTP project, the data suggest that it is possible to reach most of the proposed bottom holes that occur below canyon bottoms by directionally drilling from the canyon rims. Recommendations from the directional drilling report have been incorporated into Alternative D, such that many of the proposed wells that were illustrated under the Proposed Action in canyon bottoms would be directionally drilled.

Under Alternative D, no construction, drilling, and completion activities would occur during the winter season (November 1 – May 15).

As discussed in **Section 2.5.1**, during the first 2 years of development, it is assumed that BBC would operate four drill rigs within the WTP Project Area during the spring, summer, and fall seasons. In addition, other operators would operate three rigs. During the third year of development, drilling activity would likely begin to decline as the other operators fully develop their drilling locations. After approximately 6 years of drilling activity, BBC would likely be the only operator drilling within the WTP Project Area.

Under Alternative D, closed-loop drilling would be employed in sensitive areas such as locations proposed within or near 100-year floodplains or drainages, near cultural resource or archaeological sites, within important wildlife habitats, or in the WSAs. The designation of a proposed location as a sensitive location requiring closed-loop drilling would generally be determined on a site-specific basis during the APD process.

Year	Number of Rigs			Number of Wells	
	BBC	Other operators	Total	Annual	Total
1	4	3	7	40	40
2	4	3	7	40	80
3	4	2	6	34	114
4	4	2	6	34	148
5	4	1	5	28	176
6	4	1	5	28	204
7	4	0	4	24	228
8	4	0	4	24	252
9	4	0	4	24	276
10	4	0	4	24	300

Year	Number of Rigs			Number of Wells	
	BBC	Other operators	Total	Annual	Total
11	4	0	4	24	324
12	4	0	4	24	348
13	4	0	4	24	372
14	4	0	4	24	396
15	4	0	4	24	420
16	4	0	4	24	444
17	4	0	4	24	468
18	4	0	4	24	492
19	4	0	4	24	516
20	4	0	4	24	540
21	3	0	3	18	558

\*For the purpose of analysis, it is assumed that winter wildlife restrictions would limit BBC and other operators' drilling activities to approximately 4 months per year (6.5 month restrictions plus an additional 6 weeks to allow time for activities such as completion and rig mobilization). Assuming that the other operators have drilling capabilities similar to BBC, it can be assumed that they would drill six wells per year during 4 months of operation.

Additional information on drilling is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.3 Completion**

Information on completion is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.4 Interim Reclamation**

Information on interim reclamation is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.5 Production and Maintenance**

Production and maintenance activities and facilities are discussed in the following sections.

#### **2.5.5.1 Production**

Under Alternative D if a well is located in a sensitive area, protective barriers, as determined appropriate during the onsite process, would be installed around the production facilities (including tanks) or they would be moved off site. Additional information on production is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.5.5.2 Compressor Stations**

Under the Conservation Alternative, three compressor stations would be constructed (see conceptual compressor station locations on **Figure 2.5-1**) totaling 20,800 hp. The new compressor stations would occupy approximate 5-acre sites, for a total disturbance

of about 15 acres. Including the existing and expected compression at the Dry Canyon Compressor Facility and new compression at the proposed compressor station, total compression within the WTP Project Area would be approximately 36,800 hp under the Conservation Alternative. Actual horsepower requirements would depend on the production of the proposed wells.

Additional information on compressor stations is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.5.3 Produced Water Management**

Under the Conservation Alternative, as many as three water management facilities and six SWD wells could be constructed within the WTP Project Area, subject to State of Utah Engineer's approval. Surface disturbance from the three water management facilities would be approximately 15 acres. Surface disturbance from construction and drilling of the SWD wells would equal surface disturbance due to the construction of gas well pads.

The exact number of SWD wells would depend upon the operators' ability to obtain the necessary permits and produced water volumes. Salt water disposal wells would be drilled to non-producing, non-potable water-bearing formations that are capable of accepting water. Exact locations of SWD wells are not yet known; however, conceptual locations for four SWD wells are illustrated on **Figure 2.5-1**.

While SWD wells are proposed under the Conservation Alternative, the feasibility of drilling SWD wells in the WTP Project Area is not known at this time. Therefore, for the purpose of disclosing the most conservative water truck traffic estimates, it is assumed that under the Conservation Alternative, 100 percent of the produced water would be trucked to either water management facilities within the WTP Project Area or to commercial disposal sites outside the WTP Project Area.

Additional information on produced water management, including details on SWD wells, water management facilities, and pump stations is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.5.4 Workovers**

Information on workovers is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.5.5 Road Maintenance**

BBC and other operators would be required to maintain transportation corridors, which they construct or use, to the standards specified in their use authorization, and in accordance with road standards established in the *BLM/U.S. Forest Service (USFS) publication Surface Operating Standards for Oil and Gas Exploration and Development – The Gold Book (Fourth Edition)* (DOI-USDA 2007); *BLM Manual 9113- Roads* (BLM 1985); and Appendix 19 of the *Price Field Office's Hydrological Modification Standards for Roads* (BLM 2004a). These standards are discussed in detail within **Appendix F – West Tavaputs Plateau Natural Gas Full Field Development Transportation Plan**.

Additional information on road maintenance is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.6 Final Reclamation and Abandonment**

Information on final reclamation and abandonment is provided in **Section 2.1**, Details Common to All Alternatives.

### **2.5.7 Water Use and Water Sources**

Under the Conservation Alternative, drilling and completion would require an average of approximately 2.0 acre-feet of water per shallow well and 3.5 acre-feet of water per deep well. Because approximately 90 percent of the proposed wells would be shallow wells, water volume calculations are based on water needs for shallow wells. As shown in **Table 2.5-1**, during the first/peak year of development it is assumed that BBC and other operators would drill and complete approximately 40 wells. Thus, assuming an average of 2.0 acre-feet of water per shallow well, 80.0 acre-feet (620,669. bbl) of water would be used for drilling and completion activities during the peak year of development.

Drilling and completion activities would decline during the remainder of the approximately 20-year development phase. Thus, assuming that BBC and other operators would drill and complete an average of 26 wells per year over a 20-year period, approximately 52 acre-feet/year (403,435 bbl/year) would be used annually for drilling and completion activities under the Conservation Alternative.

Estimates of annual water use for dust suppression are based on 10 dust abatement trips per day using 4,200-gallon trucks for 100 days per year, or 12.8 acre-feet/year (99,307 bbl/year). An additional 10 dust abatement trips per rig move could be required when moving drill rigs. Assuming that BBC and other operators would drill and complete approximately 40 wells during the first/peak year of development, an additional 5.2 acre-feet/year (40,343 bbl/year) would be used for rig moves. Therefore, estimated water use for dust suppression during the peak year of development would be approximately 18 acre-feet (139,650 bbl).

Assuming that BBC and other operators would drill and complete an average of 26 wells per year over a 20-year development phase, average annual water use for dust suppression would be approximately 16.2 acre-feet/year (125,685 bbl/year).

In summary, the total annual water use for drilling, completion, and dust suppression during peak development would be approximately 98 acre-feet/year (760,320 bbl/year). Average annual water use for drilling, completion, and dust suppression over an approximately 20-year development phase would be approximately 68 acre-feet/year (527,568 bbl/year).

### **2.5.8 Hazardous Materials and Solid Waste**

Information on hazardous materials and solid waste handling is provided in **Section 2.1**, Details Common to All Alternatives.

## 2.5.9 Workforce and Worker Housing

Information on workforce needs is provided in **Section 2.1**, Details Common to All Alternatives.

As previously discussed, under the Conservation Alternative there would be no temporary worker housing locations to reduce potential for worker-related impacts (e.g., loss or damage) to cultural resources.

### 2.5.10 Access and Traffic

As illustrated on **Figure 2.5-1**, under Alternative D, Horse Bench, Jack Canyon, Jack Ridge, and Cedar Ridge roads would be gated. Use of these roads would be limited to those with administrative access. In addition to the BLM, permitted oil and gas operators, Carbon County emergency services, grazing allottees, and SITLA, its permittees, grantees, and successors-in-interest may be provided access.

Administrative closure of the four roads mentioned above, would limit motorized access on approximately 41 miles of existing road in the WTP Project Area. The purpose of gating these particular roads would be to minimize traffic related impacts in these areas. Each of these roads is adjacent or provides access to Federal lands that have important wilderness characteristics, and/or recreational, cultural, and biological values.

Under the Conservation Alternative, the operators would be encouraged to make use of air travel to reduce employee-related traffic between surrounding municipalities and the WTP Project Area<sup>15</sup>. Upgrades could potentially be made to the existing Peter's Point landing strip by expanding the landing strip to a width of approximately 62 feet and a length of approximately 1 mile. In addition, the operators could install an approximately 100- to 200-hp diesel engine generator, pilot-operated runway lights, and a helicopter landing pad within the upgraded landing strip. On Flat Iron and Prickly Pear Mesas, BBC and other operators could construct new 62-foot wide by 1-mile long landing strips, which would also likely include 100- to 200-hp diesel engine generators, pilot-operated runway lights, and helicopter landing pads within the upgraded landing strips. The exact location for a new airstrip on Prickly Pear Mesa has not yet been determined by the BLM, thus, it is not illustrated on **Figure 2.5-1**.

Air travel to and from the WTP Project Area has the potential to substantially reduce daily traffic volumes that could occur during the construction, drilling, and completion phases. Under the Conservation Alternative, air travel would be encouraged but not enforced. Thus, for the purposes of providing the most conservative analysis, it is assumed that the majority of workers would use vehicles to commute to and from the WTP Project Area. The traffic tables below reflect this conservative assumption.

Improvement or construction of landing strips in the WTP Project Area would require approximately a 70-foot wide construction ROW. Total disturbance from improvements of existing landing strips and construction of a new landing strip would be approximately 20 acres.

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<sup>15</sup> Upgrades to or use of the Interplanetary airstrip for project-related activities would be prohibited.

**Table 2.5-2** shows the total traffic that could occur during the LOP. Actual traffic volumes would vary depending on the specific operations that might be underway. For example, traffic for completing an individual well would average 11 round trips per day but on any single day might require 22 round trips between the WTP Project Area and nearby cities and towns.

<b>Table 2.5-2 Traffic Estimates for Development under Alternative D</b>						
<b>Project Phase</b>	<b>Vehicle Type</b>	<b>Average Weight (lbs)</b>	<b>Daily Round Trips per Well/Pad</b>	<b>Total Round Trips per Well/Pad<sup>1</sup></b>	<b>Total Round Trips During Development<sup>2</sup></b>	<b>Total Traffic<sup>4</sup></b>
Construction (Well Pad and Access Road)	Haul Trucks	80,000	1	7	2,436	4,872
	Light Trucks	20,000	4	28	9,744	19,488
	<b>Total</b>		<b>5</b>	<b>35</b>	<b>12,180</b>	<b>24,360</b>
Drilling (Vertical wells)	Haul Trucks <sup>5</sup>	80,000	2	26	9,048	18,096
	Logging/Mud Trucks	70,000	0.5	6.5	2,262	4,524
	Water Trucks	60,000	1.5	19.5	6,786	13,572
	Light Trucks <sup>4</sup>	8,000	4	52	18,096	36,192
	<b>Total</b>		<b>8</b>	<b>104</b>	<b>36,192</b>	<b>72,384</b>
Drilling (Directional wells)	Haul Trucks <sup>5</sup>	80,000	2	52	10,920	21,840
	Logging/Mud Trucks	70,000	0.5	13	2,730	5,460
	Water Trucks	60,000	1.5	39	8,190	16,380
	Light Trucks <sup>4</sup>	8,000	4	104	21,840	43,680
	<b>Total</b>		<b>8</b>	<b>208</b>	<b>43,680</b>	<b>87,360</b>
Completion	Semi/Transport/Water/Sand	80,000	7	203	13,274	26,548
	Haul Trucks <sup>5</sup>	80,000	1	29	16,182	32,364
	Light Trucks	8,000	4	116	64,728	129,456
	<b>Total</b>		<b>12</b>	<b>348</b>	<b>194,184</b>	<b>388,368</b>
Reclamation	Haul Trucks	80,000	1	6	3,348	6,696
	Light Trucks	8,000	3	18	10,044	20,088
	<b>Total</b>		<b>4</b>	<b>24</b>	<b>13,392</b>	<b>26,784</b>
Infrastructure Development <sup>3</sup>		NA	NA	NA	<b>50,370</b>	<b>100,740</b>
Total Development Traffic		NA	NA	NA	<b>349,998</b>	<b>699,996</b>
Total Production Traffic		NA	NA	NA	<b>668,292</b>	<b>1,336,584</b>
Total Traffic LOP		NA	NA	NA	<b>1,018,290</b>	<b>2,036,580</b>

<sup>1</sup>Traffic estimates are based upon an approximately 7-day construction period, 13-day period drilling at vertical locations (shallow wells), 26-day period drilling at direction wells (shallow wells), 29-day completion period, and 6-days reclamation period per well or well pad as appropriate.

<sup>2</sup>Traffic estimates are based upon approximately 807 gas wells drilled from up to 538 well pads.

<sup>3</sup> Infrastructure development includes approximately 25 vehicles per day for pipeline installation, road construction, compressor station, worker housing construction, etc.

<sup>4</sup>Total vehicle traffic equals number of round trips multiplied by two (inbound and outbound traffic).

<sup>5</sup>Haul trucks include drill and completion rigs.

NA = Not Available

**Table 2.5-3** includes approximations of AADT associated with each year of development. Traffic volumes would be highest during the first 2 years of development and would likely decline relative to development decline.

Year	Number of Wells	Total Annual Vehicle Trips	ADT
1	40	50,179	300
2	40	50,179	300
3	34	42,652	255
4	34	42,652	255
5	28	35,125	210
6	28	35,125	210
7	24	30,107	180
8	24	30,107	180
9	24	30,107	180
10	24	30,107	180
11	24	30,107	180
12	24	30,107	180
13	24	30,107	180
14	24	30,107	180
15	24	30,107	180
16	24	30,107	180
17	24	30,107	180
18	24	30,107	180
19	24	30,107	180
20	24	30,107	180
21	18	22,581	135

**Table 2.5-4** illustrates typical pumper traffic, and traffic associated with the collection of produced water and condensate during the production phase. Production traffic estimates are based upon the drilling schedule discussed in **Table 2.5-1**.

As discussed in **Section 2.1**, the anticipated life of an individual well is approximately 20 years. Thus, as the project reaches its 20<sup>th</sup> year, initial wells would begin the abandonment phase, and production traffic would begin to decrease accordingly.

Year	Approximate Number of Producing Wells	Approximate Round Trips Traffic by Pumpers <sup>1</sup>	Approximate Daily Round Trips for Produced Water Disposal	Approximate Daily Round Trips for Condensate Removal	Approximate Total Daily Round Trips During Production
1	40	2	4	1	6
2	80	3	8	2	13
3	114	4	11	2	18

<b>Year</b>	<b>Approximate Number of Producing Wells</b>	<b>Approximate Round Trips Traffic by Pumpers<sup>1</sup></b>	<b>Approximate Daily Round Trips for Produced Water Disposal</b>	<b>Approximate Daily Round Trips for Condensate Removal</b>	<b>Approximate Total Daily Round Trips During Production</b>
4	148	6	15	3	23
5	176	7	18	3	28
6	204	8	20	4	32
7	228	9	23	4	36
8	252	9	25	5	39
9	276	10	28	5	43
10	300	11	30	6	47
11	324	12	32	6	51
12	348	13	35	7	54
13	372	14	37	7	58
14	396	15	40	7	62
15	420	16	42	8	66
16	444	17	44	8	69
17	468	18	47	9	73
18	492	18	49	9	77
19	516	19	52	10	81
20	540	20	54	10	84
21	558	21	56	10	87
22	518	19	52	10	81
23	478	18	48	9	75
24	444	17	44	8	69
25	410	15	41	8	64
26	382	14	38	7	60
27	354	13	35	7	55
28	330	12	33	6	52
29	306	11	31	6	48
30	282	11	28	5	44
31	258	10	26	5	40
32	234	9	23	4	37
33	210	8	21	4	33
34	186	7	19	3	29
35	162	6	16	3	25
36	138	5	14	3	22
37	114	4	11	2	18
38	90	3	9	2	14
39	66	2	7	1	10
40	42	2	4	1	7
41	18	1	2	0	3

<sup>1</sup>This table assumes that pumpers would visit approximately 75 percent of producing wells on a daily basis and that an individual pumper could service approximately 20 wells each day. The table also assumes that an average of 8 bbl of water and 1.5 bbl of condensate would be produced per day per well.

### 2.5.11 Surface Disturbance under the Conservation Alternative

Surface disturbance anticipated under the Conservation Alternative is shown in **Table 2.5-5**. Short-term surface disturbance impacts would occur during and immediately after construction, drilling, completion, and testing activities. Total short-term disturbance for well pads, access roads, pipelines, and other surface facilities would equal approximately 2,510 acres. However, as discussed in **Section 2.5**, total unreclaimed surface disturbance would be limited to 1,440 acres at any given time.

Project Feature	Surface Disturbance Width		Surface Disturbance Acreage <sup>3</sup>	
	Short-term (feet)	Long-term (feet)	Short-term (acres)	Long-Term (acres)
Proposed Well Pads (includes gas wells, SWD wells, and water wells)	NA	NA	990	643
Proposed Road and Pipeline (co-located)	80	30	1,168	438
Proposed Road	40	30	30	22
Proposed Pipeline along Existing Road	40	2	94	5
Cross-country Pipeline <sup>2</sup>	40	2	48	2
Roads Needing Extensive Improvement (on slopes greater than 30 percent)	30	10	49	16
Roads Needing Extensive Improvement (on slopes less than 30 percent)	15	10	60	40
Equipment Storage Areas	NA	NA	15	15
Compressor Stations	NA	NA	15	15
Aggregate Borrow Areas (Quarries)	NA	NA	4	4
Water Management Facilities	NA	NA	15	15
Pump Stations	NA	NA	2	2
Airstrips	NA	NA	20	20
<b>Total</b>	<b>NA</b>	<b>NA</b>	<b>2,510</b>	<b>1,237</b>

<sup>1</sup> It is important to note that the well pads, access roads, pipelines, and other facilities illustrated on **Figure 2.5-1** and associated disturbance levels in this table represent a conceptual maximum level of development that would not likely be realized by the actual development.

<sup>2</sup> Potential locations for cross-country pipelines are currently unknown, and would not be decided on until the APD process. Therefore, cross-country pipelines are not illustrated on **Figure 2.5-1**. However, surface disturbance for cross-country pipelines is accounted for within **Table 2.5-5**. Cross-country pipelines could total approximately 10 miles and would likely require disturbance of 40 feet within a 50-foot wide construction ROW, hence, the 48-acre initial surface disturbance estimate.

<sup>3</sup> Minor discrepancies due to rounding.

NA = Not Applicable

Portions of the well pads, access roads, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons following completion of the respective well, access road, or pipeline. Successful reclamation, as discussed in **Section 2.1.4**, would be expected within an approximate 5-

year period. What would remain following successful interim reclamation would be a “long-term” disturbance of approximately 1,237 acres. Long-term disturbance includes the 20-year production life of an individual well plus the 5 years it would take to successfully abandon and reclaim the well pads, access roads, pipeline ROWs, and other surface facilities.

### **2.5.12 Mitigating Measures**

In compliance with the BLM policy, **Table 2.6-7** includes additional environmental BMPs contained in WO IM 2007-021 and the latest version of the Gold Book (DOI-USDA 2007). The BMPs included in the table have been tailored to and would be uniformly applied across the WTP Project Area under Alternative D. As these mitigation measures are also generally specific to a stage of oil and gas development, the table is subdivided by requirements specific to pre-drilling, construction, drilling, completion, production and maintenance, final reclamation and abandonment. It is important to note that the list of BMPs included in **Table 2.6.7** is not comprehensive; additional BMPs in the Gold Book and available on the BLM’s BMP website could be implemented on a site-specific basis.

**Table 2.6-8** contains environmental protection measures and mitigating measures identified by the BLM and its cooperators during preparation of the EIS. Mitigating measures identified in **Table 2.6-8** would be in addition to those mentioned in WO IM 2007-021 and the Gold Book. These mitigation measures are generally specific to individual resources or values within the WTP Project Area. Thus, the measures are subdivided by resources of concern. While the BLM only has the authority to enforce compliance with these measures on Federal lands in the WTP Project Area, it is recommend that other surface management or permitting agencies consider applying the BMPs and environmental protection measures discussed in **Tables 2.6-7** and **2.6-8** to State and private lands.

## **2.6 ALTERNATIVE E – AGENCY PREFERRED ALTERNATIVE**

In accordance with CEQ regulation (Figure 1502.14(e)), the BLM is required to identify a preferred alternative in the EIS if one or more exists. The Agency Preferred Alternative is identified so that the public can understand the agency's orientation. For this EIS, the BLM has designated Alternative E as the Agency Preferred Alternative.

### **2.6.1 Introduction**

For the WTP project, the primary objective of the Agency Preferred Alternative is to meet the purpose and need for the project while minimizing or mitigating environmental impacts. These objectives would be accomplished by limiting or phasing new annual surface disturbance and total unreclaimed surface disturbance allowed at any given time, and by incorporating key elements of the Transportation Impact Reduction Alternative, Conservation Alternative, and cultural resource protection measures outlined within the WTP PA. These components of the Agency Preferred Alternative are discussed more in the following paragraphs. Some of the additional mitigation and environmental protection measures included under the Agency Preferred Alternative and **Tables 2.6-7** and **2.6-8** have been voluntarily agreed to by the operators since the publication of the DEIS, and in light of public comments received on the DEIS. As some of these measures go beyond those required by the Approved RMP, regulation, or

statute, and/or are not required under the operator's valid and existing leases, their voluntary agreement to these components of the alternative would enhance the BLM's ability to include the measures as COAs in the ROD.

### **2.6.1.1 Surface Disturbance Thresholds**

Under the Agency Preferred Alternative, BBC and other operators would be limited to approximately 540 acres of annual surface disturbance. In addition, total unreclaimed surface disturbance (i.e., surface disturbance from any project-related feature such as well pads, access roads, pipeline ROWs, compressor stations, pump stations, etc.) at any given time would be limited to approximately 2,310 acres. To accommodate these surface disturbance thresholds, BBC and other operators would be required to initiate interim reclamation measures as soon after development as practicable. Acreages of disturbance would be removed from the unreclaimed surface disturbance totals upon meeting successful interim reclamation standards. Assuming successful interim reclamation, the maximum long-term disturbance (i.e., after all construction, drilling, completion, and interim reclamation activities have been completed) would be approximately 1,678 acres. Surface disturbance thresholds are described more in **Appendix C**.

### **2.6.1.2 Transportation Restrictions**

In addition to limiting annual surface disturbance, which places some constraint on the intensity of development and therefore traffic during peak development, transportation-related impacts would also be reduced by implementation of the following measures:

- Produced water from wells on mesas would be transported via pipeline to SWD wells or water management facilities with limited exceptions (see **Section 2.6.11.3**).
- Use of storage areas would be required for casing material and pipeline material to reduce project-related traffic.
- Prohibited use of Prickly Pear Canyon Road (i.e., from Nine Mile Canyon to the top of Prickly Pear Mesa) by all project-related trailer traffic or vehicles with truck-load capacity of 1-ton or larger.
- Limiting transportation of routine drilling and completion supplies on weekends and holidays.
- Gating all new roads longer than 2 miles after drilling and completion activities are completed in sensitive resource areas.
- Gating all roads that provide access to proposed well locations in the WSAs (i.e., closed to the general public).
- Reclaiming roads that create unnecessary loops, or are determined to unnecessarily compromise sensitive natural and cultural resources, such as in sage-grouse core winter use areas.

### **2.6.1.3 Protective Measures for Sensitive Resource Areas**

In an effort to minimize impacts to sensitive resource areas, the Agency Preferred Alternative also contains several components from Alternative D. The following measures would reduce the impacts of development within WSAs, canyon bottoms, the Desolation Canyon NHL, and the Nine Mile Canyon ACEC.

- As feasible (where to do so would not preclude development of valid and existing lease rights), NSO by new well pads or other facilities on Federal lands within Jack Canyon and Desolation Canyon WSAs;
- NSO on Federal lands within the Desolation Canyon NHL;
- As feasible, NSO on Federal lands within canyon bottoms;
- NSO on unleased Federal lands within the Nine Mile Canyon ACEC, as designated in the Approved Plan of the *Price Field Office Approved Resource Management Plan and Record of Decision* (BLM 2008b).

### **2.6.1.4 Special Protective Measures for Resources in the WTP Project Area**

The special protective measures developed in this alternative are designed to address certain sensitive resource issues, which through land use planning, are subject to special lease stipulations. While other resources subject to lease stipulations are adequately addressed through standards incorporated into all alternatives, these measures are specifically developed to address the WTP Project Area's wildlife and water resources.

It is important to recognize that full field development of natural gas on the WTP Project Area would occur on a patchwork of oil and gas leases. Leases predating the BLM land use planning, issued as early as the 1950s, do not contain resource protection stipulations, while others, issued subsequent to planning, may contain multiple stipulations. Future leases, if approved, would be based on plan revisions currently underway and could be subject to yet a different, though similar, set of stipulations.

Although full field development on this patchwork of oil and gas leases and associated stipulations would present a complex management challenge for the Price Field Office, the BLM believes that special measures are needed to address certain sensitive resource issues. Because these resources are predominant throughout the WTP Project Area, resource protection measures need to be applied consistently, regardless of varying lease terms.

To accommodate this need for consistency, the BLM would, depending on the lease terms, use these special protection measures as criteria by which a waiver or exception of lease stipulations, including those on future leases, may be granted, or as COAs for actions on leases which have no stipulations. Either application of the measures, presented in more detail below, would ensure that sensitive resource issues are sufficiently mitigated throughout the WTP Project Area:

- The BLM would grant a waiver or exception to the lease stipulations in the WTP Project Area on a lease-by-lease basis as specific applications for development on the affected lease are submitted, under the condition that operators comply

with the special protection measures outlined below and carryout wildlife mitigation measures (see **Section 2.6.1.5**). An annual review would be completed by the BLM in coordination with other appropriate agencies to evaluate operator compliance with conditions of waivers or exceptions, resource conditions, and effectiveness of mitigation measures, particularly those addressing wildlife.

- On leases that have no stipulations attached, the special protective measures outlined below would be applied to APDs (and other individual applications) as COAs to ensure sensitive resource impacts present within the WTP Project Area are sufficiently mitigated.

### ***Special Protective Measures for Wildlife***

The special protective measures presented below were developed by the BLM and its cooperating agencies to address the effects of winter development on wildlife. The BLM would evaluate the effectiveness of these measures annually and adaptively adjust their application to optimize opportunities to mitigate these resource issues.

The BLM and its cooperators would conduct an annual review to evaluate operator compliance with conditions of waivers or exceptions, resource conditions, and effectiveness of mitigation measures, particularly those addressing wildlife. While exceptions may be granted in mapped sage-grouse wintering areas using the criteria set forth in the Approved RMP (BLM 2008b) and this FEIS, no exceptions would be granted to seasonal closures in areas that UDWR and the BLM have identified as the core winter-use areas. In other areas, the BLM would apply wildlife mitigation measures consistent with adaptive management practices as necessary to achieve its resource objectives. As part of the review of resource conditions the following information would be considered:

- Annual report on reclaimed versus unreclaimed surface disturbance.
- Range trend studies, including evaluation of phenology, endangered plants, and noxious weeds, would be submitted for review every three years.
- Annual survey results would be submitted on mule deer herd populations while their numbers are below objectives; if population objectives are exceeded, population survey results would be submitted every three years. Annual surveys would supplement those conducted by UDWR as necessary.
- Survey results on elk populations would be submitted every three years while populations exceed their objective numbers; if population numbers are below their objective, surveys would be submitted annually. Annual surveys would supplement those conducted by UDWR as necessary.
- Annual report on sage-grouse winter use monitoring to determine the effectiveness of sage-grouse mitigation and to provide useful information for potentially modifying the winter drilling exceptions through the adaptive management process.

### General Measures

- The operator would be responsible to coordinate with the BLM and appropriate agencies on an annual basis (prior to September 1 of each year) to plan for winter drilling activities.
- All coordination on winter drilling between the appropriate agencies must be completed and all respective APDs must be submitted prior to September 1 each year.
- As part of the annual review and planning process for winter drilling, the BLM and agencies would coordinate with the operators to concentrate the locations of winter drilling activities to limited or confined areas (e.g., on one or two mesas only).

### Measures for Big Game Species

- The following travel restrictions would be adhered to between December 1 and April 15 by all types of vehicles in order to minimize disturbances during periods of major animal movement (6:00-8:00 AM and 5:00-7:00 PM or 6:00-8:00 AM and 6:00-8:00 PM during daylight savings time). These restrictions would be contingent on the presence of elk and deer in the areas.
  - Contractors and vendors for non-critical rig visits would not travel during these periods.
  - Rig shift changes would be adjusted so that they would not coincide with these periods.
  - Normal delivery of drilling supplies would not occur during these periods.
- These restrictions would not apply to vehicles directly involved in casing, cementing, and/or emergency operations necessary to maintain viable hole conditions.
- During snow depths of 16 inches or greater, edges of plowed roads would be opened at intervals of approximately ¼ mile to create wildlife exit points and crossing areas when snow walls develop. Exits would be opened to approximately 15 feet, down to the top of vegetation, and would remain within the ROW.

### Measures for Sage-Grouse

- Disturbance would be minimized in and around core winter use areas through strategic planning for optimal realignment of existing roads and placement of new roads, well pads and other infrastructure, reclaiming old roads, thereby reducing habitat fragmentation (see **Figure 2.6-1**). Strategic planning would include cooperation with the UDWR to determine appropriate locations for road realignments and other surface activities so as to minimize impacts on sage-grouse.
- No surface disturbance would be authorized in core winter use areas until the operator submits a site-specific plan of development for proposed roads, wells, pipelines, reclamation of old roads, and/or other project features that would be constructed within those areas.

- No winter development (i.e., construction, drilling, or completion activities) would be allowed in core winter use areas on Prickly Pear Bench or in the Peters Point area (see **Figure 2.6-1**) December 1 - March 14.
- Construction, drilling, or completion activities would be precluded within two miles of known leks (or new leks which may be located during the life of the project) between March 15 and July 15. In addition, regardless of season, development would be precluded from within ½ mile of known leks.
- Upgrades to or use of the Interplanetary airstrip for project-related activities would be prohibited.

### ***Special Protective Measures for the Water Resources***

The following special protective measures were developed by the BLM and its cooperating agencies to address the effects of development on water resources, including high country watersheds:

- Well pads and access roads within high-country watershed areas (areas above 7,000 feet in elevation) would be fully constructed or upgraded during the period between April 15 and December 1.
- Throughout the WTP Project Area, snow must be removed within 48 hours of cessation of each winter storm producing greater than 4 inches of snowfall; snow removal would occur only on those roads necessary to access wells and production facilities.
- The operators would be required to fund an annual water quality monitoring program as outlined in **Appendix Q**. If samples and monitoring detect or determine any degradation of water quality as a result of the WTP project the BLM would reevaluate the effectiveness of the BMPs and mitigation measures discussed in Tables **2.6-7** and **2.6-8**.

#### **2.6.1.5 Agency Wildlife Mitigation Plan**

The Price Field Office in coordination with the UDWR has developed a Wildlife Mitigation Plan, which outlines proposed mitigation for natural gas full field development in the WTP Project Area. The agencies' mitigation plan, which is a modified version of BBC's Wildlife Mitigation Plan, emphasizes the importance of offsetting, to the extent reasonable, the effects of the full field development in its entirety. The agencies' plan gives priority to compensating for potential effects to greater sage-grouse, deer, raptors, and elk.

The Agency Wildlife Mitigation Plan would require mitigation at a 4:1 acre ratio based on total potential long-term surface disturbance. This ratio generally serves as the limitation on the extent to which operators would be required to mitigate.

Under the Agency Wildlife Mitigation Plan, 30 percent of the total potential long-term surface disturbance (approximately 503 acres under Alternative E) would be mitigated during the first 3 years following a decision to authorize the full field development project. As part of this initial effort, the following measures<sup>16</sup> would be implemented:

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\* Some of the measures proposed by the operators' Wildlife Mitigation Plan not carried forward into the Agency's wildlife

- Habitat improvement and connectivity as described in the operators' plan. This would be implemented at a 4:1 ratio as indicated above.
- Wet meadow/summer range enhancement as described in the operators' plan. Up to six projects would be implemented. Acres enhanced would be counted under the habitat improvement tally at an equal or greater acreage value based on the qualitative benefits of the enhancement as determined appropriate by the WTPMOC.
- The operators would contribute to UDWR for monitoring greater sage-grouse, whether through continued telemetry study or other, more aggressive means of monitoring, if necessary, including experimental designs.

The Agency Wildlife Mitigation Plan would also establish an oversight committee to be led by the BLM, in coordination with UDWR, and other agencies. The WTPMOC would evaluate the implementation and effectiveness of mitigation measures, provide direction on effective means of mitigating planned development activities, and develop adaptive strategies and projects to mitigate beyond the initial 30 percent commitment. All mitigation commitments (i.e., the remaining 70%) under the Agency Wildlife Mitigation Plan would be initiated within one year from completion of drilling operations. The WTPMOC would complete evaluations and make recommendations to the authorized officer on on-going and planned mitigation activities on an annual basis, in advance of considerations for winter activities (as is outlined under Alternative E), and prepare a report on its findings.

Adaptive strategies beyond the initial mitigation effort could include a broad menu of mitigation options. The relative value of the various options would be determined by the WTPMOC such that their value can be applied toward the operators' 4:1 mitigation requirement.

Mitigation options which would be considered by the WTPMOC for implementation of the plan include, but are not limited to, the following actions:

- Additional habitat improvement and connectivity projects. A variety of methods could be used, targeting a range of vegetative communities and habitats, including wet meadow/summer range.
- Continued or more aggressive monitoring of greater sage-grouse, including experimental designs.
- Conversions of grazing allotments around Nine Mile Canyon from domestic sheep to cattle (this could provide for the reintroduction of big horn sheep into Nine Mile Canyon and would help mitigate the loss of bighorn sheep habitats).
- The purchase of conservation easements on private lands.
- Management of private lands for the benefit of wildlife.

The WTPMOC would recognize, within the 4:1 parameter, mitigation activities on Federal, State, and private lands, including those which build upon or complement past

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mitigation plan are incorporated elsewhere in the alternative as general alternative components.

commitments by operators to mitigate activities authorized under previous analyses and associated decisions. However, acreage credit for previous project mitigation activities would not be permitted.

#### **2.6.1.6 WTP Programmatic Agreement**

Under the Agency Preferred Alternative BBC and other operators would be required to fulfill mitigation commitments included in the WTP PA, which has been included as **Appendix T**. The purpose of the WTP PA is to mitigate the adverse effects associated with natural gas development on cultural resources in the APE. An abbreviated description of some of the most important commitments can be found in the sections below.

##### ***Class II Inventory***

Under Alternative E, BBC and other operators would be required to provide funding for a Class II cultural resource inventory not to exceed 3,700 acres, which is approximately 2.5 percent of the project APE. The purpose of the Class II inventory would be to improve cultural resource information in areas where data is currently lacking.

##### ***Cultural Resources Monitoring and Mitigation***

BBC and other operators would be required to provide financial support for a cultural resource monitoring plan. The intent of the plan is to gather information about a sample of sites and then monitor changes to those sites over time. As part of the monitoring plan, a third-party contractor would collect dust samples to determine if dust, generated by industrial traffic, is still being deposited on sites. If the BLM determines that dust is continuing to accumulate on sites, the BLM would mitigate the impacts by 1) requiring conservation treatments; 2) requiring BBC and other operators to implement additional project-related traffic reduction measures; and/or 3) stopping or limiting approval of new APDS and denying or limiting new ROW applications.

##### ***Conservation Treatments***

The operators would have to fund removal of dust from panels that have previously been impacted by oil and gas development in the APE. Prior to removing dust from affected sites, systems for removing dust would be developed and tested by a rock art conservator selected by the BLM.

##### ***Continuing Research***

If the Agency Preferred Alternative were selected, within 6 months of project authorization, BBC and other operators would be required to fund a research project, which looks at whether dust that has settled on rock art is causing physical degradation.

##### ***Expanded Dust Suppression Efforts and Dust Monitoring***

Under this Alternative, BBC and other operators would be required to ensure that dust suppression efforts are expanded to include portions of Nine Mile and Gate Canyon Roads within the APE, which extends beyond the WTP Project Area boundary (see **Figure 3.12-1 Appendix A**). The operators, in coordination with the Nine Mile Canyon

Road Cooperative Board would also be required to identify new dust monitoring methods that would be qualitative, cost effective, and easy to operate.

### ***Personnel Training***

All personnel (including contractors; and new, added, or replaced personnel) would be instructed on site avoidance, site etiquette, and statutes protecting cultural resources prior to working in the WTP Project Area. BBC and other operators would be required to maintain records demonstrating that personnel's training has been carried out.

### ***Visitor Interpretation/ Site Enhancement***

BBC and other operators would be required to fund development of visitor interpretation/enhancement (e.g., parking, walking paths, signage, and/or information kiosks) at 9-11 sites within the WTP Project Area. The purpose of these site enhancements would be to inform and educate visitors of the unique archeological resources in Nine Mile Canyon as well as improve visitor safety.

## **2.6.2 Construction**

As previously discussed, the Agency Preferred Alternative would limit new annual surface disturbance to approximately 540 acres, and total unreclaimed surface disturbance at any given time to approximately 2,310 acres. Provided the operators comply with surface disturbance limitations and other conditions and requirements within this alternative, as well as applicable State and Federal regulations (e.g., State well spacing limitations, Federal NAAQS), no additional limitations would be placed upon the number of well pads, roads, pipelines, or ancillary facilities constructed. However, for the purpose of analysis, it is assumed that BBC and other operators would develop up to 807 natural gas wells from approximately 488 well pads in the WTP Project Area.

### **2.6.2.1 Well Pad Construction**

For the purpose of analysis, it is assumed that initial surface disturbance resulting from the construction of up to 488 well pads would be up to 1,390 acres.

Following well completion(s), portions of the well pad not needed for production would be reseeded and reclaimed according to specifications of the BLM or UDOGM as appropriate. Long-term well pad disturbance from 488 well pads would be reduced to approximately 902 acres following successful interim reclamation.

### **2.6.2.2 Access Road Construction**

Under the Agency Preferred Alternative, it is assumed that BBC and other operators would construct approximately 164 miles of access roads on the BLM, State, and private land to access the proposed well pads.

The majority of the proposed access roads (155 miles) would be paralleled by new pipelines (i.e., co-located roads and pipelines). Where new pipelines are proposed adjacent to new access roads, a 100-foot wide ROW would initially be needed. Of the 100 feet, on average, about 80 feet would be disturbed during road and pipeline construction. The ROW width for a new access road alone (i.e., without co-located

pipeline) would be approximately 50 feet. Estimated surface disturbance width within the ROW would be approximately 40 feet, for a total of approximately 1,545 acres.

For disturbance calculations, it is assumed that following interim reclamation access roads co-located with pipeline as well as access roads alone would be reduced to a 30-foot wide corridor. Assuming successful interim reclamation, long-term surface disturbance from the 164 miles of access roads would be approximately 595 acres.

Under the Agency Preferred Alternative, roads would be upgraded to achieve the following objectives:

- Accommodate future road use needs (increased traffic volumes);
- Ensure public safety;
- Allow year-round access for oil and gas operations;
- Facilitate drainage and reduce erosion and sedimentation;
- Alleviate dust; and
- Prevent stream degradation.

These objectives would be met by constructing or upgrading roads on Federal land to standards established in the Gold Book (DOI-USDA 2007); the *BLM Manual 9113* (BLM 1985); and in the *Price Field Office's Hydrological Modification Standards for Roads* (Appendix 19- Draft Price RMP EIS [BLM 2004b]).

As discussed in the BLM roads report *West Tavaputs Analysis of Selected Roads (Appendix F)*, most of the existing BLM system roads in the WTP Project Area were not constructed to meet the BLM design standards. Nevertheless, in their current condition, the majority of roads could appropriately be labeled as either primitive roads or the BLM resource roads. For the purpose of analysis, it is assumed that the average width of existing roads is approximately 14 feet; however, it should be noted that actual road widths, which are dependant upon variables such as current use and topography, vary substantially across the WTP Project Area. In order to accommodate increased traffic anticipated as a result of the WTP project, BBC and other operators would be required to widen and improve many existing roads so that they would meet either a local or collector road standard (see Tentative Road Classifications in **Appendix F**). In accordance with the BLM guidelines, local and collector roads require a minimum travel width of 20 feet. For existing roads that occur on slopes less than 30 percent, it is assumed that increasing the travel width to meet local or collector road standards would require an approximate 15-foot surface disturbance width. For existing roads that occur on slopes greater than 30 percent it is assumed that increasing the travel width to meet local or collector road standards would require an approximate 30-foot surface disturbance width.

Actual surface disturbance caused by improving existing roads would vary substantially depending on the site-specific conditions (e.g., existing width, grade, side slopes, and drainage patterns). However, for analysis purposes, the assumptions discussed above have been applied. Thus, if Alternative E were implemented, BBC and other operators would be required to implement extensive improvements to approximately 47 miles of roads. Anticipated short-term disturbance associated with extensive road improvements

would be approximately 109 acres. Roads needing extensive improvement are illustrated on **Figure 2.6-1**.

In some instances BBC and other operators would be allowed to reroute roads as an alternative to improving existing roads. Proposed reroutes for the existing dugways from Cottonwood Canyon to Flat Iron Mesa and Peter's Point, Jack Canyon road, and Horse Bench road are illustrated on **Figure 2.6-1**. If BBC and other operators select to reroute a road segment the existing road segment would be closed and reclaimed upon completion of the new road. Anticipated short-term disturbance from road reroutes would be approximately 29 acres.

Prior to upgrading or rerouting a road, BBC and other operators would submit appropriate road plans and profiles that demonstrate compliance with the established BLM road standards associated with each road classification to the BLM for approval. Conformance with the BLM road standards could entail improving or rerouting additional road segments beyond those that are illustrated on **Figure 2.6-1**. This decision would be made by the AO as APDs are submitted.

With respect to the Jack Canyon, should construction within Jack Canyon be determined necessary, BBC and other operators would be required to submit a plan of development for the proposed wells, roads, and pipelines that would be constructed in the bottom of the canyon prior to improving the existing road or constructing a new road. Improvement of the existing road or construction of new road would likely require authorization of a new ROW. If approved, the new road would be gated (i.e., limited administrative access only).

Where environmental conditions and/or economic considerations make road construction or upgrades to the BLM standards infeasible, BBC and other operators would be required to obtain a waiver to these standards from the AO. A waiver could be granted provided BBC and other operators can demonstrate that roads open to the public would not compromise safety, as well as demonstrate one or more of the following criteria:

- Road construction or improvements would require extensive economic resources.
- Road construction or upgrade to the BLM standards would cause undue or unnecessary degradation to sensitive environmental resources (e.g., visual and wildlife resources).
- Road construction to the BLM standards would cause environmental harm through erosion and stream degradation.

Aggregate for road surfacing would be obtained from quarries on State of Utah and private lands or new aggregate borrow areas on the BLM land. For new aggregate borrow areas, three approximately 2-acre quarries would be developed at any one time (one quarry per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point, and Flat Iron), for a total of 6 acres of disturbance due to quarries. Upon completion of road construction or expiration of available aggregate, the quarry areas would be re-contoured and reclaimed. No more than one aggregate borrow area on each of the three primary mesas would be open at any one time.

Additional road construction guidelines are provided in **Section 2.1**, Details Common to All Alternatives and in **Appendix F**.

### 2.6.2.3 Pipeline Construction

Under Alternative E, for the purpose of analysis, it is assumed that the majority of the proposed pipelines (160 miles) would be installed adjacent to (i.e., co-located with) the proposed access roads. The construction of co-located access road, gathering line, and produced water/condensate transfer pipelines would not result in additional surface disturbance beyond the 1,546 acres previously disclosed in **Section 2.6.2.2**.

Under the Agency Preferred Alternative, it is also assumed that BBC and other operators would install approximately 24 miles of pipelines along existing roads. Short-term disturbance from the construction of the pipelines along existing roads would be approximately 115 acres. Following interim reclamation of the buried pipelines, there would be no long-term disturbance. Installation of cross-country pipelines would initially disturb approximately 48 acres, and there would be no long-term disturbance following interim reclamation.

In accordance with WO IM-2007-021 (Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way), under the Agency Preferred Alternative, the BLM would require the burial of proposed pipelines except in limited circumstances where locally established criteria would allow to surface lay the pipe. Surface-laid pipeline would be allowed:

- where very shallow topsoil occurs over bedrock (5-20 inches);
- where the pipeline does not follow an access road (cross-country);
- over cliffs where there is no other viable route available; and/or
- in sensitive areas as determined during the onsite process.

A determination as to whether one or more of these exceptions apply would be made on a site-specific basis. In the circumstances where the operator proposes to construct a new pipeline adjacent to an existing surface pipeline, the proposed pipeline and existing pipeline would be buried subject to the exception criteria listed above.

Buried pipelines would be installed using one of two general construction sequences, as described below.

In areas where sufficient soil is present such that blasting would not be required, the following techniques would be employed to bury pipelines:

- A brush-hog would be used to remove shrubs and small trees from the ROW. Topsoil removal would not occur except directly over the trench.
- A trench approximately 4 feet deep would be excavated using a track hoe and the soil stockpiled to one side, making sure the topsoil and spoil do not mix together.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench.

- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

In areas where compacted sandstone or bedrock exists, the following techniques would be employed to bury pipelines:

- A brush-hog would be used to remove shrubs and small trees from the ROW. Topsoil removal would not occur except directly over the trench.
- In most areas where pipelines would be buried, chain trenchers and/or rocks saws (also known as wheel or disc trenchers) would be used to excavate trenches.
- In areas where blasting is required in order to excavate pipeline trenches, the following techniques would be used (e.g., on slopes or other areas where use of chain trenchers and/or rock saws are not feasible):
  - A track hoe-mounted air drill would drill detonation holes at an interval of approximately every 4 feet along the trench route to be blasted.
  - A granular explosive would be placed in the holes with primers and then wired together for detonation.
  - As needed, roads along areas to be blasted may be temporarily closed for safety purposes.
  - The charges would be detonated in accordance with relevant safety regulations.
- Following excavation of the pipeline trenches (whether by chain trencher and/or rock saw or detonation), a track hoe and bulldozer would be used to remove debris from the trench.
- Spoil would be used to pad the bottom of the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- The pipeline would be installed using a side-boom, the trench backfilled to a depth of approximately 3 feet, and the spoil compacted in the trench. As needed, additional soil would be brought in from an approved borrow area and used to pad the bottom of the trench.
- Stockpiled topsoil would be placed over the compacted spoil to facilitate reclamation.
- Scalped vegetation would be placed back on the ROW to reduce erosion potential and reduce visual impacts.
- The entire ROW would be reseeded in the first appropriate season after disturbance.

Where surface-laid pipelines are approved, ROW stipulations would include painting to match the surrounding environment, bonding, and a strict liability clause. Surface pipelines adjacent to roads would be assembled on the roadway or construction ROW, lifted, and placed in the existing vegetation using a side-boom. Pipeline markers would be strategically placed at intervals along all buried and surface pipelines.

Additional information on the construction of pipelines is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.6.2.4 Storage Areas**

Under the Agency Preferred Alternative, BBC and other operators would construct three 5-acre equipment storage locations (one per each of the three primary mesas in the WTP Project Area - i.e., Prickly Pear, Peter's Point and Flat Iron), which would be used to temporarily house construction equipment, vehicles, pipe and pipe welding materials, CO<sub>2</sub> tanks, frac tanks, production equipment, and other standard gas field equipment (see conceptual locations of equipment storage areas on **Figure 2.6-1**).

BBC and other operators would also avoid transportation of routine drilling and completion supplies on weekends and holidays.

Additional information on equipment storage areas is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.6.3 Drilling**

Prior to publication of the EIS, an independent technical support document was prepared by New Tech Engineering and independently reviewed by the BLM engineers to evaluate the technical and economic limits of directional drilling in the WTP Project Area (see **Appendix H**). The directional drilling analysis and report indicates that current technology provides for a maximum horizontal offset of 3,000 feet within the WTP Project Area. The data suggest that it is possible to reach most of the proposed bottom holes that occur below canyon bottoms and in the WSAs by directionally drilling from outside these areas. Recommendations from the directional drilling report have been incorporated into the Agency Preferred Alternative, such that many of the proposed wells that were illustrated under the Proposed Action in these sensitive areas would be directionally drilled under the Agency Preferred Alternative from areas outside the canyon bottoms and WSAs.

Under the Agency Preferred Alternative, there would be no restriction on the number of drill rigs or seasonal drilling restrictions within the WTP Project Area; however, the intensity of development would be limited by the maximum annual surface disturbance threshold, other conditions and requirements within this alternative, and applicable State and Federal regulations (e.g., State well spacing limitations, Federal NAAQS). Based upon a maximum annual disturbance of 540 acres, it is assumed that BBC and other operators could utilize approximately seven rigs per year.

Based upon current technology and drilling rates in the WTP Project Area, BBC has indicated that they could drill as many as 20 wells per year per drill rig. For the purpose of analysis, it is assumed that all WTP operators would have similar capabilities.

As depicted in **Table 2.6-1**, during the first year of development, it is assumed BBC and other operators would operate four drill rigs year-round within the WTP Project Area. In addition, other operators would operate three rigs year-round. During the second and third year of development, drilling activity would likely begin to decline as the other operators fully develop their drilling locations. Following the first approximately 3 years of drilling activity, BBC and other operators would likely slow their drilling rates. From approximately years 4 through 8, BBC anticipates operating four rigs year-round until they have fully developed their resources.

Under Alternative E, closed-loop drilling would be employed in sensitive areas such as locations proposed within or near 100-year floodplains or drainages, near cultural resource or archaeological sites, within important wildlife habitats, in the WSAs, etc. The designation of a proposed location as a sensitive location requiring closed-loop drilling would generally be determined on a site-specific basis during the APD process

Of the 807 proposed wells, approximately 70 would be deep wells and the remaining 737 would be shallow wells.

Year	Number of Rigs			Number of Wells	
	BBC	Other	Total	Annual	Total
1	4	3	7	128	128
2	6	1	7	127	255
3	6	0	6	120	375
4	4	0	4	80	455
5	4	0	4	80	535
6	4	0	4	80	615
7	4	0	4	80	695
8	4	0	4	80	775
9	4	0	4	32	807

#### **2.6.4 Completion**

Information on completion is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.6.5 Interim Reclamation**

Information on interim reclamation is provided in **Section 2.1**, Details Common to All Alternatives.

#### **2.6.6 Production and Maintenance**

Production and maintenance activities and facilities are discussed in the following sections.

### 2.6.6.1 Production

Under Alternative E if a well is located in a sensitive area, protective barriers, as determined appropriate during the onsite process, would be installed around the production facilities (including tanks) or they would be moved off site.

Additional information on production is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.6.2 Compressor Stations

For purposes of analysis, under Alternative E, it is assumed that BBC and operators would construct up to two new 6,400-hp and one new 11,200-hp compressor stations (see conceptual compressor station locations on **Figure 2.6-1**). Including the existing and expected compression at the Dry Canyon Compressor Facility and new compression at proposed stations, total compression within the WTP Project Area would be approximately 40,000 hp. Actual horsepower requirements would depend on the production of the proposed wells. All applicable production equipment, including compressor engines, would have hospital grade mufflers. Each new compressor station would occupy an approximate 5-acre site, resulting in about 15 acres of new disturbance for compressor stations.

Additional information on compressor stations is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.6.3 Produced Water Management

Under Alternative E, there would be no limitation on the number of SWD wells and water management facilities permitted within the WTP Project Area except the disturbance thresholds discussed in **Section 2.6**.

However, for the purpose of analysis, it is assumed that BBC and other operators would construct approximately three water management facilities and six SWD wells within the WTP Project Area. Surface disturbance from three water management facilities would be approximately 15 acres. Surface disturbance from construction and drilling of the SWD wells would equal surface disturbance due to the construction of gas well pads, and is included in the surface disturbance summarized for well pads in **Table 2.6-5**.

The exact number of SWD wells would depend upon BBC's ability to obtain the necessary permits and produced water volumes. Salt water disposal wells would be drilled to non-producing, non-potable water-bearing formations that are capable of accepting water. Exact locations of SWD wells are not yet known; however, conceptual locations for six SWD wells are illustrated on **Figure 2.6-1**.

Additional information on produced water management, including details on SWD wells, water management facilities, and pump stations is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.6.4 Workovers

Information on workovers is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.6.5 Road Maintenance

BBC and other operators would be required to maintain transportation corridors, which they construct or use, to the standards specified in their use authorization, and in accordance with road standards established in the *BLM/U.S. Forest Service (USFS) publication Surface Operating Standards for Oil and Gas Exploration and Development – The Gold Book (Fourth Edition)* (DOI-USDA 2007); *BLM Manual 9113- Roads* (BLM 1985); and Appendix 19 of the *Price Field Office's Hydrological Modification Standards for Roads* (BLM 2004a). These standards are discussed in detail within **Appendix F – West Tavaputs Plateau Natural Gas Full Field Development Transportation Plan**.

Additional information on road maintenance is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.7 Final Reclamation and Abandonment

Information on final reclamation and abandonment is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.8 Water Use and Water Sources

Under the Agency Preferred Alternative, drilling and completion would require an average of approximately 2.0 acre-feet of water per shallow well and 3.5 acre-feet of water per deep well. As 91 percent of the proposed wells would be shallow wells, water volume calculations are based on water needs for shallow wells. Thus, assuming 128 shallow wells would be drilled and completed during the peak year of development, approximately 256 acre-feet (1,986,142 bbl) would be used for drilling and completion activities.

As shown in **Table 2.6-1**, drilling and completion activities would gradually decline during the 9-year development phase. Thus, assuming that BBC and other operators would drill and complete an average of 90 wells per year over a 9-year period, approximately 180 acre-feet/year (1,396,506 bbl/year) would be used annually for drilling and completion activities.

Estimates of annual water use for dust suppression are based on 10 dust abatement trips per day using 4,200-gallon trucks for 100 days per year, or 12.8 acre-feet/year (99,307 bbl/year). An additional 10 dust abatement trips per rig move could be required when moving drill rigs. Assuming 128 wells per year would be drilled and completed during the peak year development, an additional 16.5 acre-feet/year (128,013 bbl) would be used for rig moves. Therefore, estimated annual water use for dust suppression would be approximately 29.3 acre-feet/year (227,320 bbl/year).

Assuming that BBC and other operators would drill and complete an average of 90 wells per year over a 9-year development phase, average annual water use for dust suppression would be approximately 19.4 acre-feet/year (150,512 bbl/year).

In summary, the total water use for drilling, completion, and dust suppression during the peak year of development would be approximately 285.3 acre-feet (2,213,462 bbl). The

average annual water use for drilling, completion, and dust suppression over a 9-year development phase would be approximately 199.4 acre-feet/year (1,547,018 bbl/year).

## 2.6.9 Hazardous Materials and Solid Waste

Information on hazardous materials and solid waste handling is provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.10 Workforce and Worker Housing

Under Alternative E, a maximum of three 10-acre locations would be needed for temporary worker housing. Each temporary housing location would generally include up to fifteen 60-foot by 15-foot sleeping trailers, a kitchen, a recreational facility, portable toilets, trash containers, generators, and fresh water tanks. Each location would be capable of housing approximately 100 personnel. The facility layout for temporary worker housing locations would be highly site-dependant. Temporary housing within the WTP Project Area could be used on a year-round basis.

Because the majority of the development is proposed on top of the mesas, temporary worker housing sites are conceptually located on top of Prickly Pear Mesa, Peter's Point Mesa, and Flat Iron Mesa, respectively (see conceptual locations illustrated on **Figure 2.6-1**).

Additional information on workforce and worker housing is also provided in **Section 2.1**, Details Common to All Alternatives.

### 2.6.11 Access and Traffic

Under the Agency Preferred Alternative, the operators would be encouraged to make use of air travel to reduce employee-related traffic between surrounding municipalities and the WTP Project Area. Upgrades could potentially be made to the existing Peter's Point landing strip by expanding the landing strip to a width of approximately 62-feet and a length of approximately 1 mile. In addition, BBC could install an approximately 100- to 200-hp diesel engine generator, pilot-operated runway lights, and a helicopter landing pad within the upgraded landing strip. On Flat Iron and Prickly Pear Mesas, BBC and other operators could construct new 62-foot wide by 1-mile long landing strips, which would also likely include 100- to 200-hp diesel engine generators, pilot-operated runway lights, and helicopter landing pads within the upgraded landing strips. The exact location for a new airstrip on Prickly Pear Mesa has not yet been determined by the BLM, thus, it is not illustrated on **Figure 2.6-1**<sup>17</sup>.

Air travel to and from the WTP Project Area has the potential to substantially reduce daily traffic volumes that could occur during the construction, drilling, and completion phases. Under the Agency Preferred Alternative, air travel would be encouraged but difficult to enforce. Thus, for the purposes of providing the most conservative analysis, it is assumed that the majority of workers would use vehicles to commute to and from the WTP Project Area. The traffic tables below reflect this conservative assumption.

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<sup>17</sup> Upgrades to or use of the Interplanetary airstrip for project-related activities would be prohibited.

**Table 2.6-2** shows the total traffic that could occur during the LOP. Actual traffic volumes would vary depending on the specific operations that might be underway. For example, traffic for completing an individual well would average 11 round trips per day but on any single day might require 22 round trips between the WTP Project Area and nearby cities and towns.

<b>Table 2.6-2 Traffic Estimates under the Agency Preferred Alternative</b>						
<b>Project Phase</b>	<b>Vehicle Type</b>	<b>Average Weight (lbs)</b>	<b>Daily Round Trips per Well/Pad</b>	<b>Total Round Trips per Well/Pad<sup>1</sup></b>	<b>Total Round Trips During Development<sup>2</sup></b>	<b>Total Vehicle Traffic<sup>4</sup></b>
<b>Construction</b>	Haul Trucks	80,000	1	7	3,458	6,916
	Light Trucks	20,000	4	28	1,3832	27,664
	<b>Total</b>		<b>5</b>	<b>35</b>	<b>17,290</b>	<b>34,580</b>
<b>Drilling (Vertical wells)</b>	Haul Trucks <sup>5</sup>	80,000	2	26	12,844	25,688
	Logging/Mud Trucks	70,000	0.5	6.5	3,211	6,422
	Water Trucks	60,000	1.5	19.5	9,633	19,266
	Light Trucks	8,000	4	52	25,688	51,376
	<b>Total</b>		<b>8</b>	<b>104</b>	<b>51,376</b>	<b>102,752</b>
<b>Drilling (Directional wells)</b>	Haul Trucks <sup>5</sup>	80,000	2	52	16,276	32,552
	Logging/Mud Trucks	70,000	0.5	13	4,069	8,138
	Water Trucks	60,000	1.5	39	12,207	24,414
	Light Trucks	8,000	4	104	32,552	65,104
	<b>Total</b>		<b>8</b>	<b>208</b>	<b>65,104</b>	<b>130,208</b>
<b>Completion</b>	Semi/Transport/Water/Sand	80,000	7	203	163,821	26,548
	Haul Trucks <sup>5</sup>	80,000	1	29	23,403	46,806
	Light Trucks	8,000	4	116	93,612	187,224
	<b>Total</b>		<b>12</b>	<b>348</b>	<b>280,836</b>	<b>561,672</b>
<b>Reclamation</b>	Haul Trucks	80,000	1	6	4,842	9,684
	Light Trucks	8,000	3	18	14,526	29,052
	<b>Total</b>		<b>4</b>	<b>24</b>	<b>19,368</b>	<b>38,736</b>
<b>Infrastructure Development<sup>3</sup></b>	NA	NA	NA	NA	<b>73,000</b>	<b>146,000</b>
<b>Total Development Traffic</b>	NA	NA	NA	NA	<b>506,974</b>	<b>1,013,948</b>
<b>Total Production Traffic</b>	NA	NA	NA	NA	<b>331,374</b>	<b>662,748</b>
<b>Total Traffic LOP</b>	NA	NA	NA	NA	<b>838,348</b>	<b>1,676,696</b>

<sup>1</sup>Traffic Estimates are based upon an approximately 7-day construction period, 13-day period drilling at vertical locations (shallow wells), 26-day period drilling at direction wells (shallow wells), 29-day completion period, and 6-days reclamation period per well or well pad as appropriate.

<sup>2</sup>Traffic estimates are based upon approximately 807 gas wells drilled from up to 538 well pads.

<sup>3</sup> Infrastructure development includes approximately 25 vehicles per day for pipeline installation, road construction, compressor station, worker housing construction, etc.

<sup>4</sup>Total vehicle traffic equals number of roundtrips multiplied by two (inbound and outbound traffic).

<sup>5</sup>Haul trucks include drill and completion rigs.

NA = Not Available

**Table 2.6-3** includes approximations of AADT during each year of development under Alternative E. Traffic volumes would be highest during the first or peak-year of development and would likely decline relative to development decline.

<b>Table 2.6-3 Annual Average Daily Traffic during Development under the Agency Preferred Alternative</b>			
<b>Year</b>	<b>Number of Wells</b>	<b>Total Annual Vehicle Round trips</b>	<b>ADT</b>
1	128	160,824	441
2	127	159,568	437
3	120	150,773	413
4	80	100,515	275
5	80	100,515	275
6	80	100,515	275
7	80	100,515	275
8	80	100,515	275
9	32	40,206	110

**Table 2.6-4** illustrates typical pumper traffic, and traffic associated with the collection of produced water and condensate over the LOP. Production traffic estimates are based upon the possible drilling schedule discussed in **Table 2.6-1**.

As discussed in **Section 2.1**, the anticipated life of an individual well is approximately 20 years. Thus, as the project reaches its 20<sup>th</sup> year, initial wells would begin the abandonment phase, and production traffic would begin to decrease accordingly.

<b>Table 2.6-4 Daily Round trips during Production under the Agency Preferred Alternative</b>					
<b>Year</b>	<b>Approximate Number of Producing Wells</b>	<b>Approximate Round Trips Traffic by Pumpers<sup>1</sup></b>	<b>Approximate Daily Round Trips for Produced Water Disposal</b>	<b>Approximate Daily Round Trips for Condensate Removal</b>	<b>Approximate Total Daily Production Traffic</b>
1	128	5	0	2	<b>7</b>
2	255	10	0	5	<b>14</b>
3	375	14	0	7	<b>21</b>
4	455	17	0	9	<b>26</b>
5	535	20	0	10	<b>30</b>
6	615	23	0	12	<b>35</b>
7	695	26	0	13	<b>39</b>
8	775	29	0	15	<b>44</b>
9	807	30	0	15	<b>45</b>
10	807	30	0	15	<b>45</b>
11	807	30	0	15	<b>45</b>

<b>Year</b>	<b>Approximate Number of Producing Wells</b>	<b>Approximate Round Trips Traffic by Pumpers<sup>1</sup></b>	<b>Approximate Daily Round Trips for Produced Water Disposal</b>	<b>Approximate Daily Round Trips for Condensate Removal</b>	<b>Approximate Total Daily Production Traffic</b>
12	807	30	0	15	<b>45</b>
13	807	30	0	15	<b>45</b>
14	807	30	0	15	<b>45</b>
15	807	30	0	15	<b>45</b>
16	807	30	0	15	<b>45</b>
17	807	30	0	15	<b>45</b>
18	807	30	0	15	<b>45</b>
19	807	30	0	15	<b>45</b>
20	807	30	0	15	<b>45</b>
21	679	25	0	13	<b>38</b>
22	552	21	0	10	<b>31</b>
23	432	16	0	8	<b>24</b>
24	352	13	0	7	<b>20</b>
25	272	10	0	5	<b>15</b>
26	192	7	0	4	<b>11</b>
27	112	4	0	2	<b>6</b>
28	32	1	0	1	<b>2</b>

<sup>1</sup>This table assumes that pumpers would visit approximately 75 percent of producing wells on a daily basis and that an individual pumper could service approximately 20 wells each day. The table also assumes that an average of 8 bbl of water and 1.5 bbl of condensate would be produced per day per well.

### **2.6.11.1 Public Restrictions**

Under the Agency Preferred Alternative, the BLM would retain the option of gating proposed roads longer than 2 miles on a year-round basis. This determination would be made on a site specific basis taking into consideration a number of variables. If an appropriate location for a gate can be identified, gates would be use in areas where sensitive resources (e.g., where threatened or endangered plant species occur, where eligible cultural resources occur, etc.) could be protected by access restrictions. In addition, all roads that provide access to proposed well pads in the Jack Canyon and Desolation Canyon WSAs would be gated on a year-round basis. Use of these roads would be limited to those with administrative access (e.g., the BLM, permitted operators, Carbon County emergency services, grazing allottees, and SITLA, its permittees, grantees, and successors-in-interest).

Based upon this criterion, 14 gates would be located on non-WSA land within the WTP Project Area. Through the use of these gates, access to approximately 75 miles of proposed lease roads would be limited to administrative access only. An additional 3 gates would limit access to approximately 5.7 miles of proposed roads within the WSAs.

In total, approximately 85 miles of the 167 miles of proposed roads would be limited to administrative access only.

Gates would be strategically located to prevent entrance from unauthorized vehicles. The operators would be required to maintain road closures using gating until the final removal of roads after the life of the project. Locations would be determined on a site-specific basis. Conceptual locations for gates are illustrated on **Figure 2.6-1**.

### **2.6.11.2 Industry Restrictions**

Under the Agency Preferred Alternative, oil and gas trailer traffic or vehicles with truck-load capacity larger than 1-ton would be prohibited from using Prickly Pear Canyon Road as an access route to or from the Prickly Pear Mesa. In its current condition, Prickly Pear Road does not meet the BLM standards for slope, turn radius, road width, sight distance, or turnouts. Upgrades that would improve the road to a BLM standard capable of handling heavy traffic (as identified in the Gold Book [DOI-USDA 2007]) would require excessive engineering and cause an impact to visual resources.

Engineering and environmental constraints associated with Prickly Pear Canyon Road are discussed in detail in **Appendix F**.

### **2.6.11.3 Produced Water/Condensate Transfer Pipelines**

Under the Agency Preferred Alternative, BBC would be required to transport produced water/condensate via pipeline (i.e., liquids gathering system) with the following exceptions:

- Use of water/condensate lines would not be required in areas where development is considered exploratory.
- Use of water/condensate lines may not be required in remote locations where the number of proposed wells is limited (e.g., Cedar Ridge, Jack Canyon, and Cottonwood Ridge) and construction of water/condensate line would be cost prohibitive.
- Use of water/condensate lines may not be required in locations where the topographical variations could require construction of additional pumping facilities in addition to those illustrated on **Figure 2.6-1** and discussed below.

Although water/condensate pipelines would not likely be required in all circumstances, to provide a comparison between the environmental impacts of each alternative, under the Agency Preferred Alternative, it is assumed that all produced water would be transported by pipeline (see **Table 2.6-4**).

Where implemented, the liquids gathering system would transport produced water/condensate from proposed well locations to water disposal facilities and centralized tank batteries located on the mesa tops. Condensate would be collected by trucks and taken from the centralized tank batteries to a processing and treatment facility outside the WTP Project Area. Traffic associated with production and well service would depend on the number of producing wells at any one time and the associated volumes of water and condensate being produced.

As previously stated, under the Agency Preferred Alternative, as many as four loading and pump facilities (i.e., pump stations) would be constructed in canyon bottoms to facilitate the transportation of produced water. Under the Agency Preferred Alternative, the following limitations would apply to pump stations proposed in canyon bottoms on Federal lands:

- All pump station engines would be fitted with at least hospital grade mufflers for noise abatement. In addition, all pumps and generators would be enclosed in acoustically insulated buildings.
- Pump station design and mitigation measures would be reviewed by a licensed landscape architect.
- Site-specific visual simulations and a detailed visual contrast rating would be completed by a licensed landscape architect to determine whether the proposed pump station is in conformance with VRM Class objectives.
- A landscape architect would ensure during construction of the pump stations that appropriate visual resource mitigation measures are implemented.
- A cultural resource specialist would be located on-site during surface disturbing activities to prevent damage to cultural sites.
- No pump stations would be allowed within “line of sight” of Key Observation Points (KOPs) within Nine Mile Canyon, which includes those sites identified within the BLM Recreation and Cultural Area Management Plan: Nine Mile Canyon Special Recreation and Cultural Management Area (BLM 1995) that could be developed as recreational/interpretive sites.
- Class I and Class III inventories of the proposed pump station location and a ½-mile buffer zone would be completed during the permitting phase to determine whether any eligible NRHP properties could be affected. For any pump stations proposed within ½-mile of eligible NRHP properties, appropriate Section 106 consultation would be completed prior to approval of the pump station location. Native American consultation would also be completed prior to approving a pump station location(s).
- Pump stations would not be located within 330 feet of riparian zones or within 100-year floodplains unless there are no practical alternatives and long-term impacts can be fully mitigated.
- In order to avoid potential noise-related impacts to potential MSO habitats, pump stations would not be located within approximately 0.5 miles of canyon rims.

## **2.6.12 Surface Disturbance under Alternative E**

### **2.6.12.1 Reclamation of Existing Roads**

To partially mitigate the impacts of an increased number of access roads, approximately 17 miles of road within the WTP Project Area would be permanently closed and reclaimed (including several miles in sage-grouse crucial winter habitat).

An inventory of roads within the WTP Project Area, including those roads that could possibly be reclaimed, is depicted on **Figure 2.6-1**. Additional roads could be reclaimed

as determined by the BLM during the APD process. No existing routes would be reclaimed that are the sole access to State trust lands without consultation with the SITLA.

**2.6.12.2 Surface Disturbance**

Estimated surface disturbance anticipated under the Agency Preferred Alternative is shown in **Table 2.6-5**. Short-term surface disturbance impacts would occur during and immediately after the construction, drilling, completion, and testing activities. Total short-term disturbance for well pads, access roads, pipeline ROWs, and other surface facilities would equal approximately 3,339 acres. However, as discussed in **Section 2.6**, total unreclaimed surface disturbance would be limited to 2,310 acres at any given time.

<b>Table 2.6-5 Surface Disturbance<sup>1</sup> Anticipated under Alternative E</b>				
<b>Project Feature</b>	<b>Surface Disturbance Width</b>		<b>Surface Disturbance Acreage</b>	
	<b>Short-term (feet)</b>	<b>Short-term (feet)</b>	<b>Short-term (acres)</b>	<b>Long-Term (acres)</b>
Proposed Well Pads (includes gas wells, SWD wells, and water wells)	NA	NA	1,390	902
Proposed Road and Pipeline (co-located)	80	40	1,503	564
Proposed Road	40	30	42	31
Proposed Pipeline along Existing Road	40	0.8	115	0
Cross-country Pipeline <sup>2</sup>	40	0.8	48	0
Proposed Reroutes	40	30	29	22
Roads Needing Extensive Improvement (on slopes greater than 30 percent)	30	10	49	16
Roads Needing Extensive Improvement (on slopes less than 30 percent)	15	10	60	40
Pump Stations	NA	NA	2	2
Equipment Storage Areas	NA	NA	15	15
Compressor Stations	NA	NA	15	15
Aggregate Borrow Areas (Quarries)			6	6
Water Management Facilities	NA	NA	15	15
Temporary Worker Housing Locations	NA	NA	30	30
Airstrips	70	70	20	20
<b>Total</b>	NA	NA	<b>3,339</b>	<b>1,678</b>

<sup>1</sup> It is important to note that the well pads, access roads, pipelines, and other facilities illustrated on **Figure 2.6-1** and associated disturbance levels in this table represent a conceptual maximum level of development that would not likely be realized by the actual development.

<sup>2</sup> Potential locations for cross-country pipeline are currently unknown, and would not be decided on until the APD process. Therefore, cross-country pipelines are not illustrated on **Figure 2.6-1**. However, surface disturbance for cross-country pipelines is accounted for within **Table 2.6-5**. Cross-country pipelines could total approximately 10 miles and would likely require 40 feet of disturbance within a 50-foot wide construction ROW, hence, the 48-acre initial surface disturbance estimate.

Portions of the well pads, access road ROWs, pipeline ROWs, and other facilities not needed for production operations would be reclaimed within one to two growing seasons following completion of the respective well, access road, or pipeline. Successful reclamation as discussed in **Section 2.1.4** would be expected within a 5-year period. What remains following successful interim reclamation would be a “long-term” disturbance of approximately 1,678 acres. Long-term disturbance includes the 29-year development and production phases plus the 5 years it would take to successfully abandon and reclaim the well pads, access roads, pipeline ROWs, and other surface facilities.

### 2.6.13 Mitigating Measures

In compliance with the BLM policy, **Table 2.6-7** includes additional environmental BMPs contained in WO IM 2007-021 and the latest version of the Gold Book (DOI-USDA 2007). The BMPs included in the table have been tailored to and would be uniformly applied across Federal lands within the WTP Project Area under Alternative E. As these mitigation measures are also generally specific to a stage of oil and gas development, the table is subdivided by requirements specific to pre-drilling, construction, drilling, completion, production and maintenance, final reclamation, and abandonment. It is important to note that the list of BMPs included in **Table 2.6-7** is not comprehensive; additional BMPs in the Gold Book are available on the BLM’s BMP website and could be implemented on a site-specific basis.

**Table 2.6-8** contains environmental protection measures and mitigating measures identified by the BLM and its cooperators during preparation of the EIS. Mitigating measures identified in **Table 2.6-8** would be in addition to those mentioned in WO IM 2007-021 and the Gold Book. These mitigation measures are generally specific to individual resources or values within the WTP Project Area. Thus, the measures are subdivided by resources of concern. While the BLM only has the authority to enforce compliance with these measures on Federal lands in the WTP Project Area, it is recommend that other surface management or permitting agencies consider applying the BMPs and environmental protection measures discussed in **Tables 2.6-7** and **2.6-8** to State and private lands.

Under Alternative E, some development would occur within the Jack Canyon and Desolation Canyon WSAs. The IMP and Guidelines for Lands Under Wilderness Review (H-8550-1) recognizes valid and existing rights with a provision that efforts be made to minimize unnecessary or undue degradation to wilderness values (BLM 1995b). Although mitigation measures for construction in WSAs are not explicitly disclosed, numerous mitigation measures for various resource values contained within **Tables 2.6-7** and **2.6-8** would serve to minimize impacts.

**Table 2.6-8** does not specify environmental protection measures for Greater sage-grouse. This is because design features of Alternatives C, D, and E are intended to minimize impacts to sage-grouse and sage-grouse habitat. For example, under Alternative D, winter drilling would largely be precluded; an alternative design feature that inherently reduces impacts on sage-grouse. Under Alternatives C and E some winter drilling would occur; however, the operators would comply with the Agency Wildlife Mitigation Plan (**Appendix E**) and special protection measures for wildlife, which

includes several mitigation and monitoring requirements designed to reduce or offset potential effects on sage-grouse populations and habitats.

<b>Table 2.6-7 Best Management Practices Applied to Alternatives C, D, and E</b>	
<b>PRE-DRILLING</b>	
<b>Source of Mitigation Measure</b>	<b>Summary of Requirements</b>
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. (Gold Book) Chapter 4: Construction and Maintenance	The site layout should be located and staked in the most level area, off narrow ridges, and set back from steep slopes, while taking into consideration the geologic target, technical, economic and operational feasibility, spacing rules, natural resource concerns, and safety considerations.
	Operations should be avoided or properly mitigated in riparian areas, floodplains, wetlands, and areas subject to severe erosion and mass soil movement.
	In visually sensitive areas, locations should be selected that provide for vegetative and topographic screening.
<b>CONSTRUCTION</b>	
<b>Source of Mitigation Measure</b>	<b>Summary of Requirements</b>
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. (Gold Book) Chapter 4: Construction and Maintenance	All surface soil materials (topsoil) are to be removed from the entire cut and fill area and temporarily stockpiled for reuse during interim and final reclamation.
	Topsoil should be segregated and stored separately from subsurface materials to avoid mixing during construction, storage, and interim reclamation. Subsurface materials should never be placed on top of topsoil material at any point in the operation. Stockpiles should be located and protected so that wind and water erosion are minimized and reclamation potential is maximized.
	Fill slopes should be compacted to minimize the chance of slope failure. If excess cut material exists after fill areas have been brought to grade, the excess material would be stockpiled at approved locations.
	To reduce erosion and soil loss, the operators would be required to divert storm water away from the well location with ditches, berms, or waterbars above the cut slopes and to trap well location runoff and sediments on or near the location through the use of sediment fences or water retention ponds.
	Reserve pits should not be constructed in natural water courses. Water courses include lake beds, gullies, draws, streambeds, washes, arroyos, or channels that are delineated on a 1:24,000 USGS quadrangle map or have a hydrologic connection to streams, rivers, or lakes.
	To prevent contamination of groundwater and soils or to conserve water, it is recommended that operators use a closed-loop drilling system or line reserve pits with an impermeable liner.
	New road construction or reconstruction by the operator must be suitable for the intended use and must comply with the BLM road and safety standards, such as those found in the BLM's 9113-Roads Manual.

<b>Table 2.6-7 Best Management Practices Applied to Alternatives C, D, and E</b>	
	<p>In areas of high environmental sensitivity, special road location, design, and construction and maintenance techniques may be required, as well as seasonal vehicular closures to the general public.</p>
	<p>Existing roads should be considered for use as access routes and may be used when they meet agency standards, transportation and development needs, and environmental objectives.</p>
	<p>To ensure successful growth of plants and forbs, topsoil must be salvaged where available during road construction and respread to the greatest degree practical on cut slopes, fill slopes, and borrow ditches prior to seeding.</p>
	<p>Construction within saturated or frozen soils should be avoided.</p>
	<p>Drainage control must be ensured through the use of drainage dips, in-sloping, natural rolling topography, ditch turnouts, ditches, or culverts. Ditches and culverts may be required in some situations, depending on grades, soils, and local hydrology. If culverts or drainage crossings are needed, they should be designed for a 25-year or greater storm frequency.</p>
	<p>Steep hillsides and water course should be avoided in the location of pipelines and flowlines.</p>
	<p>Flowline routes should take advantage of road corridors wherever possible to minimize surface disturbance and provide better leak detection and access for installation and repair operations.</p>
	<p>When clearing is necessary, the width disturbed should be kept to a minimum. Topsoil material must be stockpiled to the side of the routes where cuts and fills or other surface disturbances occur during the pipeline construction. Topsoil material must be segregated and not be mixed or cove red with subsurface material. Bladed material must be placed back into the cleared route upon completion of construction and returned back to the original contour before reapplying topsoil.</p>
	<p>Pipeline construction should not block, dam, or change the natural course of any drainage.</p>
<p>WO IM 2007-021: Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way: Road Construction</p>	<p>All new roads would be designed and constructed to a safe and appropriate standard, “no higher than necessary” to accommodate intended vehicular use. New roads would follow the contour of the land. Existing oil and gas roads that are in eroded condition or contribute to other resource concerns would be brought to the BLM standards within a reasonable period of time.</p>

<b>Table 2.6-7 Best Management Practices Applied to Alternatives C, D, and E</b>	
<b>DRILLING</b>	
<b>Source of Mitigation Measure</b>	<b>Summary of Requirements</b>
The BLM/USFS Surface Operating Standards for Oil and Gas Exploration and Development (Gold Book) Chapter 5: Drilling and Production Operations	Pits, water impoundments, and surface discharges that present a potential hazard to humans, livestock, wildlife, or to the resources should be subject to appropriate mitigation such as fencing, netting, caging, or covers as appropriate.
	Noise that has the potential to disturb wildlife, livestock and private surface owners or neighbors should be controlled to reduce sound levels. Suitable mufflers should be installed on all internal combustion engines and certain compressor components.
WO IM 2007-021: Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way: Multiple Wells From Single Pad	Multiple wells would be drilled from a single well pad wherever technically feasible.
<b>PRODUCTION AND MAINTENANCE</b>	
<b>Source of Mitigation Measure</b>	<b>Summary of Requirements</b>
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. (Gold Book) Chapter 4: Construction and Maintenance	When required, the operator shall submit a road maintenance plan for all roads that would be constructed or used in conjunction with the drilling program.
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. (Gold Book) Chapter 5: Drilling	The operator must comply with the visual resource management objectives established in the land use plan for all activities that alter landforms, disturb vegetation, or require structures (BLM 8400 Manual Series). Site-specific mitigation practices may be required by the surface management agency to minimize visual impacts, while remaining consistent with the lessee's right to conduct operations under the lease.

<b>Table 2.6-7 Best Management Practices Applied to Alternatives C, D, and E</b>	
and Production Operations	<p>All long-term facility structures, including worker housing, would be painted a color that enables the facilities to blend in with the natural background color of the landscape as seen from a viewing distance and location typically used by the public. The selected color should be one or two shades darker than the dominant background color, typically a vegetation color.</p> <p>In VRM Class I and II areas, the use of properly chosen camouflage techniques may be an appropriate method for matching the texture of the landscape. This strategy should be given strong consideration when proposed facilities are between 0.25 and 1.25 miles from a KOP. Semi-gloss paints may be preferred because of their resistance to staining and weathering. Where necessary, the use of contrasting safety paint can be used to highlight and mitigate a potential hazard, such as a tripping hazard or protruding or mechanical edge that could harm the operator or public. Refer to Draft Standard Environmental Color Chart - 2<sup>nd</sup> Edition Standard Environmental Color Chart (which replaces the current Standard Environmental Color Chart and the Supplemental Environmental Color Chart) for guidance when selecting colors for treating facilities.</p>
	<p>Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.</p>
	<p>Operators are expected to initiate their own inspections programs, identify noncompliance, and take appropriate corrective actions, rather than relying on Federal inspections to identify problems.</p>
WO IM 2007-021: Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way	<p>All above ground facilities including power boxes, building doors, roofs, and any visible equipment would be painted the darker colors selected from the latest national color charts that best allows the facility to blend into the background. Refer to Draft Standard Environmental Color Chart - 2<sup>nd</sup> Edition Standard Environmental Color Chart (which replaces the current Standard Environmental Color Chart and the Supplemental Environmental Color Chart) for guidance when selecting colors for treating facilities.</p>
	<p>The placement of production facilities on hilltops and ridgelines would be prohibited where they are highly visible. In all areas, low profile tanks would be used in combination with vegetative and landform screening wherever and whenever possible. The need to place wellheads below ground in order to reduce visual impacts would be determined on a site-specific basis.</p>
	<p>Noise reduction techniques and designs would be used to reduce noise from compressors or other motorized equipment.</p>
<b>RECLAMATION AND ABANDONMENT</b>	
<b>Source of Mitigation Measure</b>	<b>Summary of Requirements</b>
Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. (Gold Book) Chapter 6:	At producing wells, the operators would reduce slopes to original contours. Areas not used for production purposes would be reclaimed and blended into the surrounding terrain, reseeded, and erosion control measures installed. Erosion control measures may be necessary after slope reduction. Mulching, erosion control measures, and fertilization may be necessary to achieve acceptable stabilization.

<b>Table 2.6-7 Best Management Practices Applied to Alternatives C, D, and E</b>	
Reclamation and Abandonment	Disturbed areas should be revegetated after the site has been satisfactorily prepared. Site preparation may include resspreading topsoil to an adequate depth, and may also include ripping, tilling, disking, on contour and dozer track-imprinting.
	Reclamation measure should begin as soon as possible after the disturbance and continue until successful reclamation is achieved.
	Reclamation can be judged successful when a self-sustaining, vigorous, diverse, native (or otherwise approved) plant community is established on the site, with a density sufficient to control erosion and non-native plant invasion and to re-establish wildlife habitat or forage production.
	Earthwork for interim and final reclamation generally must be completed within 6 months of well completion or plugging (weather permitting).
	All pits must be reclaimed to a natural condition that blends with the rest of the reclaimed pad area. In addition the pit must be restored to a safe and stable condition. Pits must be free of oil and other liquid and solid wastes, allowed to dry, be pumped dry, or solidified in-situ prior to filling.
	Pipeline routes and roads should be co-located as much as possible to reduce reclamation needs and impact to other resources.
	Pipeline trenches are to be compacted during backfilling and must be maintained to correct backfill settling and prevent erosion. Reclamation involves filling the trench, compacting the fill, regarding cut-and-fill slopes to restore the original contour, replacing topsoil, installing temporary waterbars only where necessary to control erosion, and revegetation in accordance with a reclamation plan.
WO IM 2007-021: Integration of Best Management Practices into Application for Permit to Drill Approvals and Associated Right of Way:	Final reclamation of all oil and gas disturbance would involve recontouring of all disturbed areas, including access roads, to the original contour or a contour that blends with the surrounding topography and revegetating all disturbed areas. Mulching, soil amendments and other state-of-the-art techniques would be utilized to assure the highest possible re-vegetation success.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
<b>Paleontology</b>	A BLM permitted paleontologist would be on site during road, pipeline, well pad, and other excavations that would disturb rocks of the Green River Formation.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
<b>Air Quality</b>	Tier II rig standards would be required for all new and re-located rigs.
	All new and replaced pneumatic controllers will be a no bleed or low bleed design.
	Emission controls would be utilized on all condensate storage batteries with emissions greater than 5 tons/year. This would include all tank batteries located at well sites, centralized production facilities and compressor stations. The emission controls may consist of vapor recovery, thermal oxidation or other available technologies. At a minimum, the applied control technology must be capable of reducing emissions by 95 percent.
	Best management practices would be employed during completion operations to minimize emissions to the atmosphere as a result of well flowback. The preferential best management practice shall be "Green Completion" where the well flowback is captured, separated, and sold as product. When Green Completions are not technically reasonable, flaring or other control practices shall be employed to minimize venting emissions directly to the atmosphere.
	Emissions from engines would be controlled utilizing Best Available Control Technology (BACT) in accordance with Utah Division of Air Quality regulations. Emissions controls may consist of lean-burn technology, catalysts, air/fuel ratio controllers or other technologies as they become commercially available. Engines located at facilities outside of Utah Division of Air Quality jurisdiction (EPA jurisdiction) would be controlled in a like manner.
	In accordance with a UDEQ-DAQ letter dated June 6, 2008 requesting implementation of interim nitrogen oxide control measures and compressor engines; BLM would require the following as a Lease Stipulation or Condition of Approval for APDs: <ul style="list-style-type: none"> <li>• All new and replaced internal combustion oil and gas field engines of less than or equal to 300 design-rated horsepower must not emit more than 2 gms of NOx per horsepower-hour. This requirement does not apply to oil and gas field engines of less than or equal to 40 design-rated horsepower.</li> <li>• All new and replacement internal combustion oil and gas field engines of greater than 300 design rated horsepower must not emit more than 1.0 gms of NOx per horsepower-hour.</li> </ul>

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	<p>To ensure that this project will result in the continued attainment of NAAQS and not contribute to ozone exceedances, within one year of the signing of this ROD, BLM and BBC with input from appropriate stakeholders (i.e., EPA, Ute Indian Tribe, UDAQ), will refine the NOx and VOC emissions inventory for the Project based upon updated actual and projected levels of development. BBC will update its emissions inventory on an annual basis and provide this inventory to the BLM and other interested stakeholders (i.e., EPA, UDAQ, Ute Indian Tribe). This information will be made publicly available on an annual basis.</p> <p>In the event that the updated emissions inventory shows a significant increase in NOx, VOCs, or other ozone precursors relative to the levels predicted by the EIS, then BBC, in consultation with the BLM and appropriate Federal, Tribal and State stakeholders, will perform a new air quality model analysis utilizing the new inventory and monitored data, or incorporate the updated emissions inventory in a planned regional scale air quality modeling study. The modeling will consider the current operating practices, operator committed mitigation, and BACT requirements in place at the time the model is conducted. BLM in consultation with appropriate Federal, State, and Tribal stakeholders will evaluate the modeling results and identify any needed additional reductions in ozone precursors emissions.</p> <p>As soon as possible following evaluation of the modeling results, BLM and appropriate stakeholders will use their respective authorities to implement any needed emission control mitigation measures and/or operating limitations necessary to ensure continued compliance with applicable ambient air quality standards for ozone. Absent an effective technology to implement, reductions in the pace of development may be utilized to ensure ambient air quality standards are met.</p> <p>Potential mitigation measures that the BLM and appropriate stakeholders may employ include:</p> <ul style="list-style-type: none"> <li>• Additional natural gas-fired rig engines;</li> <li>• Fuel additives;</li> <li>• Gas turbines rather than internal combustion engines for compressors;</li> <li>• Secondary controls on drill rig engines;</li> <li>• Electric drill rigs;</li> <li>• Electric compression;</li> <li>• Cleaner technologies on completion activities, and other ancillary sources;</li> <li>• Reduction in the pace of development;</li> <li>• Further centralization of gathering facilities to reduce truck traffic, including liquids gathering system; and/or Advancements in drilling technologies.</li> </ul>
<b>Soils</b>	For construction on slopes greater than 30 percent, operators must demonstrate that other placement alternatives would cause undue or unnecessary degradation.
	For construction on slopes greater than 30 percent, erosion control plans would be prepared.
	For construction on slopes greater than 30 percent, proper surveying and design would be required by a certified engineer and approved by the BLM before construction and maintenance.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	When constructing new roads on steep slopes within the WSAs (20 to 40 percent), the operators would backhaul cut material to an appropriate location in the WTP Project Area rather than side casting the materials into adjacent drainages.
	The presence of biological crusts would be evaluated during the APD process for each proposed project facility. Consideration would be given to relocating project facilities that would destroy significant amounts of biological crusts
<b>100-year Floodplains, Springs, and Riparian Areas</b>	Where no practical alternative exists, surface disturbance could be permitted within 330 feet from centerline of intermittent or perennial streams.
	Where no practical alternative exists, surface disturbance could be permitted within the 100-year floodplains of intermittent or perennial streams.
	No excess material (e.g., soil, overburden, etc.) would be stored within 100-year floodplains; all excess material would be relocated to appropriate locations outside of 100-year floodplains but within the WTP Project Area.
	Centralized production facilities would be located at an optimal location away from 100-year floodplains.
	For wells within 100-year floodplains, springs, or riparian areas, closed-loop drilling system would be utilized.
	As feasible, crossings of intermittent or perennial streams to access well pads would be avoided. Where stream crossings are necessary, engineered culverts, low water crossings, or a bridge would be constructed as appropriate; the type and location of crossing structures would be determined by the surface management agency as part of the APD process.
	As appropriate, the BLM would consider requiring implementation of the BLM Technical Note Hydraulic Considerations for Pipeline Crossings of Stream Channels.
	For wells within 100-year floodplains, springs, or riparian areas, impervious well pads would be constructed using plastic, bentonite, etc.
	For wells within 100-year floodplains, springs, or riparian areas, an impervious containment structure or a permanent high berm (approximately 18 - 24 inches in height) would be constructed around all well pads and storage tanks located within 100-year floodplains.
	For wells within 100-year floodplains, springs, or riparian areas, all cuttings would be solidified on location, or removed and disposed of appropriately.
	Within 100-year floodplains, springs, or riparian areas, remote monitoring of well locations would be used to closely observe the status of each well.
To the maximum extent possible, construction would be avoided in riparian zones. In riparian areas where road and pipeline crossings are necessary, an erosion, revegetation, and reclamation plan would be required.	

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	Within 100-year floodplains, springs, or riparian areas, major spill kits would be available on each location during drilling.
	A reclamation plan would be developed and implemented for all impacted riparian areas.
<b>Surface and Ground Water Resources</b>	Detailed construction plans would be prepared by the operator and would include site-specific drainage components and sediment and erosion controls that would be utilized to address control of sedimentation of surface waters in the WTP Project Area.
	Regular inspections of well locations, topsoil stockpiles, cut- and fill-slopes, roads, and pipeline corridors would be conducted by the third-party monitor for signs of erosion and runoff problems. Problem locations would be stabilized and seeded as appropriate to prevent additional erosion and potential impacts to receiving waters.
	Regular inspections of erosion control structures, drainage structures, and culverts would be conducted for signs of failure or malfunction and repair of those facilities.
	Regular inspections of project facilities containing hydrocarbons, such as tanks, wellheads, and above-ground piping, would be performed to identify and any potential leaks and correct any identified problems.
	Any shallow groundwater zones encountered during drilling of the proposed wells would be properly protected and the presence of these zones reported to the appropriate surface management agency. After the completion of drilling operations, the producing formation(s) would be logged and production casing run and cemented in accordance with the drilling program approved in the APD. This would isolate all groundwater-bearing formations in the borehole and would effectively eliminate communication between hydrocarbon-bearing zones and shallow groundwater aquifers.
	Screened containment troughs would be used around ethylene glycol on locations.
	If oil based drilling muds are using in the drilling of wells, proper environmental controls would be used such as: closed-loop systems, placing an impermeable barrier under the rig, etc.
	All cuttings piles would be located on an impermeable barrier and provided with secondary containment or other BMPs to prevent impacts to stormwater.
	In addition to the testing required by UDOGM, prior to surface use, drill cuttings would be subject to Toxicity Characteristic Leaching Procedure (TCLP) testing. These data would be used to evaluate potential impacts to surface water and other natural resources, and whether surface use of the cuttings is appropriate.
	Groundwater resources would be protected as outlined in <b>Appendix P</b> .
Under Alternatives C and E the operators would be required to conduct long-term monitoring of groundwater, seeps and springs, and surface water within the WTP Project Area as described in <b>Appendix Q</b> .	

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
<b>Wildlife</b>	Under Alternatives C and E the operators would be required to comply with the Agency Wildlife Mitigation Plan, which is described in <b>Appendix E</b> .
<b>Rangeland Management and Wild Horses</b>	Damaged fences, gates, or cattle guards would be fixed by the operators as soon as they are damaged in order to prevent unintentional movements of livestock herds.
	Roads would be plowed to improve access and movement of livestock and horses during periods of heavy snow, generally 16 inches or greater.
	During atypical deep snow the operators would open edges of plowed roads to create exit points and crossing areas when snow walls develop.
	The operators would implement an Approved Pesticide Use and Weed Control Plan from the AO of the appropriate surface management agency. Weed monitoring would continue on an annual basis (or as frequently as the surface management agency determines) throughout the life of the project.
	Pilots would buzz the existing Peter's Point airstrip, and proposed Flat Iron and Prickly Pear Mesa airstrips prior to landing to reduce the potential for plane/livestock collisions.
	The operators would be required to construct watering facilities if during the onsite process it is determined that the project location/facility/activity would adversely affect, or preclude use of, an existing watering source for livestock or wild horses.
<b>Raptor Nests</b>	The operators would comply with the Utah Raptor BMPs, which were adopted by BLM under the Approved RMP and which incorporate the U.S. Fish and Wildlife Service, Utah Field Office's "Guidelines for Raptor Protection From Human and Land Use Disturbances. The USFWS Guidelines for Raptor Protection require that prior to any surface-disturbing activities proposed between February 1 and August 31, all steep areas and areas with trees within 0.5 mile of proposed construction sites would be surveyed for the presence of raptor nests. If occupied raptor nests are found, construction, drilling, and completion would not occur within species-specific buffer radii during the species-specific active nesting season (as outlined in the U.S. Fish and Wildlife Service, Utah Field Office's "Guidelines for Raptor Protection From Human and Land Use Disturbances"), unless topographic or vegetative characteristics obscured visual and auditory impacts from the nest. Raptor nest surveys would be funded by the operator. The Utah Raptor BMPs also require at least a 3-year monitoring period of non-activity before a raptor nest can be considered abandoned or no longer useable.
	Except for authorized biologists trained in survey techniques, avoid operating aircraft within 1,000 feet of occupied raptor nests during the breeding season.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
<b>Migratory Birds</b>	On Federal lands, the operators would install netting on reserve pits to prevent contact of birds with harmful fluids. For water management facilities on Federal lands, netting or other bird deterrent techniques such as, the "Birdavert System," would be installed to prevent contact of birds with produced water in water management facilities. If flagging is used, it would be in combination with other bird deterrent techniques. The Birdavert system manufactured by Peregrine Systems, Salt Lake City, UT, is a fully automated system that prevents bird contact with fluids in ponds based on emission of sounds, light, or motion at random intervals that are designed to frighten birds and other wildlife away from ponds. The Birdavert system, which was designed by ornithologists, computer programmers, and radar technologists, specifically uses radar, computer technology, and hazing devices to deter birds from landing on ponds. Use of bird deterrent techniques on State or private lands would be determined by the Surface Management Agency during the onsite process.
	On Federal lands, surface-disturbing activities may be restricted in high-value migratory breeding habitat for migratory birds during the migratory bird nesting season (i.e., approximately April 15 – August 1). Species-specific spatial and temporal "closures" in high-value breeding habitat would be determined on a site-specific basis during the Federal onsite process. The need to restrict surface disturbing activities to protect migratory bird nesting activities at a site-specific location would be determined by the Authorized Officer based on the presence of breeding or nesting bird species at the time of surface disturbing activities, climatic and weather conditions, and/or topographical and/or vegetative visual screening. Priority consideration would be given to BLM sensitive migratory bird species.
<b>Big Horn Sheep</b>	To avoid impacts to bighorn sheep lambing activities, construction, drilling and completion activities would be prohibited or limited (based on site-specific review with the BLM and UDWR) within identified bighorn sheep lambing areas from March 15 – June 30.
<b>Vegetation</b>	An Approved Pesticide Use and Weed Control Plan would be prepared and implemented in consultation with the AO of the appropriate surface management agency. Weed monitoring would be continued on an annual basis (or as frequently as the surface management agency determines) throughout the LOP. The Pesticide Use and Weed Control Plan needs prescribed application methods that account for the reclamation objective of re-establishing indigenous forbs, shrubs and trees in addition to grasses.
	Site-specific interim reclamation plans would be prepared by the operator and submitted with APD packages.
	Interim and final reclamation activities and evaluation would be consistent with the Green River District Reclamation Guidelines for Reclamation Plans or other subsequent guidance by the BLM.
	Monitoring of reclamation success and report submission would be consistent with the MOU for <i>Mitigation Compliance and Monitoring Plan (Appendix D)</i> and the Green River District Reclamation Guidelines for Reclamation Plans (BLM 2009a).
	The operators would use materials from well pad or reserve pit construction as aggregate.
	All construction equipment coming into the WTP Project Area would be power-washed prior to entering the WTP Project Area.

Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.	
Resource	Summary of Mitigating Measures
Mexican Spotted Owl	Where feasible, well pads and facilities would be located away from steep-walled canyons.
	On Federal lands, all noise-producing production facilities (e.g., compressor engines, pump jacks, water pumping units, etc.) within potential MSO habitats* and within 0.5 miles of potential MSO habitat would be tested to determine noise levels of the equipment. If noise from production equipment within potential MSO habitat exceeds 45 dBA, the operators would be required to use reasonable measures (e.g., hospital-grade mufflers, housing of equipment, and/or other measures determined to be reasonable by the BLM and operator) to reduce noise levels of that particular facility to 45 dBA or lower. Furthermore, if production equipment located more than 0.5 miles from potential MSO habitat is determined to generate exceedances of the 45 dBA within the 0.5-mile buffer of potential MSO habitat, operators would also be required to use reasonable measures to reduce noise levels of that particular facility so that it does not exceed 45 dBA within 0.5 miles of potential MSO habitat.
	*As described in <b>Section 3.10.2.1</b> , MSO habitat models were developed by Willey and Spotskey in 1997 and 2000 in an attempt to determine potential MSO habitat within the State of Utah. According to the 1997 and 2000 models, there are approximately 63,930 acres of potential MSO habitat within the WTP Project Area. If future modeling or ground-truthing of existing modeling determines that an area currently mapped as potential MSO habitat actually does not support the constituent elements needed for potential MSO habitat, the operators would not be obligated to comply with this mitigation measure.
	Where feasible, well pads and facilities would be located in a manner that would conceal development if development is proposed within mixed-conifer vegetation.
	Field surveys for MSO would be conducted according to USFWS protocol in all “fair” and “good” MSO habitats. Furthermore, the operators would fund ground-truthing exercises to categorize modeled MSO habitats into “good,” “fair,” or “poor” MSO habitat (see <b>Section 3.10.2.1</b> ). The ground-truthing exercises would help refine where actual MSO surveys are needed as well as where additional noise mitigation/abatement is needed as previously discussed.
	Road access and fencing would be minimized to reduce or prevent habitat fragmentation and disturbance, and to reduce above-ground obstacles to birds in flight.
	Down-shield security lighting would be used for on-ground facilities and equipment to keep light within the boundaries of the affected location.
	White (preferable) or red strobe lights would be used at night at airstrips.
	Lighting at all facilities would be downshielded/directed to areas of human activity as much as possible to ensure human safety. Lighting at compressor stations would be kept to the minimum safely permissible level.
	TDS levels in water management facilities and reserve pits would be regularly monitored to minimize the risk of salt toxicity.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	A noise monitoring study would be initiated if field surveys detect MSO in the WTP Project Area.
<b>Bald and Golden Eagles</b>	The operators would conduct field surveys for bald and golden eagle winter roosting sites in all suitable habitats on a site-specific basis as determined necessary by the BLM, prior to beginning surface disturbance activities from November 1 – March 31.
	The operators would protect and preserve communal roost sites and important foraging areas. Retain mature trees and old growth stands wherever possible, particularly within ½-mile from surface water features.
	Where feasible, the operators would locate well pads and facilities in a manner to conceal them from bald and golden eagle winter roosting sites by considering vegetation (i.e., cottonwood trees and other large trees) and topographical features (i.e., rivers).
	The operators would locate water management facilities away from important bald and golden eagle foraging areas.
	The operators would avoid conducting potentially disruptive activities and development in the eagles' direct flight path between roosting and foraging areas.
	During the winter months, and where to do so would not endanger personal safety, the operators would remove carrion from access roads to reduce the potential for vehicle collisions with wintering bald and golden eagles that may forage in the area.
	The operators would not use explosives within ½-mile (or within 1 mile in open areas) of communal roosts when bald or golden eagles are congregating, without prior coordination with USFWS.
	Airstrips would be located at least 1,000 feet from bald or golden eagle winter roosting sites.
<b>Uinta Basin Hookless Cactus</b>	<p>Pre-project habitat assessments would be completed across 100 percent of the project disturbance area within potential* habitat prior to any surface disturbing activities to determine if suitable Uinta Basin hookless cactus habitat is present.</p> <p><i>*Potential habitat</i> is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment.</p>

Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.	
Resource	Summary of Mitigating Measures
	<p>Within suitable** habitat, site inventories would be conducted to determine occupancy. Inventories:</p> <ol style="list-style-type: none"> <li>a. Must be conducted by qualified individual(s) and according to the BLM and Service accepted survey protocols,</li> <li>b. Would be conducted in suitable and occupied habitat for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected, and during appropriate flowering periods:               <ol style="list-style-type: none"> <li>i. <i>Sclerocactus brevispinus</i> surveys should be conducted March 15<sup>th</sup> to June 30<sup>th</sup>, unless extended by the BLM</li> <li>ii. <i>Sclerocactus wetlandicus</i> surveys can be done any time of the year, provided there is no snow cover,</li> </ol> </li> <li>c. Would occur within 300 feet from the edge of disturbance along proposed ROWs for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad or other surface facility locations (e.g., compressor stations, pump stations, etc.),</li> <li>d. Would include, but not be limited to, plant species lists and habitat characteristics, and</li> <li>e. Would be valid until March 15<sup>th</sup> the following year for <i>Sclerocactus brevispinus</i> and one year from the survey date for <i>Sclerocactus wetlandicus</i>.</li> </ol> <p>**<i>Suitable habitat</i> is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Uinta Basin hookless cactus. Habitat descriptions can be found in the U.S. Fish and Wildlife Service's 1990 Recovery Plan and Federal Register Notices for the Uinta Basin hookless cactus.</p>
	<p>Design project infrastructure to minimize impacts within suitable habitat:</p> <ol style="list-style-type: none"> <li>a. Reduce well pad size to the minimum needed, without compromising safety,</li> <li>b. Limit new access routes created by the project,</li> <li>c. Roads and utilities should share common ROWs where possible,</li> <li>d. Reduce width of ROWs and minimize the depth of excavation needed for the road bed; where feasible, use the natural ground surface for the road within habitat,</li> <li>e. Place signing to limit OHV travel in sensitive areas,</li> <li>f. Stay on designated routes and other cleared/approved areas, and</li> <li>g. All disturbed areas would be re-vegetated with native species comprised of species indigenous to the area and non-native species that are not likely to invade other areas.</li> </ol>

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	<p>Within occupied*** habitat, project infrastructure would be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:</p> <ol style="list-style-type: none"> <li>a. Follow the recommendations for project design within suitable habitats,</li> <li>b. Buffers of 300 feet minimum between the edge of the ROW (roads and surface pipelines) or surface disturbance (e.g., well pads, compressor stations, pump stations, etc) and plants and populations would be incorporated,</li> <li>c. Surface pipelines would be laid such that a 300 foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat to ensure the pipelines don't move towards the population,</li> <li>d. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.,</li> <li>e. Where technically and economically feasible, use directional drilling or multiple wells from the same pad,</li> <li>f. Designs would avoid concentrating water flows or sediments into occupied habitat,</li> <li>g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and</li> <li>h. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.</li> </ol> <p>***<i>Occupied habitat</i> is defined as areas currently or historically known to support Uinta Basin hookless cactus; synonymous with "known habitat."</p>
	<p>Occupied Uinta Basin hookless cactus habitats within 300 feet of the edge of the surface pipeline's ROWs, 300 feet of the edge of the roads' ROWs, and 300 feet from the edge of the well pad shall be monitored for a period of three years after surface-disturbing activities. Monitoring would include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures would be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.</p>
	<p>Reinitiation of Section 7 consultation with the Service would be sought immediately if any loss of plants or occupied habitat for the Uinta Basin hookless cactus is anticipated as a result of project activities.</p>
<b>Graham's Beardtongue</b>	<p>Pre-project habitat assessments will be completed across 100 percent of the project disturbance area within potential habitat prior to any surface-disturbing activities to determine if suitable Graham's beardtongue habitat is present (<i>potential habitat</i> is defined as areas which satisfy the broad criteria of the species habitat description; usually determined by preliminary, in-house assessment).</p>
	<p>All surface disturbing activities having potential direct or indirect impacts on proposed critical habitat are prohibited (<i>proposed critical habitat</i> is defined as habitat proposed in the Federal Register (71 FR 3158) to be designated as critical habitat under Section 4 of the Endangered Species).</p>

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	<p>Within suitable habitat (<i>suitable habitat</i> is defined as areas which contain or exhibit the specific components or constituents necessary for plant persistence; determined by field inspection and/or surveys; may or may not contain Graham's beardtongue plants; detailed habitat and plant descriptions can be found in the Federal Register 71 (12): 3158-3196), site inventories will be conducted to determine occupancy. Inventories:</p> <ol style="list-style-type: none"> <li>a. Must be conducted by qualified individual(s) and according to the BLM and Service accepted survey protocols,</li> <li>b. Will be conducted in suitable and occupied habitat (occupied habitat is defined as areas currently or historically known to support Graham's beardtongue; synonymous with "known habitat") for all areas proposed for surface disturbance prior to initiation of project activities and within the same growing season, at a time when the plant can be detected (usually April 15th to May 20th in the Uinta Basin; however, surveyors should verify that the plant is flowering by contacting a BLM or FWS botanist or demonstrating that the nearest known population is in flower),</li> <li>c. Will occur within 300 feet from the edge of disturbance of the proposed ROW for surface pipelines or roads; and within 300 feet from the perimeter of disturbance for the proposed well pad including the well pad or other surface facility locations (e.g., compressor stations, pump stations, etc.),</li> <li>d. Will include, but not be limited to, plant species lists and habitat characteristics, and</li> <li>e. Will be valid until April 15th the following year.</li> </ol>
	<p>Design project infrastructure to minimize impacts within suitable habitat<sup>2</sup>:</p> <ol style="list-style-type: none"> <li>a. Reduce well pad size to the minimum needed, without compromising safety,</li> <li>b. Limit new access routes created by the project,</li> <li>c. Roads and utilities should share common ROWs where possible,</li> <li>d. Reduce the width of ROWs and minimize the depth of excavation needed for the road bed; where feasible, use the natural ground surface for the road within habitat,</li> <li>e. Place signing to limit OHV travel in sensitive areas, and</li> <li>f. Stay on designated routes and other cleared/approved areas.</li> </ol>

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	<p>Within occupied habitat<sup>4</sup>, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants:</p> <ol style="list-style-type: none"> <li>a. Follow the recommendations for project design within suitable habitats,</li> <li>b. Construction of roads will occur such that the edge of the right of way is at least 300 feet from any plant,</li> <li>c. Roads will be graveled within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from April 15<sup>th</sup> to May 20<sup>th</sup> (flowering period); dust abatement applications will be comprised of water only,</li> <li>d. The edge of the well pad should be located at least 300 feet away from plants,</li> <li>e. Surface pipelines will be laid such that a 300 foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat (exposed raw shale knolls and slopes derived from the Parachute Creek and Evacuation Creek members of the geologic Green River Formation) to ensure pipelines don't move towards the population,</li> <li>f. Construction activities will not occur from April 15<sup>th</sup> through May 30<sup>th</sup> within occupied habitat,</li> <li>g. Before and during construction, areas for avoidance should be visually identifiable in the field, e.g., flagging, temporary fencing, rebar, etc.,</li> <li>h. Where technically and economically feasible, use directional drilling or multiple wells from the same pad,</li> <li>i. Designs will avoid concentrating water flows or sediments into occupied habitat,</li> <li>j. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, and</li> <li>k. Minimize the disturbed area of producing well locations through interim and final reclamation. Reclaim well pads following drilling to the smallest area possible.</li> </ol>
	<p>Occupied Graham's beardtongue habitats within 300 feet of the edge of the surface pipelines' ROWs, 300 feet of the edge of the roads' ROWs, and 300 feet from the edge of well pads shall be monitored for a period of three years after surface-disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service.</p>
	<p>Reinitiation of Section 7 consultation with the Service will be sought immediately if any loss of plants or occupied habitat for the Graham's beardtongue is anticipated as a result of project activities.</p>
<b>Cultural Resources</b>	<p>If unanticipated cultural sites are discovered during surface-disturbing activities, the steps in <b>Appendix N</b> would be followed to ensure proper mitigation and handling.</p>
	<p>To account for direct and indirect impacts, a 160-acre area would be inventoried at the Class III level at each worker housing location within the WTP Project Area prior to surface disturbance / installation of the temporary worker housing facilities.</p>

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
<b>Tribal Consultation</b>	Per the 2010 WTP PA (see <b>Appendix T</b> ), the BLM will continue to consult with appropriate Indian Tribes regarding historic properties of religious and cultural significance, in accordance with the NHPA, the Native American Graves Protection and Repatriation Act, Archaeological Resources Protection Act (NAGPRA) of 1979 (ARPA), American Indian Religious Freedom Act of 1978 (AIRFA), Executive Order 13007 Sacred Sites, and their implementing regulations. The BLM will provide copies of any report/studies developed pursuant to the WTP PA to those tribes that have expressed a desire for information as it is gathered for the WTP project.
<b>Transportation</b>	The operators would prepare erosion control plans and install erosion control BMPs prior to constructing or upgrading roads in sensitive areas.
	All well heads would be fitted with remote telemetry equipment to facilitate remote monitoring of the wells and reduce pumper traffic.
	Access route closures would be accompanied by public outreach, including appropriate signage to ameliorate conflicts between the public and operators.
	In Nine Mile Canyon (between Harmon and Cottonwood Canyons) and in Harmon, Gate, and Cottonwood Canyons dust would be considered controlled when 1) no dust is generated above the cab of the vehicle, or 2) there are no hanging dust plumes.
<b>Health and Safety</b>	Fire suppression equipment (e.g., fire extinguishers, fire water, and hoses) would be available at each construction site.
	Storage facilities may be fenced as determined necessary during the onsite process.
<b>Visual Resources</b>	During the onsite process, the BLM would consider adding visual resource mitigation measures as conditions of approval as necessary to meet VRM Class III objectives on Horse Bench. Given the lack of vegetative and topographic screening, meeting VRM Class III objectives in this area may require implementation of measures above and beyond those discussed in <b>Appendix L</b> .
	The operators would minimize pumping unit heights.
	The operators would use vegetative and topographic screening when selecting well locations.
	The operators would avoid highwall cuts.
	Lighting at all drilling locations and facilities would be downshielded/directed to areas of human activity as much as possible to ensure human safety.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	The operators would use low profile tanks.
	Within VRM Class I areas and within Canyon Bottoms in VRM Class II areas, the alignment of facilities with respect to observation points (roads in particular) would be reviewed during the pre-installation phase of well development and visual contrast ratings would be performed.
	No development would be located within the viewshed of the Green River unless to do so would preclude the development of valid and existing lease rights. If development were to occur within the viewshed, drilling and completion would only be permitted outside of the high use river recreation season (May 15 <sup>th</sup> to August 15 <sup>th</sup> ).
	Within VRM I and II areas, the operators would contract with a licensed landscape architect approved by the BLM for construction monitoring, inspection, and supervision of visual mitigation and environmental protection measures such as recontouring of landform to approximate natural conditions and berming, revegetation and introduction of screening vegetation, pipeline texturing and coloring (where appropriate), and other measures mentioned below and elsewhere in this document.
	Edges of disturbed areas would be feathered by creating a vertical transition from taller to shorter vegetation along disturbed edges.
	The width of disturbance would be varied and some plant masses would be preserved to create a more naturally appearing edge, thereby avoiding straight, sweeping, and converging lines in the landscape.
	Overall width of surface disturbance would be reduced by working with equipment on the road, and taking advantage of the access already provided by the roadway.
	A revegetation plan would be implemented that includes the installation of shrubs and tubelings, thus, establishing larger caliper plants early in the process.
	Rocks and downed vegetation would be used to “break up” new textures created by disturbance and exposure of soils, and to provide “planting pockets” for the establishment of new plant materials.
	Where stream crossings are necessary, equipment would be kept away from the edge of escarpments and stream banks as feasible, thereby minimizing impacts to the escarpment edge. These edges would be pre-constructed using vegetative or mechanical methods.
	All disturbed surfaces would be recontoured to more natural appearing landform, similar in topography to pre-disturbance and surrounding landscape.

<b>Table 2.6-8 Environmental Protection and Mitigation Measures Applied to Alternatives C, D, and E.</b>	
<b>Resource</b>	<b>Summary of Mitigating Measures</b>
	Soils would be prepared for proper revegetation and environmental protection measures would be implemented for revegetation and erosion control.
	The operators would use materials from well pad or reserve pit construction as aggregate for road construction.
<b>Noise</b>	Operators would be required to reduce noise from drilling and completion operations from within sound of the Green River (approximately 2 miles), through use of mechanisms such as hospital-grade mufflers on drill rigs, compressor stations, and pumping units.
<b>Mitigation Monitoring</b>	The operators would be required to comply with the Mitigation Compliance and Monitoring Plan outlined in <b>Appendix D</b> .

## 2.7 SUMMARY COMPARISON OF THE IMPACTS OF THE ALTERNATIVES

Table 2.7-1 provides a brief summary comparison of resource-specific direct and indirect impacts that could or would result from implementation of the alternatives. Detailed discussions (including quantitative impacts) on impacts or environmental consequences are addressed within Chapter 4 of this EIS.

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
<b>Geology and Minerals</b>	Topographic changes would result from the construction of 538 well pads and other facilities on mesa tops, canyon bottoms, and canyon rims. No significant impacts to salable minerals, coal, tar sands, or oil shale. Slightly increased potential for landslides and rock falls in canyons during blasting.	Topographic changes would be approximately 17 percent of Proposed Action. No significant impacts to salable minerals, coal, tar sands, or oil shale. Slightly increased potential for landslides and rock falls in canyons during blasting. Recovery of natural gas about 9 percent of Proposed Action.	Impacts similar to Proposed Action, but would occur over a longer time period. Production of natural gas would proceed at approximately 33 percent slower rate than under the Proposed Action.	Topographic changes would be about 69 percent of that for the Proposed Action. Production of natural gas would proceed at 50 percent slower rate than for the Proposed Action. Depletions of natural gas about 65 percent of that for the Proposed Action. Limited development in canyon bottoms or slopes over 40 percent would lessen the potential for landslides compared to the Proposed Action. Slightly increased potential for rock falls in canyons during blasting.	Impacts similar to Proposed Action. Topographic changes approximately 91 percent of Proposed Action. No significant impacts to salable minerals, coal, tar sands, or oil shale. Slightly increased potential for landslides and rock falls in canyons during blasting. Recovery of natural gas similar to Proposed Action.
<b>Paleontology</b>	Based on conceptual locations of surface facilities, surface-disturbing activities could result in impacts to four known and other unknown paleontological localities in the WTP Project Area. Construction of project facilities may also uncover scientifically important fossils.	Based on conceptual locations of surface facilities, surface-disturbing activities could result in impacts to three known and other unknown paleontological localities in the WTP Project Area. Construction of project facilities may also uncover scientifically important fossils. Surface disturbance equals approximately 17 percent of Proposed Action.	Impacts similar in nature and scope to the Proposed Action.	Surface disturbance equals approximately 69 percent of Proposed Action and no development would occur on Federal lands in canyon bottoms. However, construction of project facilities may still result in the discovery of scientifically important fossils on the plateau.	Impacts similar in nature and scope to the Proposed Action. Surface disturbance equals approximately 91 percent of Proposed Action.
<b>Air Quality</b>	The Proposed Action would result in concentrations of criteria pollutants below the NAAQS with the exception of ozone. NO <sub>2</sub> concentrations	Qualitative air quality impacts under the No Action Alternative would be similar in nature to those described for the Proposed Action given the	Qualitative air quality impacts would be similar to but slightly less than those described under the Proposed Action. Impacts to air quality would be reduced	Qualitative air quality impacts would be similar to but substantially less than those described under the Proposed Action given the reduction in	Qualitative air quality impacts would be similar to those described under the Proposed Action. Impacts to air quality would be reduced based on

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
	would not likely exceed PSD Class II increments. However, PM <sub>10</sub> concentrations would potentially exceed the PSD Class II increments. Non-carcinogenic acute REL and RfC impacts would be below all applicable significance criteria. Formaldehyde and benzene impacts are not expected to exceed TSLs for the State of Utah. Increases in pollutant concentrations are not expected to exceed PSD Criteria Increments. Terrestrial acid deposition is not expected to exceed thresholds at Class I or Class II areas. Predicted impacts at all lakes would be a 10 percent change in acid neutralizing capacity. No changes in visibility at Class I areas that exceeded a 1.0 deciview limit of acceptable change. Ozone levels due to WTP project emissions would result in less than 0.5 ppb incremental increases.	reduction in numbers of wells and compression; however, under the No Action Alternative, PM <sub>10</sub> concentrations would not exceed the PSD Class II Increments.	based on mitigation measures in <b>Table 2.6-8</b> , which include use of Tier II rigs, emission controls on all condensate storage tank batteries with emissions greater than 5 tons/year, use of best management practices during completion (e.g., green completions), use of best available control technologies (BACT) on engines.	numbers of wells and compression. In addition, impacts to air quality would be reduced based on mitigation measures in <b>Table 2.6-8</b> similar to Alternative C.	mitigation measures in <b>Table 2.6-8</b> similar to Alternative C. Impacts from fugitive dust would be somewhat reduced given the additional dust abatement required as part of the Programmatic Agreement ( <b>Appendix T</b> ), which would require BBC and other operators to control dust throughout the revised Area of Potential Effect for cultural resources; an area much larger in size than the immediate Project Area.
<b>Soils</b>	Increased erosion, vegetation loss, loss of productivity, and increased compaction on approximately 3,656 acres short-term and 1,864 acres long-term surface disturbance. Erosion increases of 2,557 tons short-term (2.9 percent increase) and 887 tons long-term (1.0 percent). Increased chance of soil contamination from products and fuels. Potential initial disturbance of	Impacts similar to the Proposed Action, but of substantially lesser magnitude. Approximately 626 acres short-term and 279 acres long-term surface disturbance. Erosion increases of 475 tons short-term (0.54 percent increase) and 147 tons long-term (0.17 percent). Increased chance of soil contamination from products and fuels	Impacts similar to the Proposed Action, but over longer time frame. Approximately 3,626 acres short-term and 1,828 acres long-term surface disturbance. Erosion increases of 2,878 tons short-term (3.2 percent increase) and 913 tons long-term (1.0 percent). Potential initial disturbance of 1,088 acres of biological soil crusts. Construction of the alternate access route in Trail canyon	Impacts similar to the Proposed Action, but of lesser magnitude. Approximately 2,510 acres short-term and 1,237 acres long-term surface disturbance. Erosion increases of 2,046 tons short-term (2.3 percent increase) and 758 tons long-term (0.9 percent). Chance of soil contamination from products and fuels substantially less in sensitive areas such as canyon bottoms, WSAs, and proposed	Impacts similar to the Proposed Action. Approximately 3,339 acres short-term and 1,678 acres long-term surface disturbance. Erosion increases of 2,651 tons short-term (3.0 percent increase) and 853 tons long-term (1.0 percent). Potential initial disturbance of 1,002 acres of biological soil crusts. Chance of soil contamination from products and fuels less in sensitive areas such

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
	1,097 acres of biological soil crusts.	approximately 17 percent of that for the Proposed Action. Potential initial disturbance of 188 acres of biological soil crusts.	would add 14 acres of disturbance north of Nine Mile Creek.	ACECs because of NSO requirements. Potential initial disturbance of 753 acres of biological soil crusts.	as canyon bottoms and WSAs because of increased directional drilling in these areas.
<b>Water Resources</b>	Increased sediment delivery to Nine Mile Creek of 538 tons per year short-term and 185 tons per year (0.16 percent) long-term. Increased sediment delivery to the Green River of 773 tons short-term and 266 tons (0.0039 percent) long-term. Slightly increased runoff, turbidity, and salinity. Increased chance of water contamination from produced fluids, dust suppressants, and fuels. Depletion of Nine Mile Creek flows by 1.15 percent over an 8-year development period. No significant impacts to groundwater or springs.	Impacts similar to the Proposed Action, but of lesser magnitude. Increased sediment delivery to Nine Mile Creek of 100 tons per year short-term and 31 tons per year (0.028 percent) long-term. Increased sediment delivery to the Green River of 147 tons short-term and 44 tons (0.0007 percent) long-term. Chance of water contamination from produced fluids, dust suppressants, and fuels approximately 17 percent of that for the Proposed Action. Depletion of Nine Mile Creek flows by 0.71 percent over a 2-year development period. No significant impacts to groundwater or springs.	Impacts similar to the Proposed Action, but over longer time frame. Increased sediment delivery to Nine Mile Creek of 608 tons per year short-term and 191 tons per year (0.16 percent) long-term. Increased sediment delivery to the Green River of 864 tons short-term and 274 tons (0.004 percent) long-term. Increased runoff, turbidity, salinity, and potential for water contamination similar to Proposed Action. Depletion of Nine Mile Creek flows by 0.65 percent over a 15-year development period. No significant impacts to groundwater or springs. Also includes special protection measures for water resources, a requirement to comply with BLM Utah Oil and Gas Development Ground Water Protection Measures ( <b>Appendix P</b> ), and a long-term water quality monitoring program ( <b>Appendix Q</b> ).	Impacts similar to the Proposed Action, but of lesser magnitude. Increased sediment delivery to Nine Mile Creek of 425 tons per year short-term and 155 tons per year (0.13 percent) long-term. Increased sediment delivery to the Green River of 614 tons short-term and 227 tons (0.0033 percent) long-term. Increased runoff, turbidity and salinity similar to Proposed Action. Potential for water contamination lower than Proposed Action due to NSO in canyon bottoms. Depletion of Nine Mile Creek flows by 0.35 percent over a 20-year development period. No significant impacts to groundwater or springs. Also includes special protection measures for water resources, a requirement to comply with BLM Utah Oil and Gas Development Ground Water Protection Measures ( <b>Appendix P</b> ), and a long-term water quality monitoring program ( <b>Appendix Q</b> ).	Impacts similar to the Proposed Action, but over longer time frame. Increased sediment delivery to Nine Mile Creek of 566 tons per year short-term and 178 tons per year (0.15 percent) long-term. Increased sediment delivery to the Green River of 808 tons short-term and 256 tons (0.0038 percent) long-term. Increased runoff, turbidity, salinity, and potential for water contamination similar to Proposed Action. Depletion of Nine Mile Creek flows by 1.01 percent over a 9-year development period. No significant impacts to groundwater or springs. Also includes special protection measures for water resources, a requirement to comply with BLM Utah Oil and Gas Development Ground Water Protection Measures ( <b>Appendix P</b> ), and a long-term water quality monitoring program ( <b>Appendix Q</b> ).
<b>Land Use</b>	Implementation would lead to adjustments in existing land uses on public and private lands and authorization of additional ROWs.	Impacts would be similar to those described under the Proposed Action but would be substantially less based upon the level of development.	Impacts would be similar to the Proposed Action; however, surface disturbance thresholds and rig limitations would limit the annual and total amount of surface disturbance. As such, the extent of land uses displaced would be less than under the	Impacts would be similar to the Proposed Action; however, surface disturbance would be approximately 69 percent of disturbance estimated under the Proposed Action. In addition, intensity of development would be controlled by rig limitations,	Impacts would be similar to the Proposed Action; however, surface disturbance thresholds would limit the annual and total amount of surface disturbance. In addition, there would be reduced surface disturbance in WSAs and NSO in canyon

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
			Proposed Action.	surface disturbance thresholds, and seasonal restrictions. Finally, there would be NSO in canyon bottoms (where surface occupancy restrictions would not preclude access to valid and existing rights) and in WSAs. Consequently, the extent of land uses displaced would be less than under the Proposed Action.	bottoms (where surface occupancy restrictions would not preclude access to valid and existing rights). As such, the extent of land uses displaced would be less than under the Proposed Action.
<b>Rangeland Management</b>	Short-term removal of forage, thereby impacting 212 AUMs; potential impacts to livestock management facilities (e.g., damage to gates and cattle guards) could subsequently affect livestock movements; potential increase in livestock–vehicle collisions; winter development in the Green River allotment and snow-plowed roads (i.e., high snow banks) with no exit points could potentially hinder livestock movement; and increased potential for invasive and noxious plants, which could further reduce available forage for livestock.	Short-term removal of forage, thereby impacting 21 AUMs; potential impacts to livestock management facilities (e.g., damage to gates and cattle guards) could subsequently affect livestock movements; potential increase in livestock–vehicle collisions; winter development in the Green River allotment and snow-plowed roads (i.e., high snow banks) with no exit points could potentially hinder livestock movement; and increased potential for invasive and noxious plants, which could further reduce available forage for livestock.  Most direct impacts would be limited to State and private lands and impacts to Federal AUMs would be substantially less than the Proposed Action, Alternatives C, D, or E.	Impacts similar in nature to those under Proposed Action; activities would result in short-term removal of forage, thereby impacting 210 AUMs within the WTP Project Area and less than 1 AUM on the Parleys Canyon allotment; potential impacts to livestock management facilities could subsequently affect livestock movements; potential increase in livestock–vehicle collisions; and increased potential for invasive and noxious plants, which could further reduce available forage for livestock. However, impacts resulting from weeds would be reduced based on mitigation measures in <b>Table 2.6-8</b> requiring a weed control plan and annual monitoring of weeds.  Winter development in the Green River allotment and snow-plowed roads (i.e., high snow banks) with no exit points could potentially hinder livestock movement; however, these potential impacts would be reduced under Alternative C given the special protection measures that would require	Impacts similar in nature to the Proposed Action; direct impacts would be substantially less than Proposed Action, Alternative C, or Alternative E because of NSO limitations in sensitive areas.  Short-term removal of forage, thereby impacting 159 AUMs; potential impacts to livestock management facilities (e.g., damage to gates and cattle guards) could subsequently affect livestock movements; potential increase in livestock–vehicle collisions; and increased potential for invasive and noxious plants, which could further reduce available forage for livestock. However, impacts resulting from weeds would be reduced based on mitigation measures in <b>Table 2.6-8</b> requiring a weed control plan and annual monitoring of weeds.  Potential impacts to livestock during the winter would be substantially reduced as construction, drilling, and completion activities would be prohibited during the winter months. However, winter-	Impacts similar in nature to those under Proposed Action; activities would result in short-term removal of forage, thereby impacting 197 AUMs; potential impacts to livestock management facilities (e.g., damage to gates and cattle guards) could subsequently affect livestock movements; potential increase in livestock–vehicle collisions; and increased potential for invasive and noxious plants, which could further reduce available forage for livestock. However, impacts resulting from weeds would be reduced based on mitigation measures in <b>Table 2.6-8</b> requiring a weed control plan and annual monitoring of weeds.  Winter development in the Green River allotment and snow-plowed roads (i.e., high snow banks) with no exit points could potentially hinder livestock movement; however, these potential impacts would be reduced under Alternative E given the special protection measures that would require operators to leave openings

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
			<p>operators to leave openings during plowing to provide for wildlife (and livestock) movement.</p> <p>Traffic related impacts (e.g., livestock-vehicle collision potential) would be reduced because of rig limitations and other measures to reduce traffic.</p>	<p>related impacts could still occur as production activities would continue year-round.</p> <p>Year-round gating of the roads to Cedar Ridge and Horse Bench would reduce public motorized access within these areas, thereby reducing potential for livestock interaction with the public, vehicle related mortality of livestock, and/or displacement of livestock as compared to the Proposed Action.</p>	<p>during plowing to provide for wildlife (and livestock) movement.</p> <p>Traffic related impacts (e.g., collision potential) would be reduced because of transportation restrictions.</p>
<b>Wild Horses</b>	<p>Proposed Action would result in short-term removal of approximately 1,091 acres of forage within Range Creek HMA, fragmentation of an additional 6,823 acres of habitat, and a general loss in habitat value. Potential displacement from habitats, could adversely affect horses especially when displaced from wintering areas. A potential increase in wild horse-vehicle collisions.</p>	<p>Impacts substantially lower than Proposed Action, or Alternatives C, D, or E because development would be limited to State and private lands.</p> <p>No Action Alternative would result in short-term removal of approximately 99 acres of forage within Range Creek HMA, increased habitat fragmentation; potential displacement from habitats, which could adversely affect horses especially when displaced from wintering areas; and potential increase in wild horse-vehicle collisions.</p>	<p>Impacts similar in nature to the Proposed Action. Short-term removal of approximately 1,116 acres of forage within the Range Creek HMA, increased habitat fragmentation, and general loss in habitat value; and potential displacement from habitats, which could adversely affect horses especially when displaced from wintering areas. Impacts on horses during the winter would be reduced as only 2 rigs would be allowed to operate during the winter season. Similarly, special mitigation measures designed to reduce winter-related effects on wildlife would also reduce impacts on wild horses.</p> <p>Traffic related impacts (e.g., collision potential) would also be reduced because of rig limitations and other measures to reduce traffic.</p>	<p>Impacts similar in nature but substantially reduced compared to the Proposed Action; Alternative C, or Alternative E because of NSO restrictions in sensitive areas.</p> <p>Alternative D would result in short-term removal of approximately 726 acres of forage within the Range Creek HMA, fragmentation of an additional, 4,469 acres of habitat, and general loss in habitat value. Potential displacement from habitats could adversely affect horses especially when displaced from wintering areas. However, potential impacts to horses during the winter would be substantially reduced as development would prohibit construction, drilling, and completion activities during the winter months. Winter-related impacts could still occur as production activities would continue year-round.</p>	<p>Impacts similar in nature to the Proposed Action. Alternative E would result in short-term removal of approximately 1,002 acres of forage within the Range Creek HMA, increased habitat fragmentation equivalent to those described under the Proposed Action, and general loss in habitat value. Potential displacement from habitats could adversely affect horses especially when displaced from wintering areas. Special mitigation measures designed to reduce winter-related effects on wildlife would also reduce impacts on wild horses.</p> <p>Traffic related impacts (e.g., collision potential) would also be reduced because of transportation restrictions.</p>

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
				Year-round gating of the Cedar Ridge Road would reduce public motorized access within this area, thereby reducing potential for wild horse interaction with the public, vehicle related mortality of wild horses, and/or displacement of wild horses as compared to the Proposed Action.	
<b>Vegetation</b>	Proposed Action would result in direct, short-term removal of approximately 3,656 acres of vegetation; increased fragmentation of vegetation communities; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could out-compete native vegetation in the WTP Project Area, primarily along roadways.	No Action Alternative would result in direct, short-term removal of approximately 626 acres of vegetation; increased fragmentation of vegetation communities; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could out-compete native vegetation in the area, primarily along roadways.  Impacts substantially lower than under the Proposed Action, or Alternatives C, D, or E because development would be limited to State and private lands.	Alternative C would result in direct, short-term removal of approximately 3,640 acres of vegetation; increased fragmentation of vegetation communities; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could out-compete native vegetation in the area, primarily along roadways. However, impacts resulting from weeds would be reduced as compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.  Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because of rig limitations and other transportation restrictions.  Fragmentation of vegetation communities would be less than	Alternative D would result in direct, short-term removal of approximately 2,510 acres of vegetation; increased fragmentation of vegetation communities; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could out-compete native vegetation in the area, primarily along roadways. However, impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.  Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because transportation restrictions would reduce traffic in sensitive areas.  Fragmentation of vegetation communities would also be less	Alternative E would result in direct, short-term removal of approximately 3,339 acres of vegetation; increased fragmentation of vegetation communities; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could out-compete native vegetation in the area, primarily along roadways. However, impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.  Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because transportation restrictions would reduce traffic in sensitive areas.  Fragmentation of vegetation communities would be less than

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
			Proposed Action due to surface disturbance thresholds and burial of 62 percent of proposed pipelines (with subsequent interim reclamation of the pipeline ROWs).	than Proposed Action due to surface disturbance thresholds.	Proposed Action due to surface disturbance thresholds and burial of 62 percent of proposed pipelines (with subsequent interim reclamation of the pipeline ROWs).
<b>Wildlife</b>	<p>Potential for direct, short-term removal of approximately 3,656 acres of habitat; 16,842 acres of habitat fragmentation in crucial winter mule deer habitat; 20,058 acres of habitat fragmentation in crucial winter elk habitat; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, noise, and lighting, which could increase physical distress, energy expenditure, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats or wintering grounds due to winter drilling; increased potential for disruption of migration routes and prevention of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p>Impacts would be substantially mitigated with implementation of BBC's Wildlife Mitigation Plan, which</p>	<p>Potential for direct, short-term removal of approximately 626 acres of habitat and foraging areas; increased fragmentation of these areas; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats due to winter drilling; increased potential for disruption of migration routes and prevention of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p>Impacts substantially lower than under the Proposed Action, or Alternatives C, D, or E because development would be limited to State and private lands.</p>	<p>Based on the special protective measures designed for wildlife, many of the direct and indirect impacts of the Proposed Action would be reduced under Alternative C. Furthermore, mitigation measures in <b>Table 2.6-8</b> (e.g., raptor nest survey requirements and compliance with spatial and seasonal restrictions) would reduce potential impacts on nesting raptors</p> <p>Potential for direct, short-term removal of approximately 3,640 acres of habitat and foraging areas; increased fragmentation of these areas; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, aerial transport, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats or wintering grounds due to winter drilling; increased potential for disruption of migration routes and prevention</p>	<p>Mitigation measures in <b>Table 2.6-8</b> (e.g., raptor nest survey requirements and compliance with spatial and seasonal restrictions) would reduce potential impacts on nesting raptors.</p> <p>Potential for direct, short-term removal of approximately 2,510 acres of habitat and foraging areas; 12,951 acres of habitat fragmentation in crucial winter mule deer habitat; 15,460 acres of habitat fragmentation in crucial winter elk habitat; increased fragmentation of these areas; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, aerial transport, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; increased potential for disruption of migration routes and prevention of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p>	<p>Based on the special protective measures designed for wildlife, many of the direct and indirect impacts of the Proposed Action would be reduced under Alternative E. Furthermore, mitigation measures in <b>Table 2.6-8</b> (e.g., raptor nest survey requirements and compliance with spatial and seasonal restrictions) would reduce potential impacts on nesting raptors.</p> <p>Potential for direct, short-term removal of approximately 3,339 acres of habitat and foraging areas; increased fragmentation of these areas; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, aerial transport, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats or wintering grounds due to winter drilling; increased potential for disruption of migration routes and prevention</p>

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
	<p>includes a commitment to mitigate 4 acres for every acre of disturbance.</p>		<p>of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p>Impacts on wildlife during the winter would be reduced as only 2 rigs would be allowed to operate during the winter season, and given the special mitigation measures designed to reduce winter-related effects on wildlife (e.g., rerouting roads around sage-grouse core-use winter areas).</p> <p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because rig limitations and other transportation restrictions would reduce traffic within the WTP Project Area.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Fragmentation of habitat would be less due to surface disturbance thresholds and burial of proposed pipelines (with subsequent interim reclamation of the pipeline ROWs).</p> <p>Habitat loss and fragmentation impacts on mule deer and elk could be mitigated with implementation of the Agency</p>	<p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because transportation restrictions would reduce traffic in sensitive areas. For example, year-round gating of the roads to Cedar Ridge, Horse Bench, Jack Canyon, and Jack Ridge would reduce public motorized access within these areas, thereby reducing potential for wildlife interaction with the public, vehicle related wildlife mortality, and/or wildlife displacement as compared to the Proposed Action.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Fragmentation of habitat would be less due to surface disturbance thresholds.</p> <p>Displacement from crucial winter habitats or wintering grounds would not occur because winter construction, drilling, and completion activities would not occur within the WTP Project Area.</p> <p>NSO within WSAs, no leasing or development of lands within non-WSA lands with wilderness characteristics, and NSO within</p>	<p>of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because transportation restrictions would reduce traffic in sensitive areas.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Impacts from winter drilling could be reduced based on special protective measures designed to reduce winter-related effects on wildlife (e.g., rerouting roads around sage-grouse core-use winter areas).</p> <p>Expanded use of directional drilling in the WSAs, non-WSA lands with wilderness characteristics, and canyon bottoms would substantially reduce potential impacts to species utilizing these areas (e.g., bighorn sheep lambing areas in Jack Canyon would not be affected).</p> <p>Fragmentation of habitats would be less due to surface disturbance thresholds and burial of proposed pipelines (with</p>

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
			Wildlife Mitigation Plan, which requires 4 acres of mitigation for every acre of disturbance.	unleased lands in canyon bottoms would substantially reduce potential impacts to species utilizing these areas (e.g., bighorn sheep lambing areas in Jack Canyon would not be affected).	subsequent interim reclamation of the pipeline ROWs).  Habitat loss and fragmentation impacts on mule deer and elk could be substantially mitigated with implementation of the Agency Wildlife Mitigation Plan which requires 4 acres of mitigation for every acre of disturbance.
<b>Threatened, Endangered, and Sensitive (T&amp;E) Plants</b>	Proposed Action would result in direct, short-term removal of approximately 3,656 acres of vegetation; increased fragmentation of vegetation communities; increased potential for exploitation by collectors resulting from improved access to habitats; increased potential for damage or destruction of plants as a result of increased OHV use due to improved access within the WTP Project Area; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could compete with vegetation in the WTP Project Area, primarily along roadways.  <i>“May affect, is likely to adversely affect”</i> Uinta Basin hookless cactus or its suitable habitat within the WTP Project Area.	No Action Alternative would result in direct, short-term removal of approximately 626 acres of vegetation; increased fragmentation of vegetation communities; increased potential for exploitation by collectors resulting from improved access to habitats; increased potential for damage or destruction of plants as a result of increased OHV use due to improved access within the WTP Project Area; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could compete with native vegetation in the area, primarily along roadways.  Impacts substantially lower than under the Proposed Action, or Alternatives C, D, or E because development would be primarily limited to State and private lands.	Based on mitigation measures in <b>Table 2.6-8</b> , which include species-specific conservation measures, many of the direct and indirect impacts on special status plants would be reduced under Alternative C.  Alternative C would result in direct, short-term removal of approximately 3,640 acres of vegetation; increased fragmentation of vegetation communities; increased potential for exploitation by collectors resulting from improved access to habitats (albeit less potential for access to T&E species habitats given gating of/administrative access only on select roads); increased potential for damage or destruction of plants as a result of increased OHV use due to improved access within the WTP Project Area; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious plants, which could compete with	Based on mitigation measures in <b>Table 2.6-8</b> , which include species-specific conservation measures, many of the direct and indirect impacts on special status plants would be reduced under Alternative D.  Alternative D would result in direct, short-term removal of approximately 2,510 acres of vegetation; increased fragmentation of vegetation communities; increased potential for exploitation by collectors resulting from improved access to habitats (albeit less potential for access to T&E species habitats given gating of/administrative access only on Horse Bench Road); increased potential for damage or destruction of plants as a result of increased OHV use due to improved access within the WTP Project Area; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious	Based on mitigation measures in <b>Table 2.6-8</b> , which include species-specific conservation measures, many of the direct and indirect impacts on special status plants would be reduced under Alternative E.  Alternative E would result in direct, short-term removal of approximately 3,399 acres of vegetation; increased fragmentation of vegetation communities; increase the potential for exploitation by collectors resulting from improved access to habitats (albeit less potential for access to T&E species habitats given gating of/administrative access only on select roads); increased potential for damage or destruction of plants as a result of increased OHV use due to improved access within the WTP Project Area; decreased productivity due to increased erosion, sediment deposition, and fugitive dust; increased potential for wildfires; and increased potential for the spread of invasive and noxious

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
	<p>Could affect individual Graham's beardtongue, and may result in a trend towards Federal listing of the species.</p>	<p><i>"May affect, is not likely to adversely affect"</i> Uinta Basin hookless cactus or its suitable habitat within the WTP Project Area.</p> <p>Could affect individual Graham's beardtongue, and may result in a trend towards Federal listing of the species.</p>	<p>native vegetation in the area, primarily along roadways.</p> <p>Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because rig limitations and other transportation restrictions would reduce traffic within the WTP Project Area; potential for exploitation by collectors would be reduced by gating roads and other transportation access restrictions; potential for noxious weeds could be reduced by surface disturbance thresholds and mitigation measures in <b>Table 2.6-8</b>; and fragmentation of vegetation communities would be less due to surface disturbance thresholds and burial of approximately 62 percent of proposed pipelines (with subsequent interim reclamation of the pipeline ROWs).</p> <p><i>"May affect, is not likely to adversely affect"</i> Uinta Basin hookless cactus or its suitable habitat within the WTP Project Area.</p> <p>Could impact individual Graham's beardtongue, but would not likely result in a trend towards Federal listing of the species.</p>	<p>plants, which could compete with native vegetation in the area, primarily along roadways.</p> <p>Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because transportation restrictions would reduce traffic in sensitive areas; potential for exploitation by collectors would be reduced by transportation access restrictions including year-round gating of Horse Bench road; potential for noxious weeds could be reduced by surface disturbance thresholds and mitigation measures in <b>Table 2.6-8</b>; and fragmentation of vegetation communities would be less due to surface disturbance thresholds.</p> <p><i>"May affect, is not likely to adversely affect"</i> Uinta Basin hookless cactus or its suitable habitat within the WTP Project Area.</p> <p>Could affect individual Graham's beardtongue, but would not likely result in a trend towards Federal listing of the species.</p>	<p>plants, which could compete with native vegetation in the area, primarily along roadways.</p> <p>Traffic-related impacts (e.g., sediment deposition, fugitive dust) would be reduced because transportation restrictions would reduce traffic in sensitive areas; potential for exploitation by collectors would be reduced by gating roads and other transportation access restrictions; potential for noxious weeds could be reduced by surface disturbance thresholds and mitigation measures in <b>Table 2.6-8</b>; and fragmentation of vegetation communities would be less due to surface disturbance thresholds and burial of approximately 62 percent of proposed pipelines (with subsequent interim reclamation of the pipeline ROWs).</p> <p><i>"May affect, is not likely to adversely affect"</i> Uinta Basin hookless cactus or its suitable habitat within the WTP Project Area.</p> <p>Could affect individual Graham's beardtongue, but would not likely result in a trend towards Federal listing of the species.</p>
<p><b>Threatened, Endangered, and Sensitive Wildlife (T&amp;E Wildlife)</b></p>	<p>Impacts on T&amp;E wildlife species would include the direct, short-term removal of approximately 3,656 acres of habitat and foraging areas; increased fragmentation of</p>	<p>Impacts on T&amp;E wildlife would be substantially lower than under the Proposed Action, or Alternatives C, D, or E because development would be primarily limited to State</p>	<p>Based on the special protective measures designed for wildlife, many of the direct and indirect impacts of the Proposed Action on T&amp;E wildlife would be reduced under Alternative C.</p>	<p>Under Alternative D, mitigation measures in <b>Table 2.6-8</b> would reduce many potential impacts to T&amp;E wildlife, as compared to the Proposed Action.</p>	<p>Based on the special protective measures designed for wildlife, many of the direct and indirect impacts of the Proposed Action on T&amp;E wildlife would be reduced under Alternative E.</p>

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
	<p>habitats; reduced habitat value or use by wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats or wintering grounds due to winter drilling; increased potential for disruption of migration routes and prevention of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p>Impacts would be substantially mitigated with implementation of BBC’s Wildlife Mitigation Plan.</p> <p><i>“May affect, is likely to adversely affect”</i> the MSO and its USFWS-designated critical habitat.</p> <p><i>“May affect, is likely to adversely affect”</i> the southwestern willow flycatcher.</p> <p>May affect and is likely to contribute to a trend toward federal listing of the yellow-billed cuckoo.</p>	<p>and private lands.</p> <p>The No Action Alternative would result in the direct, short-term removal of approximately 626 acres of habitat and foraging areas; increased fragmentation; reduced habitat value or use by T&amp;E wildlife; temporary habitat loss due to changes in vegetation structure; avoidance of habitat or temporary displacement from habitat caused by increased human activity, traffic, noise, and lighting, which could increase physical distress, energy expenditure, competition for resources, and decrease nutritional condition and reproductive success; displacement from crucial winter habitats due to winter drilling; increased potential for disruption of migration routes and prevention of access to sufficient foraging and water resources; and increased potential for collisions with vehicles.</p> <p><i>“May affect, is likely to adversely affect”</i> the MSO and its USFWS-designated critical habitat.</p> <p><i>“May affect, is likely to adversely affect”</i> the southwestern willow flycatcher.</p> <p>May affect and is likely to lead contribute to a trend toward</p>	<p>Furthermore, mitigation measures in <b>Table 2.6-8</b> would reduce many of the potential impacts.</p> <p>Direct, short-term removal of approximately 3,640 acres of habitat and foraging areas. Other impacts on T&amp;E wildlife would be similar to the Proposed Action.</p> <p>Impacts on wildlife during the winter would be reduced as only two rigs would be allowed to operate during the winter season, and given the special mitigation measures designed to reduce winter-related effects on wildlife.</p> <p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because rig limitations and other transportation restrictions would reduce traffic within the WTP Project Area.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Fragmentation of habitat would be less due to surface disturbance thresholds and burial of 62 percent of proposed pipelines (with subsequent interim reclamation of the</p>	<p>Direct, short-term removal of approximately 2,510 acres of habitat. Other impacts would be similar to the Proposed Action; however, impacts on T&amp;E wildlife during the winter would be reduced given seasonal closures on construction, drilling and completion activities during the winter.</p> <p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because rig limitations and transportation restrictions would reduce traffic within the WTP Project Area.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Fragmentation of habitat would be less due to surface disturbance thresholds.</p> <p>NSO within WSAs, no leasing or development of lands within non-WSA lands with wilderness characteristics, and NSO within unleased lands in canyon bottoms would substantially reduce potential impacts to T&amp;E species utilizing these areas (e.g., MSO in canyon habitats).</p> <p>Impacts to MSO would be substantially reduced given NSO</p>	<p>Furthermore, mitigation measures in <b>Table 2.6-8</b> would reduce many of the potential impacts.</p> <p>Direct, short-term removal of approximately 3,399 acres of habitat. Other impacts on T&amp;E wildlife would be similar to the Proposed Action.</p> <p>Impacts on wildlife during the winter would be reduced given the special mitigation measures designed to reduce winter-related effects on T&amp;E wildlife.</p> <p>Traffic-related impacts (e.g., avoidance, displacement, and potential for collisions with vehicles) would be reduced because transportation restrictions would reduce traffic within the WTP Project Area.</p> <p>Impacts resulting from weeds would be reduced compared to the Proposed Action based on mitigation measures in <b>Table 2.6-8</b> that include requirements for a weed control plan and annual monitoring of weeds.</p> <p>Fragmentation of habitat would be less due to surface disturbance thresholds and burial of 62 percent of proposed pipelines (with subsequent interim reclamation of the ROWs).</p> <p>Impacts to MSO would be substantially reduced given NSO requirements in canyon bottoms,</p>

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
	<p>Would reduce sage-grouse habitat and may displace or affect individual sage-grouse. However, implementation of BBC's Wildlife Mitigation Plan would benefit sage-grouse by improving or creating habitat for the species.</p> <p><i>"May affect, is likely to adversely affect" the Colorado River fish and their USFWS-designated critical habitats.</i></p> <p>Impacts to bald eagles would be similar to the general impacts described above.</p>	<p>federal listing of the yellow-billed cuckoo.</p> <p>Would reduce sage-grouse habitat and may displace or affect individual sage-grouse.</p> <p><i>"May affect, is likely to adversely affect" the Colorado River fish and their USFWS-designated critical habitats.</i></p> <p>Impacts to bald eagles would be similar to the general impacts described above.</p>	<p>ROWs).</p> <p>Impacts to MSO would be substantially reduced given survey requirements and other measures listed in <b>Table 2.6-8</b>. Although impacts would be reduced, Alternative C <i>"may affect, is likely to adversely affect" the MSO and its USFWS-designated critical habitat.</i></p> <p><i>"May affect, is not likely to adversely affect" the southwestern willow flycatcher.</i></p> <p>May affect but is not likely to lead contribute to a trend toward federal listing of the yellow-billed cuckoo.</p> <p>Would reduce sage-grouse habitat and may displace or affect individual sage-grouse. However, implementation of the Agency Wildlife Mitigation Plan would benefit sage-grouse by improving or creating habitat for the species.</p> <p><i>"May affect, is likely to adversely affect" the Colorado River fish and their USFWS-designated critical habitats.</i></p> <p>Impacts to bald eagles would be similar to the general impacts described above.</p>	<p>requirements in canyon bottoms, survey requirements, and other measures listed in <b>Table 2.6-8</b>. Although impacts would be reduced, Alternative D <i>"may affect, is likely to adversely affect" the MSO and its USFWS-designated critical habitat.</i></p> <p><i>"May affect, is not likely to adversely affect" the southwestern willow flycatcher.</i></p> <p>May affect but is not likely to lead contribute to a trend toward federal listing of the yellow-billed cuckoo.</p> <p>Impacts to wintering sage-grouse would be substantially reduced given winter closures. Year-round gating of Cedar Ridge road would reduce motorized access in crucial winter and brooding habitats. However, implementation of the Agency Wildlife Mitigation Plan would benefit sage-grouse by improving or creating habitat for the species.</p> <p><i>"May affect, is likely to adversely affect" the Colorado River fish and their USFWS-designated critical habitats.</i></p> <p>Impacts to bald eagles would be similar to the general impacts described above.</p>	<p>survey requirements, and other measures listed in <b>Table 2.6-8</b>. Although impacts would be reduced, Alternative E <i>"may affect, is likely to adversely affect" the MSO and its USFWS-designated critical habitat.</i></p> <p><i>"May affect, is not likely to adversely affect" the southwestern willow flycatcher.</i></p> <p>May affect but is not likely to lead contribute to a trend toward federal listing of the yellow-billed cuckoo.</p> <p>Would reduce sage-grouse habitat and may displace or affect individual sage-grouse. However, implementation of the Agency Wildlife Mitigation Plan would benefit sage-grouse by improving or creating habitat for the species.</p> <p><i>"May affect, is likely to adversely affect" the Colorado River fish and their USFWS-designated critical habitats.</i></p> <p>Impacts to bald eagles would be similar to the general impacts described above.</p>
<b>Recreation</b>	Potential impacts to scenic driving and viewing opportunities and experiences from increased dust and	Potential impacts to scenic driving and viewing opportunities and experiences from increased dust and	Potential impacts to scenic driving and viewing opportunities and experiences from increased dust and particulate matter;	Potential impacts to scenic driving and viewing opportunities and experiences from increased dust and particulate matter;	Potential impacts to scenic driving and viewing opportunities and experiences from increased dust and particulate matter;

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
	<p>particulate matter; potential impacts to river recreation opportunities and experiences from increased sedimentation, runoff, turbidity, salinity, and potential for contamination in the Green River; potential impacts to hunting and wildlife viewing opportunities; and experiences from increased disturbances to wildlife populations and habitats. ROS designations would shift toward Rural in the short-term and Roaded Natural in the long-term for areas near development. Recreational experiences would be diminished in the Desolation Canyon and Nine Mile Canyon SRMAs. Expanded road systems would increase opportunities for OHV use. Opportunities for primitive and unconfined recreation would be reduced by development in the WSAs and other areas designated as primitive. Development would likely be within sight and sound of the Green River.</p>	<p>particulate matter; potential impacts to river recreation opportunities and experiences from increased sedimentation, runoff, turbidity, salinity, and potential for contamination in the Green River; potential impacts to hunting and wildlife viewing opportunities; and experiences from increased disturbances to wildlife populations and habitats. Potential impacts would be similar to those described for the Proposed Action but would be substantially lower because development would be limited to State and private lands. Opportunities for primitive and unconfined recreation would continue to be available in a broader portion of the WTP Project Area as there would no development within sight or sound of the Green River or within the Jack or Desolation Canyon WSAs.</p>	<p>potential impacts to river recreation opportunities and experiences from increased sedimentation, runoff, turbidity, salinity, and potential for contamination in the Green River; potential impacts to hunting and wildlife viewing opportunities; and experiences from increased disturbances to wildlife populations and habitats. Potential impacts would be similar to the Proposed Action, but would be reduced in proportion to reduction in traffic levels. Gating of roads would limit expansion of OHV opportunities in the WTP Project Area and traffic in the WSAs. Impacts would extend over a longer period of time. Under Alternative C, development could occur within sight and sound of the Green River and within the Jack and Desolation Canyon WSAs. However, mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize these impacts when compared to the Proposed Action.</p>	<p>potential impacts to river recreation opportunities and experiences from increased sedimentation, runoff, turbidity, salinity, and potential for contamination in the Green River; potential impacts to hunting and wildlife viewing opportunities; and experiences from increased disturbances to wildlife populations and habitats. Potential impacts would be similar to the Proposed Action but would be reduced in proportion to the reduction in proposed development. In addition, opportunities for primitive and unconfined recreation would continue to be available in a broader portion of the WTP Project Area as there would be NSO allowed within the WSAs, and no development allowed on unleased lands within the potential Nine Mile and Desolation Canyon ACECs, or Jack and Desolation Canyon wilderness characteristics areas. Year-round gating of the roads to Cedar Ridge, Horse Bench, Jack Canyon, and Jack Ridge would reduce public motorized access within these areas providing for a more primitive recreational experience along Horse Bench and in the WSAs. Alternatively, gating would adversely affect the recreational experience of publics that prefer motorized access. In addition, no development would occur within sight or sound of the Green River.</p>	<p>potential impacts to river recreation opportunities and experiences from increased sedimentation, runoff, turbidity, salinity, and potential for contamination in the Green River; potential impacts to hunting and wildlife viewing opportunities; and experiences from increased disturbances to wildlife populations and habitats. Potential impacts would be similar in nature to the Proposed Action with the following exceptions. Gating of roads would limit expansion of OHV opportunities and would limit traffic within WSAs. In addition, under Alternative E opportunities for primitive and unconfined recreation would continue to be available in a broader portions of the of the WTP Project Area because there would be less surface disturbance within the WSAs as well as other areas considered primitive. Development could occur within sight and sound of the Green River; however, mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize these impacts when compared to the Proposed Action. Cultural site interpretation and stewardship requirements outlined in the Programmatic Agreement (Appendix T) would benefit cultural resource-related recreational uses of the Project Area.</p>

**Table 2.7-1. Summary Comparison of the Impacts of the Alternatives**

Resource	Alternative A – Proposed Action Impacts	Alternative B – No Action Alternative Impacts	Alternative C – Transportation Impact Reduction Alternative Impacts	Alternative D – Conservation Alternative Impacts	Alternative E – Agency Preferred Alternative Impacts
<b>Cultural Resources</b>	<p>Implementation of the Proposed Action could have an “adverse effect” on historic properties in the WTP Project Area. Based on conceptual locations for surface facilities, activities associated with new surface disturbance could directly impact 37 known cultural resources – 21 of which are eligible for the NRHP. Activities associated with existing road maintenance or upgrades would potentially conflict directly with 43 known cultural resources – 26 of which are eligible for the NRHP. Surface-disturbing activities would potentially conflict directly with between approximately 94 and 219 unknown cultural resources. Direct impacts to buried cultural resources could also occur. Direct impacts would be largely mitigated by complying with the avoidance and unanticipated discovery measures discussed in Appendix N. Anticipated indirect impacts to cultural resources include the accumulation of dust and its impact on rock art, the impact of vibration and project-related erosion on cultural resources, increased visitation and vandalism, OHV use and traffic, and impacts to the natural setting and viewshed. Development would introduce visual, atmospheric, and auditory elements that could</p>	<p>Based on conceptual locations for surface facilities, activities associated with new surface directly impact five known cultural resources – three of which are eligible for the NRHP. Activities associated with existing road maintenance or upgrades would potentially conflict directly with 43 known cultural resources – 26 of which are eligible for the NRHP. Surface-disturbing activities would potentially conflict directly with between approximately 17 and 59 unknown cultural resources. Direct impacts to buried cultural resources could also occur. Direct impacts would be largely mitigated by complying with the avoidance and unanticipated discovery measures discussed in Appendix N. Anticipated indirect impacts to cultural resources include the accumulation of dust and its impact on rock art, the impact of vibration and project-related erosion on cultural resources, increased visitation and vandalism, OHV use and traffic, and impacts to the natural setting and viewshed. Development would introduce visual, atmospheric, and auditory elements that could detract from the cultural significance of identified TCPs and adversely impact sites that are listed, or eligible for listing on the National</p>	<p>Based on conceptual locations for surface facilities, direct impacts to cultural resources are similar to those described under the Proposed Action. Indirect impacts to cultural resources are also similar to those described under the Proposed Action, although the extent of the impacts is slightly different. Specifically, use of an alternative access route through Trail Canyon, use of aerial transportation, and transportation restrictions could reduce traffic-related impacts such as vibration, erosion, increased visitation, and vandalism in areas with high cultural resource density such as Nine Mile Canyon. Anticipated indirect impacts to cultural resources include the accumulation of dust and its impact on rock art, the impact of vibration and project-related erosion on cultural resources, increased visitation and vandalism, OHV use and traffic, and impacts to the natural setting and viewshed. Development would introduce visual, atmospheric, or auditory elements that could detract from the cultural significance of identified TCPs and adversely impact sites that are listed, or eligible for listing on the National Register.</p> <p>Implementation of the dust suppression plan would substantially reduce the amount of dust generated by project-</p>	<p>Given reductions in the amount proposed development (approximately 30 percent) impacts would be less than under the Proposed Action. No development would occur on Federal lands in Canyon bottoms, where concentrations of cultural resources are highest.</p> <p>Based on conceptual locations for surface facilities, activities associated with new surface disturbance could directly impact 25 known cultural resources – 13 of which are eligible for the NRHP. Activities associated with existing road maintenance or upgrades would potentially conflict directly with 41 known cultural resources – 30 of which are eligible for the NRHP. Surface-disturbing activities would potentially conflict directly with between approximately 68 and 181 unknown cultural resources. Direct impacts to buried cultural resources could also occur. Direct impacts would be largely mitigated by complying with the avoidance and unanticipated discovery measures discussed in Appendix N. Indirect impacts to cultural resources are similar to those described under the Proposed Action, although the extent of the impacts is slightly different. Specifically, transportation restrictions, and surface occupancy restrictions could reduce traffic-related impacts such as dust, vibration, erosion, increased visitation, and</p>	<p>Implementation of the Agency Preferred Alternative could have an “adverse effect” on historic properties in the WTP Project Area. To mitigate adverse impacts, under the Agency Preferred Alternative BBC and other operators would be required to carry out cultural resource mitigation measures as specified in the WTP PA (<b>Appendix T</b>). These measures include, but are not limited to:</p> <ul style="list-style-type: none"> <li>Providing funding for a Class II cultural resource inventory;</li> <li>Providing funding for a cultural resource monitoring plan;</li> <li>Providing funding for conservation treatments and continuing research;</li> <li>Expansion of current dust suppression efforts and dust monitoring;</li> <li>Increasing personnel training; and</li> <li>Development of visitor interpretation/enhancement sites.</li> </ul> <p>Implementation of the dust suppression plan throughout the revised APE (which is larger than the Project Area) would substantially reduce the amount of dust generated by project-related traffic.</p> <p>Direct impacts to cultural resources would be similar to those described under the Proposed Action, but reduced in proportion to reduction in the</p>

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	<p>detract from the cultural significance of indentified TCPs and adversely impact sites that are listed, or eligible for listing on the National Register.</p> <p>Implementation of the dust suppression plan would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.</p>	<p>Register.                      . However, all of these impacts would be substantially reduced when compared to the Proposed Action given the reductions in the amount of proposed development.</p>	<p>related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.</p>	<p>vandalism.</p> <p>Development would introduce visual, atmospheric, and auditory elements that could detract from the cultural significance of indentified TCPs and adversely impact sites that are listed, or eligible for listing on the National Register.</p> <p>Implementation of the dust suppression plan would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.</p> <p>Year-round gating of the roads to Cedar Ridge, Horse Bench, Jack Canyon, and Jack Ridge would reduce public motorized access within these areas, thereby reducing traffic related effects on cultural resources and possibly reducing the potential for theft and vandalism of cultural artifacts and sites.</p>	<p>level of development (approximately 10 percent).</p> <p>Additional direct impacts could occur to cultural resources through the proposed installation of turnouts and/or designated parking locations at frequently-visited sites within the WTP Project Area. As these turnouts and/or designated parking locations would be located near known cultural sites, any surface disturbance associated with this proposal has a high potential to encounter buried cultural resources. However, these impacts would be largely mitigated by complying with the avoidance and unanticipated discovery measures discussed in Appendix N. Indirect impacts to cultural resources are similar in nature to those described under the Proposed Action, although the extent of the impacts is slightly different. Specifically, traffic reduction measures would reduce traffic-related impacts such as vibration, erosion, increased visitation, vandalism, and possibly the effects of dust accumulation on rock art.</p>
<b>Socio-Economics</b>	<p>During the 8-year development phase total average employment (direct and secondary) would be approximately 1,100 jobs in Carbon, Duchesne, and</p>	<p>During the 2-year development phase total average employment (direct and secondary) would be approximately 435 jobs in Carbon, Duchesne, and</p>	<p>During the 15-year development phase total average employment (direct and secondary) would be approximately 585 jobs in Carbon, Duchesne, and Uintah Counties.</p>	<p>During the 21-year development phase total average employment (direct and secondary) would be approximately 281 jobs in Carbon, Duchesne, and Uintah Counties.</p>	<p>During the 9-year development phase total average employment (direct and secondary) would be approximately 972 jobs in Carbon, Duchesne, and Uintah Counties. Increased</p>

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	<p>Uintah Counties. Increased employment could create a temporary housing shortage within Duchesne County.</p> <p>Production from up to 807 wells could generate substantial public revenues (e.g., property taxes, severance taxes, mineral lease royalties, sales and use taxes, and ad-velorem taxes) for the State as well as for impacted counties and local governments.</p> <p>Implementation of the Proposed Action could result in reductions in visitors to the WTP Project Area, which could result in a loss of revenue for local businesses that serve the tourist industry.</p>	<p>Uintah Counties.</p> <p>Production from up to 81 wells on State and private lands would generate public revenues; however, these revenues would be only a fraction of those generated by the Proposed Action.</p> <p>It is not anticipated that implementation of the No Action Alternative would result reductions in visitors to the WTP Project Area.</p>	<p>Total public revenues would be roughly equivalent to those under the Proposed Action but annual revenues would be lower because development, and therefore production, would be spread out over a longer period of time.</p> <p>Implementation of Alternative C could result in reductions in visitors to the WTP Project Area, which could result in a loss of revenue for local businesses that serve the tourist industry. However, many of the mitigation measures contained in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize impacts to recreation and cultural resources, which could in turn reduce adverse economic impacts to local businesses that serve the tourist industry when compared to the Proposed Action.</p>	<p>Because of the length of the development phase, population and housing impacts would less than under the Proposed Action and employment would be sustained over a longer period of time. However, seasonal employment could have a disruptive influence on local communities.</p> <p>Cumulative public revenues would be approximately 30 percent less under Alternative D than the Proposed Action based on the number of proposed wells (558 wells). In addition, annual revenues would be lower because development, and therefore production, would be spread over a longer period of time.</p> <p>Implementation of Alternative D could result in reductions in visitors to the WTP Project Area, which could result in a loss of revenue for local businesses that serve the tourist industry. However, based on the level of proposed development, it is expected that these impacts would be substantially less than under the Proposed Action. In addition, many of the mitigation measures contained in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize impacts to recreation and cultural resources, which could in turn reduce adverse economic impacts to local businesses that serve the tourist industry.</p>	<p>employment could create a temporary housing shortage within Duchesne County.</p> <p>Similar to the Proposed Action, production from up to 807 wells could generate substantial public revenues (e.g., property taxes, severance taxes, mineral lease royalties, sales and use taxes, and ad-velorem taxes) for the State and impacted counties and local governments.</p> <p>Implementation of Alternative E could result in reductions in visitors to the WTP Project Area, which could result in a loss of revenue for local businesses that serve the tourist industry. However, many of the mitigation measures contained in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize impacts to recreation and cultural resources, which could in turn reduce adverse economic impacts to local businesses that serve the tourist industry when compared to the Proposed Action.</p>

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<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
<b>Environmental Justice</b>	No disproportionately high or adverse human health or environmental impacts on low-income, minority, or Tribal populations would occur as a result of the Proposed Action. The one exception to this is that activities associated with the Proposed Action have the potential to impact important, traditional Tribal lifeways, and religious and cultural sites. Regarding low-income communities, these groups would likely experience economic benefits by the Proposed Action.	Impacts would be similar to the Proposed Action. However, because Alternative B involves considerably less development and associated surface disturbance, the potential impacts to important, traditional Tribal lifeways, and religious and cultural sites would be proportionately reduced. In addition, because Alternative B involves considerably less development, the potential economic benefits available to low-income populations under the Proposed Action would be proportionately reduced.	Environmental justice impacts similar to the Proposed Action.	Environmental Justice impacts would be similar to the Proposed Action, but reduced in proportion to reductions in the level of proposed development, especially in canyon bottoms.	Impacts would be similar to the Proposed Action. The construction of turnouts and/or designated parking locations would present benefits to public safety and recreation, but also has the potential for adverse effects to cultural sites as increased visitation increases the risk of vandalism (both intentional and unintentional), and unauthorized collection of artifacts and other cultural materials.
<b>Transportation</b>	The Proposed Action could result in an ADT increase of 575 vehicles per day during peak development (approximately 555 percent increase) and significant road improvements on a limited number of primary access roads.  Construction of 178 miles of new access road.  BBC and other operators have agreed to put into operation a dust suppression plan that would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.	Minor ADT traffic increases in comparison with all other alternatives. Construction of 32 miles of new access road. Significant upgrades to Horse Bench Road only.  BBC and other operators have agreed to put into operation a dust suppression plan that would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.	ADT increase of 125 vehicles during the winter and 261 vehicles during other seasons.  Where feasible, all existing BLM system roads would be improved to "Gold Book" standards.  Construction of 178 miles of new access roads would be partially mitigated by reclamation of 19 miles of roads.  Administrative access only on Horse Bench and the majority of new roads in the WTP Project Area, winter closure of all existing roads providing access to the Plateau, required use of aerial transportation, and transporting produced water via pipeline would also reduce transportation impacts.	No development traffic would occur during the winter. ADT increase of 300 vehicles during other seasons.  Where feasible all existing BLM system roads would be improved to "Gold Book" standards.  Construction of 127 miles of new access roads.  Administrative access only on Horse Bench, Jack Ridge, Jack Canyon, and Cedar Ridge.  Similar to other alternatives, BBC and other operators would be required to put into operation a dust suppression plan that would substantially reduce the amount of dust generated by project-related traffic in portions	ADT increase of 441 vehicles per day during peak development.  As feasible, all primary roads would be improved to "Gold Book" standards.  Construction of 168 miles of roads would be partially mitigated by reclamation of 17 miles of roads.  Administrative access only on the majority of new roads and compliance with other transportation impact reduction measures, such as transporting produced water via pipeline, would further reduce impacts.  Similar to other alternatives, BBC and other operators would

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			<p>Similar to other alternatives, BBC and other operators would be required to put into operation a dust suppression plan that would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons.</p> <p>Additionally, BBC and other operators would be required to construct an alternative access route through Trail Canyon. Use of this route would reduce the amount of industrial traffic in Nine Mile Canyon between Gate and Harmon Canyons.</p>	of Nine Mile, Gate, Harmon, and Cottonwood Canyons.	be required to put into operation a dust suppression plan that would substantially reduce the amount of dust generated by project-related traffic in portions of Nine Mile, Gate, Harmon, and Cottonwood Canyons. In addition BCC would be required to control dust in the APE, which extends beyond the WTP Project Area.
<b>Health and Safety</b>	Potential impacts on human health and safety include occupational accidents, traffic accidents, exposure to air pollutants, fire hazards, rupture or damage of pipelines, and accidental spills.	Potential impacts on human health and safety would be similar to the impacts discussed under the Proposed Action but of lesser magnitude based on the reduction in proposed development.	<p>Potential impacts on human health and safety would be similar to the impacts discussed under the Proposed Action; however, the majority of pipelines would be buried resulting in less risk of pipeline damage and traffic would be lower resulting in a lower number of traffic accidents.</p> <p>Gates would also reduce motorized traffic along roads that are not passable in the winter or year-round.</p>	<p>Potential impacts on human health and safety would be similar to the impacts discussed under the Proposed Action, but of lesser magnitude because the amount of development would be approximately 30 percent less.</p> <p>Gates would also reduce motorized traffic along roads that are not passable in the winter or year-round.</p>	Potential impacts on human health and safety would be similar to the impacts discussed under the Proposed Action; however, the majority of pipelines would be buried resulting in less risk of pipeline damage.
<b>Visual Resources</b>	Proposed facilities would introduce new elements of form, line, color, and texture into the landscape, which would essentially dominate foreground views. Development would be inconsistent with existing VRM	Impacts substantially lower in magnitude than Proposed Action, Alternative C, or Alternative E because development would be limited to State and private lands. No development would occur in VRM Class I Areas.	The level of development, location of facilities, and expected surface disturbance under Alternative C would be nearly identical to those described for the Proposed Action. However, Alternative C contains many mitigation	Potential impacts to visual resources would be similar in nature to those described under the Proposed Action but the magnitude of the impacts would be reduced in proportion to the reduction in planned development. This reduction	Potential impacts are expected to be similar to those described for the Proposed Action; however, impacts would be reduced in proportion to the reduction in planned surface disturbance (approximately 10 percent less). This reduction

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	Class designations in many areas but especially in WSAs and canyon bottoms.		measures that reduce impacts to visual resources. A moderate reduction in indirect impacts would occur with the reduction in traffic.	would not be equally distributed across the WTP Project Area. Impacts to WSAs and canyon bottoms would not occur. Therefore there would be no development in VRM Class I areas and less development in Class II areas. In addition, Alternative D contains many mitigation measures that would reduce impacts to visual resources.  Year-round gating of the Cedar Ridge, Jack Canyon, Jack Ridge, and Horse Bench roads would reduce visual intrusion effects from vehicles in these areas.	would not be equally distributed across the WTP Project Area. Under Alternative E, surfaced disturbance would be substantially reduced in the WSAs, the Nine Mile Canyon ACEC, and restricted in canyon bottoms (unless surface occupancy restrictions would prohibit access to valid and existing rights). Therefore there would be less disturbance in VRM class I and II areas. In addition, Alternative E contains many mitigation measures that would reduce impacts to visual resources. . For example, under the Programmatic Agreement for cultural resources ( <b>Appendix T</b> ), BBC and other operators would be required to control dust throughout the revised Area of Potential Effect; an area larger in size than the WTP Project Area. These enhanced dust abatement requirements would reduce effects of fugitive dust on visibility along roads to, from, and within the WTP Project Area.
<b>Existing Nine Mile Canyon ACEC</b>	No surface disturbance would occur on Federal lands; however, increased traffic and human activity in Nine Mile Canyon has the potential to impact the relevant and important values for which the ACEC was designated.	Impacts would be similar to those described under Alternative A, but substantially reduced in proportion to reductions in traffic.	Impacts would similar to those described under Alternative A, but substantially reduced in proportion to reductions in traffic. Design features of Alternative C and Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would also reduce impacts to the relevant and important values.	Impacts would similar to those described under Alternative A, but reduced in proportion to reductions in traffic. Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would also reduce impacts to the relevant and important values.	Traffic and human activity would be similar, but slightly less than described under the proposed action; however, implementation of the WTP PA would reduce impacts to the relevant and important cultural resource values in Nine Mile Canyon. In addition, Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would also reduce impacts to the relevant and important values.

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<b>Potential ACECs</b>	Implementation of the Proposed Action would result in impacts to the relevant and important criteria for which the areas are being considered for designation. Impacts would be the greatest within the immediate vicinity of existing roads used for project purposes and proposed development.	Minimal impacts would occur on Federal lands within the potential ACECs from the development of access roads and pipelines on Federal ROWs.	Potential impacts would be identical in nature to the Proposed Action but traffic-related impacts would be reduced in proportion to decreases in traffic. Gating of roads and mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would reduce anticipated impacts to the relevant and important values for which the ACECs are proposed.	Development would be limited to existing leases within potential ACECs, substantially reducing the impacts in those areas. Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would also reduce anticipated impacts to the relevant and important criteria for which the ACECs are proposed.  Furthermore, year-round gating of the Cedar Ridge, Jack Canyon, Jack Ridge, and Horse Bench roads would reduce non-administrative motorized traffic in the potential Nine Mile Canyon and Desolation Canyon ACECs.	Traffic and human activity would be similar, but slightly less than described under the proposed action; however, implementation of the WTP PA would reduce impacts to the relevant and important cultural resource values in Nine Mile Canyon. Gating of new roads and mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would reduce anticipated impacts to the relevant and important values for which the potential Desolation and Nine Mile Canyon ACECs are proposed.
<b>WSAs</b>	Development within Jack and Desolation Canyon WSAs (approximately 43 well pads) would impact the wilderness values of these areas. Direct impacts would be high within the immediate vicinity of development, but the majority of the WSAs would remain undeveloped. Indirect impacts to solitude and the opportunities for primitive and unconfined recreation would extend beyond the areas of direct impact.	No impact. WSAs are a Federal designation and do not apply to State and private lands.	Impacts to the WSAs would be similar to the Proposed Action; however, access into the WSAs would be gated, thereby reducing use-related impacts. In addition, Alternative C contains a number of mitigation measures that would reduce impairment to the wilderness values within the WSAs.	No surface disturbance impacts based on NSO requirements within WSAs. Furthermore, year-round gating of the Cedar Ridge, Jack Canyon, and Jack Ridge roads would minimize the potential for unauthorized motorized travel in the WSAs.	Direct impacts to the WSAs would be reduced in proportion to the amount of proposed development (approximately 20 proposed wells pads); in addition, all roads providing access to proposed well pads in the WSAs would be gated, thereby reducing use-related impacts. Finally, Alternative E contains a number of mitigation measures that would reduce impairment to the wilderness values within the WSAs.
<b>Non-WSA Lands with Wilderness Characteristics</b>	Development within the Desolation Canyon and Jack Canyon WIAs would impact the wilderness values within these areas. Direct impacts would be high within the immediate vicinity of	Minimal impacts would occur to the Desolation Canyon WIA from the development of access roads and pipelines on Federal ROWs.	Direct and indirect impacts would be similar to the Proposed Action; however, impacts to primitive and unconfined recreation would be reduced with the reduction in traffic and the gating of roads. In addition,	Development would be limited to existing leases, effectively eliminating impacts to the Jack Canyon WIA and substantially reducing potential direct and indirect impacts to the Desolation Canyon WIA. Gating	Direct and indirect impacts would be similar to the Proposed Action; however, impacts to wilderness characteristics would be reduced via gating of new roads. In addition, Alternative E contains a number of mitigation

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	development. Indirect impacts to solitude and the opportunities for primitive and unconfined recreation would extend beyond the areas of direct impact.		Alternative C contains a number of mitigation measures that would reduce impairment to wilderness values.	Horse Bench, Jack Canyon, and Jack Ridge roads would minimize impacts to wilderness characteristics. In addition, Alternative D contains a number of mitigation measures that would reduce impairment to wilderness values.	measures that would reduce impairment to wilderness values.
<b>Eligible Wild and Scenic Rivers</b>	Implementation of the Proposed Action has the potential to impact the outstandingly remarkable values along the segment of Nine Mile Creek between Minnie Maud and Bulls Canyon, especially during the construction period. Implementation of the dust suppression plan would minimize impacts the cultural, historic, and scenic values. The Proposed Action would not directly impact other eligible WSR segments within the WTP Project Area. However, development outside of WSR corridors could result in indirect impacts to the outstandingly remarkable values.	Impacts would be similar in nature to those described under the Proposed Action but would be less because of reductions in the amount of development and traffic.	Impacts would be similar in nature to those described under the Proposed Action but would be less because of the reductions in traffic. Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize indirect impacts the Green River WSR corridor.	Impacts would be similar in nature to those described under the Proposed Action but would be less because of the reductions in the amount of development and traffic. Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize indirect impacts the Green River WSR corridor.	Impacts would be similar in nature to those described under the Proposed Action. However, implementation of the WTP PA would mitigate impacts to the outstandingly remarkable cultural, historical, and scenic values. Mitigation measures included in <b>Tables 2.6-7</b> and <b>2.6-8</b> would minimize indirect impacts the Green River WSR corridor.
<b>Desolation Canyon NHL</b>	No surface disturbance would occur within 1 mile of the Green River; however, approximately three well pads are proposed within the viewshed and there is potential for auditory impacts.	No impacts.	Impacts would be the same as under Alternative A; however, Alternative C contains mitigation measures which could reduce potential visual and auditory impacts.	No surface disturbance related impacts. Furthermore, gating of the Horse Bench road, and to a lesser extent the gating of Cedar Ridge road, would minimize vehicle use within the NHL.	Impacts would be the same as under Alternative A; however, Alternative E contains mitigation measures which could reduce potential visual and auditory impacts.
<b>Backcountry Byways/Scenic Byways</b>	The quality of a visit along the byway would be reduced and the integrity of the byway designation could be diminished due to visual	Impacts would be similar in nature to the Proposed Action but would be of a far lesser magnitude.	Impacts would be similar in nature to the Proposed Action but impact traffic-related impacts would be reduced proportional to the reduction in traffic levels. Use	Impacts would be similar in nature to the Proposed Action but would be of a lesser magnitude proportional to the reduction in proposed	Impacts would be similar to the Proposed Action. The construction of pullouts at popular cultural sites within Nine Mile Canyon and visitor

<b>Table 2.7-1. Summary Comparison of the Impacts of the Alternatives</b>					
<b>Resource</b>	<b>Alternative A – Proposed Action Impacts</b>	<b>Alternative B – No Action Alternative Impacts</b>	<b>Alternative C – Transportation Impact Reduction Alternative Impacts</b>	<b>Alternative D – Conservation Alternative Impacts</b>	<b>Alternative E – Agency Preferred Alternative Impacts</b>
	<p>modifications, elevated noise levels, and potential for conflict between industrial and recreational users. Implementation of the dust suppression plan would minimize the amount of dust in the WTP Project Area.</p>		<p>of the Trail Canyon road would reduce industrial traffic on the portion of the byway extending from Gate to Harmon Canyons along Nine Mile Canyon Road.</p>	<p>development and associated traffic.</p>	<p>interpretation/site enhancement projects could reduce conflicts between industrial and recreational users. Implementation of the dust suppression plan in the expanded APE would minimize dust impact along the majority of the byway.</p>
<b>Noise</b>	<p>Construction, drilling, completion, and production would affect ambient noise in terms of altering the types of human-induced noise, volumes, tones, and low frequency sounds within the WTP Project Area. Changes in noise could adversely affect sensitive resources such as wildlife and recreation. Modeling results showed that noise levels would be increased in both the Jack and Desolation Canyon WSAs, non-WSA lands with wilderness characteristics contiguous to the WSAs, and along the Green River.</p>	<p>Impacts would be similar to those described for the Proposed Action, but substantially decreased given the limited number of wells that would be developed. No development would occur on Federal lands in noise sensitive recreation areas (i.e., the Green River corridor, WSAs, or non-WSA lands with wilderness characteristics).</p>	<p>Impacts would be similar to those described for the Proposed Action, but decreased based on required use of remote telemetry and water/condensate pipelines to transport water, which would reduce traffic and production noise; and mitigation to reduce noise within 2 miles of the Green River.</p>	<p>Impacts would be similar to those described for the Proposed Action, but substantially decreased given limited number of wells; NSO restrictions for WSAs, potential ACECs, and canyon bottoms; and mitigation to reduce noise within 2 miles of the Green River; and no leasing (or development) within unleased lands with wilderness characteristics.</p>	<p>Impacts would be similar to those described for the Proposed Action, but decreased given directional drilling requirements in WSAs and canyon bottoms; and mitigation to reduce noise within 2 miles of the Green River.</p>

## **2.8 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS**

### **2.8.1 Rescinding Leases**

During scoping, it was suggested that an option be considered that would buy back producing and non-producing Federal mineral leases within the WTP Project Area or exchange them for Federal mineral interests outside the WTP Project Area. This option was not analyzed in detail because it does not meet the BLM's purpose and need, which is to allow development of WTP lease rights held by BBC and other operators in an environmentally sensitive manner. In addition to interfering with valid existing lease rights, a decision to buy back leases held by production would interfere with existing infrastructure development and production occurring on those leases previously authorized by the BLM. Based on this information, an alternative analyzing rescinding existing Federal leases was eliminated from detailed analysis.

### **2.8.2 Suspending Leases within WSAs**

During the scoping process, it was suggested that suspending oil and gas leases terms within the Jack Canyon and Desolation Canyon WSAs should be considered as a separate alternative. According to the BLM's Interim Management Policy and Guidelines for Lands Under Wilderness Review (H-8550-1), the Secretary of the Interior has the discretionary authority to direct or assent to a suspension of lease terms if it is in the interest of conservation to do so and when the specific circumstances involved warrant such an action (BLM 1995b).

A separate alternative was not analyzed in detail because the impacts of suspending operational and production requirements of leases within the WSAs would be substantially similar, for the duration of the suspension, to the impacts described under Alternative D – Conservation Alternative, which prohibits surface occupancy within these areas. Also, suspension of lease terms would not remove the valid existing rights to develop leases within the WSAs, but only delay their development.

In addition, alternatives analyzed in full in this EIS are developed to meet the requirements of the Interim Management Policy for Lands under Wilderness Review, which addresses valid existing rights such as those associated with the leases within Jack Canyon and Desolation Canyon WSAs.

### **2.8.3 No New Development in the WTP Project Area**

A No New Development Alternative, which would deny all APDs and ROWs in the WTP Project Area, was briefly considered but eliminated from further analysis because it does not meet the BLM's purpose and need purpose and need for the following reasons:

- BBC maintains valid existing rights to develop all of its leases that are located in the WTP Project Area.
- With approval from the appropriate landowner, development would occur on State of Utah and private lands within the WTP Project Area regardless of a BLM decision to deny development of Federal lands.

- Development on Federal lands could potentially be approved on a site-specific basis under the guidelines of the Price RMP (BLM 2008b), through the Categorical Exclusion process in Section 390 of the 2005 Energy Policy Act, and/or through additional analysis under NEPA.
- The BLM cannot deny access through Federal lands to private holdings on non-Federal lands. The BLM's policy concerning access to oil and gas resources on non-Federal lands is detailed in the BLM Manual 2800 on ROW and in 43 CFR Part 2800. This policy directs the BLM to allow access to secure to the owner/lessee reasonable use and enjoyment. Necessary access through Federal lands cannot be denied as long as the landowner/lessee complies with the BLM rules and regulations on Federal surface.
- Denial of development on Federal lands could lead to the drainage of Federal reserves by wells on adjacent State and private lands. Drainage by offset non-Federal wells would result in a loss of Federal royalties. A drainage stipulation designed to protect the Federal mineral estate is included in the terms of the lease contracts for all Federally-leased lands in the WTP Project Area.
- A denial to develop valid leases would violate the lessees' contractual rights as agreed to by the United States. An oil and gas lease grants the lessee the right and privilege to drill from, extract, mine, remove, and dispose of all oil and gas deposits in the leased lands, subject to the terms and conditions of the lease, applicable laws, and reasonable measures imposed by the BLM. A denial of all activity would constitute a breach of contract of the lessees' rights to conduct oil and gas operations on the leased lands. Only the U.S. Congress has the authority to grant a complete denial of the granted lease rights. Disallowing the development of valid leases would also result in a loss of Federal royalties.

Based on the above rationale, an alternative analyzing No New Development in the WTP Project Area would not meet the purpose and need for this project, and was eliminated from detailed analysis.

#### **2.8.4 Alternatives X and Y**

In early drafts of the WTP alternative outlines, the BLM, in coordination with its cooperating agencies, briefly considered including two separate alternatives that addressed the features currently found within Alternative D (Conservation Alternative). In preliminary alternative outlines, the BLM considered an alternative entitled "No Surface Occupancy in Federal Land Canyon Bottoms, Wilderness Study Areas, or the National Historic Landmark" and another alternative entitled "Conformance with Existing Lease Notices and Stipulations." For ease of understanding, these briefly considered alternatives will be referred to as Alternatives X and Y. Within the very preliminary outlines of these alternatives, the intent of each was fairly distinct:

- The original intent of Alternative X (NSO in Federal Land Canyon Bottoms, WSAs, or National Historic Landmark) involved the protection of resources within specific, bounded, geographic or designated areas, that is, canyon bottoms, WSAs, and the NHL.
- The original intent of Alternative Y (Conformance with Existing Lease Notices and Stipulations) involved strict adherence or conformance with existing or

proposed environmental protection measures, such as conformance with winter drilling and high country watershed standards.

However, during subsequent alternative development meetings, the BLM, in coordination with its cooperating agencies, began incorporating additional components in Alternatives X and Y in order to respond to public comments received during the public scoping period. For example, under Alternative X, the BLM added a requirement that there would be no temporary worker housing within the WTP Project Area in order to minimize potential impacts of cultural resource vandalism during off-project hours. In another example, under Alternative Y, the BLM added an NSO requirement for non-WSA lands with wilderness characteristics. With the accumulation of additional spatial and temporal protective measures to both Alternatives X and Y, the original intent and goals of these alternatives began to mirror one another. NEPA does not require the BLM to conduct a “separate analysis of alternatives which are not significantly distinguishable from alternatives actually considered, or which have substantially similar consequences” (Headwaters, Inc. v. BLM, 914 F.2d 1174, 1181 [9th Cir. 1990]). Therefore, the BLM combined the components of the original Alternatives X and Y into a cohesive Conservation Alternative. Based on this decision, the original Alternatives X and Y were eliminated from detailed analysis.

### **2.8.5 Directional Drilling**

An independent directional drilling analysis conducted by New Tech Engineering and reviewed by the BLM considered greater utilization of directional drilling, namely, limiting surface density to one drill pad per 160 acres. As described in the analysis (see **Appendix H**), based on recent drilling and completion history in the WTP Project Area, 160-acre surface pad density would be economically and technically feasible under ideal circumstances. That is, if the well pad could be placed near the center of a 160-acre parcel, the horizontal offset between surface and downhole locations would be limited and current directional drilling technology would likely allow economical recovery of the resource. Topographic conditions in the WTP Project Area, however, would often prevent access to the ideal surface location. These circumstances result in longer horizontal offsets that cause mechanical problems and escalate drilling and completion costs. Due to reservoir configuration and production characteristics, horizontal drilling, typified by production from very long, near horizontal well bores, and 160-acre surface pad density is not feasible in the WTP Project Area. Based on the information within the directional drilling analysis in **Appendix H**, an alternative that limits surface density to one drill pad per 160 acres was eliminated from detailed analysis because it would not be feasible for BBC to access reserves within their lease holds.

### **2.8.6 Alternative Access Routes**

In an effort to reduce impacts to cultural resources and cultural resource tourism, during the scoping process it was suggested that the BLM should identify an alternative access route that would reduce traffic in Nine Mile Canyon, which has been designated as a BLM Backcountry Byway and by the State of Utah as a State Scenic Byway.

As part of the DEIS, which was released to the public on February 1, 2008, the BLM considered three alternative routes including 1) new routes that transect Nine Mile Canyon from the Uinta Basin; 2) the Bruin Point route; and 3) a route around the mouth of Nine Mile Canyon.

After considering each of these alternative routes it was determined by the BLM, in coordination with their CAs, that there were legitimate reasons for eliminating each of these alternative routes from detailed analysis in the DEIS.

However, during the 90-day public comment period (February 1- May 1, 2008) numerous comments were received from individuals and organizations that suggested the BLM had failed to provide adequate justification for dismissing these alternative transportation routes from detailed analysis, and that the BLM should reconsider an alternative that includes use of one or a combination of the aforementioned routes to reduce industrial traffic and dust in Nine Mile Canyon.

In response to comments received during the public comment period, during April of 2008, a BLM interdisciplinary team conducted a field evaluation to reexamine proposed alternative access routes to the West Tavaputs Plateau.

After reevaluating alternative access routes, it was determined that construction of a new route through Trail Canyon should be considered. The impacts of constructing a new route through Trail Canyon are now considered under Alternative C in this FEIS.

After careful consideration, other routes brought forward by the public during the scoping and public comment period were dismissed from further analysis for the following reasons:

The Bruin Point Route is problematic for numerous reasons. First, traffic originating in the Uinta Basin would be required to travel Highway 40/191 to Duchesne, Highway 191 through Indian Canyon, Highway 6 through Helper, Price, and Wellington, and Highway 123 through Sunnyside. By using Duchesne County Road 32 (Gate Canyon) to its junction at Nine Mile Canyon (Carbon County Road 53) these rural and urban communities would largely be avoided. Displacing industrial traffic onto routes through population centers could impact public safety and add several hours of driving time to each vehicle round trip. Increased travel time would also result in increased impacts to regional air quality. Second, the elevation of West Tavaputs Plateau gradually rises from the south to the north. The majority of development is proposed near the southern end of the plateau in areas with an elevation which ranges between 6,000 and 7,500 feet. Bruin Point, on the other hand, is located on the northern end of the plateau, and has an elevation of over 10,000 feet. At higher elevations on the plateau freeze conditions persist for a longer period and snow accumulation is greater making winter road maintenance more difficult than in areas such as Gate and Nine Mile Canyon. Third, the existing road to Bruin Point does not meet standards and would require extensive engineering. During a field evaluation of roads within the WTP Project Area, a BLM engineer traveled the Bruin Point Route and concluded that upgrading the existing road to a standard capable of accommodating the amount of traffic which could be generated by implementation of the Proposed Action or Alternatives would result in unnecessary and undue degradation to other resources in the area.

A summary of the preliminary engineering assessment can be found in **Appendix F** (*Transportation Plan–West Tavaputs Full Field Development Environmental Impact Statement*). Finally, opening the Bruin Point route year-round could significantly increase impacts to sage-grouse and big game species. While it is true that each of the alternatives would result in some impacts to big game and sage-grouse habitats,

construction of the Bruin Pointe Route would magnify these impacts by disrupting migration patterns between crucial winter and summer habitats for big game, increasing habitat fragmentation, increasing the loss of available forage due to increased surface disturbance, and increasing temporary wildlife displacement due to increased noise levels.

A new route around the mouth of Nine Mile Canyon would provide motorized access into what is currently an undeveloped and inaccessible area and is inconsistent with the BLM's land use planning objectives. Under all alternatives the operators would be granted reasonable access necessary to develop their valid and existing lease rights in the WTP Project Area. In select locations within the WTP Project Area this would require the BLM to grant access through areas that are currently undeveloped, inaccessible, and protected by special designation. However, under no alternative analyzed within the EIS is surface disturbing activity proposed within the Desolation Canyon SRMA, the Desolation Canyon NHL, or the potential Green River WSR corridor. Creating new access through these remote and sensitive resource areas would cause unnecessary and undue degradation that could be avoided by using existing travel routes through Nine Mile and Gate Canyons. It is true that the implementation of certain alternatives could result in increased OHV use along the existing unmaintained two-track route that crosses through these areas of special designation which provide protection of the Green River corridor. However, these impacts would not be comparable to the adverse impacts that would occur if the existing primitive route were upgraded to a standard that could accommodate the amount of industrial traffic anticipated under the Proposed Action or Alternatives.

Based on public comments received on the DEIS, under Alternative C the BLM is considering the impacts of constructing a new route through Trail Canyon, which intersects Nine Mile Canyon near Harmon Canyon. Harmon Canyon is the primary access route to Prickly Pear Mesa. Public comments received on the DEIS suggested that once vehicles are on the mesa, existing road segments extending beyond the boundaries of the WTP Project Area could provide access to the other mesas from Prickly Pear. By using mesa to mesa routes, industrial traffic could avoid use of the Nine Mile Canyon Road. However, use of these existing routes would be problematic for the following reasons:

- Because BBC is a predominant landowner in Nine Mile Canyon, the Nine Mile Canyon Road between Harmon and Gate Canyons would still be used to access staging areas, the existing Dry Canyon compressor station, and other ancillary facilities located on their lands;
- Nine Mile Canyon would have to be used to access existing and proposed well locations and facilities located on other private lands (i.e., those not owned by BBC) in Nine Mile Canyon;
- Existing two-track roads between Prickly Pear and Flat Iron Mesa would require substantial engineering and upgrade to accommodate industrial traffic. Road upgrades would result in increased impacts to a number of resources such as soils, vegetation, water resources, wildlife, and visual resources;
- The existing two-track roads that connect Prickly Pear Mesa to Flat Iron Mesa include the routes to Mt. Bartles and Bruin Point. Use of these routes would add approximately 20 miles of travel on unpaved roads to each vehicle trip, or 40

miles to each round-trip. Traveling from Prickly Pear Mesa to proposed wells on Peter's Point would add approximately 30 miles of travel on unpaved roads to each vehicle trip, or 60 miles to each round-trip. Increased travel distances on unpaved roads by a large number of vehicles would increase dust and vehicle emissions;

- As previously described, because of elevation, the road around Mt. Bartles (9,750 feet) and Bruin Point (10,184 feet) would be difficult to maintain in the wintertime;
- As previously described, road upgrades and increased traffic on existing roads between Prickly Pear and Flat Iron Mesa would cause additional surface disturbance, fragmentation of crucial wildlife habitat, and disruption of migration between summer and winter ranges; and
- Existing two-track roads between Prickly Pear and Flat Iron Mesa cross private land(s).

During the public comment period it was also suggested that the BLM consider a combination of alternative access routes. By using a combination of alternative access routes the operators would be able to access their leases on each of the three mesas, while avoiding use of Nine Mile Canyon. The rationale as to why a combination of access routes is not feasible would be the same as the rationale as to why each individual access route is not feasible, which was presented above. A combination of access routes would magnify rather than reduce or eliminate these impacts.

As part of the Section 106 consultation process, and during development of the WTP PA, the BLM reopened discussion of alternative access routes with those organizations that had been invited to be consulting parties. During the course of consultation, a considerable amount of time was spent reevaluating alternative access routes that had previously been dismissed as well as exploring different options. The four primary routes discussed during meetings held with the consulting parties were:

- The NTHP alternative access routes;
- The NMCC connecting mesa routes;
- The potential Devil's and Daddy Canyon routes; and
- The Questar pipeline route.

After information was submitted to the BLM for each of these routes, a BLM IDT considered the routes and then provided feedback, generally in the form of written and verbal response, to the WTP PA consulting parties. For some of the routes, the project proponent independently submitted information regarding technical and economic feasibility.

Following consultation meetings held on March 26 and May 6, 2009, wherein potential alternative access routes to Nine Mile Canyon were discussed in detail, the BLM made a final determination regarding access to the WTP Project Area. The BLM concluded that use of Nine Mile Canyon would be necessary to access all or portions of the WTP Project Area. An "access determination" letter was sent to the SHPO, ACHP, and consulting parties informing them of the BLM's decision on May 28, 2009. Thereafter,

discussions were focused on identifying measures that would mitigate the impacts of industrial traffic in Nine Mile Canyon.

Provided below is a brief description of the abovementioned proposed alternative access routes and rationale as to why these routes discussed during the course of consultation were not carried forward for analysis.

- The NTHP submitted a report completed by KPFF Engineering, which examined the feasibility of alternative access routes to the West Tavaputs Plateau. In addition to discussing the transecting Trail Canyon route, the Feasibility Review suggested construction of two potential connecting routes between Prickly Pear Mesa, Flat Iron Mesa, and Peter's Point which would allow project-related traffic to avoid use of Nine Mile Canyon Road as a primary route. After receiving this study the BLM conducted an evaluation of the routes identifying both potential adverse and beneficial impacts. In addition, BBC provided information on the technical feasibility of using these access routes based on the increased travel distance from the Uinta Basin. The specific routes proposed by the NTHP were dismissed for principally the same reasons that mesa-to-mesa routes were dismissed above, with the primary impediment being access limitations through private lands. There are numerous private landowners on the route proposed by the NTHP. At least two of these land owners expressed in writing their opposition to project traffic crossing their private lands.
- On May 4, 2009 the NMCC submitted a letter and a map asking the BLM to consider use of the proposed Trail Canyon route, as well as construction of shorter trans-mesa or connecting roads that would connect Prickly Pear Mesa to Flat Iron Mesa via Dry Canyon. The BLM followed through evaluating these routes by conducting a field trip into the WTP Project Area. The NMCC proposal was dismissed because of the technical feasibility of building a road out of a very steep walled canyon that would meet BLM road standards. BBC provided profiles of the proposed roads, which reinforced the BLM's decision.
- Because of the challenges presented by mesa-to-mesa routes within the WTP Project, it was suggested that the BLM should consider other routes from the Uinta Basin that could transect Nine Mile Canyon near Cottonwood Canyon, which provides access to both Flat Iron Mesa and Peter's Point. The two canyons located to the north of the WTP Project Area that could potentially be used to reduce the length of travel in Nine Mile Canyon are Devils Canyon and Daddy Canyon. As with other route submissions, the BLM conducted a field evaluation of these potential routes. BBC also conducted a detailed engineering study of these routes, which identified a number of concerns. Alternative access routes through these canyons were dismissed predominantly because of other resource concerns (including potential impacts to known significant cultural resources located at the mouth of these canyons). In addition, both canyons are steep and narrow leaving little room for a road outside the canyon bottom. Any road constructed would likely be flooded or washed out during storm events/flash floods.
- Finally, it was suggested that the BLM should consider approval of a route that would follow the Questar Pipeline, which would provide access to Prickly Pear Mesa via Soldier Creek Canyon. Use of all or portions of the Questar pipeline route was dismissed because of technical feasibility. Portions of the pipeline

route are very steep and would require extensive rerouting to make the grades useable by heavy truck traffic.

### **2.8.7 Compliance with the BLM Road Standards**

During the scoping process it was suggested that the BLM should consider an alternative that would require BBC and other operators to upgrade all existing roads and build all new roads within the WTP Project Area to comply with road standards that are contained in the BLM Manual 9113-*Roads*. A BLM engineer has evaluated the primary roads that would be used for full field development in the WTP Project Area and has determined that in certain situations the resource damage incurred by complying with specific road standards outweighs the advantages of compliance. The report recommends that BBC and other operators should be allowed to apply for variances to some of the 9113 standards on a site-specific basis. The BLM's complete engineering report is contained in **Appendix F**. Based on the conclusions in the BLM's engineering report, an alternative requiring that all existing and new roads within the WTP Project Area be upgraded or built to comply with the BLM road standards was eliminated from detailed analysis.