

2.0 Project Description and Alternatives

2.1 Introduction

As discussed in Section 1.1, the proposed project would consist of two wind farm sites located near each other (approximately 9 miles apart) within the Application Area (see **Figure 1-2**); however, not all of this land would be used for or disturbed by the project. In addition to the WTGs, the proposed project would require the construction of ancillary facilities. A general description of the project proposed by PCW can be summarized as follows:

- A 2,000 to 3,000-MW wind farm project consisting of approximately 1,000 WTGs with a nameplate capacity ranging from 1.5- to 3-MW;
- Development of step-up transformers, underground and overhead electric collection and communication lines, electric substations, IRF, O&M facility, and staging areas;
- Construct new roads and upgrade existing roads; and
- Power from the wind farms would be transmitted via overhead electric transmission lines that would connect to a new substation in the Application Area.

Power generated by the project would be routed to transmission lines analyzed in detail in separate NEPA analyses. At this time, BLM Wyoming is analyzing five applications for large scale overhead electric transmission line projects. Because the wind farm project would not be possible without overhead transmission lines, any of these projects could be considered a connected action. Each of these proposed projects are described and analyzed in the cumulative impacts analysis.

Following construction, all disturbance areas would be reclaimed in accordance with the BLM-approved Reclamation Plan to facilitate eventual ecosystem reconstruction to maintain a safe and stable landscape and meet the desired outcomes of the land use plan. For analysis purposes, it is assumed that reclamation activities would be the same on public and private lands.

The BLM identified a range of alternatives based on issues and concerns raised from public comments, through interdisciplinary interaction between resource professionals, and in collaboration with the cooperating and interested agencies. Elements common to all action alternatives and alternatives considered are discussed in this chapter:

- Project Elements Common to All Action Alternatives (Section 2.2);
- No Action Alternative (Section 2.3.1);
- Alternative 1R: Applicant Proposed Alternative (Section 2.3.2);
- Alternative 2: Checkerboard Only (Section 2.3.3);
- Alternative 3: No Miller Hill or South Sierra Madre (Section 2.3.4);
- Alternative 4: Private Lands Only (Section 2.3.5); and
- Alternatives considered but eliminated from detailed analysis (Section 2.4).

Project-specific terminology is used in this EIS when discussing project geography. The Application Area refers to the area, encompassing 222,689 acres, specified in the applicant's Wind Site Testing and Monitoring Application filed with the BLM. The "alternative boundary" refers to a smaller boundary within the Application Area that was created specifically for each alternative based on constraints identified

during the alternatives development process (these boundaries are discussed in Section 2.3 by alternative). The “conceptual area of development” is the area within each alternative boundary where development would most likely occur based on wind potential considerations and environmental constraints (discussed in Section 2.2.1).

2.2 Project Elements Common to All Action Alternatives

This section describes project elements that would be part of all action alternatives considered in the analysis: Alternatives 1R, 2, 3, and 4 (discussed in Section 2.3). Details contained in the following sections are derived from the information provided by PCW in the March 2009 POD, the December 2009 *Power Company of Wyoming Response and Data on Bureau of Land Management Alternatives*, and the April 2010 *Applicant Proposed Alternative and Bureau of Land Management Response Letter* as well as modifications that occurred through ongoing discussions with the applicant. A detailed discussion of elements common to all alternatives and individual components associated with project construction is provided in **Appendix A**.

While the referenced documents serve as the basis for analysis in this document, micro-siting of turbine locations, roads, transmission lines, and support facilities has not been completed. The information provided for each Alternative assumes the greatest potential for disturbance, and, therefore, it is assumed that impacts identified at the time of micro-siting would not exceed those described in this document.

Upon completion of this project-wide level NEPA analysis, PCW would then submit up to four separate PODs for the internal haul road, transmission line between the two sites, Sierra Madre development, and Chokecherry development. The site-specific POD proposals would be tiered to the analysis and decision described in the ROD associated with this project-wide level EIS. ROW grants for these PODs must comply with the NEPA analysis and would include site-specific terms and conditions tiered back to the project-wide level EIS. Upon review of the individual PODs, additional NEPA analysis may be required prior to issuance of any ROW grants. The final turbine layout would adhere to the terms and conditions of the ROD and any ROW grants issued by the BLM.

Background

In March 2009, PCW submitted a revised POD to accompany the ROW applications for the CCSM Wind Energy Project (PCW 2009a). The POD includes descriptions of and guidelines for the design, construction, operation, reclamation, and maintenance of the wind farm, access roads, electric gathering lines, transmission lines, and electric substations that would be constructed as part of the project.

Due to the technical nature of wind turbine layout siting, the BLM also requested that PCW provide technical data and develop a conceptual model of turbine layouts to show where turbines could potentially be sited for a set of BLM-provided alternatives and environmental constraints that the BLM may consider for further analysis. This information was presented to the BLM in December 2009 as the report entitled *Power Company of Wyoming Response and Data on Bureau of Land Management Alternatives* (PCW 2009b).

As a result of ongoing discussions and additional information, PCW also submitted an *Applicant Proposed Alternative and Bureau of Land Management Response Letter* (PCW 2010a) in April 2010 that identifies an acceptable alternative to their original project concept, which was determined to be not in conformance with the Rawlins RMP (further discussed in Section 2.5). Additional communications between April and September 2010 clarified information and provided corrections to some information contained in the previously submitted materials. A revised preliminary *Transportation Management Plan* (PCW 2010b), received on August 30, 2010, supersedes transportation-related information previously presented in the March 2009 POD.

2.2.1 Environmental Constraints and Applicant Committed Measures

The Application Area is within a checkerboard landownership pattern, which is alternating sections of public, private, and state lands (**Table 1-2**). Use of the public lands for either development or access requires compliance with the stipulations and policy governing the public lands, including the Rawlins RMP and relevant federal laws, regulations, and policy. A summary of the BLM's environmental constraints is provided in **Appendix C**. **Figure 2-1** depicts the no surface use (NSU) constraints (see Chapter 8.0, Glossary) for the Application Area and **Figure 2-2** depicts the timing stipulations. With the exception of variations for greater sage-grouse noted in Alternative 2 (Section 2.3.3), the NSU constraints and timing stipulations would apply on public lands to all action alternatives (**Table C-1, Appendix C**). Under all action alternatives, PCW has committed to no development within the greater sage-grouse core breeding areas (Wyoming Governor's State EO 2010-4 Greater Sage-grouse Core Area Protection [August 2010]) (**Table C-2, Appendix C**).

The BLM does not have jurisdiction over development on private or state lands. However, the BLM has been coordinating with the state and county, both of which are cooperating agencies on this project, to incorporate recommendations and address concerns from these agencies into the EIS process for their consideration in subsequent permit decisions. Use of the State Land Board lands requires compliance with Board-approved restrictions, including the State of Wyoming greater sage-grouse stipulations under the authority of W.S. 36-2-101; other stipulations may be applied on a case-by-case basis through the Board. In addition, PCW has provided ACMs that would be applied to all private, state, and public lands. Summaries of the ACMs and applicant committed BMPs are provided in **Appendix C**. BMPs established through the *Record of Decision for Implementation of a Wind Energy Development Program and Associated Land Use Plan Amendments* (BLM 2005) for wind energy development activities on public lands also are considered applicable to this project. BMPs established in Appendix 15 of the Rawlins RMP ROD (2008) for reducing surface disturbance and disruptive activities would apply to this project.

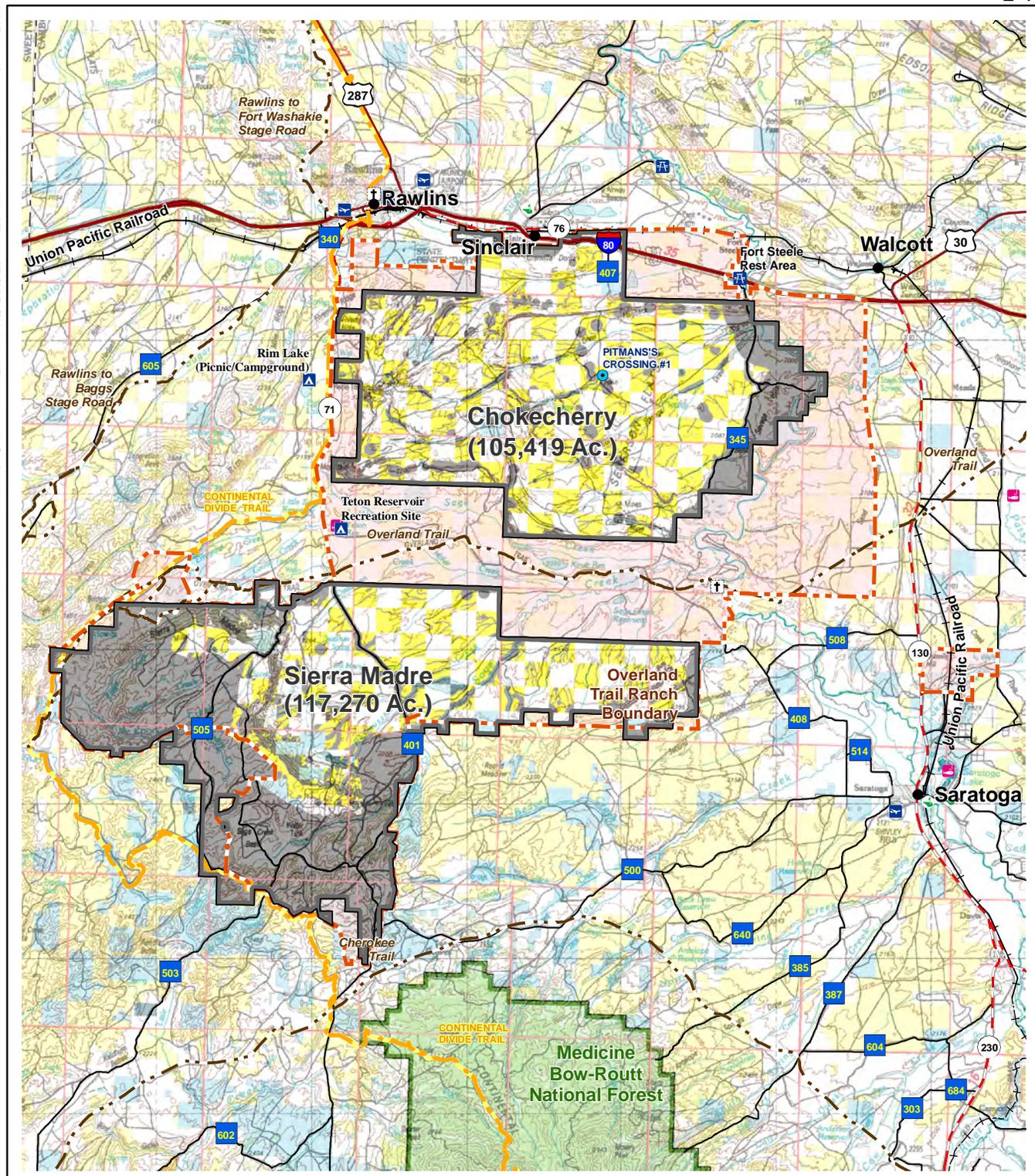
In addition to the BMPs, NSUs, and ACMs described in **Appendix C**, additional constraints may come through development of a reclamation and monitoring plan (**Appendix D**), Programmatic Agreement (PA) for cultural and Native American resources (**Appendix E**), an Avian Protection Plan (APP; **Appendix J**), and a Biological Opinion (BO [**Appendix L**]). These documents have not yet been completed, and consultation with other regulatory agencies including the USFWS and the Wyoming SHPO is ongoing. However, environmental constraints that may come through development of each of these documents would be incorporated into the selected alternative.

Additionally, mitigation as defined in 40 CFR 1508.20 may be identified through analysis conducted in Chapter 4.0 of this document (summarized in **Table C-4 of Appendix C**). These measures would be identified as those that would avoid, minimize, rectify, reduce, eliminate, or compensate for potential environmental impacts to the extent possible. Constraints identified through the development of the APP, BO, PA, and mitigation measures would be incorporated by reference into any additional NEPA analysis required prior to issuance of any ROW grants for the project. These constraints would then in turn be considered as stipulations of approval in the ROW grants.

2.2.1.1 Visual Resource Management Considerations

As discussed in Section 1.6.1.1, no action alternatives could be developed that would be in conformance with the Rawlins RMP (2008b). Approval of any of the action alternatives would require an RMP Amendment to change the VRM classes in the Application Area. The VRM Plan Amendment for the CCSM project is being addressed in Volume I of this document. As part of the ROD, the BLM will decide whether to amend the Rawlins RMP as a prerequisite to approval of the CCSM project. The Preferred Alternative identified in the VRM Plan Amendment in Volume I has been carried forward to inform the alternatives and the conceptual areas of development as well as the analysis in this Volume. All project alternatives conform to the Rawlins RMP (2008) and the Preferred Alternative in the VRM-targeted Plan Amendment in Volume I.

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Legend

- Well
- Continental Divide Trail
- - - Historic Trail
- Interstate Highway
- U.S. Highway
- - - State Highway
- Application Area
- No Surface Use and Applicant Committed Measures
- Overland Trail Cattle Company Ranch Boundary

Land Owner

- Bureau of Land Management
- Bureau of Reclamation
- Forest Service
- Private
- State
- Wyoming Game and Fish

Chokecherry and Sierra Madre Wind Energy Project

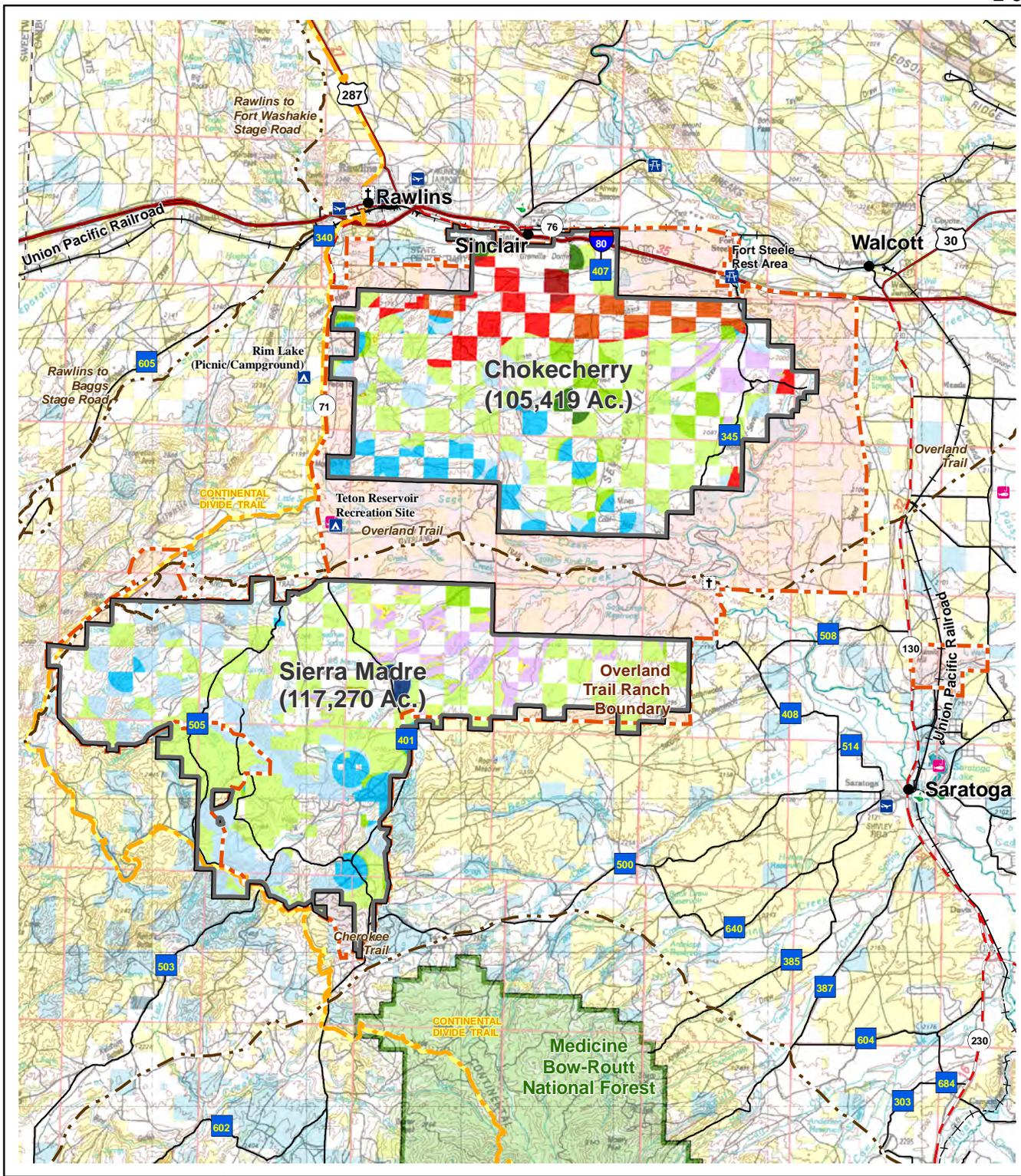
Figure 2-1

Areas of No Surface Use and Applicant Committed Measures in the Application Area

0 1 2 3 4 5 Miles
0 2 4 6 8 10 Kilometers

1:375,000

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Timing Stipulations

| | |
|---|--|
| <ul style="list-style-type: none"> November 15 - April 30 November 15 - July 10 November 15 - July 15 November 15 - July 31 November 15 - September 15 February 1 - July 15 February 1 - July 31 February 1 - August 31 | <ul style="list-style-type: none"> February 1 - September 15 March 1 - July 15 March 1 - July 31 March 1 - September 15 April 10 - July 10 April 10 - September 15 April 15 - September 15 |
|---|--|

**Chokecherry and Sierra Madre
Wind Energy Project**

Figure 2-2

**Timing Stipulation Constraints
in the Application Area**

0 1 2 3 4 5 Miles
0 2 4 6 8 10 Kilometers

1:375,000

2.2.1.2 Phased Construction Sequence Mitigation

The applicant has proposed to construct the project over four years with all internal access roads constructed in the first year (discussed in Section A.3.1.1 of **Appendix A**). However, this approach would result in surface disturbance throughout the Application Area in the first year, but most access roads would not be needed until subsequent construction years. This would ultimately delay reclamation of these areas. As a result, the BLM has developed a mitigation measure (**GEN-1** in **Table C-4**, **Appendix C**) that would limit surface disturbance to areas where turbines would be constructed within 12 months with a goal to mitigate impacts from surface disturbance to wildlife, soils, water, and vegetation (e.g., weeds). This approach would result in four ROW grants issued for the project: 1) internal haul road in Phase I; 2) transmission line between the two sites in Phase I; 3) Sierra Madre development in Phase II; and 4) Chokecherry development in Phase III. Mitigation measure **GEN-1** is further detailed in Section A.3.1.1 of **Appendix A** and would apply to all alternatives.

2.3 Alternatives Considered in the EIS

While multiple alternatives and specific actions were considered, five alternatives are studied in detail in this EIS – the No Action and four action alternatives. These alternatives are described in the following sections.

Within each alternative boundary, a conceptual area of development where turbines and associated roads would most likely be developed is presented for each action alternative. While micro-siting of turbines has not yet been completed, the areas presented for analysis in each of the alternatives is based upon the latest wind resource data and environmental constraints known at the time of analysis. The potential does remain that deviations from the conceptual areas depicted for each alternative could occur. For this reason, subsequent NEPA analysis, tiered to the analysis conducted in this document, would be required prior to issuance of any ROW grants. The final turbine layout would adhere to the terms and conditions of the ROD and any ROW grants issued by the BLM.

2.3.1 No Action Alternative

NEPA regulations require that EIS alternative analyses “include the alternative of no action” (40 CFR 1502.14(d)). For this analysis, no action means that the BLM would reject PCW’s request to develop wind energy on public lands and deny any request to provide access to private lands for wind development with the Application Area. The area would continue to be used for livestock grazing and recreation. The BLM may consider ROW requests or similar applications for other projects, such as power transmission or mineral development, which may be proposed for this area in the future. This alternative does not meet the purpose and need of the project, which is to promote the development of wind energy on public lands.

2.3.2 Alternative 1R, Applicant Proposed Alternative

Alternative 1R, the Applicant’s Proposed Alternative, was submitted by PCW as an alternative to their original project concept. PCW developed this alternative after considering numerous environmental factors identified through the scoping process. This alternative was developed after a comprehensive review of information pertaining to wildlife issues in the Application Area had been identified. The BLM evaluated this alternative and determined it to be a reasonable alternative that met the purpose and need and was, therefore, carried forward for detailed analysis.

Alternative 1R involves authorization of wind development in the 215,560-acre alternative footprint to accommodate development of a 2,000- to 3,000-MW project consisting of approximately 1,000 turbines in the two sites, the 105,644-acre Chokecherry site and 109,916-acre Sierra Madre site. Jurisdiction for this alternative is presented in **Table 2-1**. The BLM does not have jurisdiction over development on private or state lands and would provide reasonable access to private in-holdings.

Table 2-1 Jurisdiction with the Alternative 1R Footprint

| Jurisdiction | Application Area ¹ (acres) | | Total |
|--------------|---------------------------------------|----------------|----------------|
| | Chokecherry | Sierra Madre | |
| Public | 48,681 | 51,934 | 100,615 |
| State | 1,937 | 7,663 | 9,600 |
| Private | 55,026 | 50,319 | 105,345 |
| Total | 105,644² | 109,916 | 215,560 |

¹ The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

² Off-site project components (including transmission line, resource roads, and internal haul road in between project sites) are included in the acreage for the Chokecherry site.

The conceptual area of development for Alternative 1R could accommodate a 2,000- to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As stated in Section 2.2.1, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise, micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-2** represents the largest extent of disturbance that would occur under this alternative.

Table 2-2 Facilities Associated with Alternative 1R

| Facility | Unit | Chokecherry | Sierra Madre | Off-site | Total |
|---|-------|-------------|--------------|----------|-------|
| Support | | | | | |
| Staging Areas | Count | 4 | 2 | 0 | 6 |
| Substations | Count | 3 | 2 | 0 | 5 |
| Concrete Batch Plants | Count | 3 | 2 | 0 | 5 |
| O&M Building | Count | 0 | 0 | 1 | 1 |
| Intermodal Facility | Count | 0 | 0 | 1 | 1 |
| Water Extraction Site | Count | 1 | 0 | 0 | 1 |
| Transportation Network | | | | | |
| Roads and Access | Miles | 182 | 146 | 7 | 335 |
| Turnarounds | Each | 85 | 52 | 0 | 137 |
| Electrical System | | | | | |
| Underground 34.5 kilovolt (kV) Collection | Miles | 411 | 413 | 0 | 824 |
| Overhead 34.5-kV Collection | Miles | 73 | 73 | 0 | 146 |
| Overhead Collection Poles | Count | 1,285 | 1,285 | 0 | 2,570 |
| Overhead Transmission Line Road | Miles | 14 | 12 | 7 | 33 |
| Overhead 230-kV Transmission Towers | Count | 82 | 70 | 41 | 193 |

The conceptual area of development for Alternative 1R is displayed on **Figure 2-3**. Under this alternative, a transmission line would parallel the internal haul road. Facilities associated with this alternative are identified in **Table 2-2**.

Disturbance estimates were generated by assuming an average amount of disturbance associated with each project component proposed by alternative. While these estimates may vary somewhat from Geographic Information System (GIS) estimates that used assumed component locations to generate resource-specific analyses (e.g., disturbance associated with a habitat or vegetation type), the difference is estimated to be less than 5 percent. Based on the average amount of disturbance for project components in this alternative, Alternative 1R would result in approximately 7,221 acres of initial disturbance (3.3 percent of the total Alternative Boundary) and approximately 1,544 acres of long-term disturbance (0.7 percent of the total Alternative Boundary). Estimated initial disturbance during the four-year construction schedule is shown in **Table 2-3**. Total long term surface disturbance for Alternative 1R would be approximately 1,544 acres.

Table 2-3 Estimated Rate of Construction Surface Disturbance for Alternative 1R¹

| Construction Year | Estimated Initial Disturbance (acres) | Portion of Construction (%) |
|--------------------------|---------------------------------------|-----------------------------|
| 1 | 5,156 | 71 |
| 2 | 893 | 12 |
| 3 | 583 | 8 |
| 4 | 589 | 8 |
| Total² | 7,221 | 100 |

¹ Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

² Discrepancies in totals due to rounding.

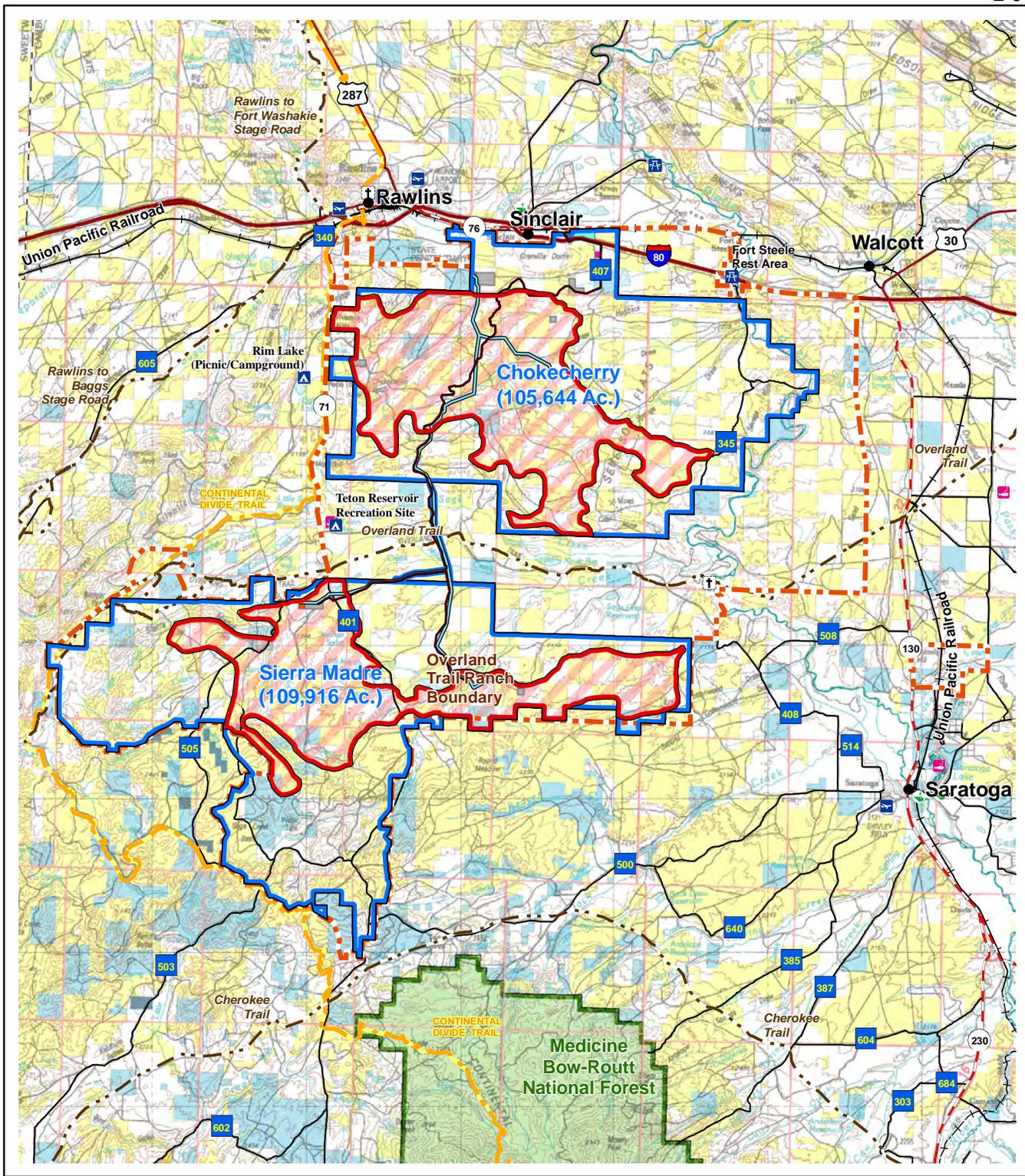
2.3.3 Alternative 2, Checkerboard Only

Alternative 2 was developed in response to public and agency comments to restrict wind development within consolidated tracts of public lands for the sake of mitigating visual impacts in areas with high recreational values. The checkerboard land pattern produces numerous federal management complications, most notably through the restrictions of public access. The Application Area lying outside of the checkerboard land pattern is highly used by recreationists including hunters and travelers along the Continental Divide National Scenic Trail (CDNST). Additionally, this area is notable for wildlife habitat including greater sage-grouse, mule deer, elk, and raptors. The proximity of this area to National Forests increases viewer sensitivity.

While PCW has committed to not developing any wind energy facilities within greater sage-grouse core breeding areas, as defined in Wyoming Governor's State EO 2010-4, numerous greater sage-grouse leks, as well as nesting and brooding habitat, are located throughout the Application Area. This alternative incorporates an additional stipulation for greater sage-grouse protection of developments over 20 feet, being precluded within 1-mile or the visual horizon (whichever is closer) of a lek; for developments less than 20 feet, the standard buffer of 0.25-mile NSU in areas outside the greater sage-grouse core breeding area would apply.

Alternative 2 would allow for 105,813 acres of wind development on public lands located within the Chokecherry site and would allow for 76,420 acres of wind development on public lands within the Sierra Madre site north of T18N. The privately-owned lands and state lands in these same areas also were considered available for the development of wind energy facilities. Jurisdiction for this alternative is presented in **Table 2-4**.

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| | |
|--|--|
| <ul style="list-style-type: none"> Transmission Line Haul Road Likely Area of Turbine Construction <p>Project Facilities</p> <ul style="list-style-type: none"> Alternate O&M Facility Intermodal Rail Facility Staging Area (Construction Only) Substation | <p>Legend</p> <ul style="list-style-type: none"> Project Area (Alt. 1R) Overland Trail Cattle Company Ranch Boundary <p>Land Owner</p> <ul style="list-style-type: none"> Bureau of Land Management Bureau of Reclamation Forest Service Private State Wyoming Game and Fish |
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Chokecherry and Sierra Madre Wind Energy Project

Figure 2-3

Conceptual Area of Development for Alternative 1R

0 1 2 3 4 5 Miles
0 2 4 6 8 10 Kilometers

1:375,000

Table 2-4 Jurisdiction with the Alternative 2 Footprint

| Jurisdiction | Application Area ¹ (acres) | | Total |
|--------------|---------------------------------------|---------------|----------------|
| | Chokecherry | Sierra Madre | |
| Public | 48,808 | 32,425 | 81,233 |
| State | 1,937 | 3,030 | 4,967 |
| Private | 55,068 | 40,965 | 96,033 |
| Total | 105,813² | 76,420 | 182,233 |

¹ The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

² Off-site project components (including transmission line, resource roads, and internal haul road in between project sites) are included in the acreage for the Chokecherry site.

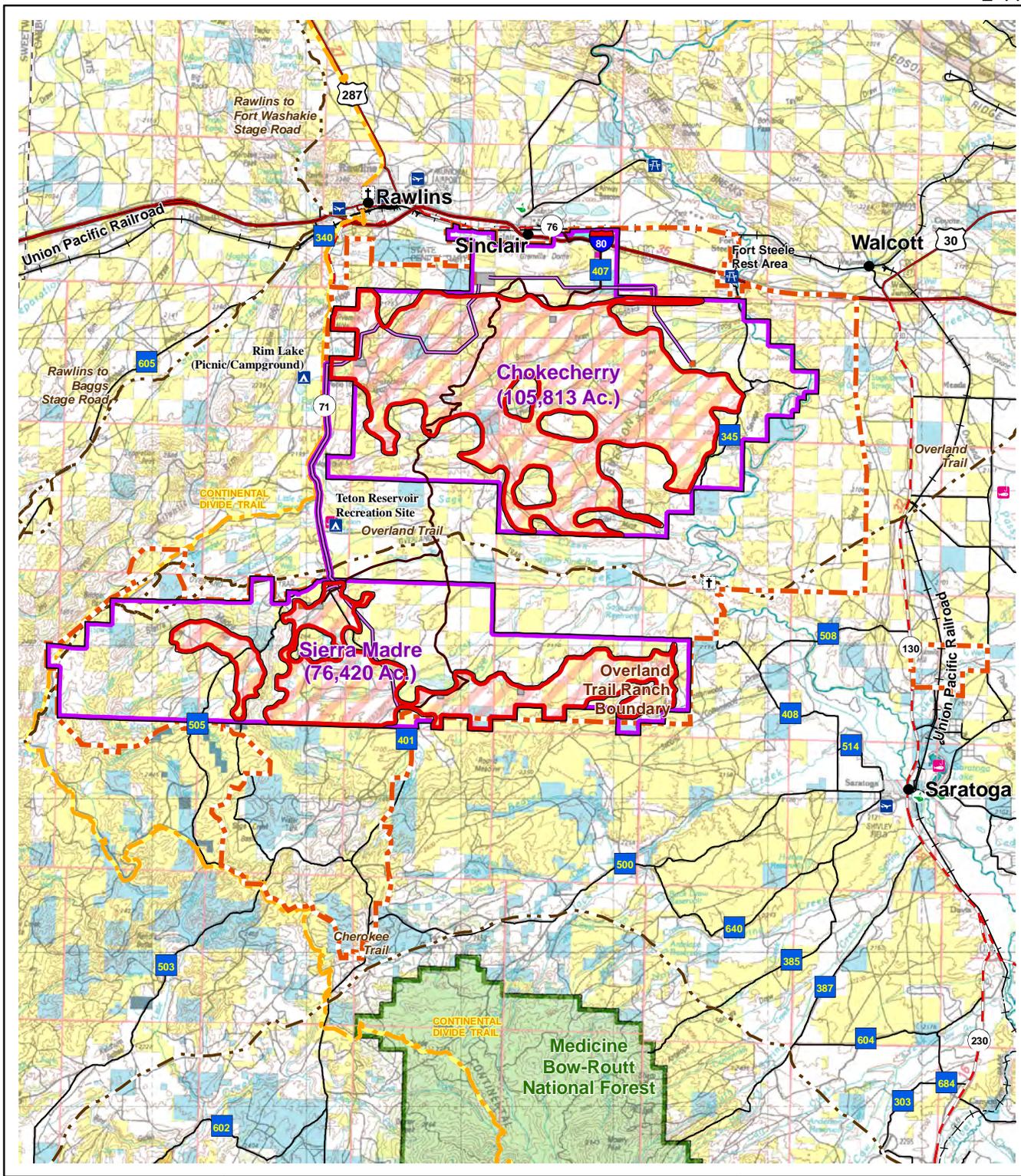
The conceptual area of development for Alternative 2 could accommodate a 2,000 to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As with Alternative 1R, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise, micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-5** represents the largest extent of disturbance that would occur under this alternative.

Figure 2-4 displays the conceptual area of development for Alternative 2. Under this alternative, the transmission line would parallel existing linear features (WY 71, roads, pipelines) to collocate linear crossings of the historic Overland Trail. Facilities associated with this alternative are identified in **Table 2-5**.

Table 2-5 Facilities Associated with Alternative 2

| Facility | Unit | Chokecherry | Sierra Madre | Off-site | Total |
|-------------------------------------|-------|-------------|--------------|----------|-------|
| Support | | | | | |
| Staging Areas | Count | 5 | 3 | 0 | 8 |
| Substations | Count | 3 | 2 | 0 | 5 |
| Concrete Batch Plants | Count | 3 | 2 | 0 | 5 |
| O&M Building | Count | 0 | 0 | 1 | 1 |
| Intermodal Rail Facility (IRF) | Count | 0 | 0 | 1 | 1 |
| Water Extraction Site | Count | 1 | 0 | 0 | 1 |
| Transportation Network | | | | | |
| Roads and Access | Miles | 263 | 165 | 12 | 440 |
| Turnarounds | Each | 135 | 86 | 1 | 222 |
| Electrical System | | | | | |
| Underground 34.5-kV Collection | Miles | 634 | 382 | 3 | 1,019 |
| Overhead 34.5-kV Collection | Miles | 112 | 68 | 1 | 181 |
| Overhead Collection Poles | Count | 1,971 | 1,197 | 18 | 3,186 |
| Overhead Transmission Line Road | Miles | 19 | 7 | 11 | 37 |
| Overhead 230-kV Transmission Towers | Count | 109 | 44 | 64 | 217 |

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| | |
|--|---|
| <ul style="list-style-type: none"> Transmission Line Haul Road Likely Area of Turbine Construction <p>Project Facilities</p> <ul style="list-style-type: none"> Alternate O&M Facility Intermodal Rail Facility Staging Area (Construction Only) Substation | <p>Legend</p> <ul style="list-style-type: none"> Project Area (Alt. 2) Overland Trail Cattle Company Ranch Boundary <p>Land Owner</p> <ul style="list-style-type: none"> Bureau of Land Management Bureau of Reclamation Forest Service Private State Wyoming Game and Fish |
|--|---|

Chokecherry and Sierra Madre Wind Energy Project

Figure 2-4

Conceptual Area of Development for Alternative 2

0 1 2 3 4 5 Miles
0 2 4 6 8 10 Kilometers

1:375,000

Disturbance estimates were generated using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 2 would result in approximately 8,795 acres of initial disturbance (5 percent of the total Alternative Boundary) and approximately 1,842 acres of long-term disturbance (1 percent of the total Alternative Boundary). Estimated initial disturbance during the 4-year construction schedule is shown in **Table 2-6**. Total long term surface disturbance for Alternative 2 would be approximately 1,842 acres.

Table 2-6 Estimated Rate of Construction Surface Disturbance for Alternative 2¹

| Construction Year | Estimated Initial Disturbance (acres) | Portion of Construction (%) |
|--------------------------|---------------------------------------|-----------------------------|
| 1 | 6,280 | 71 |
| 2 | 1,088 | 12 |
| 3 | 710 | 8 |
| 4 | 718 | 8 |
| Total² | 8,795 | 100 |

¹ Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

² Discrepancies in totals due to rounding.

2.3.4 Alternative 3, No Miller Hill or South Sierra Madre

This alternative was developed in response to public and agency comments to restrict wind development within consolidated tracts of public lands and exclude the Miller Hill portion of the Application Area in an attempt to protect existing VRM Class II areas and areas with high wildlife concerns. The issues raised in association with the Application Area outside of the checkerboard land pattern and described for Alternative 2 are addressed again in Alternative 3.

Miller Hill was identified as a highly sensitive area for wildlife, specifically greater sage-grouse, mule deer, elk, and raptors based on its proximity to the Grizzly WHMA. Furthermore, the headwaters of Muddy Creek, home to three BLM sensitive species, are located on Miller Hill. Mule deer and elk migration routes have been identified as terminating on Miller Hill as the area is used by both species as winter range.

While PCW has committed to not developing any wind energy facilities within greater sage-grouse core breeding areas, as defined in Wyoming Governor's State EO 2010-4, numerous greater sage-grouse leks as well as nesting and brooding habitat is located throughout the Application Area. This alternative incorporates an additional stipulation for greater sage-grouse protection. Timing stipulations from March 1 to July 15 would apply to the entire greater sage-grouse core breeding area and within 2 miles of a lek outside the greater sage-grouse core breeding area.

Alternative 3 would allow 105,813 acres of wind development on public lands within the Chokecherry site and 50,070 acres of wind development on public lands located within the Sierra Madre site located east of the eastern half of T18N, R88W. Privately owned and state lands located in these same areas also were considered available for the development of wind energy facilities. This would result in all lands (public, state, and private) below T18N or in the western half of T18N, R88W being considered as excluded from wind development. Jurisdiction for this alternative is presented in **Table 2-7**. The conceptual area of development for Alternative 3 could accommodate a 2,000 to 3,000-MW project consisting of up to 1,000 turbines within the alternative footprint. As with Alternative 1R, additional environmental constraints would come forth through development of an APP, BO, and PA. Likewise,

micro-siting could result in the inability to locate all 1,000 turbines. For this reason, the information provided in **Table 2-8** represents the largest extent of disturbance that would occur under this alternative.

Figure 2-5 displays the conceptual area of development for Alternative 3. Similar to Alternative 2, the transmission line would parallel the existing linear features (WY 71, roads, pipelines) to collocate linear crossings of historic trails. Facilities associated with this alternative are shown in **Table 2-8**.

Table 2-7 Jurisdiction with the Alternative 3 Footprint

| Jurisdiction | Application Area ¹ (Acres) | | Total |
|--------------|---------------------------------------|---------------|----------------|
| | Chokecherry | Sierra Madre | |
| Public | 48,808 | 22,633 | 71,441 |
| State | 1,937 | 1,277 | 3,214 |
| Private | 55,068 | 26,160 | 81,228 |
| Total | 105,813² | 50,070 | 155,883 |

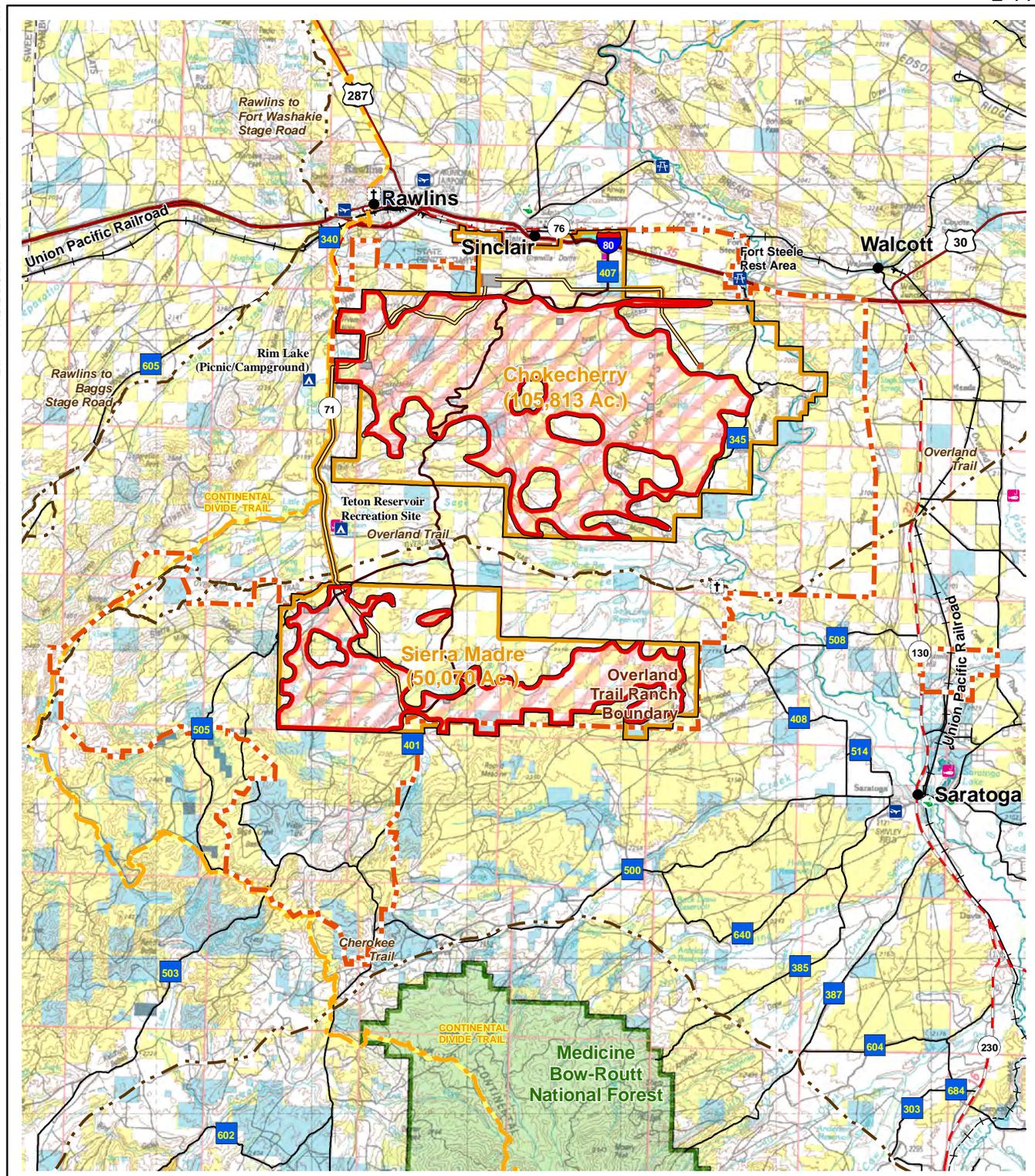
¹ The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

² Off-site project components (including transmission line, resource roads, and internal haul road in between project sites) are included in the acreage for the Chokecherry site.

Table 2-8 Facilities Associated with Alternative 3

| Facility | Unit | Chokecherry | Sierra Madre | Off-site | Total |
|-------------------------------------|-------|-------------|--------------|----------|-------|
| Support | | | | | |
| Staging Areas | Count | 5 | 2 | 0 | 7 |
| Substations | Count | 3 | 1 | 0 | 4 |
| Concrete Batch Plants | Count | 3 | 2 | 0 | 5 |
| O&M Building | Count | 0 | 0 | 1 | 1 |
| Intermodal Facility | Count | 0 | 0 | 1 | 1 |
| Water Extraction Site | Count | 1 | 0 | 0 | 1 |
| Transportation Network | | | | | |
| Roads and Access | Miles | 280 | 134 | 11 | 425 |
| Turnarounds | Each | 143 | 70 | 0 | 213 |
| Electrical System | | | | | |
| Underground 34.5-kV Collection | Miles | 664 | 374 | 3 | 1,041 |
| Overhead 34.5-kV Collection | Miles | 117 | 66 | 0 | 183 |
| Overhead Collection Poles | Count | 2,059 | 1,162 | 0 | 3,221 |
| Overhead Transmission Line Road | Miles | 17 | 6 | 11 | 34 |
| Overhead 230-kV Transmission Towers | Count | 100 | 37 | 64 | 201 |

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Legend

- Transmission Line
- Haul Road
- Likely Area of Turbine Construction
- Project Facilities**
- Alternate O&M Facility
- Intermodal Rail Facility
- Staging Area (Construction Only)
- Substation
- Overland Trail Cattle Company Ranch Boundary
- Land Owner**
- Bureau of Land Management
- Bureau of Reclamation
- Forest Service
- Private
- State
- Wyoming Game and Fish

Chokecherry and Sierra Madre Wind Energy Project

Figure 2-5

Conceptual Area of Development for Alternative 3

1:375,000

Disturbance estimates were generated using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 3 would result in approximately 8,504 acres of initial disturbance (6 percent of the total Alternative Boundary) and approximately 1,780 acres of long-term disturbance (1 percent of the total Alternative Boundary). Estimated initial disturbance during the 4-year construction schedule is shown in **Table 2-9**. Total long term surface disturbance for Alternative 3 would be approximately 1,780 acres.

Table 2-9 Estimated Rate of Construction Surface Disturbance for Alternative 3¹

| Construction Year | Estimated Initial Disturbance (acres) | Portion of Construction (%) |
|--------------------------|---------------------------------------|-----------------------------|
| 1 | 6,072 | 71 |
| 2 | 1,052 | 12 |
| 3 | 686 | 8 |
| 4 | 694 | 8 |
| Total² | 8,504 | 100 |

¹ Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

² Discrepancies in totals due to rounding.

2.3.5 Alternative 4, Private Lands Only

Alternative 4 was developed in response to public and agency comments to limit the wind development to private lands only.

Alternative 4 considers no placement of WTGs on public lands or state lands within either the Chokecherry site or Sierra Madre site. This alternative, however, considers that the BLM would provide ROW grants to PCW across public lands which would allow PCW to develop wind energy facilities on the privately-held lands. The BLM does not have jurisdiction over development on private or state lands and must provide reasonable access to private in-holdings. Application of stipulations is beyond the control of the BLM for development on private or state lands. The BLM would apply required NSU and timing stipulations to public lands for requested access points. Jurisdiction for this alternative is presented in **Table 2-10**.

Table 2-10 Jurisdiction with the Alternative 4 Footprint

| Jurisdiction | Application Area ¹ (Acres) | | Total |
|--------------|---------------------------------------|----------------|----------------|
| | Chokecherry | Sierra Madre | |
| Public | 48,808 | 51,934 | 100,742 |
| State | 1,937 | 7,663 | 9,600 |
| Private | 55,068 | 50,319 | 105,387 |
| Total | 105,813² | 109,916 | 215,729 |

¹ The Chokecherry site boundary comprises all land within the Application Area that is north of the Overland Trail; the Sierra Madre site boundary comprises all land south of the Overland Trail.

² Off-site project components (including transmission line, resource roads, and internal haul road in between project sites) are included in the acreage for the Chokecherry site.

The conceptual area of development for Alternative 4 resulted in a decrease in the number of turbines that could be sited to 846 within the alternative footprint. **Figure 2-6** displays the conceptual area of development for Alternative 4. This alternative meets PCW's minimum capacity requirements of developing a 2,000-MW project.

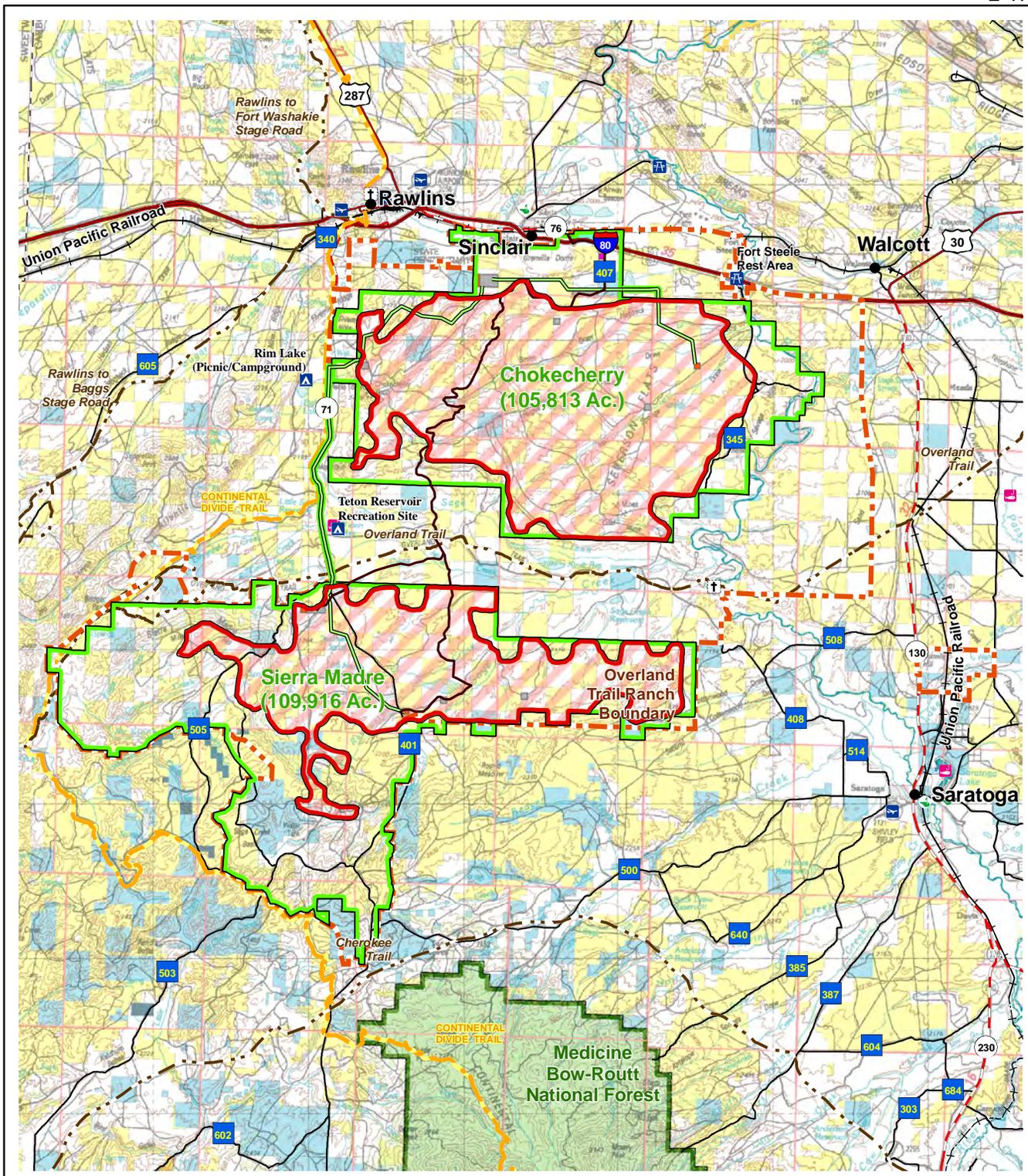
Similar to Alternative 2, the transmission line would parallel the existing linear features (WY 71, roads, pipelines) to collocate linear crossings of the historic Overland Trail. Facilities associated with this alternative are shown in **Table 2-11**.

Table 2-11 Facilities Associated with Alternative 4

| Facility | Unit | Chokecherry | Sierra Madre | Off-site | Total |
|-------------------------------------|-------|-------------|--------------|----------|-------|
| Support | | | | | |
| Staging Areas | Count | 4 | 4 | 0 | 8 |
| Substations | Count | 3 | 2 | 0 | 5 |
| Concrete Batch Plants | Count | 3 | 2 | 0 | 5 |
| O&M Building | Count | 0 | 0 | 1 | 1 |
| Intermodal Facility | Count | 0 | 0 | 1 | 1 |
| Water Extraction Site | Count | 1 | 0 | 0 | 1 |
| Transportation Network | | | | | |
| Roads and Access | Miles | 169 | 156 | 152 | 477 |
| Turnarounds | Each | 94 | 74 | 5 | 173 |
| Electrical System | | | | | |
| Underground 34.5 kV Collection | Miles | 264 | 308 | 264 | 836 |
| Overhead 34.5 kV Collection | Miles | 46 | 54 | 46 | 146 |
| Overhead Collection Poles | Count | 810 | 950 | 810 | 2,570 |
| Overhead Transmission Line Road | Miles | 8 | 5 | 23 | 36 |
| Overhead 230 kV Transmission Towers | Count | 105 | 41 | 64 | 210 |

Disturbance estimates were generated by using the same average amount of disturbance associated with each project component as Alternative 1R. Based on the average amount of disturbance for project components in this alternative, Alternative 4 would result in approximately 8,918 acres of initial disturbance (4 percent of the total Alternative Boundary) and approximately 1,871 acres of long-term disturbance (1 percent of the total Alternative Boundary). The higher amount of surface disturbance in relation to fewer turbines is associated with the additional road network required across more area to access private lands. Estimated initial disturbance during the 4-year construction schedule is shown in **Table 2-12**. Total long term surface disturbance for Alternative 4 would be approximately 1,871 acres.

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| | |
|---|--|
| <ul style="list-style-type: none"> — Transmission Line — Haul Road Likely Area of Turbine Construction <p>Project Facilities</p> <ul style="list-style-type: none"> Alternate O&M Facility Intermodal Rail Facility Staging Area (Construction Only) Substation | <p>Legend</p> <ul style="list-style-type: none"> Project Area (Alt. 4) Overland Trail Cattle Company Ranch Boundary <p>Land Owner</p> <ul style="list-style-type: none"> Bureau of Land Management Bureau of Reclamation Forest Service Private State Wyoming Game and Fish |
|---|--|

Chokecherry and Sierra Madre Wind Energy Project

Figure 2-6

Conceptual Area of Development for Alternative 4

1:375,000

Table 2-12 Estimated Rate of Construction Surface Disturbance for Alternative 4¹

| Construction Year | Estimated Initial Disturbance (acres) | Portion of Construction (%) |
|--------------------------|--|------------------------------------|
| Year 1 | 6,368 | 71 |
| Year 2 | 1,103 | 12 |
| Year 3 | 720 | 8 |
| Year 4 | 728 | 8 |
| Total² | 8,918 | 100 |

¹ Estimated disturbance based on average disturbance associated with each facility proposed under the alternative within the alternative boundary (includes all jurisdictions).

² Discrepancies in totals due to rounding.

2.4 Alternatives Considered but Eliminated from Detailed Analysis

The following alternatives and management options were considered but were eliminated from detailed analysis as either unreasonable or impractical because of technical, legal, or policy considerations. Some concepts were raised as independent alternatives, but were either considered to be required stipulations, mitigation, or incorporated as part of another alternative. These alternatives and concepts were developed through interdisciplinary team meetings, meetings with agencies, and input received during public scoping.

2.4.1 Proponent's Original Project Concept

The original Proposed Action includes development of a 2,000 to 3,000-MW wind farm consisting of approximately 1,000 WTGs on two wind farm sites – CCSM – within an approximately 98,477-acre area primarily within the 315,000-acre TOTCO ranch. Based on a conceptual area of development, approximately 675 turbines would be sited within the 72,835-acre Chokecherry site and approximately 325 turbines would be sited within the 25,642-acre Sierra Madre site. The installed project capacity would be between 2,000-3,000-MW.

Based on the average amount of disturbance for proposed project components, the original project concept would result in approximately 8,730 acres of initial disturbance (8.8 percent of the total Alternative Boundary) and approximately 1,811 acres of long-term disturbance (1.8 percent of the total Alternative Boundary). Construction would be planned to occur over a three-year period.

The original project concept does not consider application of BLM required stipulations on public lands. Therefore, the original project concept does not meet the BLM's purpose and need in that it does not conform to management policy set forth in the Rawlins RMP. For this reason, it was not carried forward.

2.4.2 Proponent's Original Project Concept with Constraints

This alternative considers the project concept with additional BLM required environmental constraints applied to public lands as well as the application of ACMs. The Alternative Boundary, however, would remain the same as those submitted by PCW as its original project concept (98,477 acres). Based on a conceptual area of development, approximately 552 turbines would be sited within the 72,835-acre Chokecherry site and approximately 185 turbines would be sited within the 25,642-acre Sierra Madre site (totaling 737 WTG). The installed project capacity would be between 1,106-2,211-MW.

Under this alternative, turbines displaced by stipulations on public lands may be relocated to private lands within the 98,477-acre Application Area. However, without expansion of the Alternative Boundary, the Original Project Concept with Environmental Constraints (e.g., RMP stipulations) does not meet

PCW's objectives in that it does not allow for the development of 2,000 to 3,000-MW (1,000 turbine locations) and would not be economically viable.

2.4.3 Alternative 1: Application of RMP Stipulations and Expanded Application Area

Alternative 1 differs from Alternative 1R in that Alternative 1R provides a different area of conceptual development that incorporates the new greater sage-grouse Version 3 map that was not available when Alternative 1 was developed. Alternative 1 considers wind development on state, private, and public lands that are located within the Application Area and within the boundaries of TOTCO grazing allotments. This alternative also would apply the BLM-required environmental constraints to public lands as well as PCW's ACMs. The expanded Alternative Boundary was intended to accommodate displaced turbines to achieve development of a 2,000 to 3,000-MW project consisting of approximately 1,000 WTG locations and maximize energy production. Based on a conceptual area of development, approximately 663 turbines would be sited within the 105,477-acre Chokecherry site and approximately 337 turbines would be sited within the 108,338-acre Sierra Madre site (totaling 1,000 WTG). The installed project capacity would be between 2,000-3,000-MW.

Alternative 1 was developed using the same criteria as PCW's applicant proposed alternative (Alternative 1R) in that both give PCW the option of designing a turbine layout that could use any portion of the area for which they have applied for site testing and monitoring while complying with BLM-required environmental constraints. For this reason, analysis of both alternatives would be redundant. As the original project concept would not be analyzed in detail, PCW's applicant proposed alternative (Alternative 1R) was carried forward for detailed analysis, essentially replacing and eliminating the need to analyze Alternative 1 in detail.

2.4.4 Alternative 5: Avoidance of Greater Sage-grouse Core Breeding Areas (Version 2 Map)

Alternative 5 considers wind development on private, state, and public lands located outside the greater sage-grouse core breeding areas, as designated by the Wyoming Governor's Greater Sage-Grouse Implementation Team and depicted on the greater sage-grouse core breeding areas Version 2 map (which was available at the time of the alternatives development), and within the Application Area. Based on a conceptual area of development, approximately 252 turbines would be sited within the 39,348-acre Chokecherry site and approximately 49 turbines would be sited within the 16,276-acre Sierra Madre site. The installed project capacity would be between 602 to 903-MW.

Alternative 5, no development in greater sage-grouse core breeding areas (based on the Version 2 Map), does not meet PCW's objectives in that it does not allow for the development of a 2,000 to 3,000-MW project consisting of approximately 1,000 WTG locations. Additionally, since development of this alternative, the Wyoming Governor's Greater Sage-Grouse Implementation Team issued the revised greater sage-grouse core breeding area boundaries (Version 3 Map) and associated recommendations (formalized in WSEO 2010-4, issued August 18, 2010), which no longer includes a larger portion of the Application Area. PCW's ACMs would exclude development in the greater sage-grouse core breeding areas (as indicated on Version 3 Map) under all alternatives in accordance with WSEO 2010-4 and, therefore, this alternative is no longer necessary.

2.4.5 Alternative 6: Chokecherry Only/No Sierra Madre Development

Alternative 6 considers wind development on private, state, and public lands only in the Chokecherry site of the Application Area. As a result, no wind energy development would occur in the Sierra Madre site. Based on a conceptual area of development, approximately 663 turbines would be sited within the 105,477-acre Chokecherry site. The installed project capacity would be between 1,326 and 1,989-MW.

Alternative 6, development of Chokecherry only, does not meet PCW's objectives in that it does not allow for the development of a 2,000 to 3,000-MW project consisting of approximately 1,000 WTG locations and maximize energy production. Additionally, the BLM NEPA Handbook (H-1790-1) allows for various parts of separate alternatives that are analyzed to be "mixed and matched" to develop a complete preferred alternative as long as the reasons for doing so are explained. Since the impact analysis for all alternatives analyzes the CCSM sites separately, the analysis would already cover this option and it would be unnecessary to complete a separate analysis.

2.4.6 Wind Turbine Design and Siting Concepts

Multiple concepts were considered regarding variations to wind turbine design and siting. Concepts considered included: alternative wind turbine designs (types) and generating capacity, reduced/limits to turbine density, and higher capacity turbines. These concepts were considered as independent alternatives to potentially reduce surface disturbance and associated direct and indirect impacts from the project, including to soils, receiving waters, and avian species as well as visual resources. Some of these options have been included as part of all alternatives to the extent that it is technically feasible and, therefore, were not considered viable independent alternatives. For example, the project already considers using the most efficient turbines available (currently 2 to 3-MW) for the Application Area's wind resource and vertical wind shear factor, and also allows for the option of using International Electrotechnical Commission Classes 1 and 2 turbines with hub heights up to and including 328 feet. There are larger capacity turbine models (including 3.6 and 5-MW models), however, those turbines were developed for off-shore development or are prototype machines that are not commercially available and may not be appropriate for the site conditions. Other considerations in turbine model selection include the ability of manufacturers to produce and deliver turbines within the project timeframe, which is beyond the scope of the BLM's NEPA process. In addition, turbine density has inherent restrictions associated with wake effect and other engineering factors. Alternatives considered area restrictions associated with environmental constraints rather than arbitrarily placing density restrictions on the project, which is not considered a reasonable or practical alternative.

The BLM gave consideration to requiring a height restriction on WTGs, which may have the potential to reduce overall visibility of the project. Tower height is an important factor in WTG design since the wind blows faster at higher altitudes because of the drag of the surface and the viscosity of the air. Therefore, a height restriction would result in less energy output. According to an independent review of the project by the National Renewable Energy Laboratory (NREL 2011), commercially available WTGs that have more energy output also are taller structures. Placing a height restriction on WTGs would reduce the energy output produced by each WTG, requiring more WTGs to achieve the minimum energy output deemed economically necessary for the project viability by the applicant. A cursory review conducted by PCW indicated that up to 2,387 turbines could be sited in the Application Area, but the wind resource of these areas would vary considerably and some areas would not achieve near nameplate capacity. The extent of additional WTGs required to produce a desired output of 2,000 to 3,000-MW may not be achieved within the Application Area using smaller WTGs. More turbines would result in more surface disturbance across the Application Area. Smaller turbines also would have faster rotor speeds, increasing the potential for avian strikes.

The BLM also gave consideration to multiple smaller projects as opposed to one large wind project in two areas that share support facilities. According to an independent review of the project by NREL (2011), Alternative 1R considers 3 substations and a collector system of approximately 31 miles of transmission/collection lines. However, a system of 10 separate 200-MW projects would require 10 substations at a substantially increased cost and more surface disturbance since each project would require separate facilities. If the ten 200-MW projects were to be spread over a larger geographic area for other reasons (i.e., environmental impacts), then the more miles of electrical transmission/collection lines would be needed, adding proportionately greater costs and surface disturbance to the project in addition to the 10 substations.

2.4.7 Transmission Concepts

Multiple concepts were considered regarding variations to the power transmission. Concepts considered included: transmission line routing relocation, alternative transmission line structure design, and transmission substation relocation. These concepts were considered as independent alternatives to address concerns related to greater sage-grouse, raptors, steep slopes, and visual resources that were identified during the public and agency scoping process.

Locating the main transmission line underground is not a viable concept due to transmission constraints, maintenance concerns, and prohibitive costs. Underground transmission lines are more difficult to site as a result of other considerations including underground waterways, varying soil and rock material, and varying thermal conditions as well as other infrastructure and ROWs. Underground circuits also are prone to heat build-up, which results in increased line resistance and lack circuit breaking capabilities that are available on overhead lines. Ultimately, design and installation as well as repairs of underground systems are more complex, time-consuming, and expensive. Therefore, the applicability of undergrounding secondary and high voltage transmission lines was eliminated from further consideration.

Viable concepts have been incorporated into the alternatives and these concepts were not considered as independent alternatives that required analysis. For example, single-pole transmission line structures were incorporated into all alternatives as they are less visible and require less disturbance than H-frame or lattice structures. These options were not considered viable independent alternatives. The most viable option was included in Alternatives 2 through 4, which incorporates the concept of the main transmission line paralleling existing linear features (WY 71, roads, pipelines) and avoiding sensitive resources through the BLM environmental constraints and ACMs.

2.4.8 Resource Protection Concepts

Multiple concepts were considered as independent alternatives to address concerns related to historic trails and other cultural resources, visual impacts to sensitive receptors, compliance with the BLM VRM classifications, avoid or reduce impacts to receiving waters, reduce impacts to avian and bat species, reduce electrocution and predation, and wildlife protection. Each of these concepts has been incorporated into either the EIS action alternatives or mitigation, as specified in the parentheses for each bullet below. In many cases these concepts are considered BLM-required environmental constraints or have been accepted as ACMs. In other cases, the concepts are considered mitigation and not reasonable or practical independent alternatives. Concepts considered include:

- Rerouting of transmission lines and roads to avoid cultural resources and crossing historic trails (addressed in Alternatives 2-4);
- Excluding wind development from existing VRM Class II areas (addressed in Alternative 3);
- Establish visual avoidance areas with ratings of high sensitivity based on viewer sensitivity, scenic quality, and distance zones to exclude wind development from critical key observation points (KOPS) and major travel routes in the analysis area (addressed with the No Action Alternative);
- Elimination of turbines and access roads upslope from the Rawlins public water supply and other receiving streams (all alternatives analyzed in detail);
- Discontinued operations during migration seasons to reduce avian and bat mortality (potential mitigation strategy in the APP);
- Installation of overhead transmission structures with anti-perching devices and adequate conductor-to-conductor and conductor-to-ground space to prevent avian electrocution (potential mitigation strategy in the APP); and

- Incorporation of protective measures including NSU and timing restrictions during breeding season (possibly beyond standard restrictions) and relocation of development to less sensitive areas which would apply to greater sage-grouse, raptors, and mountain plover (all alternatives analyzed in detail).

2.4.9 Renewable Energy Development Concepts

Thermal solar energy has gained considerable attention during recent years as a renewable resource for power generation. Designs include the use of parabolic mirror troughs, power tower designs, dish designs, and Fresnel lenses and reflectors. Parabolic mirror troughs have been in use for decades as a means to focus solar energy on a media to create heat to drive turbines and generators.

The 400 acre Nevada Solar One plant is one of the newer facilities in operation using parabolic mirror troughs to produce 64-MW. Pacific Gas and Electric Company has entered into power purchase agreements as part of BrightSource Energy with a planned capacity of 900-MW from a variety of generating configurations.

In general, a parabolic trough power plant uses about 5 to 10 acres land per megawatt of electric capacity depending on whether or not the solar field has been oversized to take advantage of thermal energy storage. Using Nevada Solar One as an example, 2,000-MW production (as proposed for the CCSM Wind Energy Project) would require development of a 12,500 acre solar facility. Such a facility would require a relatively level development site with multiple turbine/generator facilities that would be located within reasonable distances from the mirror trough solar array.

The application of solar power generation as an alternative to wind power generation has not been carried forward as a viable alternative because generating capacity is largely contingent upon daylight hours during summer months. It is anticipated that the proposed wind farm would deliver electricity at roughly half of the cost of concentrating solar. Furthermore, rough (hilly) terrain within the CCSM project sites makes it poorly suited for a solar power facility.

Biomass generator facilities have been developed using agricultural products and waste and human waste as fuels. Ethanol production has been increasing within the U.S. and elsewhere for use as an additive to gasoline on the premise that ethanol would replace (and therefore reduce) gasoline consumption. Biomass also has been used to produce methanol and similar gasses for power generation. Relatively small-scale methanol generating facilities have been developed using agricultural by-products and waste, animal waste, and human waste.

The potential use of ethanol or methanol as a fuel was not carried forward for further consideration. Ethanol production requires excessive amounts of water for production, energy output (when compared to gasoline) is low, and shipping of corn, sugar beans, and other commodities required to produce ethanol can be cost prohibitive due to transportation requirements. Furthermore, land required for commodities production for ethanol cannot be used for other purposes.

2.4.10 Alternate Project Site

The proposed CCSM Wind Energy Project is located in an area that is currently used for livestock production and recreation but also contains sensitive resources that would be adversely affected by the project. Development of the proposed Wind Energy Project at another location that contains less sensitive resources may reduce environmental impacts associated with the construction and generation of 2,000-MW. According to the applicant, the proposed project location contains the following characteristics atypical of other locations:

- Compatible land uses, current private ownership/management by the proponent, and availability for use as a wind farm;

- Availability of a developable wind resource with a wind power potential of “excellent”, “outstanding”, or “superb” as determined through modeling by AWS Truewind Solutions and validated by the NREL (2011) as an excellent wind resource;
- Existing or reasonably foreseeable long-distance transmission resources that would be available to interconnect the facility to the national or regional power grid;
- Availability of site access that could be used to transport turbines and ancillary equipment;
- Water availability for project development; and
- Adjacent land uses that are compatible with site development and/or project operations.

These key siting elements offer a unique opportunity for project development and operations proposed by the proponent, who has ownership of private lands within the Application Area and is currently using these lands and interspersed public and state lands for livestock grazing, a use compatible with the proposed project. While there may be suitable alternate locations with good wind resources and fewer resource constraints, consideration of siting the CCSM Wind Energy Project on an alternate project location would not meet the applicant’s objectives to construct the project within TOTCO ranch boundaries. While general concepts of alternate locations were raised during scoping, no specific alternate site feasible for the project was identified. Alternate project locations also may not possess some or all of the characteristics listed that are necessary for the proposed wind energy project. Additionally, alternate project locations also may be subject to conflicts identical or similar to those found at the proposed project location, including wildlife, visual resources, or socioeconomic concerns.

2.4.11 Staged Development Alternatives

Multiple concepts were considered regarding variations to staging development of the project with enough time during each stage to allow for monitoring of wildlife impacts from the project. Concepts considered included development of the Chokecherry site prior to the Sierra Madre site. These concepts were considered as independent alternatives; however, after further evaluation, project development should be dictated by seasonal stipulations and the applicant’s economic considerations and, therefore, the concepts were not considered reasonable or practical alternatives.

2.4.12 Turbine Transport Alternatives

Concerns were raised that hairpin turns and difficult terrain could inhibit the transport of turbine components and alternative transportation routes may be required. However, turbine transport should be dictated by engineering constraints and mitigation identified through the environmental analysis.

2.5 Comparison of Alternatives

This section includes a summary of impacts (**Tables 2-13** and **2-14**) to provide a side-by-side comparison of the alternatives.

Table 2-13 Surface Disturbance Comparison for CCSM Alternatives

| New Facilities | Size (ROW width [feet] or acres/facility) | Initial Surface Disturbance by Alternative | | | | | | | |
|---|--|--|---|------------------------------------|--|------------------------------------|--|------------------------------------|--|
| | | Alternative 1R | | Alternative 2 | | Alternative 3 | | Alternative 4 | |
| | | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) |
| Wind Turbine Generators (WTG) | 1.5 acres | 1,000 each | 1,500 | 1,000 each | 1,500 | 1,000 each | 1,500 | 846 each | 1,269 |
| Roads | | | | | | | | | |
| Off-site access, internal resource roads | 94 feet | 335 miles | 3,817 | 440 miles | 5,013 | 425 miles | 4,843 | 477 miles | 5,435 |
| Turnaround roads | 0.94 acre | 137 each | 129 | 222 each | 209 | 213 each | 200 | 173 each | 163 |
| WTG road networks subtotal | | | 3,946 | | 5,222 | | 5,043 | | 5,598 |
| Electrical System | | | | | | | | | |
| Underground collections system (34.5 kV) | 0 feet | 824 miles | 0 | 1,019 miles | 0 | 1,041 miles | 0 | 836 miles | 0 |
| Overhead collections system (34.5 kV) | 0 feet | 146 miles | 0 | 181 miles | 0 | 183 miles | 0 | 146 miles | 0 |
| Overhead collection poles | 0.08 acre | 2,570 each | 206 | 3,186 each | 255 | 3,221 each | 258 | 2,570 each | 206 |
| OH transmission line road (construction and O&M) | 94 feet | 33 miles | 376 | 37 miles | 422 | 34 miles | 390 | 36 miles | 410 |
| OH transmission line towers and construction loop roads | 0.13 are. | 193 each | 25 | 217 each | 28 | 201 each | 26 | 210 each | 27 |
| Electrical System Subtotal | | | 607 | | 705 | | 673 | | 643 |
| Support Facilities | | | | | | | | | |
| Staging areas | Variable acres | 6 each | 680 | 8 each | 880 | 7 each | 840 | 8 each | 920 |
| Substations | Variable acres | 5 each | 200 | 5 each | 200 | 4 each | 160 | 5 each | 200 |
| Concrete batch plants | 0 acre | 5 each | 0 | 5 each | 0 | 5 each | 0 | 5 each | 0 |

Table 2-13 Surface Disturbance Comparison for CCSM Alternatives

| New Facilities | Size (ROW width [feet] or acres/facility) | Initial Surface Disturbance by Alternative | | | | | | | |
|--|--|--|---|------------------------------------|--|------------------------------------|--|------------------------------------|--|
| | | Alternative 1R | | Alternative 2 | | Alternative 3 | | Alternative 4 | |
| | | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) | Multiplier (number or miles) | Disturbance (acres or % of alternative area) |
| O&M building | 40 acres | 1 each | 40 | 1 each | 40 | 1 each | 40 | 1 each | 40 |
| Intermodal facility | 244 acres | 1 each | 244 | 1 each | 244 | 1 each | 244 | 1 each | 244 |
| Water extraction | 5 acres | 1 each | 5 | 1 each | 5 | 1 each | 5 | 1 each | 5 |
| Support Facilities Subtotal | | | 1,169 | | 1,369 | | 1,289 | | 1,409 |
| Alternative surface disturbance (acre) | | | 7,221 | | 8,795 | | 8,504 | | 8,918 |
| Alternative boundary area (acre) | | | 215,560 | | 182,233 | | 155,883 | | 215,729 |
| Alternative disturbance (%) | | | 3.3% | | 4.8% | | 5.5% | | 4.1% |
| Long-term Surface Disturbance by Alternative | | | | | | | | | |
| Long-term surface disturbance (acre) | | | 1,544 | | 1,842 | | 1,780 | | 1,871 |
| Long-term surface distance as % of Alternative Area | | | 0.7% | | 1.0% | | 1.1% | | 0.9% |

¹ Subtotal amounts may not add up due to rounding.

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|---|---|---|--|--|------------------------------|
| Cultural Resources and Native American Traditional Values | | | | | |
| Visual impacts to the historic properties | Visual effects to historic properties, specifically the Overland Trail, by introducing visual elements that diminish the integrity of the property's setting. | Increased potential for visual effects to the Overland Trail from Alternative 1R relative to the WTGs; visual effects associated with the proposed transmission line would be less than Alternative 1R. | Decreased potential for visual effects to the Overland Trail from Alternative 1R relative to WTGs; visual effects associated with the proposed transmission line would be the same as Alternative 2. | Increased potential for visual effects to the Overland Trail from Alternative 1R relative to WTGs; visual effects associated with the proposed transmission line would be the same as Alternative 2. | Section 4.2 |
| Geology and Minerals | | | | | |
| Aggregate consumption ¹ (cubic yards) | 1,384,200 | 1,620,041 | 1,556,097 | 1,632,640 | Section 4.3 |
| Land slide constraints (acres of landslide deposits potentially affected) | Approximately 6.7 | Approximately 5.6 | Approximately 0.6 | Approximately 4.8 | Section 4.3 |
| Swelling soil constraints (acres of shrink-swell potential bedrock) | Approximately 34 | Approximately 123 | Approximately 124 | Approximately 180 | Section 4.3 |
| Land Use/Recreation | | | | | |
| Public access | Limited temporary access restrictions (for public safety and project security), in particular at WTG sites and other critical project infrastructure. | Same as Alternative 1R | Same as Alternative 1R | No access to WTGs and other facilities on private land. Internal development road on public lands closed to public use. Current public access not affected. | Section 4.4 |

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|---|---|--|--|--|------------------------------|
| Impacts to the Grizzly Special Management Area (SMA) | The area inside the Grizzly SMA and inside the Application Area, but outside the greater sage-grouse core breeding area, could have WTGs and supporting facilities. | Would not build within the Grizzly SMA. | Would not build within the Grizzly SMA. | Would not build within the Grizzly SMA. | |
| Lands with wilderness characteristics | Two inventory units affected: Initial disturbance of up to 214 acres in Sage Creek Basin East and 5 acres in Sage Creek Basin West. | One inventory unit affected: Initial disturbance of up to 46 acres in Sage Creek Basin East. | One inventory unit affected: Initial disturbance of up to 49 acres in Sage Creek Basin East. | One inventory unit affected: Initial disturbance of up to 32 acres in Sage Creek Basin East. | Section 4.4 |
| Paleontology | | | | | |
| Potential Fossil Yield Classification (PFYC) Classes 4 or 5 areas (acres) direct impact | 6,294 | 7,543 | 7,874 | 7,625 | Section 4.5 |
| Range Resources | | | | | |
| AUMs lost – direct | 928 | 1,027 | 988 | 2,024 | Section 4.6 |
| AUMs lost – dust deposition | 1,673 | 1,956 | 1,886 | 2,024 | Section 4.6 |

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|--|---|---|---|---|-----------------------|
| Socioeconomics | | | | | |
| Employment (number jobs): Peak – development | 1,644 | Similar to Alternative 1R. Incrementally higher labor requirements for road construction and project development costs. | Similar to Alternative 1R. Incrementally higher labor requirements for road construction and project development costs. | Similar to Alternative 1R. Incremental higher labor for road construction, combined with reduction in labor due to 15 percent fewer WTGs. | Section 4.8 |
| Year round range – jobs | 205 to 284 | Similar to Alternative 1R. | Similar to Alternative 1R. | Similar to Alternative 1R. | Section 4.8 |
| Temporary housing demand (peak) | 1,144 units; demand for temporary housing exceeds availability. | Higher peak impacts would increase housing shortfall in Year 1. | Higher peak impacts would increase housing shortfall in Year 1. | Higher peak impacts would increase housing shortfall in Year 1. | Section 4.8 |
| Public sector revenues – (millions of dollars): Federal ROW grant rentals | \$2.1 to \$3.2 per year at full development. | \$2.1 to \$3.2 per year at full development. | \$2.11 to \$3.12 per year at full development. | Unknown, but likely less than \$100,000 per year at full development. | Section 4.8 |
| Public sector revenues – (millions of dollars): Local ad valorem/property tax (including mandatory state levies) | \$29.7 to \$42.4 (Year 1) \$21.7 to \$31 (Year 10) | \$29.7 to \$42.4 (Year 1) \$21.7 to \$31 (Year 10) | \$29.7 to \$42.4 (Year 1) \$21.7 to \$31 (Year 10) | More than \$25.5 to \$36.1 (Year 1) \$18.6 to \$26.3 (Year 10). | Section 4.8 |
| Public sector revenues – (millions of dollars): Sales and use tax | \$216 to \$336 (over 4 years). Much lower during operations. | \$216 to \$336 (over 4 years). Much lower during operations. | \$216 to \$336 (over 4 years). Much lower during operations. | More than \$194 to \$284 (over 4 years). | Section 4.8 |
| Public sector revenues – (millions of dollars): Wind energy production tax | \$6.1 to \$9.2 per year (at full production after 3-year exemption period). | \$6.1 to \$9.2 per year (at full production after 3-year exemption period). | \$6.1 to \$9.2 per year (at full production after 3-year exemption period). | \$5.2 to \$7.8 per year (at full production after 3-year exemption period). | Section 4.8 |

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|---|--|--|--|---|-----------------------|
| Soils | | | | | |
| Severely water erodible soils (acres) | 1,832 | 1,937 | 2,009 | 1,811 | Section 4.9 |
| Severely wind erodible soils (acres) | 75 | 48 | 83 | 49 | Section 4.9 |
| Poor topsoil ratings (acres) | 3,199 | 3,843 | 3,961 | 3,921 | Section 4.9 |
| Transportation and Access | | | | | |
| I-80 (Exit 221) construction effects on WY 76/CR 407 – haul road commuting option | High volumes of construction traffic on WY 76/CR 407 at I-80 Exit 221 during construction activity in each of the 4 years. Peak hour delays and reductions in level of Service (LOS) at intersection on WY 76, I-80 westbound off-ramp and eastbound-on ramp resulting in significant impact. Intermittent delay on Bridge over I-80 at Exit 221 during WTG transport. | Similar to, but slightly higher than Alternative 1R due to additional road construction. | Similar to, but slightly higher than Alternative 1R due to additional road construction. | Somewhat reduced overall volumes of construction traffic as compared to Alternative 1R. High volumes of peak month/peak hour traffic still anticipated. | Section 4.10 |
| WY 71 (crossing) Impacts: Number of SM turbines west/east of WY 71/CR 401 | 294/176 | 220/189 | 135/202 | 154/223 | Section 4.10 |
| Visual Resources | | | | | |
| Percent of WTGs on BLM – VRM Class IV | 45 | 39 | 43 | 0 | Section 4.12 |
| State | 4 | 3 | 2 | 0 | Section 4.12 |

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|--|-----------------------|----------------------|----------------------|----------------------|------------------------------|
| Private | 51 | 59 | 54 | 100 | Section 4.12 |
| Total | 100 | 100 | 100 | 100 | Section 4.12 |
| Water Resources | | | | | |
| Water consumption ² (acre-feet/year) | 500 | 603 | 584 | 637 | Section 4.13 |
| Waterbody crossings (number) | 386 | 465 | 457 | 541 | Section 4.13 |
| Wildlife Resources | | | | | |
| Mule deer crucial winter (acres) direct habitat loss | 225 | 254 | 260 | 244 | Section 4.14 |
| Mule deer permanent roads in seasonal range (miles) | 368 | 477 | 456 | 513 | Section 4.14 |
| Pronghorn permanent roads in seasonal range (miles) | 368 | 477 | 459 | 513 | Section 4.14 |
| Elk permanent roads in seasonal range (miles) | 36 | 28 | 0 | 28 | Section 4.14 |
| Annual bat collision mortality | 6,300 | 6,300 | 6,300 | 5,380 | Section 4.14 |
| Estimated annual raptor collision mortality | 120 | 120 | 120 | 102 | Section 4.14 |
| Estimated annual collision mortality or all birds | 5,400 | 5,400 | 5,400 | 4,612 | Section 4.14 |
| Number or stream crossings - ephemeral | 382 | 458 | 450 | 531 | Section 4.13 |
| Number or stream crossings - perennial | 4 | 7 | 7 | 10 | Section 4.13 |

Table 2-14 Impact Comparison by Resource for All Alternatives

| Resource | Alternative 1R | Alternative 2 | Alternative 3 | Alternative 4 | Additional Discussion |
|--|---|---------------------------------|---|---------------------------------|-----------------------|
| Special Status Species | | | | | |
| Number of WTGs in greater sage-grouse core breeding area | 0 | 0 | 0 | 0 | Section 4.15 |
| Acres of greater sage-grouse core breeding area within 4 miles of project facilities | 127,096 | 122,771 | 97,149 | 135,432 | Section 4.15 |
| Noise | | | | | |
| Distance to nearest noise sensitive receptor | >0.5 mile from WTG >1 mile from substation | >1 mile from WTG and substation | >1 mile from WTG >5 mile from substation | >1 mile from WTG and substation | Section 4.16 |

¹ Aggregate would be used for roads, staging areas, substations, transmission line access roads, and concrete.

² Water would be used for concrete mixing, road watering, and road compaction.