4.12 Impacts to Visual Resources

This section provides an assessment of the direct and indirect potential impacts to visual resources from the construction, operation, and decommissioning phases of the proposed project and alternatives. The impacts study area, impact assessment methodology, scoping issues, and significance criteria are summarized below, followed by the potential impacts of the proposed project and alternatives.

Impacts Study Area

The visual resource study area is the visible area (viewshed) from the CCSM Application Area to a distance of 30 miles, as shown in **Figure 4.12-1**. The study area includes roads, recreational use areas, communities, and residences that provide views of the proposed project and alternatives. All proposed project facilities are located within the Application Area. Primary access roads that connect the project (within the alternative areas) to the regional transportation network are located partially outside the alternative boundaries, but within the study area.

Methods for Analysis

Short-term visual impacts associated with construction activities and the presence of construction equipment was assessed qualitatively. Long-term impacts were assessed qualitatively and quantitatively utilizing the BLM's VRM system contrast rating process and significance criteria.

The contrast rating process compared changes to existing visual characteristics from the introduction of proposed facilities and activities. The visual contrast created between a project and the existing landscape is described in terms of form, line, color, and texture. The contrast is then compared with VRM classes to determine whether construction and operation phases of the project meet management objectives. The degree of contrast is evaluated according to the criteria shown in **Table 4.12-1**. For comparative purposes, the four acceptable levels of contrast (i.e., none, weak, moderate, and strong) roughly correspond with VRM Classes I, II, III, and IV, respectively. In other words, a "strong" contrast rating may be acceptable in a Class IV area but probably would not meet the VRM objectives for a Class III area.

Viewshed analyses for each alternative were prepared using GIS to depict the areas that would be within views of KOPs within the study area, and to quantify the number of WTGs that would be visible from each KOP based on alternative conceptual layouts. The computer-generated viewshed mapping was projected from the 100-m tall nacelle of WTGs, using a 30-m USGS digital elevation model, out to a distance of 30 miles from the Application Area boundary. Due to the general absence of tall land cover that could alter the actual viewshed in this landscape, the topographically generated viewshed mapping is considered generally accurate.

KOPs were selected in the field with BLM resource specialists where views of the proposed project: 1) would be most visible to the public; 2) were representative of typical views and project components; or 3) were visible from visually sensitive locations, such as scenic or historic trails and other recreational use areas.

Photographic simulations of each alternative convey the overall perception of landscape changes of the four action alternatives as seen from nine KOPs, and show the scale, extent, and other characteristics of the project relative to major landscape features. Photographic simulations were based on conceptual layouts and were prepared and evaluated in accordance with BLM Handbook H-8432-1. Photographs were taken with a GPS-enabled digital SLR camera, focal length of 50 mm. Actual WTG sites may differ somewhat from the locations depicted in the simulations; however, the simulations are representative of the full build out scenario for each action alternative. A KOP viewshed analysis accompanies each photographic simulation to illustrate the topography, visibility and distance from the KOP to project facilities. **Appendix I** displays each simulation side-by-side with an existing conditions photograph and a

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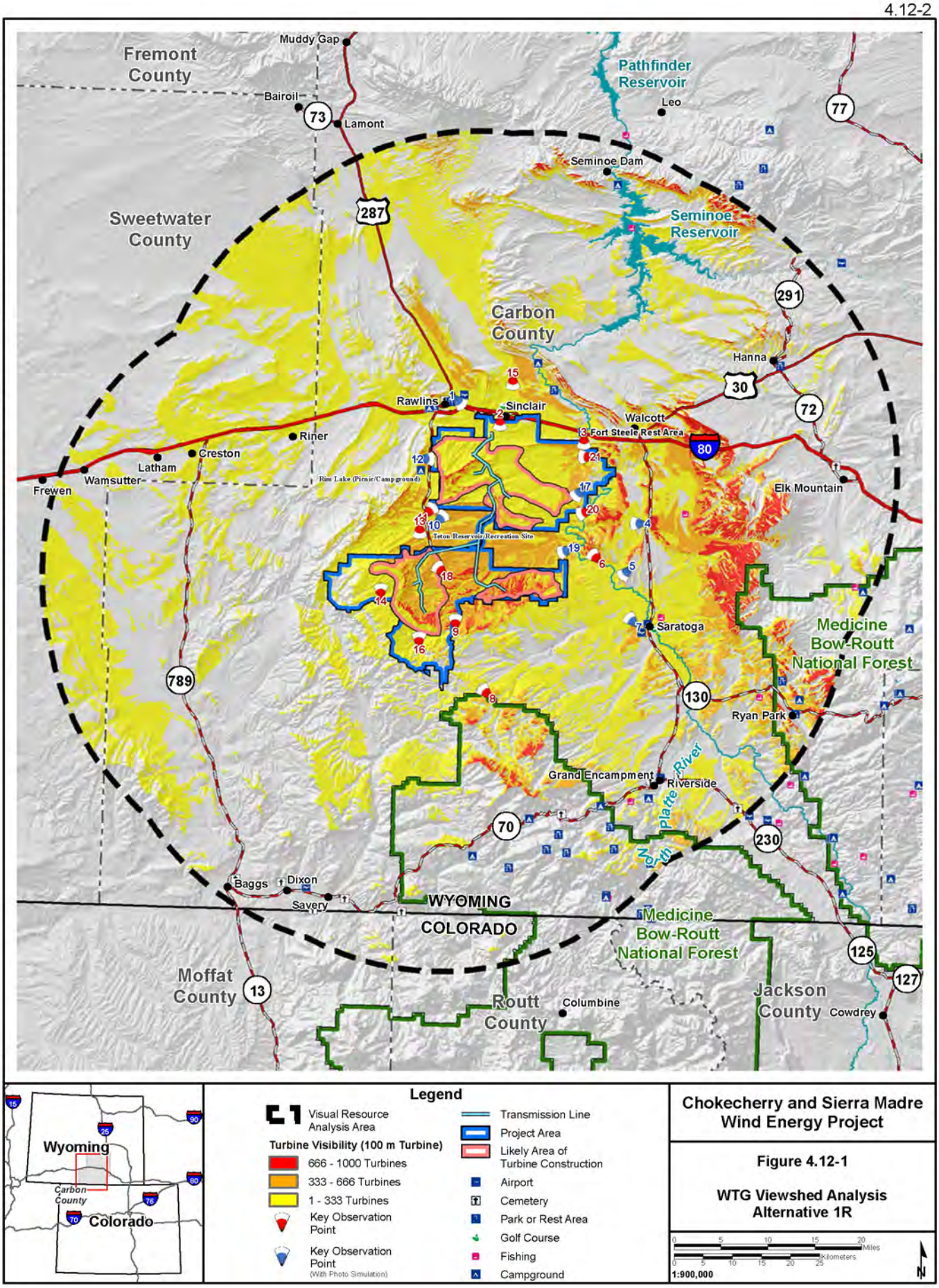

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-1

WTG Viewshed Analysis Alternative 1R

Table 4.12-1 VRM Class and Contrast Ratings Criteria

VRM Class	Acceptable Degree of Contrast	Criteria
I	None	Contrast is not visible or perceived
II	Weak	Contrast can be seen but does not attract attention
III	Moderate	Contrast begins to attract attention and begins to dominate the characteristic landscape
IV	Strong	Contrast demands attention, will not be overlooked, and is dominant in the landscape

KOP viewshed analysis. All photographic simulations show WTGs with a non-reflective 5 percent gray as proposed in the POD. Contrast ratings take into account differences between photographic simulations and the actual appearance of a wind project in the landscape (University of Newcastle 2002). Photographic simulations cannot depict movement, lighting, and ever-changing environmental conditions. The human eye sees differently than a camera lens, both optically and figuratively. The focusing mechanisms of human eyes and camera lenses are different: human eyes move, and the brain integrates a complex mental image; human vision is binocular and dynamic, compared to a camera that tends to flatten an image. Furthermore, impact ratings are highly sensitive to changing atmospheric conditions and seasons. Observations of the Foote Creek Rim, High Plains, Seven Mile Hill, McFadden Ridge, and Happy Jack wind energy projects in the same physiographic region aided in a comprehensive evaluation.

BLM BMPs and ACMs were incorporated into the alternative analysis. Mitigation measures were developed to minimize or eliminate adverse impacts to the extent feasible.

Issues and Management Considerations

The project area contains major roadways, communities, residential areas, and recreation sites with a high number of potential viewers of proposed project activities. The area is a popular destination for developed and dispersed recreational opportunities with residents and draws visitors from the surrounding region. Recreational uses available in the area are described in Section 3.7. The proposed project under any action alternative would result in long-term changes to the visual setting as seen from large portions of the area, as well as from KOPs. The primary visual issues and concerns associated with the proposed project include:

Construction

- Short- and long-term visual resource changes resulting from WTGs and other aboveground facilities, power lines, project surface disturbance, and construction-generated dust as seen from public viewpoints at recreation sites and popular use areas, residential areas in nearby communities, heavily used highways, and public roads that provide access to recreational and residential uses.
- Impact of potential light sources associated with aboveground facilities.

Operation

- Potential changes in the existing natural and rural landscape to a landscape with a strong industrial component as seen from public viewpoints.
- Visibility of the proposed project from important recreation and scenic destinations that include the CDNST, Overland Historic Trail, North Platte River, Teton Reservoir Recreation Site, and the Rim Lake Recreation Site (**Figure 4.12-1**).

- Public lands in the area are managed for multiple uses according to the direction set forth in the 2008 Rawlins RMP/ROD (BLM 2008a). BLM is responsible for managing public lands for multiple uses while ensuring that the scenic values of public lands are considered before allowing uses that may have negative visual impacts. Management goals and objectives for the CDNST and the North Platte River SRMA are included in **Table 4.7-1**. Management actions designed to achieve the goals for these SMAs consider the quality of the visual resource, which provides the setting for recreational uses of these areas. The 2008 Rawlins RMP/ROD and applicable visual resource management considerations, as well as the FLPMA, are listed in **Table 4.12-2**. As summarized in Section 2.2.1.1, this analysis follows the VRM Plan Amendment preferred alternative in Volume 1.

Table 4.12-2 Relevant Management Considerations for Visual Resources

Chokecherry Sierra-Madre Wind Project EIS, Volume 1 – VRM Plan Amendment (Section 2.2)
Amends the 2008 Rawlins RMP/ROD by proposing a preferred VRM alternative for the Plan Amendment planning area.
2008 Rawlins RMP and ROD – Visual Resource Management (Section 2.3.15, page 2-48)
Management Goals • Manage public lands according to VRM classes that are determined based on land use allocation decisions made in the 2008 Rawlins RMP.
Management Objectives • Establish VRM classes for the planning area. • Maintain the overall integrity of visual resource classes while allowing for development of existing and future uses.
Carbon County Comprehensive Land Use Plan - November 9, 2010 (Chapter 8: Goals and Strategies, pages 91, 92)
Management Goals • Sustain scenic areas, wildlife habitat, and other important open spaces.
Management Strategies • Undertake a countywide assessment of scenic resources to precisely identify the important scenic areas that should be protected from conflicting land uses. • Identify open space priorities and recommendations for maintaining these resources.
Management Action • Conduct a survey of county residents to ask which areas have the most important scenic value. • Develop land use standards that will maintain scenic vistas by the use of innovative subdivision design and clustering. • Support the acquisition of conservation easements on sensitive and unique scenic area. • Adopt an overlay district for open space, scenic, and wildlife areas

Assumptions

The following assumptions were used in the impacts analysis for visual resources:

- All action alternatives would result in visual change to the area because most project components would be visible from some location, however remote;
- Assumes WTG locations are conceptual and subject to change after the ROD is issued;
- Assumes the assessment is being completed at a programmatic level. Additional NEPA analysis will be necessary for all project components after the ROD is issued. One outcome of this approach is to better define the resource constraints, standard practices, and mitigation measures that all future NEPA analyses will depend on;
- Assumes most impacts to the recreational experience are of a visual nature and will be addressed in the visual resource section;
- Visual impacts to historic trails and context-sensitive cultural sites are addressed in Section 4.2 and socioeconomic impacts related to visual impacts are addressed in Section 4.8;
- For purposes of this analysis, potential effects or impacts are considered either construction or operation related. Construction-related impacts are assumed to be short-term and visible during construction activities of up to 5 years; operation-related impacts are assumed to be long-term and visible for the duration of the operation phase of the proposed project. Most impacts to the recreational experience are of a visual nature and are addressed in this section as direct effects to visual resources; and
- The evaluation assumes that ACMs and BMPs would be successfully implemented (e.g., roads would be designed and constructed in accordance with the BLM Gold Book design criteria). According to the applicant's POD, operators would monitor and maintain visual mitigation measures for the approved project in accordance with a visual monitoring and compliance plan, which will be incorporated into the Master Reclamation Plan and Environmental Compliance Plan.

Significance Criteria

There is a wide and diverse range of opinions on the visual significance of wind energy effects, explained by the complexity and the subjectivity of the issues; the meanings attributed to renewable energy; the desire of one set of wind interests to minimize the political, professional, and public perception of the landscape effects of wind projects; and an opposing desire by another set of interests to maximize these perceptions. A goal of the BLM VRM system is to objectively quantify the changes introduced by a project compared to existing conditions and management objectives, with the bias that natural-appearing landscapes (i.e., existing conditions) are more appealing to viewers.

Significance criteria were based on the issues identified in Section 4.12.3 from public and agency scoping, and from a literature review of issues associated with similar projects.

A significant impact to visual resources would occur if:

- Development has a substantial adverse effect on a designated scenic vista;
- Development substantially alters the existing scenic quality of a Class A scenic landscape;
- The project would be incompatible with the designated VRM class objective; and
- Development creates a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

4.12.1 Impacts to Visual Resources from the No Action Alternative

Under the No Action Alternative, there would be no anticipated impacts to visual resources as the proposed project would not be developed. Under this alternative, the project would not be developed on BLM lands, or have access to private lands for developing the proposed project. Existing management and recreational activities and other uses of the area would continue.

4.12.2 Impacts to Visual Resources from Alternative 1R, Applicant Proposed Alternative

Alternative 1R, Applicant Proposed Alternative, consists of aboveground and underground facilities. Viewpoints within the alternative boundary and surrounding area (including roadways, recreational use areas, and residences) would experience visual impacts from up to1,000 WTGs and ancillary aboveground facilities, including transmission lines, substations, step-up transformers, overhead electric collection lines, roads, a RDF, and the O&M facility. Underground facilities include electric collector lines and communication lines that connect individual wind turbines and WTG foundations.

Direct effects to visual resources occur as a result of the disturbance of the landscape by project activities and the addition to the landscape of proposed facilities. Direct effects can be short- or long-term. Indirect effects caused by the proposed project occur later in time or farther removed in distance, and would likely involve indirect changes in the local economy from visibility of facilities.

Short-term effects result from temporary disturbances, such as the initial monitoring and testing activities, and construction and installation activities. Visual impacts related to underground cables are limited to short-term construction impacts.

Long-term effects result from the addition of permanent structures to the landscape and from operation of facilities. Facilities that would contribute to long-term effects include WTGs, substations, new and reconstructed WTG internal resource roads, reconstructed primary access roads, O&M facility, RDF, overhead electric collection system, step-up transformers, and transmission lines. Effects from long-term disturbance would occur for the duration of the operation phase of the proposed project. The most substantial impacts would occur from the addition of WTGs to the landscape and disturbances resulting from grading and vegetation removal on WTG pad areas and roads.

<u>Short-term Effects</u>

Short-term direct and indirect effects to the visual character of the area would occur from the transport of WTGs and other supplies and equipment on public roadways through the project area from the RDF; the construction of WTG pads and installation of WTGs; and construction of ancillary facilities, including step-up transformers, underground and overhead electric collection and communication lines, roads, transmission lines, electric substations, RDF, O&M facility, and laydown areas. Temporary facilities and disturbances associated with construction activities include laydown areas and the presence of construction equipment and vehicles, which would impact the visual resource for the duration of the 5-year construction period. Construction equipment, the sequence of construction and installation activities, and the anticipated schedule of events for each year of the POD construction phase are summarized in Section 2.2.

Impacts to some sensitive viewpoints from construction activities would be substantially reduced with implementation of phased construction sequence mitigation. Effects to viewers at specific viewpoints would likely occur for a maximum of 1 year, as activities during the construction phase would be limited to specific locations within the alternative boundary. Specific areas would be reclaimed down to the long-term (operational) disturbance areas within 1 year, reducing the overall area of visible disturbance.

A phased construction sequence would reduce the duration of short-term visual conflicts by compressing the time between construction and reclamation, and increasing the effectiveness of reclamation following completion of construction activities. As the reclamation of one area occurs concurrently with construction in another area, it would be possible to reduce the overall area of visible disturbance and

the amount of time that exposed soils and erosion create color and textural contrasts with the surrounding vegetation.

Short-term direct effects also include decommissioning activities following completion of the operating phase. The visual impacts from decommissioning activities are similar to construction.

Fugitive airborne dust that settles on vegetation would potentially reduce plant growth, which may further alter the natural character of the area. The BLM has issued dust restrictions for minerals development in the BLM planning area that indicates that 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. Implementation of these restrictions using appropriate dust control measures would substantially reduce the visual impact of fugitive dust during the construction phase of the proposed project (Jones and DeMille Engineering 2008).

The following major short-term activities associated with Alternative 1R would affect visual resources:

- Clearing, grading, and restoration of the construction disturbance areas for roads, transmission line construction ROW, WTG pads, truck turnaround areas, and laydown areas. The total initial disturbance of 7,221 acres accounts for 3.3 percent of Alternative 1R;
- Assembly and installation of up to 1,000 WTGs;
- Construction of other aboveground facilities (step-up transformers, underground and overhead electric collection and communication lines, transmission lines, electric substations, RDF, O&M facility);
- Increased vehicle traffic for worker access and large construction equipment (e.g., trucks, excavators, cranes). Increased traffic would produce visible activity and dust from disturbance of dry soils, which would impair viewing distances and coat vegetation;
- Increased human presence from the workforce at construction sites and laydown areas for Alternative 1R; and
- Decommissioning activities.

Temporary construction disturbance from the construction of new access roads and internal resource roads, and the reconstruction of existing roads, WTG pads, truck turnaround areas, and laydown areas would be visible as light-tan exposed soils in geometrically shaped areas with straight, linear edges that provide some textural and color contrasts with the surrounding undisturbed vegetation. The construction disturbance width of internal resource roads is assumed to be 94 feet wide, depending on the terrain. Roads located on steep slopes may require wider construction disturbance due to the cuts-and-fills required for road construction on slopes (the cut-and-fill slope required for the Miller Hill Road would be 1,000 feet, which is the largest required on the project). Large cuts-and-fills required for roads and WTG pads on steep slopes that face viewers would create cleared areas with strong color, line, and form contrasts that would be easily visible to viewers located at KOPs until the disturbed areas are successfully reclaimed. Once construction and installation activities are completed, construction disturbance areas would be reclaimed back to the long-term, operation phase disturbance areas except for the internal resource haul road. Reclamation procedures would minimize the visual impact from construction disturbances by restoring plant cover and species composition of disturbed sites to pre-project conditions. Section 2.2.6 provides the short-term disturbance acres from construction activities for each surface disturbing activity under Alternative 1R.

Visual impacts from construction equipment and activities would consist of visible large trucks, semi-tractors, and trailers delivering facility components to facility sites and laydown areas, earthmoving equipment at facility locations, and assembly and installation activities. Equipment that may provide noticeable line, color, texture, and form contrasts with the characteristic landscape (as seen from KOPs)

include cranes, large trucks used to haul equipment and supplies, construction and earthmoving equipment, and batch plant facilities.

WTG components (towers, blades, and nacelles) would be transported to each pad site on trucks, semi-tractors, and trailers, and unloaded using various crane types and sizes. Each WTG would require the use of seven to eight large cranes. Due to the rate of part delivery and construction phasing, no site pad would require more than two cranes at any given time. The scale, form, and motion of large cranes required to install WTGs can be visible for several miles, and creates strong vertical and diagonal linear contrasts with the dominant horizontal and rolling lines of the landscape for the duration of construction activities. The visibility of cranes and their location, with increasing distance relative to the viewer, would be dependent on size and the color selected for the cranes. Safety colors, such as orange, would create a strong contrast with surrounding vegetation and soil colors. While the impact of cranes and WTG assembly at any one site would be of relatively short duration, the overall impact of WTG assembly in all parts of the WTG areas over a 5-year period would be high. The impact from construction activities would be mostly from sites where low-profile activities would be within the viewsheds of communities, transportation routes, and recreation areas. The construction sites visible in these viewsheds occur mostly at the perimeters of the project footprint, and in larger public land blocks south of T18N, and would be visible from a relatively small percentage of the area. Project-related traffic would consist of frequent daily trips made by trucks hauling WTGs and other large equipment, earth-moving equipment and cranes, and small vehicle traffic for construction workers. Project traffic hauling WTG and other large components would be obvious and intermittently intrusive to motorists on WY 71, CR 345S, and other roadways with views of activities in the alternative boundary for the duration of construction activities. Airborne dust from moving vehicles on existing dirt and gravel roads, as well as from construction activities, would be visible to viewers throughout the area during construction periods.

Evidence of increased human presence from the workforce at construction sites and laydown areas would be visible from KOPs and other public viewpoints, primarily from the movement of construction equipment and equipment hauling vehicles on area roadways, and the sights of equipment involved in construction and installation activities.

Short-term visual impacts from installation of aboveground facilities would be limited in spatial extent to specific development sites at any one time during the 5-year construction phase. Construction and reclamation activities would take place concurrently in different locations within the alternative boundary. Apart from road construction in Year 1, construction activities scheduled for each year would concentrate on the full development of WTGs at site facilities within specific development areas within the Alternative 1R boundary. Once facilities have been installed, facilities can be brought online once the main transmission line has been completed and tied into the regional grid. Therefore, over a 5-year period, some WTGs will be rotating while other WTG are constructed or await project completion. Reclamation activities would take place in areas where construction activities are complete as soon as practicable. The POD assumes that reclamation would follow construction activities within a maximum period of 1 year.

When the project lifespan is completed and decommissioning becomes necessary, all facilities would be removed. Ground disturbance associated with complete decommissioning of the project will be similar to the ground disturbance associated with construction of the project. Reclamation procedures would include regrading, spreading topsoil, and revegetating all disturbed areas. Visual impacts from decommissioning are similar to those described for construction activities.

All surface disturbing activities would result in direct adverse visual impacts. The scale of surface disturbing construction activities and visibility from sensitive viewpoints (including historic and scenic trails, popular recreation sites, residential areas, and communities) over a 5-year period would result in adverse short-term visual impacts. The impacts to visual resources are substantial in that construction activities would be visible to some sensitive viewpoints; however, current BLM VRM objectives for Class IV, or the VRM Plan Amendment preferred alternative in Volume 1, would be met during the 5-year construction phase.

Lighting Impacts

Some construction activities would occur during day and night work shifts. The work area would be lighted at night with portable lighting powered by a diesel-fueled generator. Construction lighting is not described in detail in the POD. Direct or indirect light sources would still be visible from specific KOPs. The degree of contrast associated with nighttime lighting depends on the proximity to KOPs (viewing distance), elevation of lighting relative to KOPs (most lighting will likely be located on WTG pads at higher elevations than viewers), the intensity of specific lighting sources, and the background or ambient level of combined nighttime lighting in the study area. Short-term impacts from the use of exterior lighting for nighttime safety and security during construction at proposed project facilities may contribute substantially to ambient nighttime lighting conditions. However, given the anticipated duration of construction-related lighting, any impacts to nighttime scenic quality would be temporary. Over the 5-year construction phase, construction lighting would occur intermittently as cranes would be lighted; lighting effects would not be significant.

4.12.2.1 Long-term Effects

Long-term effects to the landscape from the project would result from the addition of up to 1,000 WTGs and ancillary operational facilities that include transmission lines, substations, step-up transformers, underground and overhead electric collection and communication lines, roads, RDF, and O&M facility. Operations facilities would introduce new elements into the landscape and would create new contrasts with the existing landscape form, line, color, and texture that would be visible from KOPs over the operating life of the proposed project.

The following major long-term activities associated with Alternative 1R would affect visual resources:

- Visibility of large-scale WTGs from large portions of the area at distances of up to 30 miles;
- Contrasts associated with WTG pad disturbance, which have the potential for strong contrasts from cut-and-fill areas on slopes with a grade of 7.5 percent or greater;
- Visibility of transmission line, which would be a large-scale linear feature constructed in new and existing ROWs;
- Contribution of overhead collector lines located along proposed internal resource roads to visual clutter;
- Contrasts associated with new access roads and internal resource roads, which have the potential for strong contrasts from cut-and-fill areas on slopes with a grade of 7.5 percent or greater;
- Visual impact of aboveground facilities located on private lands. Facilities proposed for development on private land include substations, RDF, and O&M facility; and
- Day and nighttime lighting of WTGs in accordance with FAA standards as a source of substantial light or glare, which would adversely affect day or nighttime views in area and could be seen from large portions of the area.

Indirect effects from Alternative 1R could occur if adverse changes to the scenic quality of the landscape made the area a less desirable location for recreation, resulting in a loss of tourist or other recreation related revenues to local economies. The effects of the proposed project on trail uses, hunting, and other recreational opportunities in the alternative boundary are described in Section 4.7.

WTGs

Under Alternative 1R, up to 1,000 WTGs would be sited on ridgetops and benches over large expanses of the area. The introduction of WTGs into the area landscape would create new straight-edged vertical lines, angular forms, and pale colors that would contrast with the horizontal, undulating landforms and seasonal vegetation colors and textures of existing natural and rural landscapes. The 100-m class WTG

model considered for use would be mounted on a single steel self-supporting tower, a maximum of 328 feet high, and anchor-bolted to a concrete foundation. Each WTG rotor would have three blades with a maximum total rotor diameter of 394 feet (depending on model selected). Overall height after construction would be approximately 525 feet from the ground to the tip of a vertical WTG blade. The WTGs would be painted a standard color of 5 percent gray, which is an off-white color. Multiple models and manufacturers of WTGs could be procured for the project; however, differing heights of WTGs are unlikely to alter the perceived visual effect that would occur from a single model. This is because WTGs are sited on varying elevations through the alternative boundary.

The large scale of individual WTGs, coupled with the large number of WTGs located in the Alternative 1R area, results in a high degree of visibility for much of the area. WTGs would be prominent in views of landscapes in foreground distance zones up to 0.5 mile from viewpoints, and would dominate most other landscape elements. Views of WTGs in foreground-middle ground distance zones up to 5 miles from viewpoints would be variable, with WTGs appearing prominent in the closer views and subordinate to other landscape features at the further reaches of the distance zone. WTGs in this distance zone are perceived as part of a larger landscape context, but would be easily visible in unobstructed viewsheds. WTGs may be visible in background views at 30 miles from viewpoints under optimal atmospheric conditions; however, they would be minor elements relative to the scale and complexity of a larger panorama.

The visual impact from the rotation of WTG blades includes effects of shadow flicker and blade glint. Shadow flicker refers to the shadows that a WTG casts at those times of the day when the sun is directly behind the turbine rotor from an observer's position. Shadow flicker is most pronounced when the sun is positioned at lower angles in the sky, which occurs during brief periods at sunset and at sunrise, and in northern latitudes during winter months. A study that evaluated the effects of shadow flicker concluded that the nearest affected receptors should be no closer than 10 rotor diameters from the WTGs (ARM Group Inc. 2009) to the northeast or northwest of the WTGs. There would be no WTGs located within 3,940 feet of any KOP evaluated for Alternative 1R. WTGs would be located within 3,940 feet on segments of WY 71 in the CCSM areas; however, viewers on these roads would be moving and affected by shadow flicker for only brief periods of time. Summer homes in the Sage Creek Basin are located about 0.75 miles south of the nearest WTGs, and would not be affected by shadow flicker. Blade glint is the reflection of sunlight off the surfaces of rotating blades. Each WTG rotor would have three blades made of fiberglass epoxy or polyester resins. Blade surfaces made from these materials are generally dull relative to older metal composite blades. There would be minimal, if any, blade glint from WTG rotor blades.

A visual impact of concern is the looming effect, which is the perception that a WTG is looming over the observer. The looming effect causes a psychological reaction from feeling "enclosed" by a tall structure, and could be a negative impact on the quality of life and well-being of viewers. There is currently little evidence supporting negative psychological effects from looming, but studies suggest that the looming effect is dissipated at a distance greater than an estimated 1,640 distance between the WTG and the viewer (Oregon Health Authority 2012). Sensitive viewpoints closest to the WTGs are summer homes in the Sage Creek basin. The closest WTG to a home is nearly 0.75 mile north and slightly higher in elevation and would therefore not be adversely affected.

Color, line, and textural contrast of operating WTG pads would be visible in unobstructed views from KOPs with contrasts that would be low to high, depending on the density and seasonal color of the surrounding vegetation. Pad clearings would be visible as light-tan exposed soils in geometrically shaped areas, with straight linear edges that provide some textural and color contrasts with the surrounding undisturbed vegetation. Pad clearings would be difficult to discern from the surrounding landscape in middleground views of more than 1.5 to 2 miles from viewpoints. This is because the existing characteristic vegetation of the area consists of low, sparse grasses and shrubs that provide little contrast to the native soils during most of the year. Color contrast between disturbed areas and the surrounding vegetation would be the most pronounced during the spring months, when the vegetation is green. Color contrasts between vegetation and soils tend to be low during the remainder of the year,

when the vegetation is varying shades of gold and tan. WTG pads constructed on steep slopes would increase the potential for visibility. Cut-and-fill slopes generally have straight linear edges that exaggerate the color contrast between bare soils against the surrounding vegetation. A slope of 7.5 percent or greater would require vertical cut-and-fill areas of 22 feet or greater in height. The effects from cut-and-fill disturbances on slopes that face KOPs and viewers at other locations would be visible for long distances until the slopes are successfully revegetated.

Groups of WTGs would be visible from many roadways, recreational use areas, communities, and residences in the area. The degree of contrast between proposed WTGs and other surface facilities with the existing landscape was evaluated for KOPs that represent views seen from each of these areas. **Table 4.12-3** summarizes the impacts to viewers at 21 KOPs from Alternative 1R, as well as other action alternatives. The table summarizes the results of a contrast rating analysis prepared for each KOP. **Table 4.12-4** provides the percent of WTGs in BLM VRM Class IV areas and breaks out the number of WTGs that would be located on steeper slopes. **Figure 4.12-1** provides a viewshed analysis that shows the number of WTGs that would be visible under Alternative 1R long-term activities.

Access into the project area and WTG sites would be on existing roads (including two-track primitive roads) and new roads. Internal resource roads would provide access to each WTG location from an internal haul road. Haul roads, internal resource roads, and transmission line O&M roads would accommodate large haul trucks and cranes. Once construction activities are complete, all project arterial roadways would be reclaimed back to a driving width of 24 feet, and WTG access roads would be reclaimed back to a width of 16 feet to accommodate O&M vehicles.

The internal haul road would extend south from the RDF and construction trailer complex in the north through the center of Chokecherry and into the Sage Creek valley. The off-site portion of the haul road in the Sage Creek valley would be an obvious new disturbance to viewers in the off-site area. Potential viewers include the public on the Overland Historic Trail. A site-specific POD will be developed for the internal haul road, including the off-site portion of the haul road, and will contain an engineering design with the necessary detail to evaluate and analyze site-specific impacts.

Color, line, and textural contrast of new road disturbance, and associated cut-and-fill slopes would be visible in unobstructed views from KOPs. The contrasts would be similar to those described for WTG pads; however, internal resource roads would be visible as a linear feature. **Table 4.12-5** summarizes the percent of interior resource road grouped by required road grade in BLM VRM Class IV areas. Road disturbances would be difficult to discern from the surrounding landscape in middle ground views of more than 2 miles from viewpoints, as the soil colors would tend to blend with the surrounding vegetation.

One objective of the Chokecherry and Sierra Madre Wind Resource Area Reclamation Plan is to re-establish visual composition and characteristics. The visual composition and character would be mitigated by contour grading and specific plant community based reclamation seed mixes so that the overall form, line, color, texture, structure, scale, and location and orientation of major landscape features will replicate pre-construction conditions and blend into surrounding plant communities, and topographic diversity will be re-established. Implementation of the Reclamation Plan would be highly effective in restoring land contours to a condition that replicates pre-existing landforms, and in reducing visual contrasts from disturbed soils.

Transmission Lines

The proposed double circuit 230-kV overhead transmission line would transmit the wind generated electricity from the electric collector substations to the national electric grid interconnection at the 250-kV substation located at the north end of the Chokecherry site. Under Alternative 1R, the transmission line would be constructed in new, previously undisturbed ROW that extends south from the 250-kV substation to collector substations along the proposed internal haul road. As seen from most KOPs, roadways, and recreational use areas and residences, the straight lines and angular, vertical forms of the

Table 4.12-3 Visual Resource Objective Consistency by KOP

KOP#	Location	Heading	VRM of the Conceptual Area of Development	Contrast Rating	Photo-simulation	Alternative Contrast Rating				VRM Class Achieved for Each Alternative				Visual Resource Issue
						1R	2	3	4	1R	2	3	4	
1	Rawlins Recreation Center	SE	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Recreation; also representative of views seen from residences in the Rawlins community
2	Sinclair I-80 Overpass	S	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Large number of viewers on I-80
3	I-80 Fort Steele Rest Stop	SE	IV	X		moderate	strong	strong	strong	yes	yes	yes	yes	Recreation, large number of viewers on I-80, special management area (North Platte River)
4	State Highway 130 at Overland Trail Historical Marker	W	IV	X	X	moderate	moderate	moderate	moderate	yes	yes	yes	yes	Special management area (historic trail), motorists on highway
5	Access Road to Pick Bridge Public Access Area	SW	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Recreation
6	Sanger Public Access Area	NW	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Recreation, special management area (North Platte River)
7	West of Saratoga - CR 385 at CR 500	NW	IV	X	X	moderate	moderate	moderate	moderate	yes	yes	yes	yes	Motorists on local roads
8	Forest Service Road 542 at USFS Boundary	NW	IV	X		moderate	moderate	moderate	strong	yes	yes	yes	yes	USFS roadway, scenic driving

Table 4.12-3 Visual Resource Objective Consistency by KOP

KOP#	Location	Heading	VRM of the Conceptual Area of Development	Contrast Rating	Photo-simulation	Alternative Contrast Rating				VRM Class Achieved for Each Alternative				Visual Resource Issue
						1R	2	3	4	1R	2	3	4	
9	CR 71 Kendt Reservoir Overlook	N	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Recreation, motorists on local road
10	Teton Reservoir Campground	NE	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Recreation
11	CDNST towards Chokecherry	NE	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Special management area (CDNST), recreation
12	CDNST above Rim Lake	E	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Special management area (CDNST), recreation
13	CR 3301 - Bridger Pass Road along CDNST	S	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Special management area (CDNST), motorists on roadway
14	CR 505 - Edge of VRM II Boundary on Miller Hill	N	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Motorists on roadway
15	Seminoe to Alcove Scenic Byway BLM Kiosk	S	IV	X	X	Moderate	Moderate	Moderate	moderate	yes	yes	yes	yes	Motorists on roadway, scenic byway

Table 4.12-3 Visual Resource Objective Consistency by KOP

KOP#	Location	Heading	VRM of the Conceptual Area of Development	Contrast Rating	Photo-simulation	Alternative Contrast Rating				VRM Class Achieved for Each Alternative				Visual Resource Issue
						1R	2	3	4	1R	2	3	4	
16	Access road - homes in Sage Creek Basin	N	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Residential
17	CR 345 SW Savage Hills	SW	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Recreation, motorists on roadway
18	WY 71 near La Marsh Creek	NW	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Motorists on roadway
19	Pioneer Cemetery above Overland Trail crossing N. Platte River	W	IV	X	X	strong	strong	strong	strong	yes	yes	yes	yes	Special management area (historic trail, North Platte River), cultural resource site
20	Cherokee Historic Trail Crossing	SW	IV	X		Weak	Weak	Weak	weak	yes	yes	yes	yes	Special management area (historic trail, North Platte River), cultural resource site
21	Rochelle Recreation Area, 3.5 miles south of Fort Steele	W	IV	X		strong	strong	strong	strong	yes	yes	yes	yes	Special management area (North Platte River), recreation

Contrast Rating Forms are available for review at the BLM RFO and in the Administrative Record.

Table 4.12-4 WTG Impacts to VRM Class IV Objectives

Management Direction	Percent of WTGs[1]			
	Alternative 1R	Alternative 2	Alternative 3	Alternative 4
BLM – VRM Class IV Lands	46	39	43	0
State	5	3	2	0
Private	50	59	54	100
Total[2]	**100**	**100**	**100**	**100**
	Percent of WTGs > 7.5% grade			
BLM – VRM Class IV Lands	49	41	45	0
State	4	3	3	0
Private	47	56	52	100
Total[2]	**100**	**100**	**100**	**100**

[1] Percent of WTGs in VRM class areas are estimates based on alternative conceptual designs.

[2] Discrepancies in totals due to rounding.

Table 4.12-5 Internal Resource Road Impacts to VRM Class IV Objectives

Management Direction	Percent of Roads Crossing VRM Class IV Lands			
	Alternative 1R	Alternative 2	Alternative 3	Alternative 4
BLM – VRM Class IV Lands (all grades)	44	37	39	27
Internal resource roads < 5% grade	30	25	26	19
Internal resource roads 5-10% grade	9	8	4	3
Internal resource roads > 10% grade	5	4	9	6
State (all grades)	4	4	3	3
Private (all grades)	51	59	58	71
Total[1]	**100**	**100**	**100**	**100**

[1] Discrepancies in totals due to rounding.

transmission line structures would be a low to moderate contrast with the surrounding landscape because the structures are generally more than 2 miles from most viewpoints. PCW intends to construct the network using wooden H-frame structures wherever practical and efficient. In locations of steep or narrow terrain, or if the demands of the double-circuit portions of the line exceed the design of the wooden H-frames, PCW will utilize either steel lattice or steel monopole structures. PCW would propose which structure type is used in the site-specific PODs. The proposed structures would be small in scale relative to the surrounding landscape, and would therefore be subordinate to the overall scale of the landscape beyond 2 miles. The vertical form and straight lines of structures are visible but difficult to

discern from the surrounding landscape and do not attract the attention of the casual observer. In addition, the area provides a backdrop that screens the structures to some degree. The angular lines of the structures become more indistinct against the stippled texture and green to tan colors of ridge slopes. In locations where lattice structures are used, the backdrop slopes would be visible through the lattice. The visual contrast of the transmission structures, as seen from most KOPs, is weak to moderate.

The transmission line would cross the Overland Trail and WY 71 in the Sage Creek Basin conceptual area of development. The transmission line structures would dominate foreground views within an approximate 1- to 2-mile distance of the trail and road crossing. Monopole or H-frame structures would be large in scale, with distinct narrow, vertical lines that would be a strong contrast with the surrounding horizontal, rolling landforms. The vertical line and form contrasts can be strong for relatively long viewing distances; particularly where the structures are skylined. Beyond an approximate 1.5-mile distance, the lattice structure tends to blend with the surrounding environment. The landscape behind the structure is visible through openings in the lattice, which renders the internal clutter of lines increasingly indistinct with increasing distance. The lateral east-west extension of the transmission line would parallel the trail at an approximate distance of 1 mile between the Overland Trail and transmission line, from the tie-in with the main transmission line and a substation located west of WY 71. Structures would be set back from the crossing to the extent practicable.

Collector Lines

A combination of underground and overhead collector lines would connect WTGs with three collector substations. The collection system would be primarily underground where practicable. For the purposes of analysis, it is assumed less than 20 percent of the collection system could be overhead line construction. Visual impacts from the underground lines would be located within the initial road disturbance and limited to short-term construction impacts. Long-term visual impacts from multiple, parallel overhead electric lines would occur from the introduction into the landscape of straight, vertical lines of individual poles placed at regular intervals along internal resource roads. The poles that would be selected for the proposed project would be either wood poles or steel wood pole equivalents. The individual poles would be erected at somewhat regular intervals, which would create a regularity of texture that would contrast with the irregular, clumping forms and textures of the surrounding vegetation. The brown color of the wood poles would harmonize with the colors of the surrounding soil and vegetation, so that the contrasts in color would be decreased. Steel wood pole equivalents also may be selected, which would present greater contrasts with the surrounding environment from the color and metallic sheen of poles until the treated poles develop a dark-brown patina. The span between the poles would be between 300 feet to 500 feet, as determined by the terrain. In addition, there may be a glare when sunlight is reflected from the conductors. The addition of the overhead electric collector lines into the natural-appearing landscape of the area, as viewed from most KOPs and other viewpoints, would constitute a visual intrusion that would be small in scale relative to the surrounding WTGs; however, the potential large numbers of poles in close proximity to WTGs and other project components would increase the overall visual clutter of those portions of the area occupied by proposed wind farm components. The estimated percent of collector lines in the project area that would affect VRM Class IV are shown in **Table 4.12-6**.

Other Aboveground Facilities

Other ancillary operational facilities include substations (including step-up transformers), the RDF, and the O&M facility. These facilities would be developed in privately-owned sections within the overall checkerboard surface ownership pattern characteristic of most of the project area. Long-term visual impacts include adverse changes in the existing landscape setting from the removal of mature vegetation and the intrusion of permanent aboveground facilities into the views seen from KOPs, as well as from sensitive viewpoints on area roadways, recreation areas, and trails. In general, ancillary aboveground facilities have a considerably lower profile than the WTGs, and would present a smaller impact as viewed from KOPs relative to WTGs. Aboveground facilities are mostly located in the interior of the alternative boundaries. Most viewpoints on roadways and other sensitive viewpoints view these facilities in middleground distance zones; the facilities in background distance zones are generally too

small in scale to be visible. Visual impacts from aboveground facilities in the middleground distance zone are moderate from color contrasts of proposed structure colors with surrounding vegetation and soil colors.

Table 4.12-6 Overhead Collection System (34.5 kV)

Overhead Collection System (34.5 kV)		Percent of Overhead Lines Crossing VRM Class IV Lands			
		Alternative 1R	**Alternative 2**	**Alternative 3**	**Alternative 4**
Chokecherry					
VRM Class IV Lands	BLM	20	29	31	27
	State	1	0	0	1
	Private	23	33	36	32
Subtotal[1]		**43**	**62**	**67**	**60**
Sierra Madre					
BLM – VRM Class IV Lands	BLM	19	15	13	14
	State	5	0	0	0
	Private	34	23	20	26
Subtotal[1]		**57**	**38**	**33**	**40**
Total[1]		**100**	**100**	**100**	**100**

[1] Discrepancies in totals due to rounding.

A 230-kV interconnection substation and up to three collection substations would be located dependent on the distribution of WTGs. The 230-kV substation is anticipated to be located either in T21 N, R86W, Section 31 or Section 33. Potential collection substation sites are located within unobstructed viewsheds of CR 345 and CR 347S overlooking portions of the Chokecherry area, WY 71 overlooking portions of the Sage Creek conceptual area of development, and the CDNST and Overland Trail looking towards Sage Creek in the Sierra Madre area. Substations would include electrical facilities and supporting infrastructure. The tallest structures in each substation would be lightning rods and 230-kV transmission line structures with heights up to 140 feet, depending on the type of structure that is selected for Alternative 1R. An 8-foot chain-link fence with barbed wire on top would surround the substation pad. The electrical and other facilities would be in close proximity to each other within the 2.0 to 5.1-acre footprint (5.7-acre footprint for the 250-kV substation), and would present a mass of complex, angular structures with straight lines and varying heights that would be obvious within the foreground-middleground distance zone of some viewpoints in the area.

The 230-kV interconnection substation would be within a three-mile distance of I-80. The interconnection substation site in Section 33 would be screened from I-80 views by the Grenville Dome, and would not be within the foreground-middle ground distance zone of other sensitive viewpoints. The substation site in Section 31 would be difficult to discern from I-80, as the nearly three mile distance would obscure form, line and color contrasts. There is potential that the substation night lighting would be visible from the highway. Collection substations are located more than three miles from KOPs and other sensitive viewpoints, and would result in weak contrasts depending on color and glare. The visual contrast from substation structures and fencing with the surrounding landscape would be reduced by painting the structures with shadow gray from the BLM Environmental Color Chart. Painting the perimeter fence with

colors that harmonize with the surrounding vegetation and soils would reduce the impact to motorists on the road.

The operation of new substations may result in a new source of light and glare from night lighting. Materials used to construct substations may be a source of glare during the day time as well; however, it is expected that substation facilities would be constructed with no reflective materials. Night lighting at substations is not described in the POD; however, it is likely that lighting would be installed near major electrical equipment and at entrance gates. The installation of lights that use directional shielding would reduce the visibility on night lighting.

As viewed from KOPs that provide views of the Sierra Madre, Chokecherry, and Bolten conceptual areas of development (**Figure 4.12-2**), which are further in distance, the substations would be a minor blockage of a high quality view, resulting in low to moderate visual impact. Painting the perimeter fences with colors that harmonize with the surrounding vegetation and soils would minimize the visibility of substations.

A RDF for receiving shipments of WTG components may be constructed on a privately owned parcel south of I-80, southwest of Sinclair. If an RDF is not constructed, then all WTG components would be transported to the project sites via trucks and semi-tractors and trailers. The RDF would be constructed during the first year of construction activities. The RDF would be within the foreground-middleground views of motorists on I-80 and an adjacent county road; however, the site would be difficult to see because the rolling terrain would screen much of the site, which would have an overall low profile from facility features and stored project-related components and equipment. Despite the large number of potential viewers of the RDF, the overall viewer sensitivity to modification of the site would be low, because the facility would be intermittently visible only for short periods of time by motorists on the highway and because of the low visibility of the RDF.

The O&M facility would be located in the northern part of the project area along the haul road within T21N, Ra86 W, Section 33. The O&M facility would be screened from viewpoints in nearby Sinclair and motorists on the I-80 by the Grenville Dome. There would be no visual impact to the landscape as viewed from any KOP or sensitive viewpoint.

<u>FAA Lighting</u>

WTGs and other project facilities exceeding 200 feet aboveground level are required to be marked and lighted to meet FAA lighting standards that promote air safety and the efficient use of the navigable airspace. The FAA has the final authority to review and approve lighting plans for wind projects (PCW 2009a). All action alternatives WTGs would result in the following lighting impacts:

- No daytime lighting would be required;
- The preferred lighting by the FAA for these installations would be the L-864 aviation red-colored flashing lights with a minimum intensity of 2,000 candelas. The flashing lights should all be synchronized simultaneously to clearly define the limits of the periphery. The obstruction light should be top-mounted well above the surface of the nacelle so it can be seen from all directions, including directly in front of the WTG. The flashing red lights have substantially lower intensity values than white strobe or steady lights, and are not an obtrusive source of night lighting (FAA 2005);
- Not all WTGs in the wind farm would need to be lighted at night; however, definition of the periphery of the wind farm is essential. Layout of the obstruction lights along the periphery would have a minimum separation of 0.25 mile and a maximum separation of 0.5 mile between WTGs where feasibly possible;
- Obstruction lights also would be placed on the inside of the group/periphery where there was a significant elevation difference between the nearby/adjacent periphery locations; and

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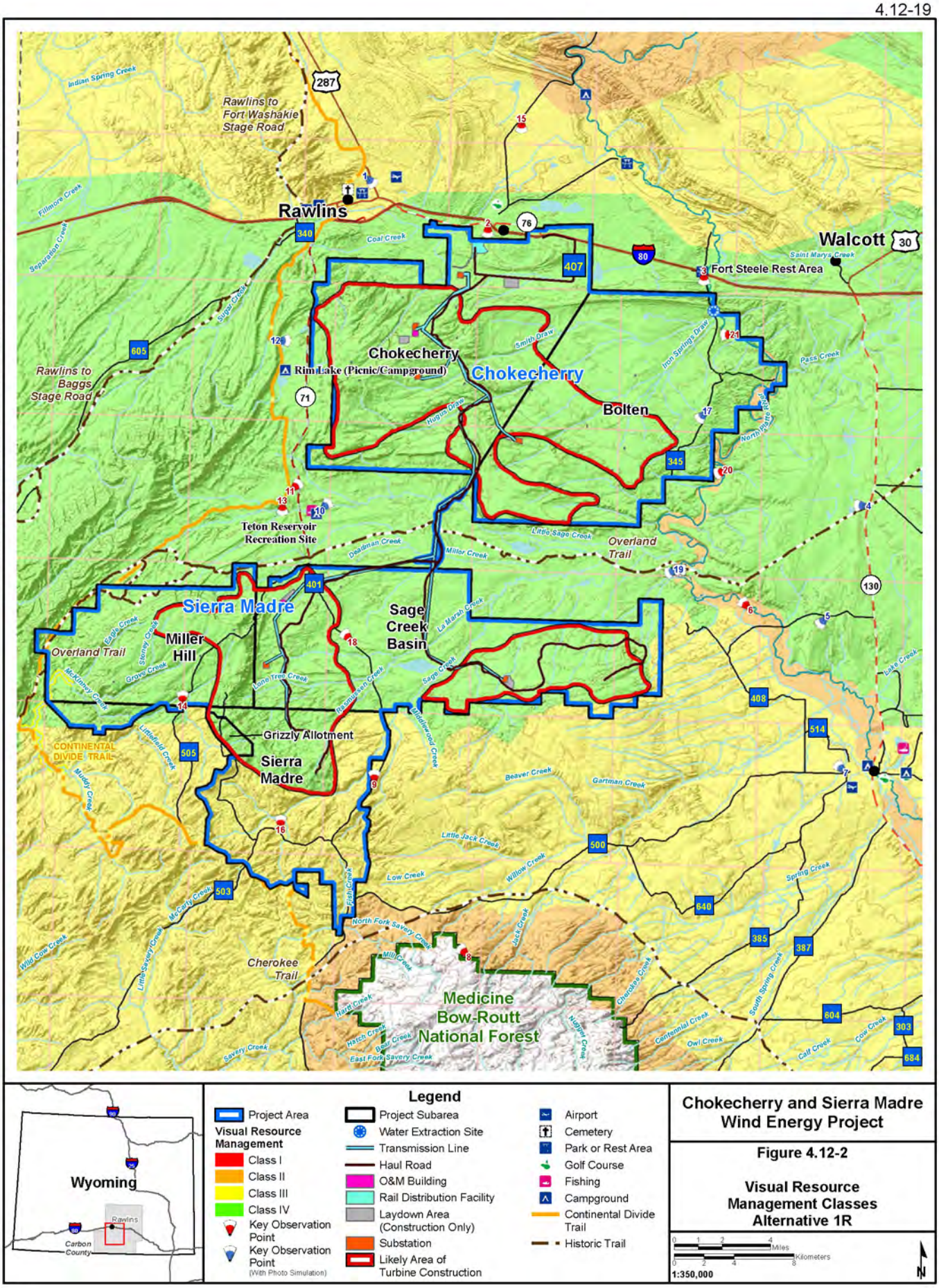


Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-2

Visual Resource Management Classes Alternative 1R

- A minimum of 200 red-colored flashing lights would be required for all action alternatives.

Over 200 simultaneously flashing lights at night over a 347-mile^2 area where no to very few existing night lights occur would result in a significant visual impact. Flashing lights would potentially be seen to the extent of the 30-mile study area.

The proposed lighting plan addresses the visual impacts of day and nighttime lighting by minimizing the number of WTGs that would be equipped with FAA compliant lighting. The FAA Advisory Council provides for a lighting plan that requires lighting and marking for the perimeter WTGs and a select group of internal WTGs. The lighting of interior WTGs is generally less important, unless they are taller than the WTGs located on the periphery (FAA 2007). The lighting plan developed for the project (included in Appendix J of the POD) would be updated based on project final design. The FAA would make the final determination regarding the exact number and locations of the towers that would be lighted and the specific lighting design to be used.

Effects to the CDNST

The CDNST in the RFO south of I-80 is located primarily within the checkerboard of public and private lands, and crosses this area through a mosaic of land and resource uses that include urban (in the vicinity of Rawlins), transportation, grazing, oil and gas development, and recreation.

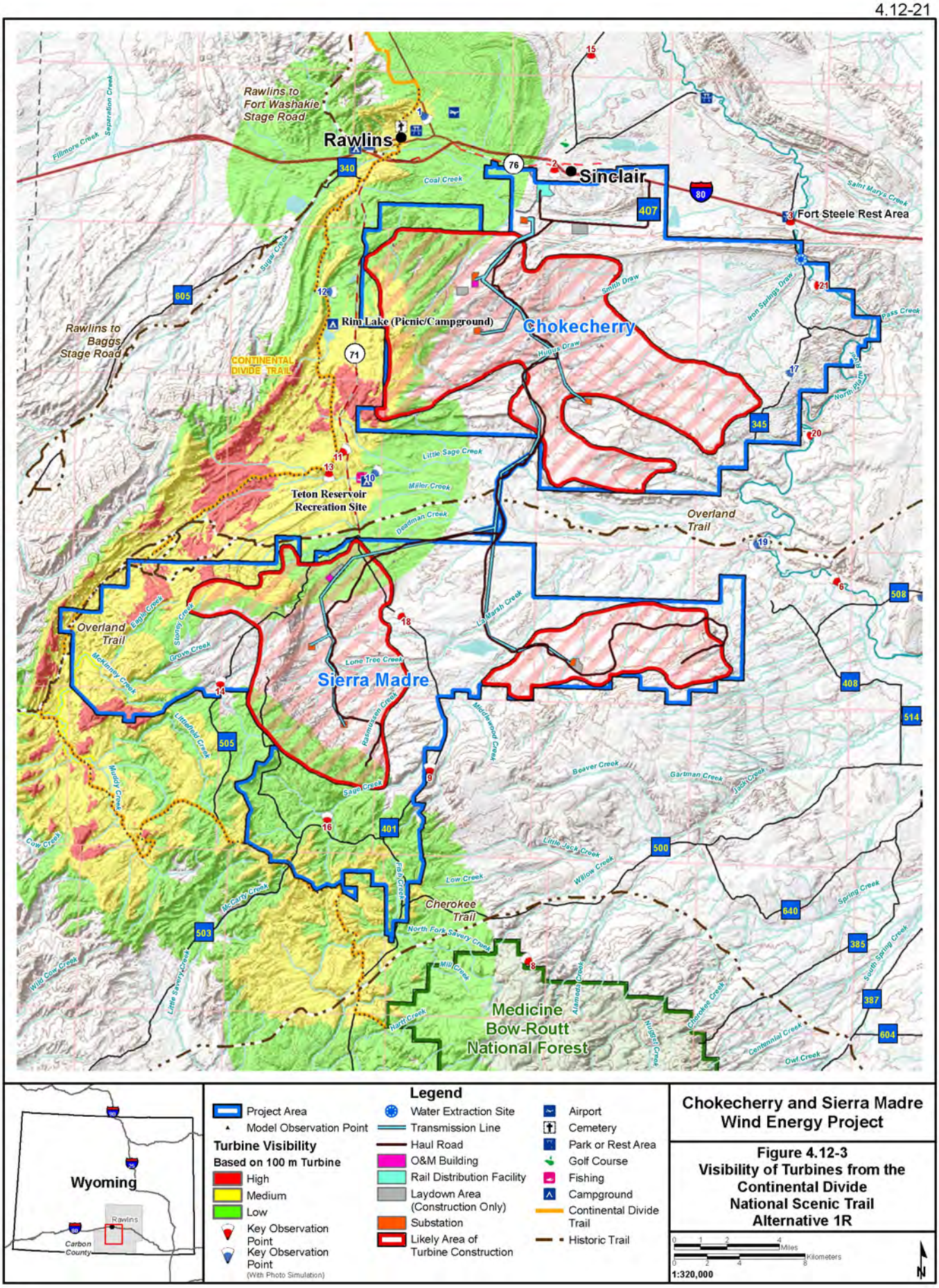
The portion of the CDNST that has the most potential to be affected by the proposed project is in the checkerboard, which encompasses the area within an approximate distance of 20 miles to either side of I-80. The CDNST in the checkerboard is highly used as described in Section 3.5, and its primary function is to connect destinations outside the checkerboard, such as between the Medicine Bow NF and Green Mountains that contain higher scenic, recreation, and cultural values. The most scenic portions of the trail occur west and south of the Sierra Madre site, outside of the checkerboard. In these locations, much of the CDNST is located in drainages and ridgelines that would provide intermittent views of the proposed project from the CDNST.

Strong contrasts would be most pronounced within 5 miles of the CDNST in the western portion of the Chokecherry site and southwest and northwest portions of the Sierra Madre site, as documented from KOPs 11, 12, 13 along the CDNST and four KOPs (1, 9, 14, 16) near the CDNST. A viewshed analysis (**Figure 4.12-3**) displays where 100m WTGs would be visible within the conceptual area of development within 5 miles of the CDNST. Some WTGs and 230 kV transmission facilities located outside of the 5-mile CDNST corridor would be visible in the background distance zone due to their large scale and light colors. Low-profile facilities, such as roads and laydown areas, would be less discernible in relation to the surrounding landscape beyond 5 miles.

The checkerboard ownership pattern, I-80, and the City of Rawlins is the context through which the CDNST passes in the RFO. The CMP demonstrates a clear understanding that an ideal condition will not always be met across private property. Therefore, Alternative 1R, though resulting in a strong visual contrast, does not substantially interfere with the nature and purposes of the CDNST. Effects to the CDNST SRMA and ROS class are addressed in 4.7, Recreation.

Effects to the North Platte River

The North Platte River SRMA provides water-based recreation and the land adjacent to the river provides hiking, camping, hunting and fishing opportunities in a scenic setting. North Platte River viewsheds most affected by Alternative 1R are between Fort Steele to the town of Saratoga. Field observations found that this section of the river is generally lower in elevation than adjacent banks and bluffs that, when combined with riparian vegetation, would screen most proposed project facilities from view (AECOM 2011). WTGs located in the eastern portion of Sage Creek Basin, Miller Hill, and the Chokecherry site would be seen intermittently depending on terrain, the level of the water and seasonal leaf-on and leaf-off conditions of tree stands along the river. For Alternative 1R, the nearest distance between the North Platte River and the conceptual locations of proposed WTGs in the Chokecherry



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-3
Visibility of Turbines from the Continental Divide National Scenic Trail Alternative 1R

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project area is 1.5 miles. The nearest distance between the North Platte River and conceptual locations of proposed WTGs in the Sierra Madre project area is 3.0 miles.

The banks and uplands along the river are used by boaters as well as recreationists who access the SRMA for land-based opportunities. The proposed project would be more visible from the valley floors and bluffs along the river by hikers within the foreground-middleground distance zone. Simulations from KOPs 17 (CR 345 Savage Hills) and 19 (Overland Trail crossing of the North Platte River) provide examples of panoramic views of Alternative 1R as seen from uplands adjacent to the North Platte River. Several high bluffs would be traversed by recreationists in vehicles accessing the river at the Foote Access Point, Pick Bridge Access, Sanger Access, and numerous Rochelle Access Points. As shown in the simulations of KOPs 5 (Pick Bridge Public Access) and 6 (Sanger Public Access Area), WTGs would be relatively small in scale, but would create strong contrasts from numerous WTGs distributed across a broad, horizontal plane.

Effects to Inventoried Scenic Quality and Sensitivity Level Rating Units

There would be no adverse effects to VRI Class A scenic landscapes from Alternative 1R, as Class A landscapes were not found in the area. Adverse effects would occur to VRI Classes B and C scenic landscapes from Alternative 1R.

The following scenic quality rating scores described in **Table 3.12-3** would be impacted and reduced: cultural modifications (the degree to which human changes enhance or detract from scenic quality), adjacent scenery (the degree to which scenery outside the SQRU being rated enhances the overall impression of the scenery within the SQRU), and vegetation (the degree of variety from patterns, forms, and textures of vegetation).

The majority of WTGs, including WTGs on slopes greater than 7 percent, and new access roads are located in areas inventoried with a Class B, or moderate, scenic quality as shown in **Table 4.12-7**. Class B lands include the entirety of the Chokecherry site, and the Miller Hill and Sierra Madre portions of the Sierra Madre site. The percent of overhead lines crossing Classes B and C lands are relatively equal.

Table 4.12-7 WTG and Other Surface Facility Impacts to VRI Scenic Quality on BLM Lands

Scenic Quality Rating	Percent of WTGs[1]			
	Alternative 1R	**Alternative 2**	**Alternative 3**	**Alternative 4**
BLM – Class B	75	71	70	0
BLM – Class C	25	29	30	0
Total	**100**	**100**	**100**	**0**
	Percent of WTGs > 7.5% grade			
BLM – Class B	80	74	76	0
BLM – Class C	20	26	24	0
Total	**100**	**100**	**100**	**0**
	Percent of Roads Crossing Scenic Quality Rating Units			
BLM – Class B	41	40	38	41
Internal resource roads 5-10% grade	25	26	26	27
Internal resource roads > 10% grade	15	14	12	14
BLM – Class C	9	10	12	9

Table 4.12-7 WTG and Other Surface Facility Impacts to VRI Scenic Quality on BLM Lands

Internal resource roads 5-10% grade	6	7	9	6
Internal resource roads > 10% grade	3	3	3	2
Total	**100**	**100**	**100**	**100**
	Percent of Overhead Lines Crossing Scenic Quality Rating Units			
BLM – Class B	**65**	**67**	**71**	**66**
BLM – Class C	**35**	**33**	**29**	**34**
Total	**100**	**100**	**100**	**100**

[1] Percent of WTGs in SQRUs are estimates based on alternative conceptual designs.

Each SQRU is rated for the influence of adjacent scenery, or the degree at which scenery outside the SQRU being rated enhances the overall impression of the scenery within the SQRU. The scenic quality of adjacent SQRUs would be impacted by proposed facilities as they would be visible in middleground or background distance zones as viewed from sensitive viewpoints in adjacent SQRUs. Subsequent inventories may reduce the scenic quality rating for adjacent landscapes outside of the Application Area.

Sensitivity level ratings described in **Table 3.12-2** would be impacted and reduced. Adverse effects also would occur to High, Moderate and Low VRI Sensitivity Level landscapes. Wind energy facilities would be visible from the historic Overland Trail, the CDNST, and many recreational use areas shown in **Figure 4.12-1.**

The majority of WTGs, including WTGs on slopes greater than 7 percent, are located in areas inventoried with a Low sensitivity level, likely owing to the fact that south facing aspects of Chokecherry and most of the Sierra Madre site are not visible from populated areas along the I-80 corridor. **Table 4.12-8** provides a summary of the percentage of proposed aboveground facilities that would affect the sensitive rating. The majority of overhead lines cross lands with High sensitivity.

Table 4.12-8 WTG and Other Surface Facility Impacts to VRI Sensitivity Levels on BLM Lands

Sensitivity Level Rating	**Percent of WTGs[1]**			
	Alternative 1R	**Alternative 2**	**Alternative 3**	**Alternative 4**
BLM – High Sensitivity Level	30	23	23	0
BLM – Moderate Sensitivity Level	27	27	17	0
BLM – Low Sensitivity Level	43	50	61	0
Total[2]	**100**	**100**	**100**	**0**
	Percent of WTGs > 7.5% grade			
BLM – High Sensitivity Level	34	27	24	0
BLM – Moderate Sensitivity Level	27	26	19	0
BLM – Low Sensitivity Level	40	47	57	0
Total	**100**	**100**	**100**	**0**

Table 4.12-8 WTG and Other Surface Facility Impacts to VRI Sensitivity Levels on BLM Lands

	Percent of Roads Crossing Sensitivity Level Rating Units			
BLM – High Sensitivity Level	28	20	22	17
Internal resource roads 5-10% grade	17	13	15	10
Internal resource roads > 10% grade	11	7	7	7
BLM – Moderate Sensitivity Level	24	24	17	19
Internal resource roads 5-10% grade	15	16	12	13
Internal resource roads > 10% grade	9	8	5	5
BLM – Low Sensitivity Level	48	57	61	64
Internal resource roads 5-10% grade	32	38	43	43
Internal resource roads > 10% grade	16	18	18	21
Total[2]	**100**	**100**	**100**	**100**
	Percent of Overhead Lines Crossing Sensitivity Level Rating Units			
BLM – High Sensitivity Level	39	18	15	19
BLM – Moderate Sensitivity Level	12	22	20	23
BLM – Low Sensitivity Level	49	60	64	58
Total	**100**	**100**	**100**	**100**

[1] Percent of WTGs in SLRUs are estimates based on alternative conceptual designs.
[2] Discrepancies in totals due to rounding.

Table 4.12-9 shows the numbers of acres and the proportion of acres within the 2008 Rawlins RMP area that are rated as Class A, B, and C within SQRUs; and as Low, Moderate, and High within SLRUs. The table also summarizes the number of acres for SQRUs and SLRUs and associated ratings within the Application Area; and determines the proportion of these units to the 2008 Rawlins RMP area. Current VRI acres that would be affected by proposed project activities account for, at most, 2.3 percent of the 2008 Rawlins RMP area.

In summary, future VRIs following project construction would likely reduce the scenic quality and/or sensitivity ratings in the area, thereby potentially reducing future VRI classes due to the presence of the project.

Indirect Long-term Effects

Indirect effects from Alternative 1R could occur if adverse changes to the visual quality of the landscape made the area a less desirable location for recreation, resulting in a loss of tourist or other recreation-related revenues to local economies. Direct effects of the proposed project on trail uses, hunting, and other recreational sites in the area are described in Section 4.7.

Table 4.12-9 SLRUs and SQRUs in the RFO Area and Percentage of RFO Area SLRUs and SQRUs in the Application Area

		Acres in Rawlins RFO Area	Percent in Rawlins RFO Area	Acres in Application Area	Percent of Application Area in Rawlins RFO Area
SLRUs	High	2,794,882	28.2	92,655	0.9
	Medium	3,835,919	38.7	53,825	0.5
	Low	3,279,400	33.1	79,888	0.8
SQRUs	A	368,956	3.7	0	0.0
	B	3,531,961	35.6	169,868	1.7
	C	6,031,290	60.7	58,500	0.6

Source: Otak, Inc. 2011.

Compliance with BLM Visual Resource Objectives

BLM VRM classes apply only to BLM-managed land. While facilities constructed on private land may affect the visual quality of public land, BLM has limited authority for VRM compliance on private land.

Alternative 1R (including WTGs, transmission lines, collector lines, other aboveground facilities) would be located on VRM Class IV lands as shown in **Figure 4.12-2**; no facilities with exception to new access roads are anticipated on VRM Classes II and III lands in the Alternative 1R boundary.

Short-term

In the short-term, BLM VRM Class IV objectives would be met during construction and installation of WTGs and ancillary operational facilities that include transmission lines, substations, step-up transformers, underground and overhead electric collection and communication lines, roads, RDF, and O&M facility. Vegetation clearing, grading, occupancy, facility construction, nighttime lighting, and revegetation of the project phases would result in areas of disturbed soil surface, human activity, and dust resulting in strong color, line, and texture contrast that would be prominent, especially when viewed from higher elevations such as WY 71 and the CDNST. As aboveground facilities are installed in phases, short-term changes are likely to be most pronounced in specific development areas.

These short-term effects, together and individually, would represent strong visual changes as seen from historic and scenic trails, recreational use areas, residential areas, and KOPs, and would not repeat the basic elements found in the predominant natural features of the characteristic landscape. When located within 1 mile of the viewer, or when viewed from an elevated position (such as the CDNST), construction activities would attract attention or dominate the view of the casual observer. While these activities and facilities would be a major focus of viewer attention, VRM Class IV would be met as it provides for major modifications of the existing landscape character.

Long-term

The contrast rating system is used by the BLM to analyze potential visual impact of proposed projects and activities. The degree of contrast of Alternative 1R components relative to the existing landscape documents the compatibility of the proposed project with BLM VRM Class IV objectives. **Table 4.12-3** summarizes the contrast ratings of all action alternatives as seen from 21 KOPs, and whether VRM Class IV was achieved for each alternative. The table also summarizes the location of each KOP and the

direction of views used to prepare contrast rating forms and visual simulations. **Table 4.12-4** estimates the percent of WTGs in VRM Class IV areas (both public and private lands) based on the conceptual layout of each action alternative.

Contrast ratings found that WTGs combined with all other aboveground facilities, including the transmission line, substations, RDF, and the O&M would result in moderate to strong changes. The angular, vertical forms and straight edges of the WTGs would dominate the horizontal lines of the landscape as seen within the foreground-middle ground distance range. Overhead collector lines would be small in scale relative to the WTGs, but would contribute clutter to the landscape. BLM BMPs and ACMs, such as BLM Gold Book design criteria to harmonize facility colors with the surrounding environment, would reduce form, line, color, and texture changes; however, the size, geographic extent, and multiple facility types would not repeat the elements of form, line, color, and texture of the characteristic landscape.

Although long-term disturbance accounts for 3.3 percent of the Alternative 1R area, the visual impact of Alternative 1R occurs throughout the alternative area as well as the larger visual resource impacts study area (viewshed). The level of change would be high because the number, size, and spatial extent of proposed components in the alternative area would be visible from large portions of the area, and would dominate the landscape as seen from KOPs and other locations within the alternative area. While some natural to rural landscape characteristic of the area would be partially retained, the majority of the area would have a strong industrial component. In general, where visible outside of the alternative area for approximately 10 miles, Alternative 1R would dominate the view of the casual observer and would result in moderate to high levels of change in the landscape. Alternative 1R would meet the VRM Class IV objectives phase as described in the VRM Plan Amendment preferred alternative in Volume 1, which provides for major modifications of the existing character of the landscape. Still, VRM Class IV objectives require that every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. With the Design Features, ACMs, BLM BMPs, and BLM-required additional mitigation measures (Section 4.12.9), the visual impact of aboveground facilities would be minimized to the greatest extent practicable.

As described under Effects to Inventoried Scenic Quality and Sensitivity Level Rating Units, future VRIs following project construction would likely reduce the scenic quality and/or sensitivity ratings in the area, thereby potentially reducing future VRI classes due to the presence of the project. Lower VRI classes and the presence of the project also would potentially reduce adjacent VRM Classes II and III objectives in subsequent resource management plan updates.

KOPs

Simulations from viewpoints in the area viewshed have been selected for recreation sites that have historic or scenic importance, and for locations that are representative of views seen from roadways, recreation uses, and residential areas in the visual impacts study area. **Table 4.12-3** summarizes the location, direction of view, VRM classes applied to the KOP viewshed, the degree of contrast associated with the implementation of each alternative, and the issues associated with the selection of the KOP.

4.12.3 Impacts to Visual Resources from Alternative 2, Checkerboard Only

Short- and long-term direct and indirect effects to the visual character of the area landscape from Alternative 2 would be very similar to the effects that would occur from Alternative 1R. The following discussion summarizes only those impacts that are different from short- and long-term direct and indirect effects disclosed in the discussion for Alternative 1R.

There would be up to 1,000 WTGs developed under Alternative 2 as in Alternative 1R. WTGs and ancillary facilities would be developed north of T17N in the Sierra Madre area to keep development primarily within the checkerboard land ownership area. To accommodate the displaced WTGs, the development footprint of the proposed WTGs has been expanded to the east in the Chokecherry area

and to the west in the Sierra Madre area, so that Alternative 2 WTGs occupy a larger development footprint than Alternative 1R, as depicted in **Figure 4.12-4**.

Short-term Effects

The increased distances between WTGs and WTG groups would require an increase in the total length of linear ancillary facilities, resulting in greater initial disturbance from the construction of increased miles of roads, overhead collection lines, and underground collection lines. Section 2.2.7 only provides the short-term disturbance acres from construction activities for each surface-disturbing activity under Alternative 2.

Construction activities would be spread over a larger area than under Alternative 1R, which would expand the visibility of activities. The expansion of WTGs, internal resource roads, and electric collector lines on Miller Hill would increase the level and areal extent of activities visible from the Overland Trail and the CDNST. There also would be an increase in the level of development viewed from CR 345 and KOP 17.

There would be minor differences from Alternative 1R in the scheduling of the transmission line, workforce and equipment scheduling, and the numbers of workers and equipment required for construction activities. The short-term impacts to the visual quality and BLM management of area landscapes are negligible from these differences.

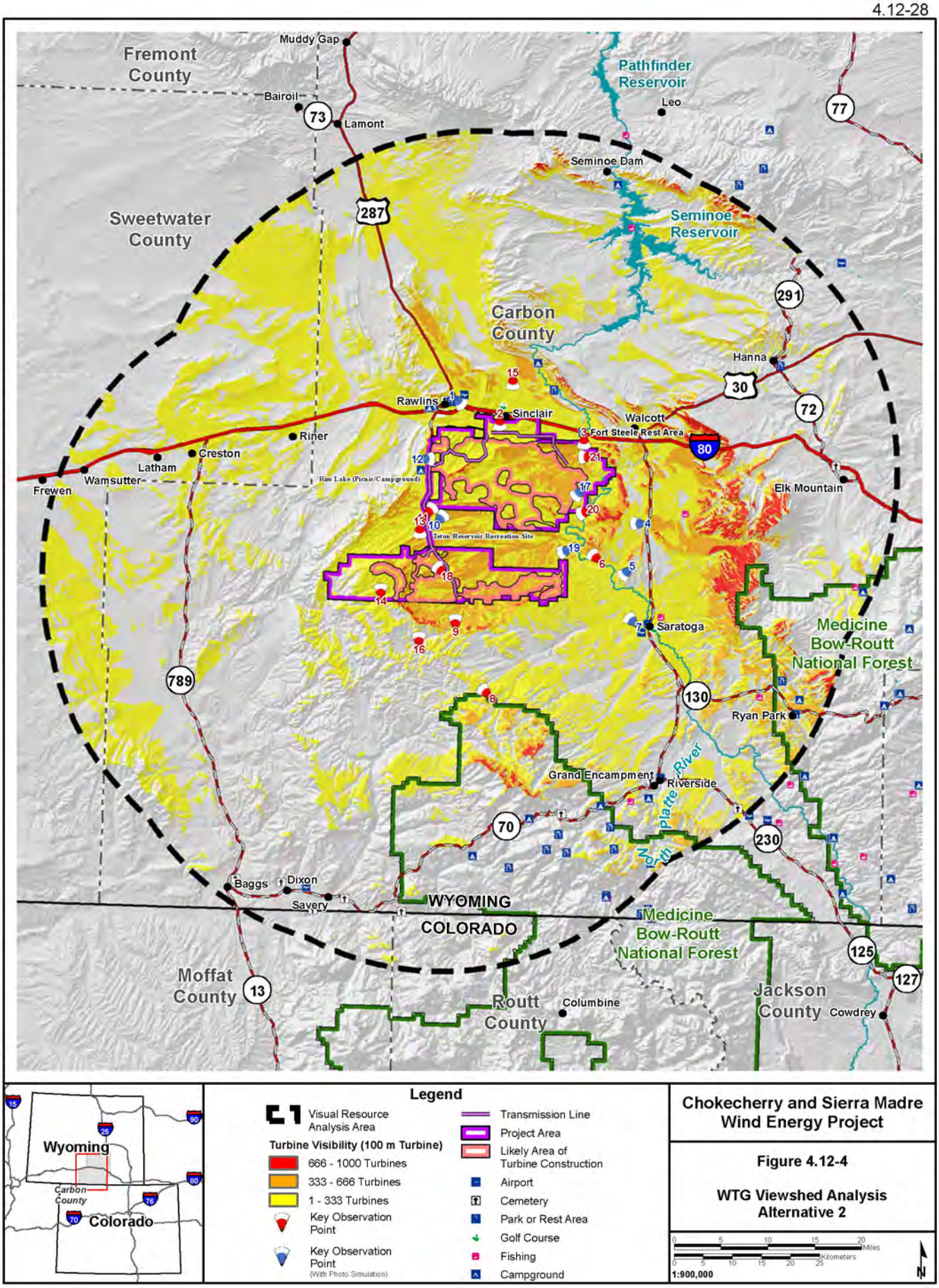
The off-site haul road under Alternative 2 would extend west from the proposed RDF to WY 71/CCR401, then parallel the east side of the WY 71/CCR401 corridor to Sierra Madre and Sage Creek Basin. The haul road along the highway would in close proximity to the CDNST, the Overland Historic Trail, and the Teton Reservoir Recreation Area. The effects to the visual quality of the CDNST and the Teton Reservoir Recreation Area settings would be greater under Alternative 2 than the effects to visual resources from the Alternative 1R haul road.

The off-site haul road would be within 1.5 miles of the CDNST between the Rim Lake campground and Little Sage Reservoir. The surface bed of the haul road would blend somewhat with the adjacent WY 71/CCR401, and would not be a noticeable adverse effect to trail visitors. The sights and sounds of construction traffic on the haul road, including the dust from haul road traffic, would be disruptive and intrusive to the experience of solitude in a natural setting. Haul road traffic would not be compatible with the nature and purposed of the CDNST in accordance with the 2009 CDNST Plan, which are to provide for high-quality scenic, primitive hiking and horseback riding opportunities and to conserve natural, historic, and cultural resources along the CDNST corridor.

The haul road would cross the Overland Trail adjacent to the WY 71/CCR401 crossing of the trail, in a segment that has been determined not to contribute to the eligibility of the trail for the National Register of Historic Places. Hiking and other recreation uses of the Overland Trail would be adversely affected by the visual impact of construction traffic on the haul road. These effects would be smaller than the impacts to the trail under Alternative 1R because the effects would be similar in quality, although considerably greater in scale, to the sights and sounds of traffic on WY 71/CCR401; whereas the effects under Alternative 1R occur in a natural landscape that does not include the sights and sounds of vehicle traffic.

The off-site haul road under Alternative 2 would be located in close proximity to the Teton Reservoir Recreation Area. The visual impact of heavy vehicles on the haul road, as well as dust from construction traffic, would be obvious and intrusive to outdoor recreational activities at the reservoir, and would degrade the opportunities for a natural setting and solitude to a greater degree than from the Alternative 1R haul road.

Impacts from haul road traffic would occur over the construction phase of the project, and are not permanent.



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-4

WTG Viewshed Analysis Alternative 2

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Long-term Effects

The WTGs, associated internal resource roads, and electric collectors under Alternative 2 would expand to cover portions of Bolten, Miller Hill, and Sierra Madre conceptual areas of development not included in the development footprint of Alternative 1R (**Figure 4.12-5**). In the Bolten conceptual area of development, visibility of the project would increase substantially as seen from CR 345 and CR 47S, which provide access to the North Platte River. Visual simulations prepared for each action alternative for KOP 17 depict the greater degree of contrast from Alternative 2 as compared to the Alternative 1R simulation. **Figure 4.12-4** provides a viewshed analysis that shows the number of WTGs that would be visible under Alternative 2 long-term activities. Overall, WTGs would be less visible within 5 miles from the CDNST in the Sierra Madre site, and closer to the CDNST in the Chokecherry site. **Figure 4.12-6** shows the visibility of the conceptual development area as viewed from the CDNST.

There would be an increase in long-term disturbance acres and miles of linear facilities from the operation of the proposed project under Alternative 2 relative to Alternative 1R. A 19 percent increase in long-term disturbance would occur from an increase in the miles of internal resource roads, increase in the operating dimensions of vehicle turnarounds, and increase in the length of the overhead transmission line. The long-term disturbance associated with specific proposed facilities in count or miles is shown in **Table 2-5** for Alternative 2, and **Table 2-2** for Alternative 1R. Increased levels of long-term disturbance would be visible in the unimpeded views but would not be noticeable from most KOPS.

The overhead transmission line is located along WY 71 for a substantial portion of the total 37-mile length, extending from a substation in the Sierra Madre area to the Chokecherry substation. There would be a greater visibility of the transmission line to a larger number of people under Alternative 2 relative to Alternative 1R. The transmission line would be a dominant feature along WY 71 and would have a moderate impact to views seen from KOP 12 on the CDNST, creating additional clutter in views from the CDNST in addition to the moderate impact from WTGs. However, most of the transmission line would be within an existing ROW that contains the road, electric distribution lines, and gas pipelines, eliminating the need for a new ROW in undisturbed, predominantly natural landscape.

As seen from WY 71 in the Sierra Madre area, a potential substation would dominate views in the foreground distance zone, blocking a high quality view to the east of the highway, and would be a strong visual impact. Painting the perimeter fence with colors that harmonize with the surrounding vegetation and soils would reduce the impact to motorists on the road.

A substation would be located on private surface in close proximity to the CDNST. A knob would block views of the substation from the trail located directly to the west of the site; however, the substation would be within foreground views of the CDNST to the north and to the southwest and would be a dominant feature in the landscape. Painting the perimeter fence with colors that harmonize with the surrounding vegetation and soils would reduce the impact to viewers on the trail.

Effects to Inventoried Scenic Quality and Sensitivity Level Rating Units

There would be no adverse effects to Class A scenic landscapes from Alternative 2, as Class A landscapes were not inventoried in the project area. There would be a slightly lower adverse effect to Class B landscapes under Alternative 2 than from Alternative 1R, and a slightly greater effect to High sensitivity level areas from roads. **Table 4.12-8** provides a summary of the percentage of Alternative 2 aboveground facilities in Classes B and C landscapes. **Table 4.12-7** summarizes the inventoried sensitivity levels of lands affected by Alternative 2 activities.

4.12.4 Compliance with Visual Resource Objectives

Short-term

In the short-term, BLM VRM objectives would not be met during construction and installation of WTGs, the haul road, and other ancillary operational facilities. The short-term effects from most components of

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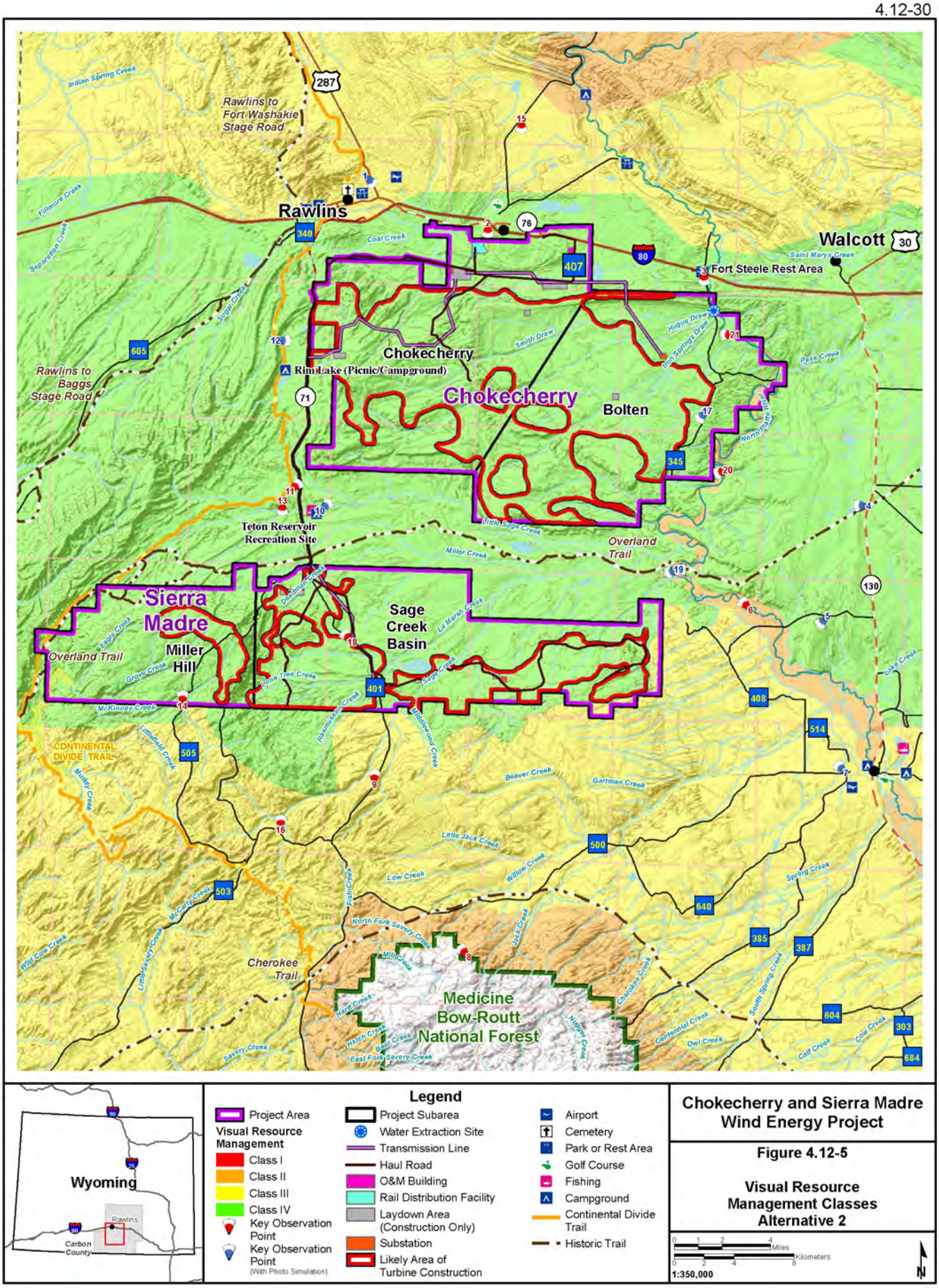
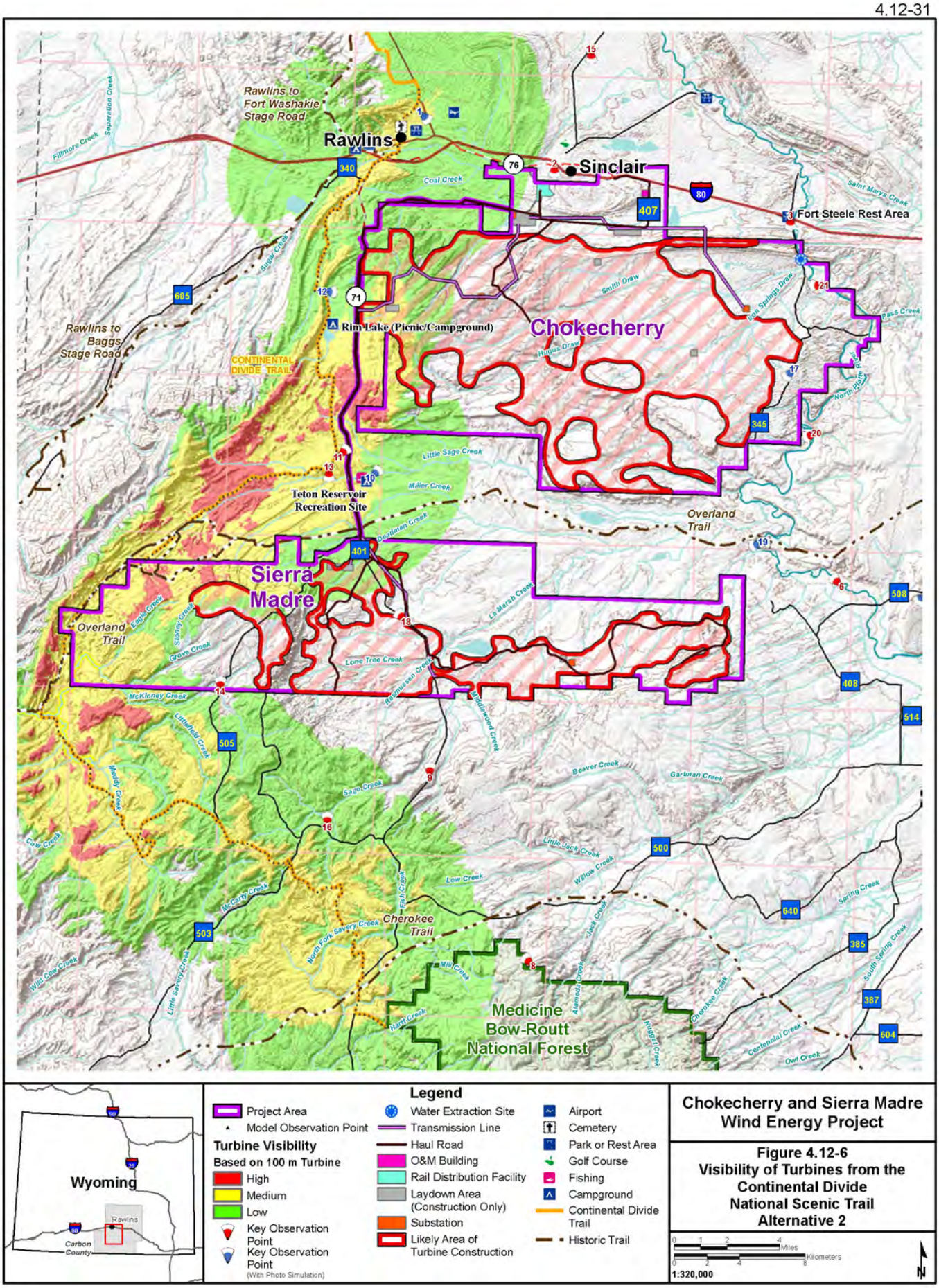


Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-5

Visual Resource Management Classes Alternative 2



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-6
Visibility of Turbines from the Continental Divide National Scenic Trail Alternative 2

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Alternative 2 would be very similar to the effects described under Alternative 1R, Applicant Proposed Alternative. Effects from the haul road along WY 71/CCR401 would be substantially greater during the construction phase because haul road construction traffic would be intrusive within the viewsheds of the CDNST and the Teton Reservoir Recreation Site.

Long-term Effects

Alternative 2 long-term effects to BLM VRM objectives are very similar to the effects described under Alternative 1R, as shown in **Figure 4.12-5**. **Table 4.12-3** provides the contrast ratings of all action alternatives as seen from 21 KOPs, and the VRM class achieved for each alternative. There would be a slightly larger contrast from Alternative 2 as seen from KOP 3: I-80 Fort Steele Rest Stop relative to Alternative 1R. While Alternative 2 would result in a strong contrast, it would meet VRM Class IV objectives which provide for major modification of the existing character of the landscape. The VRM Class IV objective requires that every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. With the Design Features, ACMs, BLM BMPs, and BLM-required additional mitigation measures (Section 4.12.9), the visual impact of above ground facilities would be minimized to the greatest extent practicable.

4.12.4.1 Impacts to Visual Resources from Alternative 3, No Miller Hill or South Sierra Madre

Short- and long-term direct and indirect effects to the visual character of the study area landscape from Alternative 3 would be very similar to the effects that would occur from Alternative 1R. The following discussion includes only those impacts that are different from short- and long-term direct and indirect effects disclosed in the discussion for Alternative 1R. For impacts that are similar to Alternative 2, refer to the Alternative 2 discussion for descriptions of the impacts.

There would be up to 1,000 WTGs developed under Alternative 3 as in Alternative 1R. WTGs and ancillary facilities would not be developed on lands south of T18N, within T18N R89W, and the western half of T18N R88W, which would exclude Miller Hill and the southern portion of the Sierra Madre conceptual area of development. To accommodate the displaced WTGs, the development would be denser in the northern part of the Sierra Madre, Chokecherry, and Bolten conceptual areas relative to Alternative 1R, and the footprint of the proposed WTGs would be expanded to the east in the Chokecherry area.

Short-term Effects

The number of WTGs in the northern part of the Sierra Madre, Chokecherry, and Bolten conceptual areas of development would require an increase in the total length of linear ancillary facilities, resulting in greater initial disturbance from the construction of increased miles of roads, overhead collection lines, and underground collection lines. Section 2.2.8 provides the short-term disturbance acres from construction activities for each surface disturbing activity under Alternative 3.

Construction activities would be distributed in a different spatial pattern over a larger area than under Alternative 1R, which would expand the visibility of activities in the affected development areas and reduce or eliminate the visibility of activities in the excluded areas. The visibility of construction activities would be greatly reduced as viewed from the CDNST west of Miller Hill, and the residential development south of Miller Hill (KOP 16). The spatial extent of project activities would be reduced as seen from the Overland Trail, with the exception of the haul road, which would have very similar impacts to Alternative 1R. The expansion of WTGs, internal resource roads, and electric collector lines into the Bolten conceptual area of development would increase the level and areal extent of activities visible to motorists accessing the North Platte River on CR 345 and CR 347S, such as from KOP 17.

There would be minor differences from Alternative 1R in the scheduling of the transmission line, workforce and equipment scheduling, and the numbers of workers and equipment required for construction activities. The short-term impacts to the visual quality and BLM management of area landscapes are negligible from these differences.

Long-term Effects

The number of WTGs and long-term disturbances of associated internal resource roads and electric collector lines under Alternative 3 would increase in the Chokecherry and the northern portion of the Sierra Madre area, and would be excluded in the Miller Hill and southern portion of the Sierra Madre conceptual areas of development relative to Alternative 1R. Visibility of the project would be reduced as seen from the CDNST and Overland Trail. Visibility of the project would increase substantially in the Bolten conceptual area of development as seen from CR 345 and CR 347S, which provide access to the North Platte River. Visual simulations prepared for each action alternative for KOP 17 depict the greater degree of contrast from Alternative 3 as compared to the Alternative 1R simulation. **Figure 4.12-7** provides a viewshed analysis that shows the number of WTGs that would be visible under Alternative 3 long-term activities. **Figure 4.12-8** shows the development footprint that excludes the Miller Hill and a portion of the Sierra Madre conceptual area of development.

There would be a substantial decrease in long-term impacts to the scenic quality of the CDNST viewshed in the Sierra Madre project site relative to Alternative 1R, as the most scenic landscapes that are visible from the CDNST occur in Miller Hill and the Sierra Madre area. **Figure 4.12-9** shows the visibility of the conceptual development area as viewed from the CDNST.

There would be an increase in long-term disturbance acres and miles of linear facilities from the operation of the proposed project under Alternative 3 relative to Alternative 1R. A 15 percent increase in long-term disturbance would occur from an increase in the miles of internal resource roads, increase in the operating dimensions of vehicle turnarounds, and increase in the length of the overhead transmission line. The long-term disturbance associated with specific proposed facilities in count or miles is shown in **Table 2-8** for Alternative 3 and **Table 2-2** for Alternative 1R. Increased levels of long-term disturbance would be visible in the unimpeded views but would not be noticeable from most KOPS.

The overhead transmission line is located along WY 71 for a substantial portion of the total 34-mile length, extending from a substation in the Sierra Madre area to the Chokecherry substation. The impacts to viewers on the CDNST and WY 71 are very similar for Alternative 3 as described for Alternative 2.

As seen from WY 71 in the Sierra Madre area, a potential substation would dominate views in the foreground distance zone, blocking a high quality view to the east of the highway, and would be a strong visual impact. Painting the perimeter fence with colors that harmonize with the surrounding vegetation and soils would reduce the impact to motorists on the road.

Effects to Inventoried Scenic Quality and Sensitivity Level Rating Units

There would be no adverse effects to Class A scenic landscapes from Alternative 3, as Class A landscapes were not inventoried in the project area. There would be a slightly lower adverse effect to Class B and Class C landscapes under Alternative 3 than from Alternative 1R, and a slightly greater effect to High sensitivity level areas from roads. **Table 4.12-8** provides a summary of the percentage of Alternative 3 aboveground facilities in Classes B and C landscapes. **Table 4.12-7** summarizes the inventoried sensitivity levels of lands affected by Alternative 3 activities.

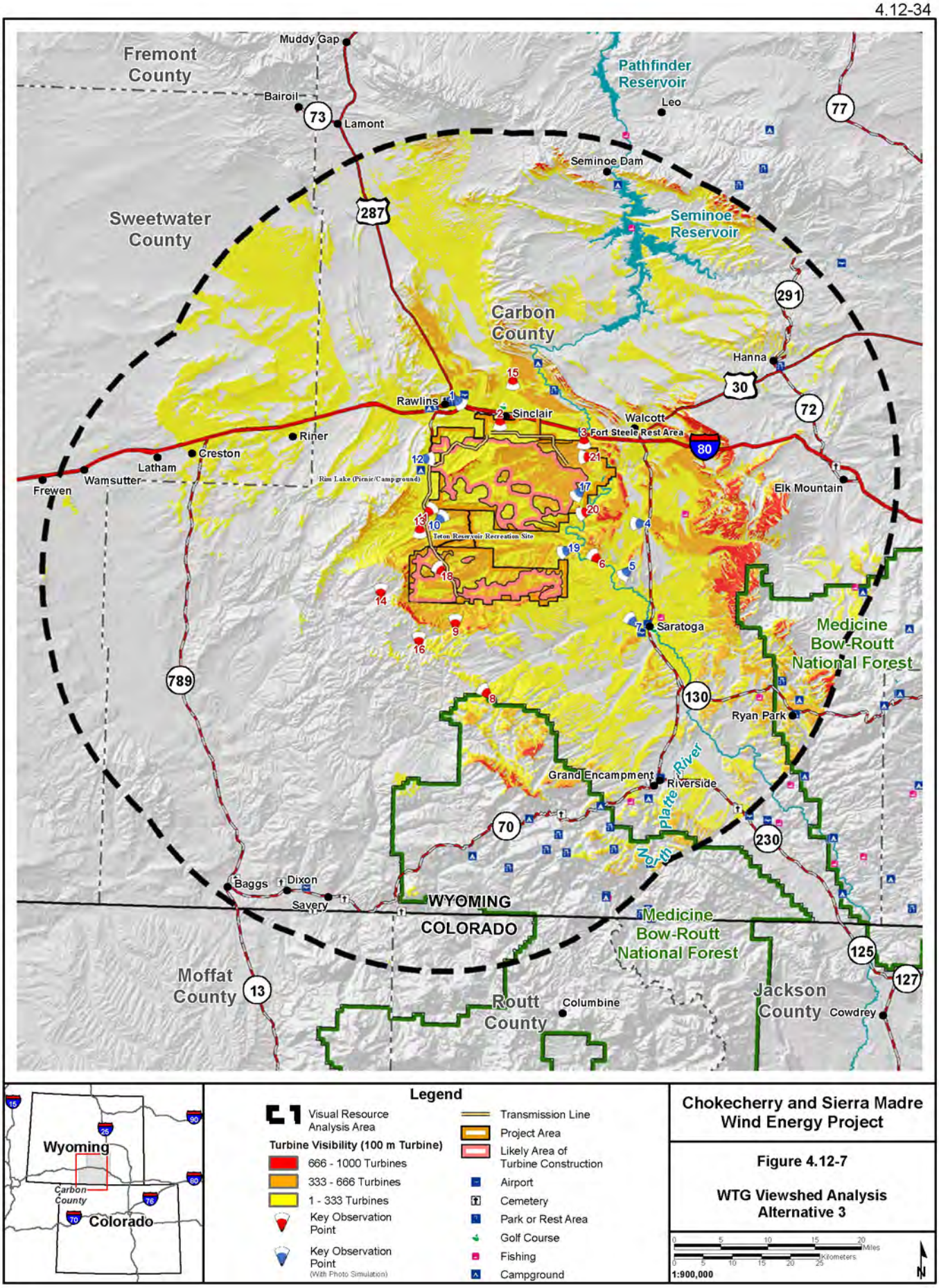
4.12.4.2 Compliance with BLM Visual Resource Objectives

Short-term

In the short term, BLM VRM objectives would not be met during construction and installation of WTGs and ancillary operational facilities. The short-term effects under Alternative 3 would be very similar to the effects described under Alternative 1R.

Long-term

Long-term Alternative 3 effects to BLM VRM objectives are very similar to the effects described under Alternative 1R, as shown in **Figure 4.12-7**. **Table 4.12-3** provides the contrast ratings of all action



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-7

WTG Viewshed Analysis Alternative 3

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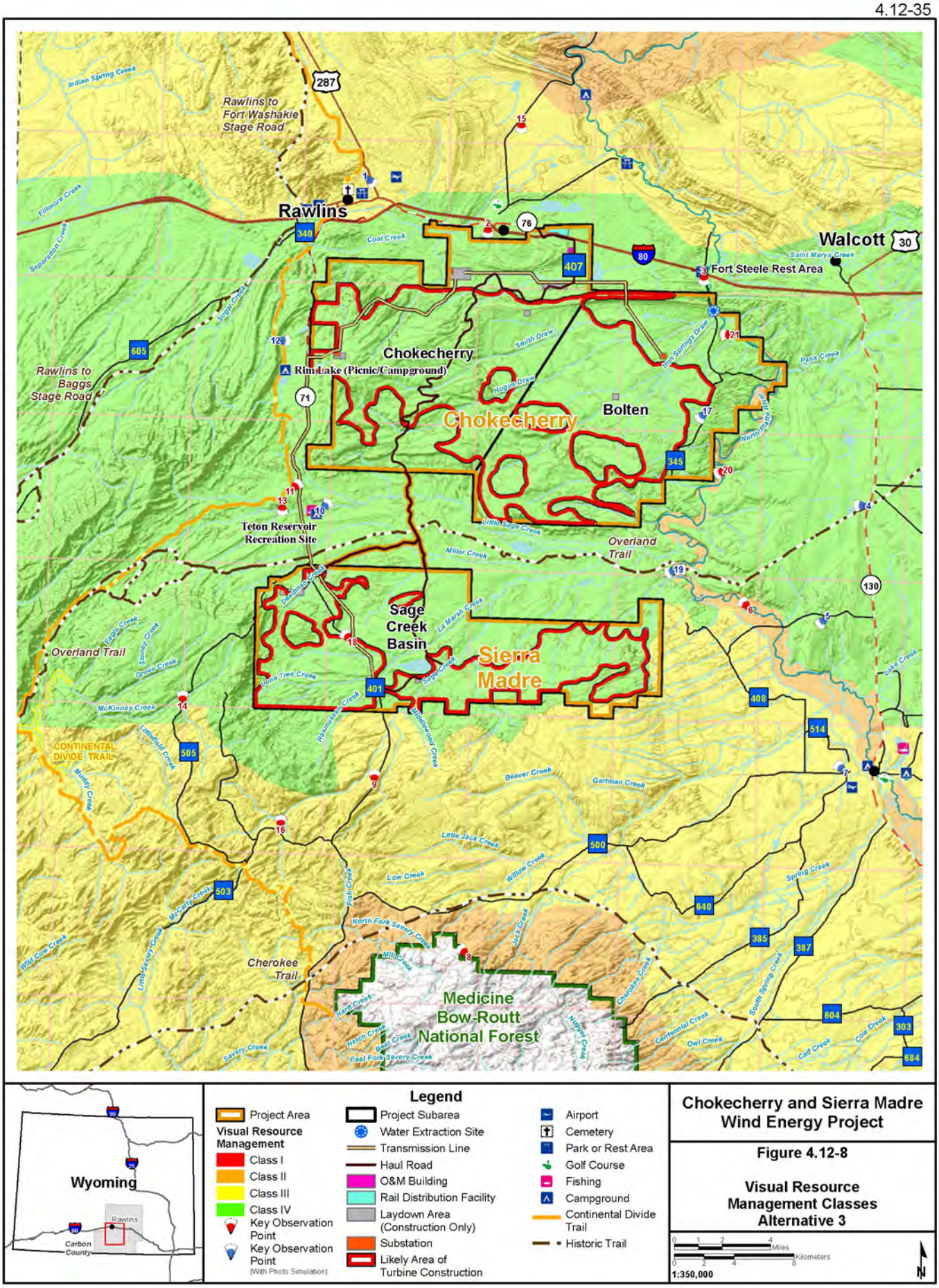

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Figure 4.12-8

Visual Resource Management Classes Alternative 3

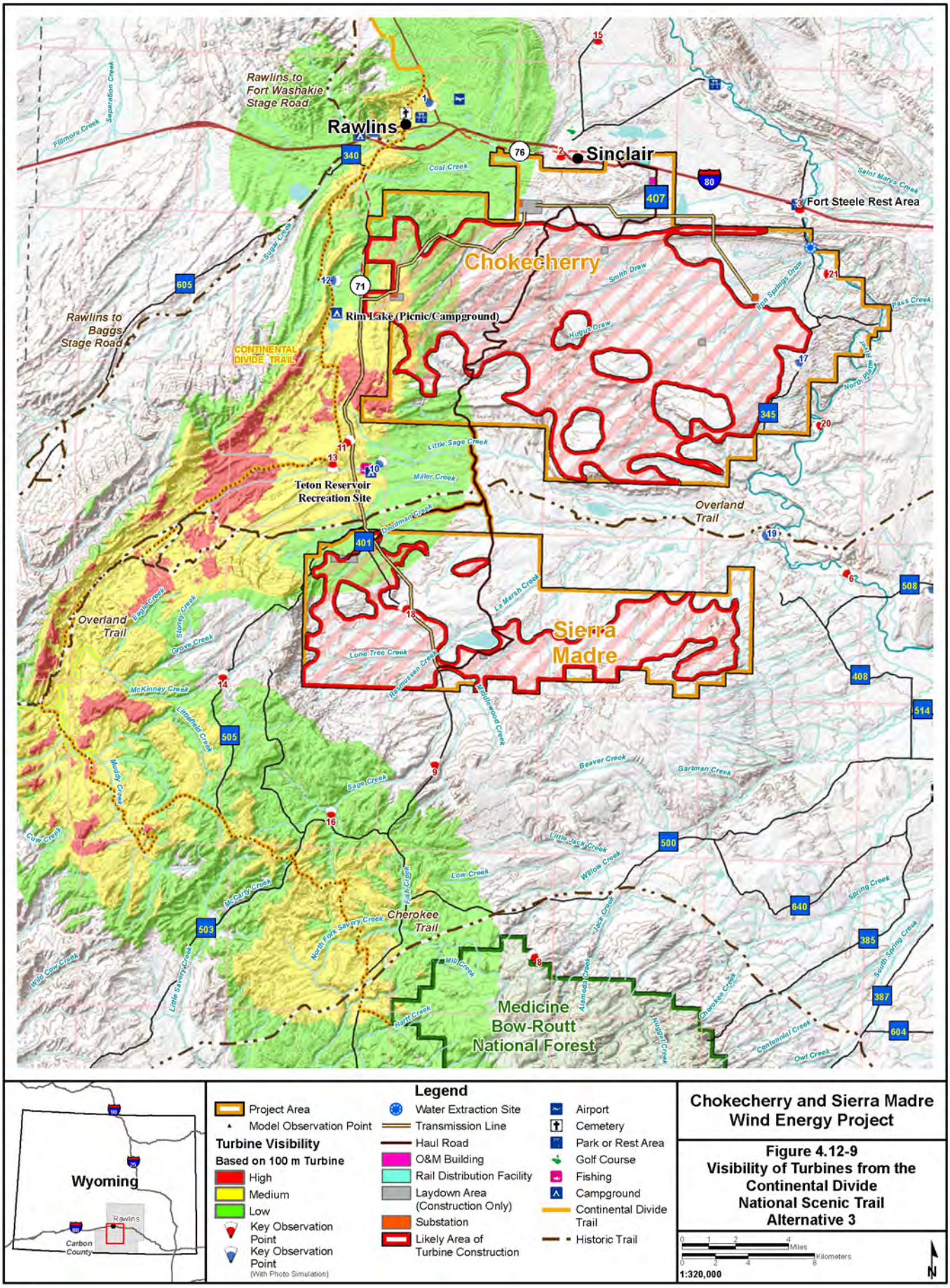

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Figure 4.12-9
Visibility of Turbines from the Continental Divide National Scenic Trail Alternative 3

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alternatives as seen from 21 KOPs, and the VRM class achieved for each alternative. As summarized for 21 KOPs in the table, there would be a slightly larger contrast from Alternative 3 relative to Alternative 1R.

Alternative 3 would result in a strong contrast, but would meet VRM Class IV objectives which provide for a major modification of the existing character of the landscape. The VRM Class IV objective requires that every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements. With the Design Features, ACMs, BLM BMPs, and BLM-required additional mitigation measures (Section 4.12.9), the visual impact of above ground facilities would be minimized to the greatest extent practicable.

4.12.5 Impacts to Visual Resources from Alternative 4, Private Lands Only

Short- and long-term direct and indirect effects to the visual character of the area landscape from Alternative 4 would be similar to the effects that would occur from Alternative 1R. The following discussion includes only those impacts that are different from short- and long-term direct and indirect effects disclosed in the discussion for Alternative 1R.

There would be up to 846 WTGs developed under Alternative 4, a reduction in the number of WTGs relative to Alternatives 1R, 2, and 3. WTGs and ancillary facilities would be developed only on private lands in all development areas. BLM would provide reasonable access to private lands to allow the construction and operation of the proposed project. Linear components that connect WTGs and WTG groups, such as internal resource roads, below and aboveground collector lines, and the overhead transmission line would be located partially on private lands. Because WTGs would be installed only on private surface, the development footprint contains a larger area than under the other action alternatives. The overall footprint of development in the Chokecherry area is similar but slightly expanded from the development footprints of Alternatives 2 and 3.

Short-term Effects

The increased distances between WTGs and WTG groups in a larger development footprint would require an increase in the total length of linear ancillary facilities, resulting in the largest initial disturbance from the construction of increased miles of roads, overhead collection lines, and underground collection lines of all action alternatives. Section 2.4.5 provides the short-term disturbance acres from construction activities for each surface disturbing activity under Alternative 4.

Construction activities would be spread over a larger area than under Alternative 1R, which would expand the visibility of activities. The expansion of WTGs, internal resource roads, and electric collector lines into the Miller Hill development area would increase the degree of contrast and areal extent of activities visible from the Overland Trail and the CDNST. The visibility of the off-site haul road would be very similar to Alternative 1R.There also would be an increase in the level of development viewed from CR 345 and KOP 17.

There would be minor differences from Alternative 4 in the scheduling of the transmission line, workforce and equipment scheduling, and the numbers of workers and equipment required for construction activities. The short-term impacts to the visual quality and BLM management of area landscapes are negligible from these differences.

Long-term Effects

The WTGs, associated internal resource roads, and electric collector lines under Alternative 4 would expand to cover portions of Bolten, Miller Hill, Sage Creek Basin, and Sierra Madre conceptual areas not included in the development footprint of Alternative 1R. In the Sage Creek Basin conceptual area of development, visibility of the project would increase substantially as seen from CR 345 and CR 47S, which provide recreational access to the North Platte River. Visual simulations prepared for each action alternative for KOP 17 depict the greater degree of contrast from Alternative 4 as compared to the

Alternative 1R simulation. Other affected viewpoints include the Overland Trail and CDNST, looking towards Miller Hill from the trail. **Figure 4.12-10** provides a viewshed analysis that shows the number of WTGs that would be visible under Alternative 4 long-term activities. The expanded conceptual area of development under Alternative 4, is depicted in **Figure 4.12-11.**

There would be an increase in long-term disturbance acres and miles of linear facilities from the operation of the proposed project under Alternative 4 relative to Alternative 1R. A 24 percent increase in long-term disturbance would occur from an increase in the miles of internal resource roads, increase in the operating dimensions of vehicle turnarounds, and increase in the length of the overhead transmission line. The long-term disturbance associated with specific proposed facilities in count or miles is shown in **Table 2-11** for Alternative 4, and **Table 2-2** for Alternative 1R. Increased levels of long-term disturbance would be visible in the unimpeded views but would not be noticeable from most KOPS.

The overhead transmission line is located along WY 71 for a substantial portion of the total 36-mile length, extending from a substation in the Sierra Madre area to the Chokecherry substation. There would be a greater visibility of the transmission line to a larger number of people under Alternative 4 relative to Alternative 1R. The transmission line would be a dominant feature along WY 71 and would have a moderate impact to views seen from KOP 12 on the CDNST, creating additional clutter in views from the CDNST in addition to the moderate impact from WTGs. However, most of the transmission line would be within an existing ROW that contains the road, electric distribution lines, and gas pipelines, eliminating the need for new ROW in undisturbed, predominantly natural landscape. **Figure 4.12-12** shows the visibility of the conceptual development area as viewed from the CDNST.

As seen from WY 71 in the Sierra Madre area, a potential substation would dominate views in the foreground distance zone, blocking a high quality view to the east of the highway, and would be a strong visual impact. Painting the perimeter fence with colors that harmonize with the surrounding vegetation and soils would reduce the impact to motorists on the road.

A substation would be located on private land in close proximity to the CDNST. A knob would block views of the substation from the trail located directly to the west of the site; however, the substation would be within foreground views of the CDNST to the north and southwest, and would be a dominant feature in the landscape. Painting the perimeter fence with colors that harmonize with the surrounding vegetation and soils would reduce the impact to viewers on the trail.

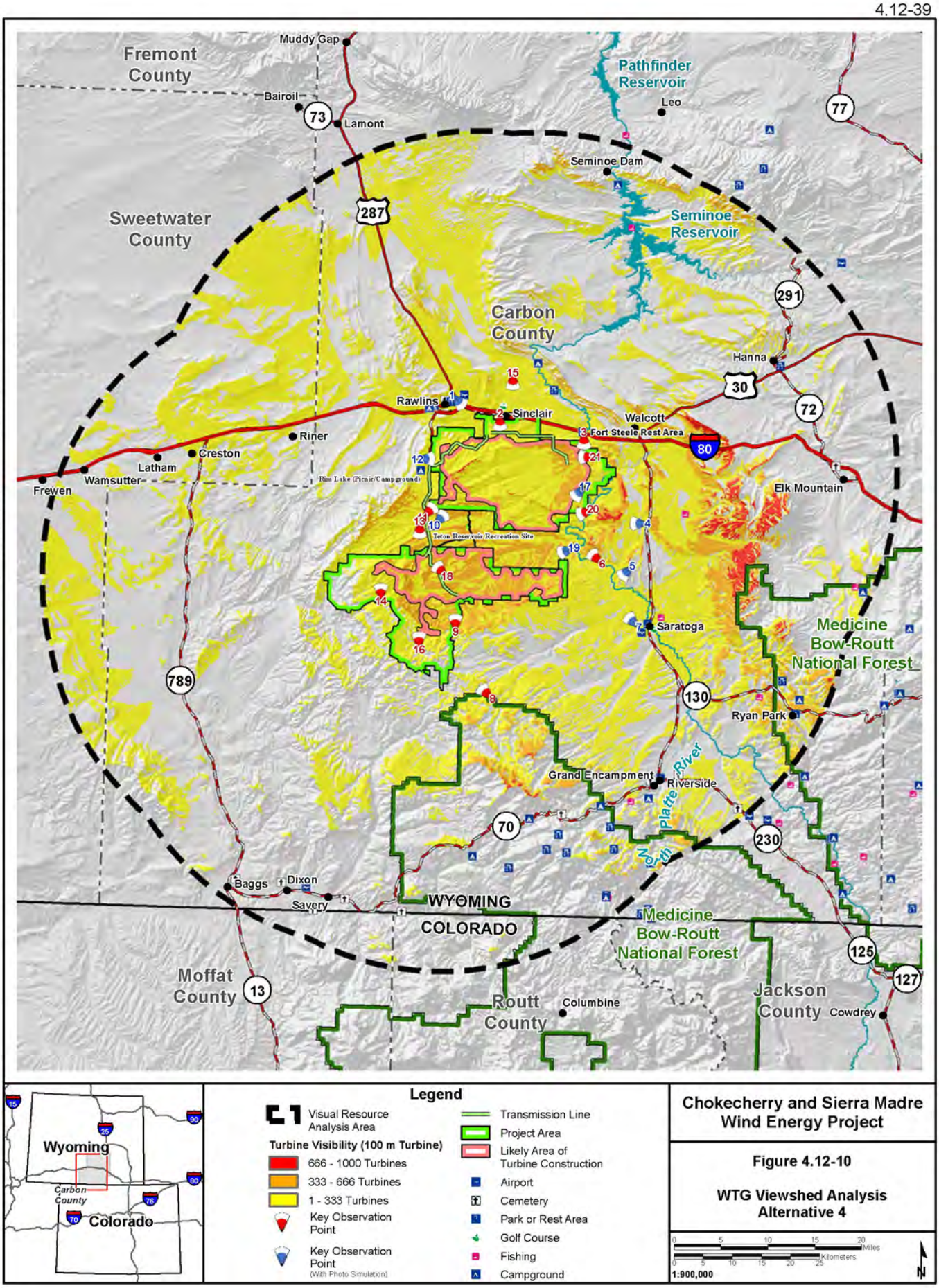
Effects to Inventoried Scenic Quality and Sensitivity Level Rating Units

No WTGs are proposed for public lands under Alternative 4; therefore, no BLM lands inventoried within SQRUs or sensitivity level rating units would be affected by proposed WTGs. Adverse effects would occur to Classes B and C landscapes from internal resource roads and overhead lines. There would be less adverse effects to Classes B and C landscapes and to High, Moderate, and Low sensitivity level areas under Alternative 4 than from Alternative 1R, because a small proportion of all proposed surface facilities under Alternative 4 are located on public lands. **Table 4.12-8** provides a summary of the percentage of Alternative 4 aboveground facilities in Classes B and C landscapes. **Table 4.12-7** summarizes the inventoried sensitivity levels of lands affected by Alternative 4 project activities.

4.12.5.1 Compliance with BLM Visual Resource Objectives

Short-term

The short-term effects impacts to visual resources under Alternative 4 would be very similar to the effects described under Alternative 1R. However, the effects would occur primarily from the construction of WTGs on private lands, which are not managed with VRM objectives. In the short-term, BLM VRM objectives would be met during construction and installation of ancillary facilities that would be required for WTGs located on private lands.



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-10

WTG Viewshed Analysis Alternative 4

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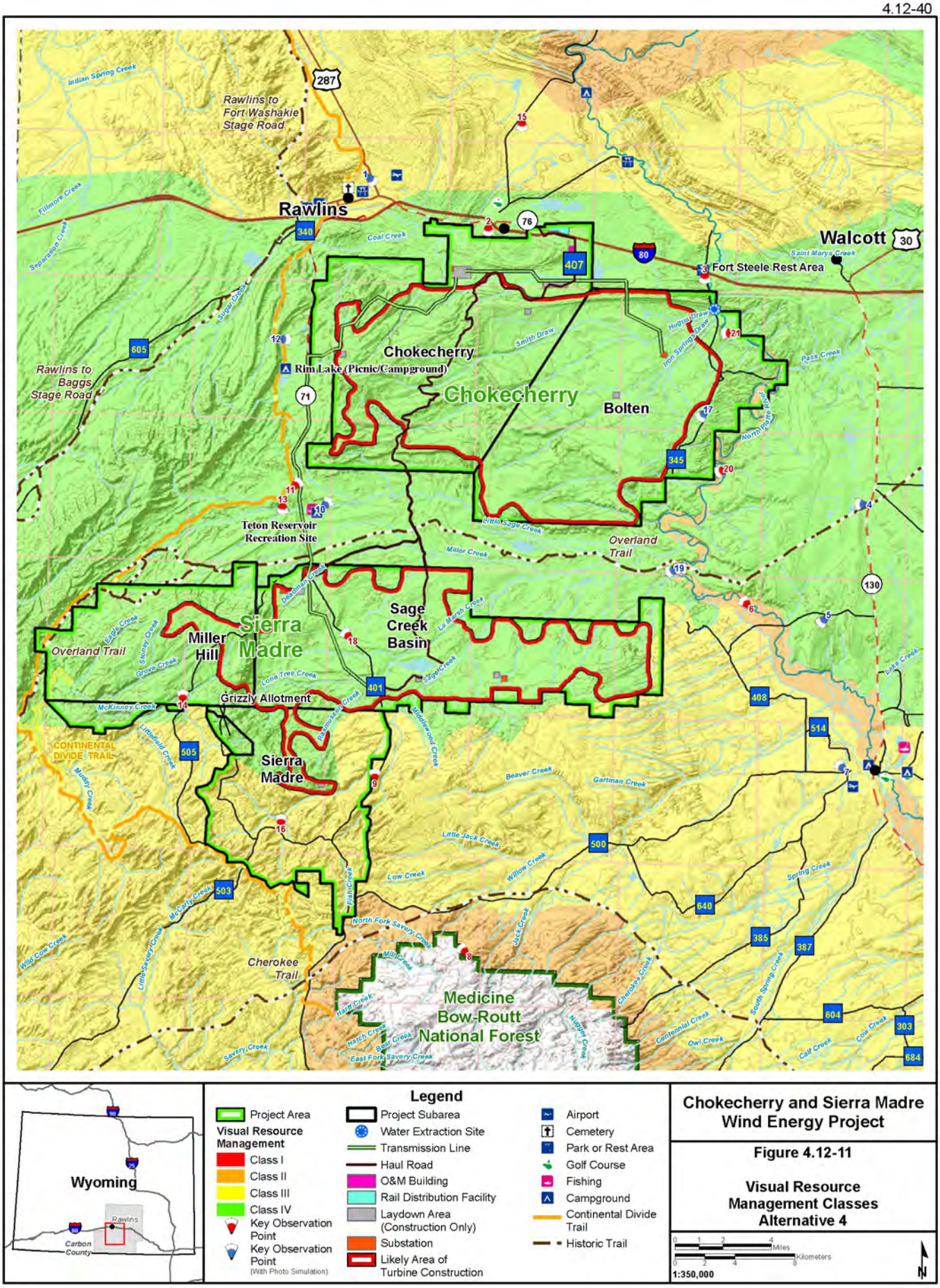


Legend

- Project Area
- Project Subarea
- Water Extraction Site
- Transmission Line
- Haul Road
- O&M Building
- Rail Distribution Facility
- Laydown Area (Construction Only)
- Substation
- Likely Area of Turbine Construction
- Airport
- Cemetery
- Park or Rest Area
- Golf Course
- Fishing
- Campground
- Continental Divide Trail
- Historic Trail

Visual Resource Management

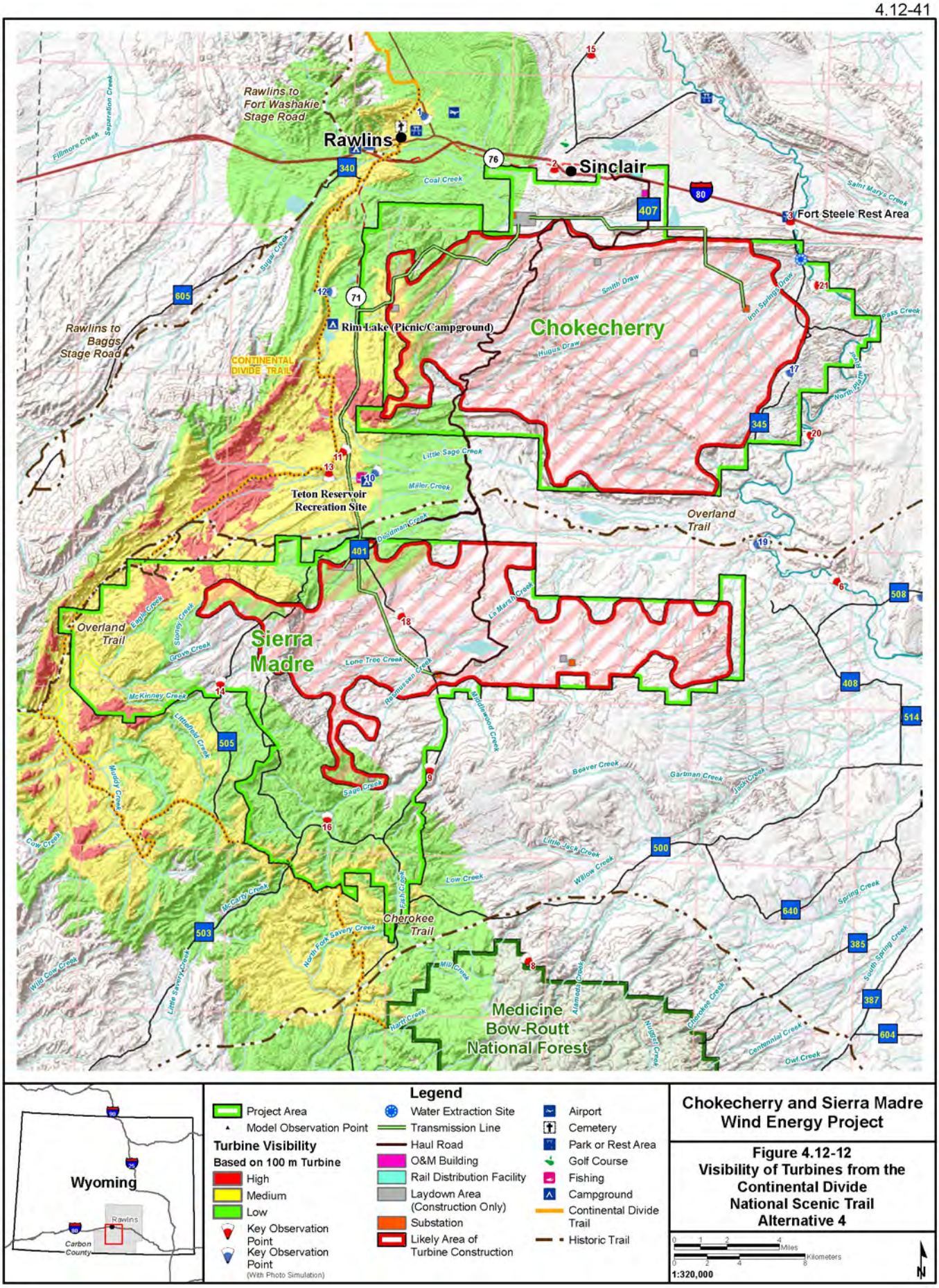
- Class I
- Class II
- Class III
- Class IV
- Key Observation Point
- Key Observation Point (With Photo Simulation)

Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-11

Visual Resource Management Classes Alternative 4

0 1 2 4 Miles
0 2 4 8 Kilometers
1:350,000
N



Chokecherry and Sierra Madre Wind Energy Project

Figure 4.12-12
Visibility of Turbines from the Continental Divide National Scenic Trail Alternative 4

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Long-term

BLM lands would be directly impacted by overhead transmission lines, collector lines, and a road network, and indirectly by views of WTGs and other facilities located on private land. Alternative 4 effects to BLM VRM objectives are similar to the effects described under Alternative 1R, as shown in **Figure 4.12-11**. **Table 4.12-3** provides the contrast ratings of all action alternatives as seen from 21 KOPs, and the VRM class achieved for each alternative. With the Design Features, ACMs, BLM BMPs, and BLM-required additional mitigation measures, the visual impact of Alternative 4 would be minimized to the greatest extent practicable.

4.12.6 Mitigation and Mitigation Effectiveness

Mitigation measures are meant to minimize adverse contrasts of project components with the existing landscape. The measures should be applied to all proposed components, even those that meet VRM objectives. In addition, mitigation measures should be applied to proposed activities on private lands. Mitigation would enable proposed project activities on both public and private land to harmonize with the surrounding landscape to the extent feasible. Mitigation measures do not include ACMs or BLM standard mitigation, which are incorporated into the proposed project. In general, resource protection measures proposed for erosion control, road construction, rehabilitation and revegetation, and wildlife protection also would mitigate effects to visual quality.

It should be noted that all action alternatives would incorporate ACMs and BMPs described in Chapter 2.0 and found in **Appendix C**. Mitigation measure GEN-1, from the Draft EIS, is now part of the alternatives analysis in the Final EIS as it was included as an ACM by the applicant in the January 2012 revised POD (PCW 2012a).

GEN-2: Off-site compensatory mitigation may be considered through future consultations between the BLM, Cooperating Agencies, and PCW if mitigation measures established through the project-wide EIS are later determined to not be adequate.

Effectiveness: Off-site compensatory could provide the opportunity to protect landscapes with a greater scenic value in other areas. Off-site relocation of portions of the CDNST to reduce project visibility would be moderately to highly effective for a specific segment, although most segments of the CDNST would continue to be within view of the project.

VR-1: Monopole and H-frame transmission structures and overhead collector line structures would be treated to have a muted, darker color than conventional galvanized steel or laminated wood to reduce color contrasts. The recommended paint color for transmission structures is Shadow Gray from the BLM Standard Environmental Colors Chart CC-00 or an equivalent color. Steel pole equivalents used in the installation of the overhead electric collector lines should be finished with paint or a self-weathering finish that will harmonize with colors of the surrounding landscape (i.e., approximate the color of wood when used with wood overhead collector lines). When not used with wood poles, the recommended paint color for power line structures is Shadow Gray from the BLM Standard Environmental Colors Chart CC-00. Conductors would have a non-reflective finish.

VR-2: Place vegetative debris on cut-and-fill slopes to vary texture and color of cut-and-fills until vegetation has been re-established.

VR-3: Lighting for ancillary facilities would be motion-activated and shielded downward to limit night lighting impacts beyond the site.

VR-4: Audio Visual Warning System (AVWS) for aircraft detection and warning may be required to reduce day and night lighting impacts from WTGs if technologies become available that are approved by FAA, are proven reliable at the scale of CCSM, and BLM determines the systems are cost effective. An AVWS is a radar-based obstacle avoidance system that uses obstruction lighting and audio signals to

alert aircraft of potential collisions with WTGs. AVWS allows wind farm lights to remain off unless the system detects aircraft with a potential heading for collision. The FAA has approved AVWS to be installed, tested, and approved for use in the national airspace in limited cases. The FAA is currently updating the FAA Advisory Circular 70/7460-1K - Obstruction Marking and Lighting to incorporate AVWS. Implementation of AVWS would substantially reduce the visual impact from FAA lighting of WTGs (OCAS, Inc. 2010).

VR-5: The most effective color for substation components, and fencing would be Shadow Gray from the BLM Standard Environmental Colors Chart CC-00 or a similar color in a dark gray color range. Color mitigation would not be required on facilities that are treated in accordance with safety and engineering concerns.

Effectiveness: Mitigation measures VR-1 and 2 would be moderately effective in reducing visual contrasts. Implementing VR-3 would reduce off-site lighting from ancillary facilities. If implemented, VR-4 would eliminate day and night lighting contrasts from WTGs except in occasions when the system detects aircraft with a potential heading for collision. Mitigation measure VR-5 would be effective in reducing visual contrasts in middleground and background distance zones where light or strong colors would otherwise increase color contrasts for great distances.

4.12.7 Residual Impacts

Mitigation measures would reduce all adverse contrasts that can be reduced. However, residual impacts would continue but to a lesser degree with application of visual resource mitigation measures. The number and magnitude of roads and facilities, and the scale and movement of WTGs would continue to attract and/or dominate the attention of viewers in nearby communities, roads and highways, and sensitive viewpoints such as the CDNST, North Platte River access routes and uplands, and the Overland Trail. Impacts from aboveground facilities would occur throughout the operational life of the project. Impacts after decommissioning would continue from surface disturbance until self-sustaining stands of vegetation are reestablished and visually adapted to the undisturbed surrounding vegetation (approximately 50 to 100 years following reclamation).

4.12.8 Irreversible and Irretrievable Commitment of Resources

Irreversible commitments are permanent or essentially permanent resource uses or losses; they cannot be reversed, except in the extreme long term. An irretrievable commitment of a resource is one in which the resource or its use is lost for a period of time. Until the affected areas are reclaimed following decommissioning of the project, the reduction in visual quality immediately following installation of the proposed project under all action alternatives would be an irretrievable loss. Future VRIs following project construction would likely reduce scenic quality and sensitivity level ratings throughout the life of the project. However, upon completion of the project, the WTGs, facilities, and roads would be removed and the disturbed areas associated with the project reclaimed, therefore no irreversible commitment of visual resources is anticipated.

4.12.9 Relationship between Local Short-term Uses and Long-term Productivity

The relationship between local short-term uses and long-term productivity does not apply to visual resources; however, the effects to visual resources in the area do affect short-term uses and long-term productivity for recreation uses.