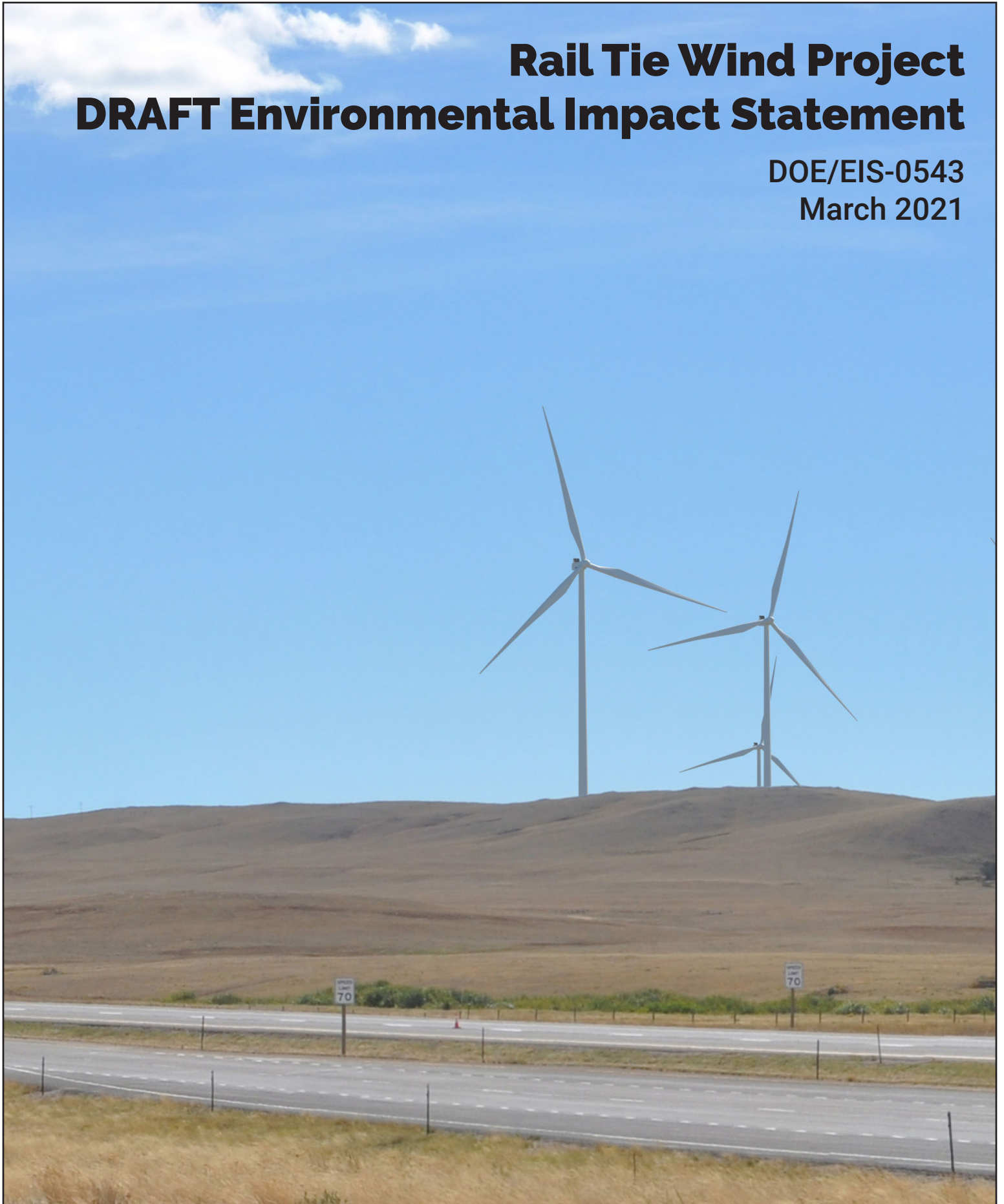


Rail Tie Wind Project DRAFT Environmental Impact Statement

DOE/EIS-0543
March 2021



Cover photograph adapted from the Visual Impact Assessment, Rail Tie Wind Project, Albany County, Wyoming (Tetra Tech 2020a). This photograph depicts the Rail Tie Wind Project Area as viewed toward the southeast from Tie Siding, Wyoming. Vestas V162-5.6 MW wind turbines have been simulated on the landscape as proposed by ConnectGen Albany County LLC. These turbines have a hub height of 410 feet, a blade diameter of 531 feet, and a total turbine height of 675 feet. The nearest turbine pictured is at a distance of approximately 1.25 miles.

Draft Environmental Impact Statement

Rail Tie Wind Project

DOE/EIS-0543

U.S. Department of Energy—Western Area Power Administration

ConnectGen Albany County, LLC

March 2021



**Western Area
Power Administration**

MISSION STATEMENT

Safely provide reliable, cost-based hydropower and transmission to our customers and the communities we serve.

RAIL TIE WIND PROJECT ENVIRONMENTAL IMPACT STATEMENT

Western Area Power Administration
12155 W. Alameda Parkway
Lakewood, Colorado 80228
DOE/EIS-0543
December 2020

Lead Agency: Western Area Power Administration

Type of Action: () Administrative Draft (X) Draft () Final

Cooperating Agencies:

U.S. Environmental Protection Agency Region 8	Wyoming State Historic Preservation Office
Wyoming Office of Governor Mark Gordan	Wyoming State Parks and Cultural Resources
Wyoming Department of Environmental Quality	Wyoming Office of State Lands and Investments
Wyoming Game and Fish Department	

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Abstract:

This draft environmental impact statement (EIS) analyzes the impacts related to the development of the Rail Tie Wind Project (Project), proposed by ConnectGen Albany County LLC (ConnectGen). The Project is a proposed utility-scale wind energy facility under development by ConnectGen. The Project would be located in southeastern Albany County, WY, and the Project Area would encompass approximately 26,000 acres of rangeland on private and Wyoming State Lands located near Tie Siding, WY. The Project would have a generating capacity of up to 504 megawatts (MW) of renewable wind energy.

ConnectGen has applied to interconnect the Project to the existing Ault-Craig 345-kilovolt (kV) transmission line that intersects the Project Area, under the Western Area Power Administration's (WAPA) Large Generator Interconnection Process (LGIP). The Ault-Craig 345-kV transmission line is jointly owned by WAPA, Tri-State Generation and Transmission Association, and Platte River Power Authority. In accordance with its Open Access Transmission Service Tariff (Tariff), WAPA's consideration to grant an interconnection request is a major Federal action subject to environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA) and the Department of Energy (DOE), and Council on Environmental Quality NEPA implementing regulations. Under these regulations, ConnectGen's Project is considered a connected action to WAPA's Federal decision of granting an interconnection to its transmission system.

This EIS describes the physical, biological, cultural, and socioeconomic resources in and around the Project. The EIS considers the impacts of WAPA's Federal action and ConnectGen's proposed Project, as well as the "no action" alternative.

EXECUTIVE SUMMARY

ES 1 Introduction

The Rail Tie Wind Project (Project) is a proposed utility-scale wind energy facility under development by ConnectGen Albany County LLC (ConnectGen). The Project would be located in southeastern Albany County, WY, and the Project Area would encompass approximately 26,000 acres of rangeland on private and Wyoming State Lands located near Tie Siding, WY. No federally managed lands are located within the Project Area (figure ES-1). The Project would have a generating capacity of up to 504 megawatts (MW) of renewable wind energy.

ConnectGen has applied to interconnect the Project to the existing Ault-Craig 345-kilovolt (kV) transmission line that intersects the Project Area, under the Western Area Power Administration's (WAPA) Large Generator Interconnection Process (LGIP). The Ault-Craig 345-kV transmission line is jointly owned by WAPA, Tri-State Generation and Transmission Association, and Platte River Power Authority. In accordance with its Open Access Transmission Service Tariff (Tariff), WAPA's consideration to grant an interconnection request is a Federal action subject to environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA) and the Department of Energy (DOE), and Council on Environmental Quality NEPA implementing regulations. Under these regulations, ConnectGen's Project is considered a connected action to WAPA's Federal decision of granting an interconnection to its transmission system.

ES 2 Western Area Power Administration's Purpose, Need, and Decision

ConnectGen has requested to interconnect its proposed Project to the Ault-Craig 345-kV transmission line via a new interconnection switchyard in the Project Area. WAPA's purpose and need is to consider and respond to the request for an interconnection agreement in accordance with its Tariff and the Federal Power Act, as amended.

Under the Tariff, WAPA offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff also contains terms for processing requests for the interconnection of generation facilities to WAPA's transmission system. The Tariff substantially conforms to Federal Energy Regulatory Commission (FERC) final orders that provide for nondiscriminatory transmission system access. WAPA originally filed its Tariff with FERC on December 31, 1997, pursuant to FERC Order Nos. 888 and 889. Responding to FERC Order No. 2003, WAPA submitted revisions regarding certain Tariff terms and included LGIP and a Large Generator Interconnection Agreement in January 2005. In response to FERC Order No. 2006, WAPA submitted additional term revisions and incorporated Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement in March 2007. In September 2009, WAPA submitted yet another set of revisions to address FERC Order No. 890 requirements along with revisions to existing terms.

In reviewing interconnection requests and making its decision, WAPA must ensure that existing reliability and service are not degraded. WAPA's LGIP provides for transmission and system studies to ensure that system reliability and service to existing power customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed Project and address whether the upgrades/additions are within the Project scope.

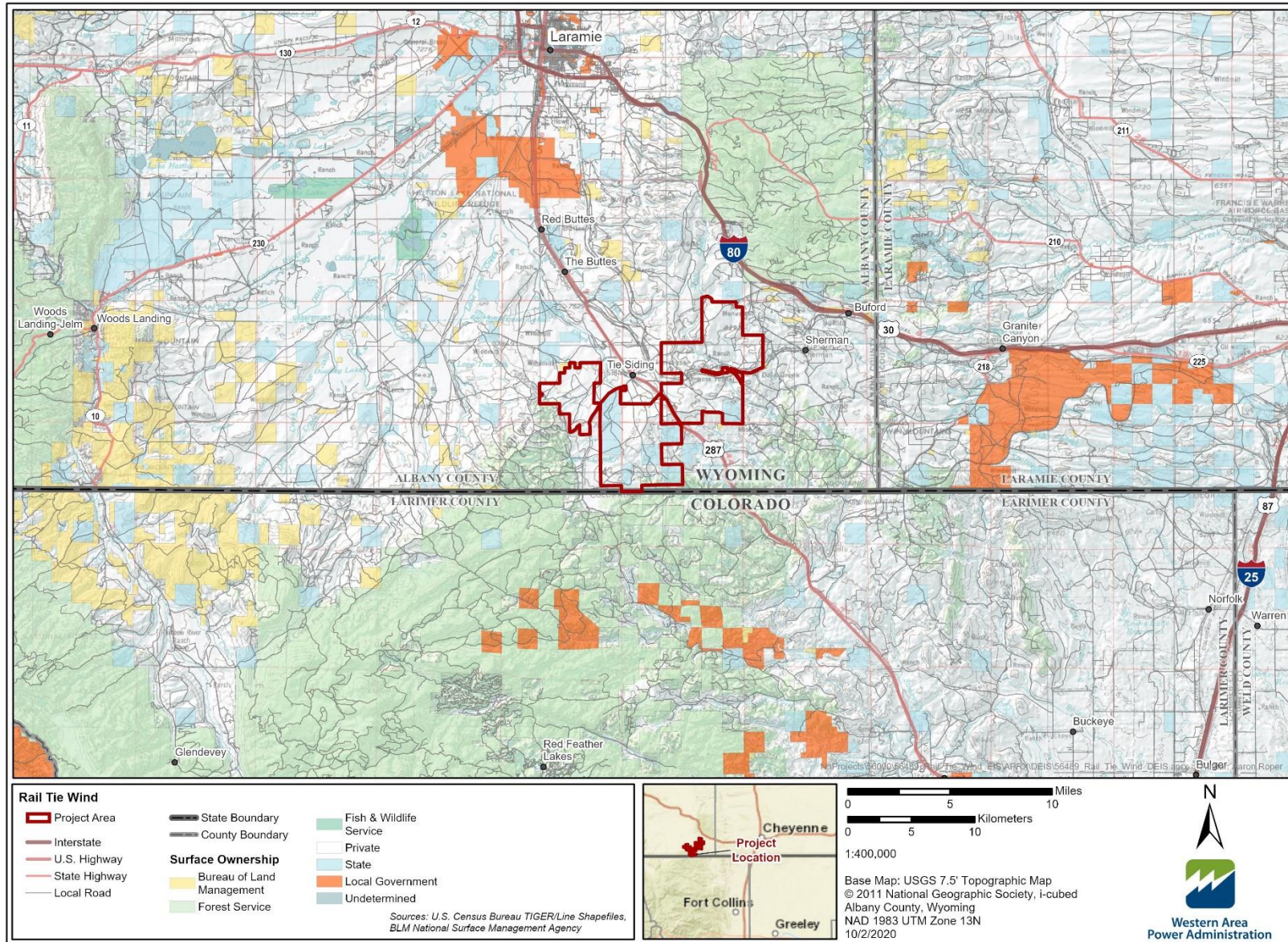


Figure ES-1. Project location.

ES 3 ConnectGen's Goals and Objectives

ConnectGen's goal is to obtain the interconnection agreement with WAPA in order to transmit the renewable energy generated by the Project to potential customers using WAPA's transmission system.

ConnectGen's objectives are to:

- (1) Develop, construct, and operate a commercial wind energy generation facility capable of generating up to 504 MW of wind energy.
- (2) Interconnect to WAPA's transmission system via a direct interconnection to the Ault-Craig 345-kV transmission line.
- (3) Locate the Project in close proximity to an existing transmission line in order to reduce impacts and costs associated with building new transmission.
- (4) Serve increasing market demand within the Western Interconnection, driven by state renewable portfolio standard (RPS) mandates and clean energy goals, the low cost of wind energy generation, and planned retirements of thermal generation facilities.
- (5) Create temporary and permanent jobs in Albany County and contribute to Albany County's tax base.
- (6) Support landowners through diversification of revenue streams.
- (7) Offset approximately 900,000 metric tons of carbon dioxide emissions annually compared to typical U.S. electric generation.
- (8) Provide emissions-free energy for the equivalent of approximately 180,000 households.

Thirty-seven states now have an RPS, or goal, for electricity produced by renewable energy sources, such as wind, solar, biomass, and geothermal sources. In addition to the demand driven by state RPS mandates and clean energy goals, there is increased demand from western load-serving entities because of the low cost of wind energy and planned retirements of thermal generation plants. The cost of generating electricity from wind continues to trend downward (DOE 2018), approaching costs competitive with existing conventional generation, even when considering unsubsidized prices (Lazard 2019). Many western utilities have announced ambitious plans to add large amounts of renewable energy to their portfolios in the coming years. These drivers of demand create a dynamic marketplace in which wind energy can be generated in one location and transmitted to another. Energy generation and transmission locations are influenced by market conditions and power purchase agreements between the wind energy developer and the utility or large-scale consumer purchasing the electricity. The Project is complementary to ConnectGen's renewable energy generation strategy and would contribute to the generation resource pool needed to meet future load and regional RPS requirements.

ES 4 Western Area Power Administration's Proposed Federal Action

The proposed Federal action being considered by WAPA in this environmental impact statement (EIS) is the interconnection request submitted by ConnectGen for the Project. FERC mandates require that interconnection requests be accommodated so long as capacity is available, operation of the power system would not be negatively affected, the applicant funds any necessary system upgrades, and existing power customers would not be impacted. WAPA can deny an interconnection request if any of these conditions are not met. If ConnectGen's interconnection request is approved, WAPA would construct, own, operate, and maintain an interconnection switchyard in the Project Area. These facilities are described below.

ES 4.1 Interconnection Switchyard

A 345-kV interconnection switchyard would be required to connect the Project to the existing Ault-Craig 345-kV transmission line. WAPA would coordinate with ConnectGen on the final design and construction of the interconnection switchyard based on the findings of WAPA's facilities study. A typical 345-kV interconnection switchyard encompasses a fenced area of up to 8 acres. A switchyard typically includes breakers and switches that protect and control the flow of power onto the power system, in addition to a small control building.

WAPA would require ConnectGen to fund and construct the switchyard as well as fund completion of other system upgrades necessary to handle the new generation. Upon completion of the switchyard, WAPA would own, operate, and maintain the switchyard as part of WAPA's transmission system.

ES 4.2 Transmission System Upgrades

Additional upgrades could be required to the WAPA transmission system, such as additional equipment installation at connecting substations. WAPA would require ConnectGen to fund completion of any other system upgrades necessary to handle the new generation. Upgrades would be installed by WAPA. Typical system upgrades would occur within the preexisting fenced substation yards without the need for expansion or new disturbance.

A System Impact Study was completed in May 2020 and concluded that the full 504-MW Project can be interconnected without any further system upgrades. WAPA is currently completing a Facilities Study to confirm if any upgrades will be required. The Facilities Study is anticipated in the second quarter of 2021. However, based on the findings of the System Impact Study, no system upgrades are anticipated.

ES 4.3 No Action Alternative

Under the No Action Alternative, WAPA would not approve the interconnection request, and ConnectGen's Project would not be allowed to connect to the existing WAPA transmission system. While this would not preclude the Project from being constructed and connected to a non-WAPA-managed transmission system, for the purposes of analysis, this EIS assumes that in that case, the Project would not be built.

ES 4.4 Proposed Federal Action Alternative Considerations

WAPA's Federal action to consider the interconnection request is limited to two distinct outcomes: either approval or denial of the interconnection request. Based on this limitation, no additional alternatives beyond the proposed Federal action and the No Action Alternative have been included in this EIS.

The proposed Federal action to consider ConnectGen's interconnection agreement is distinct from ConnectGen's proposal to construct a wind energy project. WAPA's proposed Federal action is limited to consideration of the interconnection request submitted by ConnectGen and the associated system upgrades that would be required, if approved. Although ConnectGen's Project is the impetus for the requested interconnection request and WAPA's need for Federal action, the Project is a connected action to WAPA's Federal action. WAPA is analyzing the potential environmental effects of ConnectGen's Project in this EIS to fully disclose the activities and associated impacts and to inform WAPA's Federal action (decision on the interconnection request). ConnectGen's decision to construct the Project, however, could proceed regardless of WAPA's involvement. In that situation, ConnectGen could seek other transmission opportunities. This scenario will not be analyzed in this EIS because, in that case, there would be no Federal nexus and no WAPA proposed Federal action to address under NEPA.

As is typical with development of energy generation projects, final selection of turbine models has not been made at this time in the planning and permitting process. ConnectGen is considering a range of turbine models for the Project and has provided representative layouts to its Project to illustrate the potential differences that might occur depending on the wind turbine generator model selected. ConnectGen will review a range of factors in selecting a turbine, such as anticipated technology advancements, costs, and availability from manufacturers for delivery if the interconnection request is approved. Final selection of the turbine model (and subsequent layout) would occur after the NEPA process is concluded and prior to construction.

The representative layouts are not NEPA alternatives for the Project, as they do not constitute alternatives to WAPA's proposed Federal action. The EIS analysis process will consider the representative layouts provided by comparing the impact indicators of each layout, or by disclosing the layout with the highest level of impact. Opportunities to lessen those impacts, regardless of layout, will be identified through design features or practices and will result in providing WAPA the required impact disclosure to make an informed and defensible decision on the interconnection request.

ES 5 ConnectGen's Rail Tie Wind Project

ConnectGen's Project is considered a connected action to the interconnection request. If the interconnection request is approved by WAPA, then ConnectGen would build the Project as described in Chapter 2. Therefore, the analysis contained herein considers both WAPA's proposed Federal action and ConnectGen's Project when disclosing potential impacts. Potential WAPA resource impacts would be limited to the approximately 8-acre interconnection switchyard and its associated interconnection facilities.

ES 6 Affected Environment and Environmental Consequences

Following is a summary of information found in Chapter 3, which contains the analysis of potential impacts that would occur from the Project.

ES 6.1 Aesthetics and Visual Resources

The term aesthetic and visual resources (visual resources) refers to the composite of basic terrain, geologic, and hydrologic features, vegetative patterns, and built features that influence the visual appeal of a landscape. The analysis area for visual resources is defined as the area of visibility up to 30 miles from the Project Area.

To investigate the potential visual impacts of the Project, a viewshed analysis was conducted to determine the extent to which the Project (wind turbines) would potentially be visible within the 30-mile analysis area. Within the 30-mile analysis area, three distance zones were established: foreground (0–5 miles), middle ground (5–15 miles), and background (15–30 miles). The analysis identified where Project components would be visible if there were no vegetation or structures to screen a viewer from Project components. This analysis, based on "bare earth" visibility, reflected the conservative scenario in determining sensitive viewing locations and potential visual impacts.

There would be approximately 138,930 acres of change to Class A, B, and C areas (approximately 6 percent of the analysis area) within the Project Area and visible areas of the foreground of the Project within the analysis area. There would be 215,920 acres of change to Class A, B, and C areas (approximately 9 percent of the analysis area) within visible areas of the middle ground of the Project within the analysis area.

Although the Project components would be visible in the background areas of the Project within the analysis area, the inherent scenic quality for areas within the background (approximately 439,172 acres or 18 percent of the analysis area) would have weak to no degrees of visual change (i.e., contrast perceived by viewers and magnitude of change to landscape character/scenic quality) because of distance and the ability to perceive the Project in relation to other existing visual elements within the landscape.

The improvements to existing access roads and the construction of new access roads within the Project Area where current public uses occur could create opportunities for people to access previously inaccessible areas. This could result in trampling vegetation and additional resource damage (such as increased erosion), which could affect scenic quality in these areas. New access roads within the Project Area would not be open for public uses. There would be weak to strong degrees of visual change for the existing scenic quality and landscape character resulting from operations and maintenance (O&M) activities.

The degrees of visual change for maximum turbine height would be moderate to strong from 76 percent of identified key observation points (KOPs) as compared to 54 percent associated with the minimum turbine height. The landscape would appear substantially to severely altered; Project components would introduce form, line, color, texture, or scale uncommon in the landscape and would be visually prominent to dominant in the landscape; Project components would attract or demand attention; and Project components would begin to dominate or dominate the visual setting. The degree of visual change for travelers, tourists, and residents ranged from none to strong, depending on distance from the Project and the observation point. The reduced activation time as well as the short-duration, synchronized flashing of the Aircraft Detection Lighting System (ADLS) would have substantially fewer significant visual effects (duration) at night than the standard continuous, or synchronized flashing, medium-intensity red strobe Federal Aviation Administration warning system, which would reduce the potential degrees of visual change of nighttime lighting depending on viewer location and proximity. One location was identified within the analysis area where there would be a maximum predicted shadow flicker of 25 hours and 6 minutes per year. This represents approximately 0.6 percent of the potential available daylight hours and is not considered significant. Based on the overall analysis of these issues, the introduction of wind turbines and associated infrastructure would result in significant impacts as compared to the characteristic landscape.

ES 6.2 Air Quality and Climate Change

For air quality, the analysis area contains portions of five counties: Albany and Laramie Counties in Wyoming, and Jackson, Larimer, and Weld Counties in Colorado. Air pollutants tend to disperse into the atmosphere, becoming more spread out as they travel away from a source of pollution, and, therefore, cannot be confined within defined boundaries such as the boundary of the Project Area or county lines. Because of the nature of air pollutants, the air quality analysis area extends approximately 31 miles (50 kilometers) in all directions beyond the Project Area. A 31-mile radius was chosen to be consistent with minimum air quality analysis required for major source air quality permitting.

Construction would impact air quality because construction equipment, earthmoving, and travel on paved and unpaved roads would emit quantities of criteria pollutants and fugitive dust. Air quality impacts because of Project construction, including fugitive dust emissions from the two portable concrete batch plants, would be temporary, ceasing when construction of the Project is complete. The concrete batch plants would require air permits from the state air permitting agency (WDEQ). The air permit would provide enforceable limits and potential air pollution mitigation measures to reduce air emissions impacts from the operation of the batch plants. The total pollutants emitted from Project construction would be a negligible portion of each county's total projected annual emissions. Estimated Project construction emissions would be well below the General Conformity de minimis thresholds and would not exceed Federal or State ambient air quality standards. Project operations would impact air quality because of O&M activities that would generate air pollutant emissions from equipment and vehicle exhaust and fugitive dust from soil disturbance and travel on unpaved roads. Estimated emissions from O&M

activities are significantly lower than construction emissions. Project O&M activity emissions of nonattainment pollutants are well below the General Conformity de minimis thresholds, and Project operations would not exceed Federal or State ambient air quality standards. The Project would generate energy from a renewable resource and would result in significantly fewer emissions than if the same amount of energy were generated by fossil fuels. Based on the analyses of these issues, no significant impacts to air quality would be anticipated.

ES 6.3 Aquatic and Terrestrial Wildlife and Special Status Species

Several factors influence the geographical occurrence and abundance of wildlife species, including vegetation, environmental conditions, population connectivity, and habitat quality. Therefore, the analysis area for potential effects on aquatic and terrestrial wildlife resources and special-status species varies depending on the resource type and what Project-related effects are assessed.

The Project would slightly decrease available habitat for big game species. Ground disturbance would remove vegetation used by big game as forage and the noise associated with construction and O&M activities would temporarily deter big game from using available habitat. Three herd management units (HMUs) completely overlap the Project Area, which amounts to approximately 2.4 percent of the total acreage of the three HMUs. Considering the percentage of impact relative to available habitat, big game individuals could be impacted by Project construction and operations, but impacts are not anticipated at the population or community levels. Impacts from noise and activities associated with construction and operations would cease when the activity was over, and impacts associated with ground disturbance would end when the disturbance was reclaimed as part of Project decommissioning. Increased vehicle and equipment traffic on new and existing access roads would increase the risk of vehicle collisions. These impacts would be reduced with the completion of construction activities, but would remain, at a lower level, for the duration of Project O&M. Throughout the life of the Project, most wildlife would be able to effectively cross Project roads during times of inactivity; vehicle mortalities are not anticipated to affect communities or populations of a species.

Construction across or near stream channels or other waterbodies that increases turbidity, sedimentation, or salinity and provide for potential spread of aquatic invasive species would degrade aquatic habitat. These effects would dissipate shortly after construction activities cease and sediment settles and are not anticipated to affect downstream aquatic species habitat or aquatic species populations or communities. It is conservatively anticipated that the volume of water required for construction of the Project would not exceed 200 acre-feet over the course of an 18-month construction period and could be acquired by entering into temporary water use agreements with landowners with existing water sources. Water also could be acquired by drilling temporary water wells that are not hydrologically connected to the Platte River so that no new depletions to the Platte River occur during construction. This volume and sources are not anticipated to have tangible effects on fish communities or populations. No new water depletions are expected for Project O&M and, therefore, no effects on aquatic resources are anticipated from water withdrawals during that time.

Project construction and operations activities and vehicle traffic during construction and operations would disturb habitat for small game and nongame species and increase predation on these species from the introduction of new perching opportunities for avian predators until the disturbance was reclaimed as part of Project decommissioning and are not expected to effect populations or communities of a species. For one special-status species, the Preble's meadow jumping mouse (*Zapus hudsonius preblei*), the U.S. Fish and Wildlife Service's Area of Influence overlaps a portion of the Project Area. There is moderate and moderately high suitable habitat present in that portion of the Project Area, but the species is not known to occur in the Project Area. The identified moderate and moderately high suitable habitat would be avoided to the extent practicable during Project construction. Based on the analysis of these issues, no significant impacts would be anticipated to terrestrial and aquatic wildlife and special-status species.

ES 6.4 Avian and Bat Species

Several factors influence the potential for avian and bat species to occur and persist in a given area, including the availability of suitable habitat, prey and forage, and nesting or roosting substrate, and the level of disturbance present. Therefore, the analysis areas for potential effects on avian and bat wildlife resources vary by resource type and the Project-related effects being assessed.

Ground-disturbing construction and operations activities would impact avian and bat habitat through the removal of vegetation used for nesting, foraging, and brood-rearing for birds. Construction disturbance and operations infrastructure would impact 1,471.3 acres of habitat (5.6 percent of the Project Area) until those areas were reclaimed following construction and again during decommissioning. Anticipated bird fatalities from collisions with vehicles and meteorological towers, and electrocution from aboveground collector lines, would be negligible, and there would be no expected population or community-level effects. The Project would develop and implement a Bird and Bat Conservation Strategy (BBCS) to avoid and reduce potential impacts that may result from Project operations; therefore, collision and electrocution effects are not anticipated to impact communities or populations and would end with decommissioning.

Project construction and, to a lesser extent, O&M activities in the siting corridors, would disturb prey habitat and individual prey animals until construction activities cease or until disturbed areas are reclaimed during decommissioning and are not anticipated to impact individual raptors or raptor communities or populations. Construction activities would remove vegetation with the potential to serve as substrate for nesting avian species in the siting corridors until disturbed areas were reclaimed. Although some birds would be displaced from nesting in the siting corridors, it is anticipated that they would use suitable habitat outside the siting corridors during construction disturbance.

Noise and increased human presence from construction and O&M activities, equipment, and personnel would affect some individual birds' nesting success because of nest abandonment, direct mortality, reduced fitness and survivorship, and disturbance of nesting vegetation. Effects would decrease with the end of construction activities and cease with reclamation during decommissioning. The Project would develop and implement eagle conservation practices to minimize the unintentional take of eagles, including setting wind turbines back at least 1 mile from known eagle nests. A BBCS would be developed and implemented to avoid and reduce potential impacts to avian and bat species. Avian and bat species of concern would be impacted by habitat loss and fragmentation, increased activity, and vehicular traffic in the same ways described for avian and bat species more generally; while individuals may be at risk, populations are not anticipated to be affected.

The risk of bird and bat mortality from turbine blade collision would be slightly increased for the Siemens Gamesa 6.0 MW turbines because they would have more total wind-swept area compared to the Vestas 5.6 MW turbines and GE 3.0 MW turbines. The relationship between turbine height and bird and bat mortality risk is unclear for the range of turbines being considered. Project construction and O&M would disturb roost sites and hibernacula for bats if present in the siting corridors in rocky outcrops (0.48 percent of the siting corridors) or forested habitat (0.82 percent of the siting corridors); however, bats could avoid these areas during construction and O&M activities and return when construction activities ceased and reclamation was completed during decommissioning. Based on the analysis of these issues, impacts are expected to individual birds and bats, but populations are not expected to be affected, and the impacts would not be significant.

ES 6.5 Cultural Resources and Native American Concerns

Cultural resources are locations that contain the physical evidence of past human behavior that allow for its interpretation, including prehistoric or historic sites, buildings, structures, objects, or districts, and any associated artifacts, records, and material remains (Advisory Council on Historic Preservation [ACHP]

2009). Such resources are identifiable through field survey, historic documentation, or other sources such as oral history. Significant cultural resources are those listed in or eligible for inclusion in the National Register of Historic Places [NRHP], generally are referred to as historic properties (36 Code of Federal Regulations [CFR] 800.16(1)(1)). For clarification purposes, such resources are hereafter referred to as NRHP-eligible cultural resources. Resources of traditional religious and cultural significance to Native American tribes could be deemed eligible for listing on the National Register (ACHP 2009). Additionally, Native American tribes, ethnic or religious groups, organizations, communities, or the public could consider specific cultural resources to be of cultural, historic, or religious importance, regardless of their NRHP eligibility. National Historic Landmarks (NHLs) are cultural resources recognized to possess exceptional value commemorating or illustrating the history of the United States. The law and regulations require that agencies, “to the maximum extent possible, undertake such planning and actions as could be necessary to minimize harm to such landmark.”

The cultural resources analysis area is the area of potential effects (APE) for the Project, as defined by WAPA (per 36 CFR 800.16(1)(1)). The APE is the area within which NRHP-eligible cultural resources could sustain loss of integrity (as defined in 36 CFR 60.4) by alteration or destruction caused by the Project. The APE includes

- horizontally, the Project footprint, which entails the physical footprint of Project facilities within an approximately 26,000-acre area where Project facilities could be built;
- vertically, a maximum depth of 15 feet for the construction of the wind turbine foundations and a maximum height of 675 feet for construction of wind turbines; and
- a 10-mile zone from the Project Area boundary within which NRHP-eligible cultural resources where “setting” and/or “feeling” are determined critical to the resource’s NRHP eligibility.

The Project would not physically impact known NRHP-eligible cultural resources or known resources of potential traditional or religious cultural importance to Native Americans, as avoidance of these significant resources, as well as other cultural resources, where possible, is planned. If not avoidable, the programmatic agreement (PA) would further address the minimization and mitigation of physical impacts and adverse effects. The Project would result in nonphysical impacts to known NRHP-eligible cultural resources where setting and/or feeling are important characteristics contributing to the site’s NRHP eligibility, and possibly to resources of potential tribal importance, should these be identified in the extent of the Project viewshed within the 10-mile zone of the APE during the consultation process, or newly identified during Class III survey for the Project. Implementation of measures specified under the PA, including a Historic Properties Treatment Plan, would resolve all adverse effects under the NHPA, satisfying the mitigation of physical and nonphysical impacts under NEPA.

ES 6.6 Geology, Soil, and Mineral Resources

For the purposes of evaluating impacts to geology and soils, the Project Area is the analysis area for geology. The analysis area for soils is the Project Area without a buffer.

The Project would not restrict access for mineral development as the likelihood of development is low and access would still be available for much of the Project Area. The Project is in areas with soils appropriate for construction and the Project would be designed and constructed so as not to increase the likelihood of geologic hazards or soil erosion. The impacts to unique or productive soils would be limited—approximately 164 acres of the prime farmland or farmland of statewide important soils would be permanently converted by the Project, which equates to approximately 2.5 percent of these soil types present within the siting corridor. Based on the analyses of these issues, no significant impacts would be anticipated to these resources.

ES 6.7 Land Use

The Project Area was selected as the analysis area for land use to capture the extent to which potential impacts from the Project could occur. County-level (Albany County) agricultural resource information was used to characterize agricultural resources within the Project Area.

The Project would not conflict with existing, applicable zoning designations, land use plans, regulations, or conservation plans. Existing land uses would be preserved to the extent possible. Land uses would be reestablished during decommissioning of the Project. The 0.3 acre of prime farmland and 1.7 acres of farmland of statewide importance (if irrigated) that would be converted to Project disturbance during O&M would be reclaimed as part of Project decommissioning. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

ES 6.8 Paleontological Resources

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under Federal and State laws, ordinances, and regulations. Paleontological resources include the rocks in which fossils are preserved because the geologic character of the rock record preserves the ecological, geographic, and evolutionary context of past life represented by fossils themselves. Paleontological resources are objects that are worthy of preservation for the inspiration and interpretive opportunities they offer. Once damaged, destroyed, or improperly collected, fossils lose their scientific and educational value. Scientific importance could be attributed to the actual fossil specimen, to fossil context (e.g., location in time and space or intimate association with other evidence of scientific importance), or to fossil preservation.

The analysis area for paleontological resources includes the Project siting corridors and a 0.5-mile buffer. Because paleontological resources could be encountered throughout a geologic unit, the analysis extends to geologic units that could be impacted by Project activities, whether at the surface or in the subsurface.

Impacts to paleontological resources would result from the discovery of fossils during construction activities or because of increased erosion during Project operations. The Project includes appropriate measures for minimizing negative impacts to paleontological resources. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

ES 6.9 Public Health and Safety

Several aspects of public health and safety were evaluated, including accidents and injuries, fires, emergency services, criminal activities, noise and vibration, and electromagnetic field (EMF) and corona. The analysis area for potential effects on public health and safety varies by the aspect of public health and safety being assessed.

The Project would not result in risks to public health and safety. Potential risks to worker health and safety would be unavoidable; however, these risks would be minimized to the extent possible, and injury rates associated with the Project are not expected to exceed national occupational injury and illness rates. Fire risks and the potential for illegal or criminal activities associated with the Project would be minimized and would not increase the risk of public or worker exposure to health or safety risks. The Project would not exceed the capacities or materials or existing emergency responders that service the Project Area, nor would Project activities result in traffic delays that would lead to degradation of emergency response times. The Project would not increase the public's exposure to EMFs or corona sources, and workers would not be exposed to Project-related EMFs or corona sources. Based on the analyses of these issues, no significant impacts would be anticipated related to public or worker health and safety.

Construction of the Project would directly and unavoidably impact noise levels at sensitive receptors, but the impacts would be short term, ceasing with the end of construction. Because construction noise is exempt from the Albany County Wind Energy Siting Regulations, construction of the Project would not violate any allowable noise levels established by Federal, State, or local laws, regulations, or guidelines. Vibration from activities associated with Project construction would not be noticeable at the nearest noise sensitive area. If any blasting is required during Project construction, it would be limited to the hours between sunrise and sunset and comply with State and local blasting regulations, including the use of properly licensed personnel and obtaining necessary permits and authorizations. Acoustic modeling demonstrated that noise generated by Project operations would not exceed 55 A-weighted decibels (dBA) at any sensitive receptors. The acoustic modeling of the worst-case scenario indicated a possibility that there would be some locations of common property lines between nonparticipating private property and a participating property where the sound level might reach slightly above 55 dBA; however, it is highly unlikely that the actual noise levels at these locations would be as high as the worst-case scenario modeled. If the worst-case scenario occurs and if written landowner permission cannot be obtained at the locations where the sound level slightly exceeds 55 dBA, micrositing of turbines could be necessary to comply with the Albany County Wind Energy Siting Regulations. Based on the analyses of these issues, no significant noise impacts are anticipated.

ES 6.10 Recreation Resources

The analysis area for overall recreation resources and opportunities is the Project Area plus a 50-mile buffer around the Project Area to capture the extent of recreation resources that would most likely be used by Project workers.

The Project could temporarily restrict or close portions of recreation areas in the Project Area; however, the use of recreation areas would not be entirely precluded. Noise during Project construction, O&M, and decommissioning would be unavoidable and could lead to the startle of big or small game. During construction and decommissioning, the frequency of noise from blasting and heavy equipment and the presence of workers could lead big and small game to avoid the area. As a result, hunting opportunities within the Project Area would be temporarily degraded. Once construction and decommissioning activities are complete, it is anticipated that big and small game would return to the area. Increased demands on recreation resources from Project workers would not exceed the capacities or availability of existing recreation resources. Based on the analyses of these issues, no significant impacts would be anticipated to recreation resources.

ES 6.11 Social and Economic Resources (including Environmental Justice)

The analysis area for the social and economic resources assessment is Albany County, WY, and Larimer County, CO.

The temporary population increase during construction is estimated to be approximately 1 percent of the current population of Albany County, and it would not result in a demand for housing or public services that could not be met by existing housing and capacity of public services. Construction and operations of the Project would provide increases in State and local tax revenues. The Project could contribute to changes in residential property values for nearby homes; however, studies of the effects of wind facilities on residential property values have shown that residential property values could increase or decrease, are not statistically significantly related to the announcement or presence of wind facilities, and are influenced by multiple other factors. Analysis of U.S. Census data do not indicate that there are high minority or high low-income populations in the immediate vicinity of the Project. Based on the analysis of these issues, no significant adverse socioeconomic impacts are anticipated from the Project, including impacts to environmental justice populations.

ES 6.12 Transportation and Access

Several aspects of transportation and access were evaluated, including roadway traffic volumes and conditions (including access), railroad capacity, traffic patterns, and aviation and radar-dependent transportation operations. The analysis areas for potential effects on transportation and access varies by the aspect of transportation and access being assessed.

The Project would contribute to changes in traffic volumes on roadways; however, there would be no degradation to the level of service (LOS) for routes used for Project activities. The Project would increase traffic volumes at primary intersections and would result in degradation of LOS at two intersections from A to B during construction and decommissioning. These degradations of LOS would be limited to construction and decommissioning periods and would be expected to return to baseline conditions following completion of these Project phases. In addition, LOS B would not restrict flows or result in declines in convenience at levels noticeable to drivers and would not exceed an LOS threshold that warrants mitigation. The Project would minimize the extent and duration of access restrictions and changes to traffic patterns. The Project would not exceed the capacity of existing railroads and would not disrupt existing and ongoing rail operations. The Project would not conflict with airport use or planning areas or airspace. Based on this analysis, no significant impacts to transportation and access are anticipated.

ES 6.13 Vegetation

The analysis area for vegetation resources, excluding noxious weeds, is the siting corridors. This analysis area captures areas of potential new ground disturbance (i.e., access roads, turbine pads, laydown yards) that would affect native vegetation communities if converted to Project-related features, as well as captures overarching changes to the landscape from Project construction and operations.

The analysis area for noxious weeds is the Project Area. This analysis area is appropriate as it considers secondary effects to vegetation communities from the potential spread of existing and new noxious weeds during vegetation removal activities associated with the Project.

Construction activities would remove vegetation and disturb soils, increasing the potential for noxious and invasive plant species to spread and/or become established. Measures to monitor (VEG-6) and treat (VEG-7) noxious and invasive species would minimize this risk. Following construction, 88 percent of disturbed vegetation would be reclaimed, and an additional 11 percent of disturbed vegetation would be reclaimed during decommissioning. Reclamation is expected to be successful in restoring native vegetation cover based on the primary vegetation types in the analysis area and through the implementation of best practices such as the Reclamation Plan, Weed Management Plan, and other relevant Environmental Protection Measures (EPMs). Fugitive dust from vehicles would affect plants growing in localized areas along access roads, and effects would diminish with the end of construction, occurring only occasionally during O&M. Based on this analysis, no significant impacts would be anticipated for vegetation.

ES 6.14 Wetland and Water Resources

The analysis area for wetland and water resources includes the siting corridors plus a 300-foot buffer around surface waterbodies (including wetlands) and areas where groundwater is shallow enough to be reached by the depth of disturbance. Potential Project impacts are not anticipated to affect impaired reaches downstream because of limited and localized Project disturbance, and therefore the analysis area does not include impacts to downstream resources outside of the analysis area other than potential depletions to the Platte River system.

Previous field investigations described in the Surface Waters Assessment Report for the Hermosa West Wind Farm Project noted that that Project was not expected to contribute marked changes in sediment load (Environmental Resources Management Southwest, Inc. [ERM] 2010b). The Project would not reduce water availability because Project activities would not connect groundwater aquifers and aquifers in the area have a high recharge rate. Construction would disturb approximately 9.9 acres of wetlands during construction and 0.8 acre of wetlands during operations. The Project will include 109 stream crossings for a total of 6,653.6 linear feet. Of these stream crossings, seven would be perennial and 102 would be ephemeral or intermittent. Several of the ephemeral waterbodies within the siting corridors could be considered non- waters of the U.S. (WOTUS) by the Army Corps of Engineers (ACE), and jurisdictional status would need to be determined. If WOTUS could be impacted, ConnectGen would complete a formal WOTUS delineation prior to construction and would use these results to further microsite the Project to avoid or minimize potential impacts to jurisdictional WOTUS, to the extent practicable, and support final Clean Water Act Section 404 and Executive Order 11990 permitting requirements (WQ-5). ConnectGen has committed to minimizing and mitigating potential impacts to wetlands and WOTUS through use of EPMS and would comply with Section 404 permitting for any potential impacts to wetlands and/or WOTUS. ConnectGen has committed to spill containment and hazardous materials storage and use measures to minimize potential impacts to surface water and wetlands. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

ES 6.15 Wildland Fire

The following analysis areas have been identified to evaluate the extent to which potential impacts from the Project could occur on wildland fire resources and conditions:

- Fire history: This analysis area includes the Project Area plus a 20-mile buffer. This extent demonstrates the variation in fire frequency and fire size on adjacent lands relative to fire occurrence in the Project Area.
- Fuels and fire behavior: This analysis area includes the Project Area.

Construction and operation of the Project would increase the potential risk of wildfire ignitions. The Project would comply with Wyoming electrical safety codes and standards, including the National Electric Code, and would implement setbacks and other measures that would mitigate this risk. Should a fire occur in the Project Area, local fire departments would respond. The incidence of turbine-ignited fires is rare, and wildfire ignitions in the Project Area are infrequent. A Supervisory Control and Data Acquisition system would detect any fire impacting infrastructure and shut down affected systems. Local fire departments would respond to fires in the Project Area to prevent fire from spreading and extinguish them. Based on this analysis, no significant impacts to wildland fire are anticipated.

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ACRONYMS AND ABBREVIATIONS

AADT	annual average daily traffic
ACE	Army Corps of Engineers
ACFD	Albany County Fire District
ACHP	Advisory Council on Historic Preservation
ALDS	Aircraft Detection Lighting System
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BCR	Bird Conservation Regions
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BLS	U.S. Bureau of Labor Statistics
BMPs	best management practices
B.P.	radiocarbon years before present
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
ConnectGen	ConnectGen Albany County LLC
CPR	cardiopulmonary resuscitation
CPW	Colorado Parks and Wildlife
CR	county roadway
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibels
DOE	Department of Energy
DNA	deoxyribonucleic acid
EIS	environmental impact statement
EITP	Eagle Incidental Take Permit
EMF	electric and magnetic field
EMT	emergency medical technician
EO	Executive order
EPA	Environmental Protection Agency

EPMs	Environmental Protection Measures
ERM	Environmental Resources Management Southwest, Inc.
ESA	Endangered Species Act of 1973
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FS	Forest Service
FSA	Farm Service Agency
FWS	Fish and Wildlife Service
GE	General Electric Company
gen-tie line	generation-tie line
GHG	greenhouse gas
GIS	geographic information system
HAP	hazardous air pollutants
HMA	hunter management area
HMU	herd management unit
HPVIA	Historic Properties Visual Impact Assessment
HSSE Plan	Health, Safety, Security, and Environment Plan
HUC	hydrologic unit code
ISC	Industrial Siting Council
KOP	key observation point
kV	kilovolts
LGIP	Large Generator Interconnection Process
LOS	level of service
LU	land use
m	meter
Ma	million years old
met tower	meteorological tower
mph	miles per hour
MW	megawatts
NAAQS	National Ambient Air Quality
NASS	National Agricultural Statistic Service
NEPA	National Environmental Policy Act

NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Database
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NWR	National Wildlife Refuge
O&M	operations and maintenance
OAHP	Colorado SHPO's Office of Archaeology and Historic Preservation
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PA	programmatic agreement
PCA	Priority Conservation Area
PFYC	Potential Fossil Yield Classification
PGA	Priority Growth Areas
PHV	peak hour volume
PPE	personal protective equipment
Project	Rail Tie Wind Project
RFFA	reasonably foreseeable future action
ROW	right-of-way
RPS	renewable portfolio standard
RSZ	rotor-swept zone
RV	recreational vehicle
SCADA	Supervisory Control and Data Acquisition
SEO	State Engineer's Office
SGCN	Species of Greatest Conservation Need
SGIA	Small Generator Interconnection Agreement
SHPO	State Historic Preservation Office
SOC	Species of Concern (as designated by Wyoming Ecological Services Field Office)
SPCC Plan	Spill Prevention, Control, and Countermeasures Plan
SWAP	State Wildlife Action Plan

SWPPP	Stormwater Pollution Prevention Plan
Tariff	Open Access Transmission Service Tariff
TCP	Traditional Cultural Properties or Places
TNC	The Nature Conservancy
tpy	tons per year
UPRR	Union Pacific Railroad
U.S.	United States
U.S. 287	U.S. Highway 287
USGS	U.S. Geological Survey
VCR	visual contrast rating
VOC	volatile organic compound
WAPA	Western Area Power Administration
WDEQ	Wyoming Department of Environmental Quality
WEG	Fish and Wildlife Service's <i>Land-Based Wind Energy Guidelines</i>
WIA	walk-in area
WHMA	Wildlife Habitat Management Area
WOGCC	Wyoming Oil and Gas Conservation Commission
WOTUS	waters of the U.S.
WSGALT	Wyoming Stock Growers Land Trust
WSGS	Wyoming State Geological Survey
WTG	wind turbine generator
WQD	Water Quality Division
WYCRO	Wyoming State Historic Preservation Office Cultural Records Office
WYDEQ	Wyoming Department of Environmental Quality
WYDOT	Wyoming Department of Transportation
WYESFO	Wyoming Ecological Services Field Office
WYGFD	Wyoming Game and Fish Department
WYPDES	Wyoming Pollutant Discharge Elimination System
Y.A.	calendar years ago

CHAPTER 1. INTRODUCTION

The Rail Tie Wind Project (Project) is a proposed utility-scale wind energy facility under development by ConnectGen Albany County LLC (ConnectGen). The Project would be located in southeastern Albany County, WY, and the Project Area would encompass approximately 26,000 acres of rangeland on private and Wyoming State Lands located near Tie Siding, WY. No federally managed lands are located within the Project Area (figure 1-1). The Project would have a generating capacity of up to 504 megawatts (MW) of renewable wind energy.

ConnectGen has applied to interconnect the Project to the existing Ault-Craig 345-kilovolt (kV) transmission line that intersects the Project Area, under the Western Area Power Administration's (WAPA) Large Generator Interconnection Process (LGIP). The Ault-Craig 345-kV transmission line is jointly owned by WAPA, Tri-State Generation and Transmission Association, and Platte River Power Authority. In accordance with its Open Access Transmission Service Tariff (Tariff), WAPA's consideration to grant an interconnection request is a Federal action subject to environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA) and the Department of Energy (DOE), and Council on Environmental Quality (CEQ) NEPA implementing regulations. Under these regulations, ConnectGen's Project is considered a connected action to WAPA's Federal decision of granting an interconnection to its transmission system.

1.1 Western Area Power Administration's Purpose, Need, and Decision

ConnectGen has requested to interconnect its proposed Project to the Ault-Craig 345-kV transmission line via a new interconnection switchyard in the Project Area. WAPA's purpose and need is to consider and respond to the request for an interconnection agreement in accordance with its Tariff and the Federal Power Act, as amended.

Under the Tariff, WAPA offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff also contains terms for processing requests for the interconnection of generation facilities to WAPA's transmission system. The Tariff substantially conforms to Federal Energy Regulatory Commission (FERC) final orders that provide for nondiscriminatory transmission system access. WAPA originally filed its Tariff with FERC on December 31, 1997, pursuant to FERC Order Nos. 888 and 889. Responding to FERC Order No. 2003, WAPA submitted revisions regarding certain Tariff terms and included LGIP and a Large Generator Interconnection Agreement in January 2005. In response to FERC Order No. 2006, WAPA submitted additional term revisions and incorporated Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement in March 2007. In September 2009, WAPA submitted yet another set of revisions to address FERC Order No. 890 requirements along with revisions to existing terms.

In reviewing interconnection requests and making its decision, WAPA must ensure that existing reliability and service are not degraded. WAPA's LGIP provides for transmission and system studies to ensure that system reliability and service to existing power customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the Project and address whether the upgrades/additions are within the Project scope.

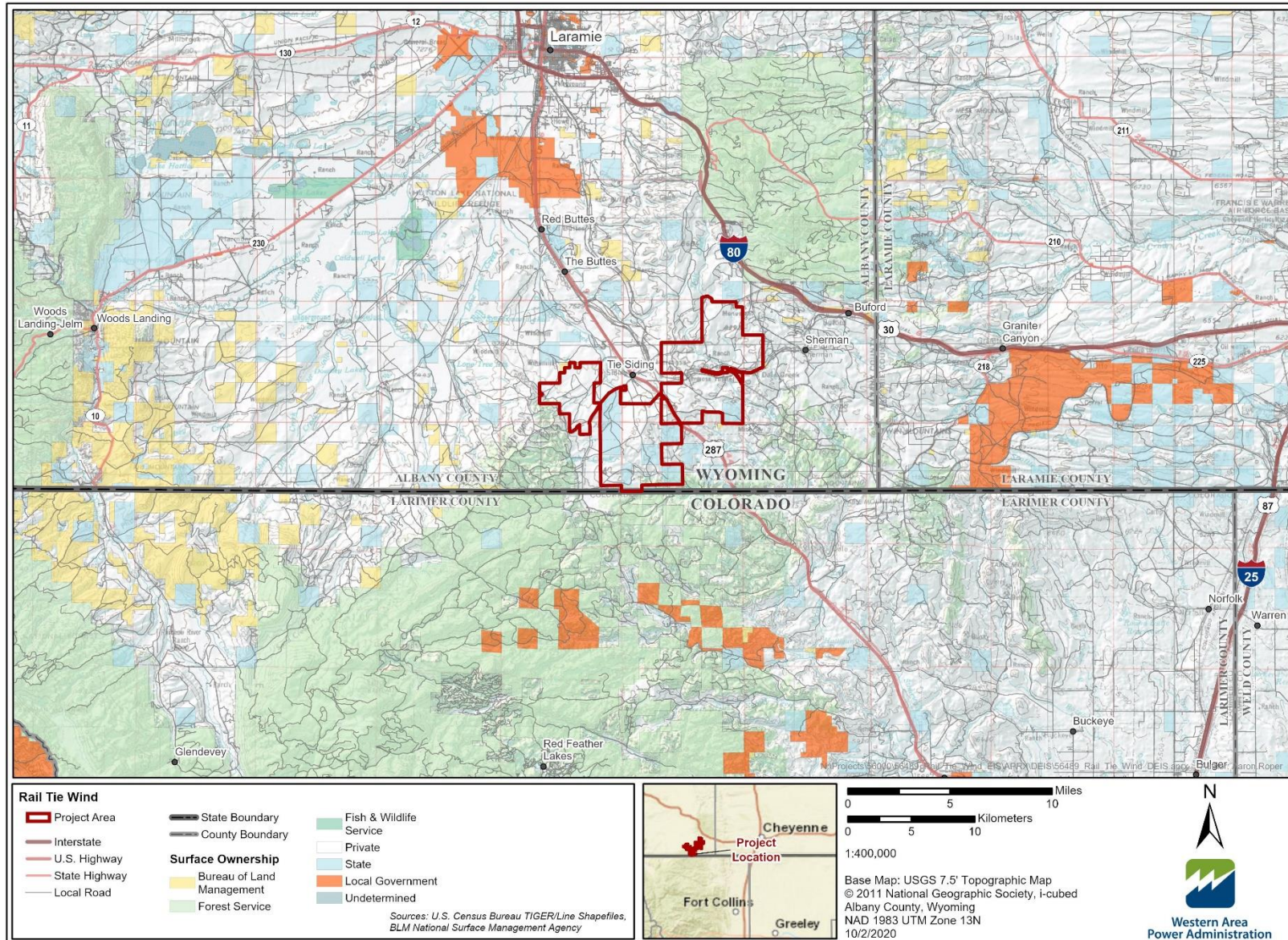


Figure 1-1. Project location.

1.2 ConnectGen's Goals and Objectives

ConnectGen's goal is to obtain the interconnection agreement with WAPA in order to transmit the renewable energy generated by the Project to potential customers using WAPA's transmission system. ConnectGen's objectives are to:

1. Develop, construct, and operate a commercial wind energy generation facility capable of generating up to 504 MW of wind energy.
2. Interconnect to WAPA's transmission system via a direct interconnection to the Ault to Craig 345-kV transmission line.
3. Locate the Project in close proximity to an existing transmission line in order to reduce impacts and costs associated with building new transmission lines.
4. Serve increasing market demand within the Western Interconnection, driven by state renewable portfolio standard (RPS) mandates and clean energy goals, the low cost of wind energy generation, and planned retirements of thermal generation facilities.
5. Create temporary and permanent jobs in Albany County and contribute to Albany County's tax base.
6. Support landowners through diversification of revenue streams.
7. Offset approximately 900,000 metric tons of carbon dioxide emissions annually compared to typical U.S. electric generation
8. Provide emissions free energy for the equivalent of approximately 180,000 households.

Thirty-seven states now have an RPS, or goal, for electricity produced by renewable energy sources, such as wind, solar, biomass, and geothermal sources. In addition to the demand driven by state RPS mandates and clean energy goals, there is increased demand from western load-serving entities because of the low cost of wind energy and planned retirements of thermal generation plants. The cost of generating electricity from wind continues to trend downward (DOE 2018), approaching costs competitive with existing conventional generation, even when considering nonsubsidized prices (Lazard 2019). Many western utilities have announced ambitious plans to add large amounts of renewable energy to their portfolios in the coming years. These drivers of demand create a dynamic marketplace in which wind energy can be generated in one location and transmitted to another. Energy generation and transmission locations are influenced by market conditions and power purchase agreements between the wind energy developer and the utility or large-scale consumer purchasing the electricity. The Project is complementary to ConnectGen's renewable energy generation strategy and would contribute to the generation resource pool needed to meet future load and regional RPS requirements.

1.3 Regulatory Framework

Construction of the Project would need to comply with the Federal, State, and local statutes, regulations, and permit requirements listed below. Many of the specific requirements listed below are described by resource in chapter 4. Compliance with some of these requirements would be achieved through completion of the environmental impact statement (EIS) process, but the responsibility for compliance during the construction, operations and maintenance (O&M), and eventual decommissioning of the Project would rest with ConnectGen. WAPA would comply with applicable regulations for its interconnection switchyard should the Project be constructed.

1.3.1 Federal Statutes

- NEPA, as amended
- Endangered Species Act of 1973 (ESA), as amended
- National Historic Preservation Act (NHPA), as amended
- Clean Air Act, as amended
- Clean Water Act (CWA), as amended
- Migratory Bird Treaty Act
- Bald and Golden Eagle Protection Act (BGEPA)

1.3.2 Federal Regulations

- CEQ Regulations for Implementing the Procedural Provisions of the NEPA (40 Code of Federal Regulations [CFR] 1500–1508) (prior to July 2020 rule revisions)¹
- DOE NEPA Implementing Procedures (10 CFR 1021)
- DOE Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022)
- Interagency Cooperation, ESA, as amended (50 CFR 402)
- Protection of Historic Properties (36 CFR 800)
- General (Clean Air Act) Conformity Regulations (40 CFR 93(b))
- National Pollutant Discharge Elimination System permitting requirements under Section 402 of the CWA
- Dredge and fill permitting requirements under Section 404 of the CWA

1.3.3 Federal Executive Orders and Guidelines

- Executive order (EO) 13927, June 2020: Accelerating the Nation's Economic Recovery From the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities
- EO 13175, November 2000: Consultation and Coordination with Indian Tribal Governments
- EO 13234, May 2018: Efficient Federal Operations
- EO 13807, August 2017: Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure
- EO 12898, February 1994: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 11990, May 1977: Protection of Wetlands
- EO 11988, May 1977: Floodplain Management

¹ The CEQ issued a final rule, on July 16, 2020, to update its regulation for Federal agencies to implement the NEPA. This update has an effective date of September 14, 2020. A 12-month period from the effective date is provided, for Federal agencies to develop or revise their proposed procedures for implementing the procedural provisions of the NEPA. The DOE is currently working to revise the agency's procedures in order to conform with updated CEQ regulations. Additionally, the NEPA process for this Project was initiated prior to the effective date of September 14, 2020. For these reasons, this EIS is being completed in conformance with the CEQ regulations prior to the July 2020 rule revisions.

- DOE P 451.1, December 2017: NEPA Compliance Program
- DOE O 436.1, May 2011: Environmental Protection Program (addresses greenhouse gas [GHG] reduction goals, use of renewable energy, and promotion of renewable energy projects in accordance with Section 2(a)(ii))
- DOE F 1325.8, December 2006: Memorandum Need to Consider Intentional Destructive Acts in NEPA Documents
- Federal Aviation Administration (FAA) Advisory Circular AC 70/7460-1L, Change 2 (August 2018)
- Fish and Wildlife Service (FWS) Final Land-Based Wind Energy Guidelines: Recommendations on measures to avoid, minimize, and compensate for effects to fish, wildlife, and their habitats. (March 2012)
- FWS Turbine Guidelines Advisory Committee Recommendations to the Secretary (April 2010)

1.3.4 State Requirements

The following is a list of State and local regulatory requirements:

- Wyoming Industrial Development Information and Siting Act permitting requirements

This Act requires certain industrial facilities to receive a permit from the Wyoming Industrial Siting Council prior to construction. For wind energy projects, those with 20 or more turbines are required to receive a permit. On September 1, 2020, the Wyoming Department of Environmental Quality (WYDEQ) Industrial Siting Division held a jurisdictional meeting with representatives of ConnectGen. At this meeting, it was determined that the Rail Tie Wind Project is jurisdictional to this Act, as it contemplates development of greater than 20 turbines. Pursuant to W.S. 35-12-106, ConnectGen must receive a permit from the Wyoming Industrial Siting Council prior to construction of this Project.
- Wyoming Office of State Lands and Investments (WYOSLI) lease for use of state lands

The WYOSLI must approve a lease for use of state lands for the Project, which is a separate process from WAPA's interconnection consideration. ConnectGen submitted an application for use of state lands in 2020. ConnectGen's application was approved on January 21, 2021, during the State Board of Land Commissioners meeting.
- WYDEQ, Air Quality Division air quality permitting
- WYDEQ, Water Quality Division (WQD) water quality permitting (Section 401 Water Quality Certification, Construction Storm Water Permit)
 - Isolated wetlands: A Wyoming Pollutant Discharge Elimination System General Permit for Wetland Mitigation is required in circumstances where the discharge of dredge or fill material results in the loss or destruction of greater than one cumulative acre of (1) naturally occurring isolated wetlands or (2) man-made isolated wetlands used to mitigate the loss of naturally occurring wetlands. Prior to commencement of the discharge, a notice of intent and mitigation plan to offset the loss of wetland function and values must be filed with the administrator of the WQD. Isolated wetlands are those wetlands, as defined in W.S. 35-11-103(c)(x), that do not meet the federal definition of waters of the United States and regulated under the Federal Clean Water Act, but meet the state's definition of waters of the state, as defined in W.S. 35-11-103(c)(vi). Additional information is available at <http://deq.wyoming.gov/wqd/discharge-permitting/>.

- Spill reporting: Wyoming Water Quality Rules and Regulations, Chapter 4, requires that the WQD be notified of any oil or hazardous substances that have been released and that enter, or threaten to enter, waters of the state. Spills can be reported to the Wyoming Department of Environmental Quality (WDEQ) by calling (307) 777-7501 or through the following website: <http://deq.wyoming.gov/admin/spills-and-emergency-response/>.
- Turbidity waiver requirements: Wyoming Water Quality Rules and Regulations, Chapter 1, Wyoming Surface Water Quality Standards, Section 23(a) include turbidity criteria for waters designated as fisheries and/or drinking water supplies. Any type of construction activity within such waters is likely to result in exceedances of these criteria. In accordance with Chapter 1, Section 23(c)(ii), the WQD administrator may authorize temporary increases in turbidity above the numeric criteria and may impose whatever controls, monitoring, and best management practices are necessary to maintain and protect all water uses. In circumstances where a project has the potential to exceed the turbidity criteria, a waiver is recommended. Applications must be submitted, and waivers must be approved by the WQD administrator before work begins. Additional information is available at <http://deq.wyoming.gov/wqd/cwa-section-401-turbidity-wetland/resources/turbidity/>.
- Wyoming Game and Fish Department (WYGFD), Wildlife Protection Recommendations for Wind Energy Development in Wyoming (November 2010)
- Wyoming State Historic Preservation Office (SHPO), NHPA Section 106 Consultation
- Wyoming State Engineer's Office (SEO), water rights permitting
- Wyoming taxes

1.3.5 Albany County Wind Energy Siting Requirements

Albany County's Wind Energy Siting Regulations establish setbacks between wind turbines and municipalities, residences, and physical infrastructure. Albany County adopted the Wind Energy Siting Regulations for the purposes (Albany County 2015, Chapter V, Section 12) listed below.

- a. To assure that any development and production of wind-generated electricity in Albany County is safe, effective, and that it will minimize impacts to wildlife.
- b. To acknowledge that these facilities are clearly visible and cannot be hidden from view, however, design consideration should include minimizing the degradation of the visual character of the area.
- c. To facilitate economic opportunities for local residents.
- d. To promote the supply of wind energy in support of Wyoming's goal of increasing energy production from renewable energy sources.
- e. To be consistent with the Albany County Comprehensive Plan.

Specific setback requirements described in Albany County's current Wind Energy Siting Regulations are outlined below in table 1-1.

Table 1-1. Albany County Wind Energy Siting Regulations

Feature	Setback Distance
Incorporated municipality	1 mile
Platted subdivision	5.5 times total turbine height ¹
Residential dwelling or occupied structure	5.5 times total turbine height
Highway right-of-way	0.25 mile
State parks and wildlife refuges	0.25 mile
Third-party transmission lines and communication towers	1.1 times total turbine height
Adjacent property lines of nonparticipating landowners	1.1 times total turbine height
Public roads and railroads	1.1 times total turbine height

Source: Albany County (2015).

¹ Total turbine height is measured from the base to the tip of the blade, not the top of the nacelle.

1.4 Cooperating Agencies

Cooperating agencies include those Federal, State, and local agencies that have jurisdiction by law and/or special expertise (40 CFR 1508.5). The role of cooperating agencies may include participating in the scoping process, developing information and environmental analysis at the request of the lead agency, and providing support staff to enhance the lead agency's interdisciplinary capacity. WAPA sent letters to 12 agencies at the Federal, State, and local level inviting participation as a cooperating agency in preparation of the EIS. Seven agencies accepted invitations to participate: U.S. Environmental Protection Agency (EPA), Region 8; Wyoming Office of Governor Mark Gordon; WYDEQ; WYGFD; Wyoming SHPO, Wyoming State Parks; and Wyoming Office of State Lands and Investments. Chapter 5, "Consultation and Coordination," includes a list of those agencies that were invited to participate as cooperating agencies.

1.5 Tribal Consultation

WAPA is conducting formal consultation with interested tribes on a government-to-government level, according to Section 106 of the NHPA as noted in section 5.2.2, "Government to Government and Section 106 Consultation." WAPA has invited 16 federally recognized tribes to participate in the Section 106 consultation process. Invitation letters were sent on February 27 and September 8, 2020. Tribes that have accepted WAPA's invitation are the Northern Cheyenne Tribe, Northern Arapaho Tribe, Standing Rock Sioux, Yankton Sioux Tribe, Rosebud Sioux Tribe and the Ute Tribe of Uintah and Ouray Reservation. In addition, WAPA has had phone conversations with the Northern Arapaho Tribe's Tribal Historic Preservation Office and the Yankton Sioux Tribe's Tribal Historic Preservation Office to discuss the Section 106 consultation process and address any questions or requests. Ten tribes have yet to respond, but consultation remains open to any tribe that wishes to participate. The Lower Brule Sioux Tribe has deferred consultation to the other tribes.

CHAPTER 2. PROPOSED FEDERAL ACTION AND ALTERNATIVES, AND CONNECTGEN'S PROJECT DESCRIPTION

2.1 Western Area Power Administration's Proposed Federal Action

The proposed Federal action being considered by WAPA in this EIS is the interconnection request submitted by ConnectGen for the Project. FERC mandates require that interconnection requests be accommodated so long as capacity is available, operation of the power system would not be negatively affected, the applicant funds any necessary system upgrades, and existing power customers would not be impacted. WAPA can deny an interconnection request if any of these conditions are not met. If ConnectGen's interconnection request is approved, WAPA would construct, own, operate, and maintain an interconnection switchyard in the Project Area and could also require upgrades to WAPA's transmission system. These facilities are described below.

2.1.1 Interconnection Switchyard

A 345-kV interconnection switchyard would be required to connect the Project to the existing Ault-Craig 345-kV transmission line. WAPA would coordinate with ConnectGen on the final design and construction of the interconnection switchyard based on the findings of WAPA's facilities study. A typical 345-kV interconnection switchyard encompasses a fenced area of up to 8 acres. A switchyard typically includes breakers and switches that protect and control the flow of power onto the power system, in addition to a small control building.

WAPA would require ConnectGen to fund and construct the switchyard as well as fund completion of other system upgrades necessary to handle the new generation. Upon completion of the switchyard, WAPA would own, operate, and maintain the switchyard as part of WAPA's transmission system.

2.1.2 Transmission System Upgrades

Additional upgrades could be required to the WAPA transmission system, such as additional equipment installation at connecting substations. WAPA would require ConnectGen to fund completion of any other system upgrades necessary to handle the new generation. Upgrades would be installed by WAPA. Typical system upgrades would occur within the preexisting fenced substation yards without the need for expansion or new disturbance.

A System Impact Study was completed in May 2020 to determine what, if any, upgrades would be required to WAPA's transmission system (beyond the interconnection) to interconnect the Project. The study concluded that the full 504-MW Project can be interconnected without any further system upgrades. WAPA is currently completing a Facility Study to confirm what specific electrical equipment will be required at the interconnection switchyard to complete the interconnection. The Facility Study is anticipated in the second quarter of 2021.

2.1.3 No Action Alternative

Under the No Action Alternative, WAPA would not approve the interconnection request, and the Project would not be allowed to connect to the existing WAPA transmission system. While this would not preclude the Project from being constructed and connected to a non-WAPA-managed transmission system, for the purposes of analysis, this EIS assumes that in that case, the Project would not be built.

Rationale for this assumption includes that the nearest regional transmission lines that would not require a WAPA interconnection would instead require a much longer generation-tie line (gen-tie line), affecting the economics of the project.

2.1.4 Proposed Federal Action Alternative Considerations

WAPA's Federal action to consider the interconnection request is limited to two distinct outcomes: either approval or denial of the interconnection request. Based on this limitation, no additional alternatives beyond the proposed Federal action and the No Action Alternative have been included in this EIS.

The proposed Federal action to consider ConnectGen's interconnection agreement is distinct from ConnectGen's proposal to construct a wind energy project. WAPA's proposed Federal action is limited to consideration of the interconnection request submitted by ConnectGen and the associated system upgrades that would be required, if approved. Although ConnectGen's Project is the impetus for the requested interconnection request and WAPA's need for Federal action, the Project is a connected action to WAPA's Federal action. WAPA is analyzing the potential environmental effects of ConnectGen's Project in this EIS to fully disclose the activities and associated impacts and to inform WAPA's Federal action (decision on the interconnection request). ConnectGen's decision to construct the Project, however, could proceed regardless of WAPA's involvement. In that situation, ConnectGen could seek other transmission opportunities. This scenario will not be analyzed in this EIS because in that case there would be no Federal nexus and no WAPA proposed Federal action to address under NEPA.

As is typical with development of energy generation projects, final selection of turbine models has not been made at this time in the planning and permitting process. ConnectGen is considering a range of turbine models for the Project and has provided representative layouts to its Project to illustrate the potential differences that might occur depending on the wind turbine generator model selected. ConnectGen will review a range of factors in selecting a turbine, such as anticipated technology advancements, costs, and availability from manufacturers for delivery if the interconnection request is approved. Final selection of the turbine model (and subsequent layout) would occur after the NEPA process is concluded and prior to construction.

The representative layouts are not NEPA alternatives for the Project, as they do not constitute alternatives to WAPA's proposed Federal action. The EIS analysis process will consider the representative layouts provided by comparing the impact indicators of each layout, or by disclosing the layout with the highest level of impact. Opportunities to lessen those impacts, regardless of layout, will be identified through design features or practices and will result in providing WAPA the required impact disclosure to make an informed and defensible decision on the interconnection request.

2.2 ConnectGen's Rail Tie Wind Project

ConnectGen's Project is considered a connected action to the interconnection request. If the interconnection request is approved by WAPA, then ConnectGen could build the Project as described in the following sections. Therefore, the analysis contained herein considers both WAPA's proposed Federal action and ConnectGen's Project when disclosing potential impacts. Potential WAPA resource impacts would be limited to the approximately 8-acre interconnection switchyard and its associated interconnection facilities.

The Project would be developed on private and State lands within the Project Area according to State and landowner agreements. The Project facilities described below would be sited and constructed away from, and with minimal access points along public roads. Project access roads, described in section 2.2.1.8, "Access Roads," would generally be used for transport and travel within the Project Area. The ground disturbance required for construction and O&M of the Project are provided in table 2-1 and appendix A.

Table 2-1. Estimated Acres of Project Disturbance

Project Phase and Facility	Private (acres)	State (acres)	Total (acres)
Construction disturbance			
WAPA interconnection switchyard	9.7	0.0	9.7
Wind turbine generator	236.1	63.2	299.3
Electrical collection system	264.4	51.9	316.3
Electrical substations	14.2	0.0	14.2
345-kV electric gen-tie line	51.9	0.0	51.9
O&M facility	7.0	0.0	7.0
Meteorological equipment	2.8	0.0	2.8
Access roads	489.6	117.6	607.2
Crane paths	119.8	7.1	126.9
Construction laydown yards	30.1	0.0	30.1
Total construction disturbance	1,231.4	239.8	1,471.3
Operations disturbance			
WAPA interconnection switchyard	8.0	0.0	8.0
Wind turbine generator	7.6	2.1	9.7
Electrical substations	10.0	0.0	10.0
345-kV electric gen-tie line	10.6	0.0	10.6
O&M facility	5.0	0.0	5.0
Meteorological equipment	0.0	0.0	0.0
Access roads	114.0	26.8	140.8
Total operations disturbance	155.2	28.9	184.1

Source: ConnectGen (2020).

Note: Acreages derived from geospatial data provided with Project description and correspond to the representative layout with the highest level of disturbance (General Electric Company 3.0 MW turbine layout). Construction disturbance acreages include the total sum of construction and operation disturbance.

2.2.1 Wind Generation Project Facilities

The wind turbines would be arranged in collinear strings located within 1,000-foot-wide wind turbine siting corridors (figure 2-1). This corridor design approach provides flexibility in turbine placement during the design stage to avoid and minimize impacts to wetlands, waterbodies, cultural sites, and other environmentally sensitive areas, to the extent practicable. Access roads and electrical collection lines would also be located within these corridors where feasible to minimize the Project’s overall footprint. For the portions of the Project where it is not feasible to locate access roads and electrical collection lines within the turbine siting corridors, 100-foot-wide and 50-foot-wide siting corridors (i.e., non-turbine siting corridors), respectively, have been identified in these areas (see figure 2-1). The precise locations of each turbine within the corridor would be based on the wind turbine model selected; as well as various siting criteria such as optimal wind speed, geotechnical conditions, and environmental considerations.

For construction planning and site optimization, the Project consists of two separate stages, each approximately 252 MW. These stages are defined as the East Component and the West Component, as differentiated by U.S. Highway 287 (U.S. 287). Construction of the Project would be expected to begin in 2022, and both stages could be fully operational by the end of 2023. As is common with large wind projects, the Project could require 2 years to fully construct. If additional time would be required for construction, it would be anticipated that the first 252-MW stage would be completed and fully operational by the end of 2023, with the second stage operational in 2024.

The Project would include the following components and equipment.

2.2.1.1 Wind Turbine Generators

Between 84 and 149 turbines would be included in the Project. The total number of wind turbines would depend on the turbine model selected and final design. ConnectGen is currently considering several turbine models with capacities between 3 MW and 6 MW each. Each turbine, with associated foundations and equipment, would have a permanent physical footprint of approximately 0.1 acre and a vertical height between 500 and 675 feet, depending on the turbine type selected.

Of the several turbine models being considered by ConnectGen, the smallest model would be the General Electric Company (GE) 3.0 MW, and the largest would be the Siemens Gamesa 6.0 MW or the Vestas 5.6 MW. The turbine specifications for each of these models are provided in table 2-2. As shown in the table, the specifications of the turbine models are similar, and thus many of the potential resource impacts associated with each turbine model would be similar. It is also expected that the specifications associated with a selected turbine model with a capacity between 3.0 MW and 6.0 MW would fall within the range of dimensions outlined in in table 2-2. Regardless of the turbine model selected, turbines would be sited within the 1,000-foot siting corridors depicted in figure 2-1 and appendix A.

Table 2-2. Potential Turbine Specifications

Turbines	GE 3.0 MW	Vestas 5.6 MW	Siemens Gamesa 6.0 MW
Tower type	Tubular	Tubular	Tubular
Blade (rotor) diameter	417 feet (127 meters [m])	531 feet (162 m)	558 feet (170 m)
Hub height	292 feet (89 m)	410 feet (125 m)	377 feet (115 m)
Total turbine height	500 feet (152.5 m)	675 feet (206 m)	656 feet (200 m)

Source: ConnectGen (2020).

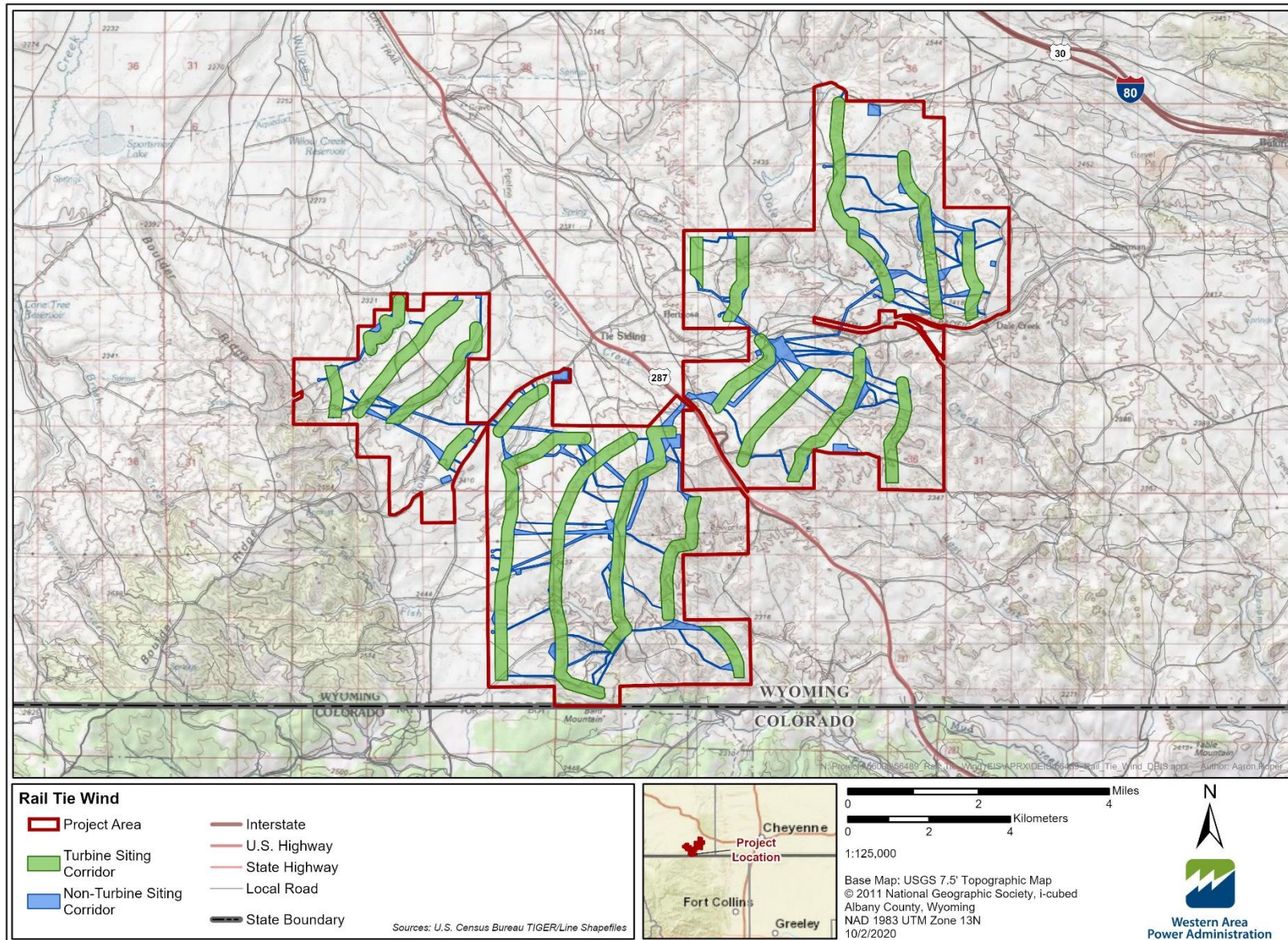


Figure 2-1. Project siting corridors.

2.2.1.2 Electrical Collection System

Underground collection lines would connect wind turbines and deliver power from each turbine to the Project substations. If necessary, because of the geology or topography, overhead collection lines could be used in some areas. Underground collection typically entails 34.5-kV electric cable buried to a depth of approximately 48 inches, while overhead collection consists of 34.5-kV electric lines strung from vertical wooden monopoles typically 50 to 80 feet tall. The total length of collection would be determined based on the final design and siting of turbine arrays and substations but could include up to 80 miles of collection facilities.

2.2.1.3 Electrical Substations

The Project would include two 345-kV substations, one to connect generation facilities located east of U.S. 287 and one for facilities west of U.S. 287. Each substation site would encompass a fenced area of up to 5 acres and would contain one or two main power transformers, depending on the stage. The eastern substation would connect to WAPA's interconnection switchyard via the 345-kV overhead transmission line, and the western substation would be directly adjacent and connect to WAPA's interconnection switchyard via jumpers.

2.2.1.4 345-kV Electric Gen-Tie Line

Approximately 4 miles of new, single circuit, 345-kV overhead gen-tie lines would connect the eastern substation to WAPA's interconnection switchyard, crossing U.S. 287. The transmission line structures would be wood H-frame or steel monopoles, as determined based on final engineering and design of the transmission line. Structure height would range between 100 and 125 feet, depending on terrain.

2.2.1.5 Operations and Maintenance Facility

A single O&M facility is proposed for the Project. The O&M facility would include an approximately 7,000-square-foot building, complete with sanitary and electrical services, located within an approximately 5-acre security-fenced area. A permanent water well would be used to supply the O&M building.

2.2.1.6 Supervisory Control and Data Acquisition System

A Supervisory Control and Data Acquisition (SCADA) system would collect and integrate the operating data from each wind turbine and the Project substations. Additionally, the wind turbines could be operated remotely via the SCADA system or the O&M facility, and each individual turbine could also be operated from the computer terminal inside its tower. Fiber-optic cables for the SCADA system would be co-located with the low-voltage electrical collection system. The central SCADA computers would be located on-site within the O&M building. Data collected by the SCADA system would be monitored 24 hours per day, 7 days a week, 365 days a year at the off-site Remote Operations Center. The Project's SCADA system would also communicate with WAPA's communications system.

2.2.1.7 Meteorological Equipment

Three 344.5-foot-tall (105-meters [m]) meteorological (met) towers would be constructed for the Project. Met towers would be self-supported, lattice-mast style towers. ConnectGen has identified 12 potential met tower locations but would select the final locations upon selection of a turbine type and finalization of Project design.

2.2.1.8 Access Roads

ConnectGen would use public roads for deliveries and travel to the Project Area. For travel and transport within the Project Area, temporary and permanent access roads, including new, improved, or existing access roads, would be necessary for both construction and operations of the Project. New, permanent, all-weather access roads would be needed to access each wind turbine location during operations, and existing or improved public roadways could be used as well. For the portions of the Project where it is not feasible to locate access roads within the turbine siting corridors, 100-foot-wide access road siting corridors have been identified in these areas (see figure 2-1). Based on initial estimates, approximately 60 miles of new, all-weather access roads would be needed for the Project.

2.2.1.9 Crane Paths

Crane paths would be compacted ground used to “walk” the cranes to each turbine pad site during construction. Crane paths would generally be co-located with the access roads. In addition, there would be several dedicated crane paths that would be located cross country in areas away from any permanent access road. Crane paths would be temporary and would be reclaimed once construction of the Project is complete.

2.2.1.10 Construction Laydown Yards

Two temporary laydown yards of approximately 15 acres each would be prepared and maintained concurrently during the construction period. Each of the laydown yards would be associated with construction activities that occur either east or west of U.S. 287 to minimize construction traffic use of local roads and construction traffic crossing U.S. 287. If necessary, additional smaller laydown yards of 2 acres each could be used through the Project Area. The laydown areas would consist of graveled storage and parking areas, which would be reclaimed to preexisting conditions, to the extent practicable, following completion of construction. Two concrete batch plants would be temporarily sited on-site, one located within each of the construction laydown yards. The Project would draw power from the local utility for these construction laydown yards. This includes an approximately 0.15-mile temporary distribution line extension to the western laydown yard, and a 1.8-mile temporary distribution line extension to the eastern laydown yard.

2.2.2 Construction Activities

During construction, ConnectGen intends to minimize environmental impacts resulting from the Project and maintain industry safety standards while managing cost and schedule. This approach would be realized by completing environmental resource studies to identify potential sensitivities and constraints to be considered during the siting and design stage and developing Environmental Protection Measures (EPMs) to avoid, minimize, and mitigate impacts during the construction, operations, and decommissioning stages of the Project. ConnectGen has adopted certain Environmental Protection Measures (EPMs) to avoid, minimize, and mitigate impacts during the construction, operations, and decommissioning stages of the Project (see section 2.2.6, “Environmental Protection Measures”). ConnectGen would follow construction best practices to reduce ground-disturbing activities, such as minimizing the cut and fill required for roads and foundations, and the use of as much excavated native soil and rock as possible. ConnectGen would also apply the concept of adaptive planning and design, which would minimize potential for significant adverse impacts to the natural characteristics of the site.

Before construction begins, each area of proposed ground disturbance would be inspected to evaluate existing conditions. To the extent possible, upon completion of construction activities, revegetation and reclamation would be conducted within disturbed areas to return the site to near preconstruction conditions. This effort would include activities such as conservation and reapplication of topsoil, seeding areas of bare soil, applying weed control measures, and returning land contours and drainage to preconstruction conditions.

A portion of the Project Area is located on State-owned land that is currently used for public recreation activities. ConnectGen would coordinate with the Wyoming State Land Office to limit public access to these areas when active construction is ongoing to ensure public and worker safety. Public access would be limited during activities such as wind turbine erection, foundation excavation, electrical collection system trenching, and substation construction and interconnection because public roads adjacent to these areas would be used to move equipment and Project components. ConnectGen would intend to keep public road closures to a minimum to the extent feasible. Disruptions to public road use in and adjacent to the Project Area could be associated with narrowing down the road to one lane of public traffic with flaggers used to direct the flow of traffic or suspending traffic for safe movement of large equipment. At any given location within the Project Area, construction would consist of a series of activities of relatively short duration separated by periods of no activity as workers move to other locations.

2.2.3 Construction Equipment

Table 2-3 and appendix A list the types of equipment that would be needed for Project construction, the purpose of each equipment type, and their anticipated numbers.

Table 2-3. Project Construction Equipment

Purpose or Stage of Construction	Equipment Type	Anticipated Amount of Equipment ¹
Road construction (2 crews)	Bulldozer	4
	Hoe and ram hoe	2
	Haul truck	15
	Grader	2
	Compactor	3
Foundation excavation (5 crews)	Hoe and ram hoe	4
	Air drill	2
	Bulldozer	2
	Compactor	2
Rebar (2 crews)	Picker	3
	Telehandler	2
Concrete placement (1 crew)	Belt truck	2
	Telehandler	2
	Concrete truck	12–18
Foundation backfill (3 crews)	Bulldozer	4
	Compactor	2
Wind turbine unloading (1 crew)	Crane	1
	Picker	2
	Telehandler	3
Wind turbine base installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6

Purpose or Stage of Construction	Equipment Type	Anticipated Amount of Equipment ¹
Wind turbine tower installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6
Wind turbine nacelle/rotor installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6
	Dozer	2
	Haul trucks	6
	Manlift	2
Collection system (1 crew)	Trencher	2
	Bulldozer	2
	Hoe	4
	Haul truck	2
	Cable truck/trailer	2
Substation (1 crew)	Drill truck	1
	Bulldozer	1
	Picker	1
	Hoe	2
	Bucket truck	2
	Pole truck	1
Miscellaneous (1 crew)	Picker	2
	Telehandler	4
	Water trucks	3-4
	Grader	1
Equipment service (1 crew)	Fuel/lube truck	1

Source: ConnectGen (2020).

¹ Totals reported are for the Project, not per crew.

Heavy vehicle traffic would be expected on the Project site during construction. Dump trucks, for example, would be needed to move soil and aggregate. Concrete trucks would be needed for wind turbine foundations and other facilities. Water tankers would be needed to wet down roadways for dust control. The crane needed for wind turbine installation would be assembled at the first wind turbine site and then would be “walked” to subsequent wind turbine sites along the Project access roads. Where the road cannot be built within the tolerances required for walking the crane, the crane would be disassembled, moved to the next wind turbine site, and reassembled.

2.2.3.1 Roads and Turbine Pads Construction

For construction crews and equipment to reach each wind turbine location, all-weather access roads would be constructed, extended, and/or improved throughout the Project Area. Existing public roads would be used and/or improved to the extent possible. In addition, new Project access roads would need to be constructed, and existing private roads would need to be improved to provide access to turbine sites, the O&M building, and the Project’s substations. Access roads would be sited to reduce ground disturbance, minimize adverse impacts to sensitive resources (e.g., wetlands, cultural resources sites, sensitive habitat, etc.) and optimize transportation safety and efficiency during construction and maintenance activities. In general, new access roads would be sited within the 1,000-foot turbine siting corridors. For the portions of the Project where it is not possible to locate the access roads and electrical

collection lines within the turbine siting corridors, 100-foot-wide access road and 50-foot-wide collection line corridors have been established for the purposes of adaptive planning and design. Depending on the turbines selected, a maximum of approximately 60 miles of new access roads would be required.

Access roads would be needed during construction and operations to access the following permanent Project facilities: turbines, met towers, substations, and the O&M building.

Crane paths, which are compacted ground that is used to “walk” the cranes to each turbine pad site, would generally be co-located with the access roads. In addition, there would be several dedicated crane paths that would be located cross-country in areas away from any permanent access road. Crane paths would be temporary and would be reclaimed once construction of the Project is complete.

Extra-long trucks (for blade transport) and heavy-load trucks (for wind turbine nacelles) would bring wind turbine components to the site, as applicable. For these trucks to reach the site, some road improvements could be completed on existing State, county, and private roads. Specifically, turns in existing roads, such as Cherokee Park Road/County Road 31, could be widened to allow access for the extra-long trucks.

The design of the new access roads would consider the flow of the natural contours; however, modifications could be made to maintain safety during construction and maintenance activities. Table 2-4 and appendix A provide general road specifications.

Table 2-4. General Project Road Specifications

Characteristic	Specification
Maximum slope	8%–14% for access roads
Maximum width (construction)	Up to 100 feet, including crane path
Maximum width (postconstruction)	20 feet
Minimum turn radius	200 feet
Road surface	All-weather gravel
Speed limit	25 miles per hour

Source: ConnectGen (2020).

Construction zones of 250 feet by 300 feet would be established around each wind turbine site. This area would need to be clear and level enough to allow for the wind turbine components to be delivered and for a crane to be set up. Construction would be designed to minimize the amount of workspace required at each turbine site consistent with the work to be done and worker safety. To the extent practicable, a minimal amount of vegetation would be removed to allow for turbine component delivery. A crane pad measuring 65 feet by 100 feet (within the construction zone) would be graded to a level surface free of vegetation at each turbine location. These pads would be recontoured and revegetated to as near as practicable to preexisting conditions once construction of the turbine is complete.

Once the construction of the Project is complete, reclamation would be performed in areas disturbed by construction activities. The cut material accumulated during road construction would be used to return contours to preconstruction conditions, as practicable. Any remaining fill material would be used at other locations across the Project site in a manner that would not contribute to dust and erosion, change drainage conditions, or impact any sensitive vegetative communities. Any exposed areas that are not covered by road materials would have topsoil stockpiles redistributed across them, and they would be revegetated using locally approved, weed-free, native seed mixes. Noxious weed control would continue on-site during the revegetation process and during the Project’s operational life.

2.2.3.2 Electrical Collection System Construction

Each wind turbine would be connected to underground electrical collection lines to allow the generated energy to be sent to the Project substations. These collection lines are anticipated to be buried directly (rather than placed in conduit) using cable specifically designed for this application. The trench for the alternating current collection is typically 24 inches wide. The voltage of this system would be up to 34.5 kV. Typically, the cables would be buried directly into native soil on-site. However, if the native soil does not provide enough thermal conductivity (i.e., to allow heat to dissipate from the cables), engineered backfill could be used. This engineered backfill would be a soil type capable of efficiently dissipating heat from the cables (e.g., compacted sand, fine gravel, stone dust, or crushed stone screenings). The engineered backfill would only be used in the cable trenches, and only in amounts needed to achieve heat dissipation from the cables. The engineered backfill would be weed and seed free. The remaining depth of the trenches would then be backfilled with native materials and recontoured to preconstruction conditions and revegetated with locally approved, weed-free, native seed mixes. ConnectGen could use blasting techniques in certain areas if rock strength exceeds typical excavation limits. If underground electrical lines are not technically or economically feasible in some areas, overhead electrical lines would be used. The overhead collection line structures would be wooden or steel monopoles and would be 50 to 80 feet tall. Depending on the turbine selected, approximately 80 miles of collection lines would be required.

To the extent possible, the electrical collection system would be co-located with access roads in areas already disturbed by the road construction. For areas near the substations where several runs of cable could be required, cable trenches could be placed on both sides of the road. In some areas, a collection line would be installed cross-country in areas not located next to existing or planned access roads. In these situations, the collection line would be installed in a manner as described above, and then recontoured to preconstruction conditions and revegetated with locally approved, weed-free, native seed mixes.

2.2.3.3 Wind Turbine Foundations Construction

The wind turbine foundation anchors the wind turbine structure securely to the ground. Typically, the construction of the wind turbine foundations constitutes the largest volume of earth excavation associated with a wind power project, although some foundation designs allow for much of the excavated material to be backfilled in and around the foundation itself. Depending on the turbine type selected, the Project would contain 84 to 149 turbine pads.

Two foundation designs are typically used for wind turbine installations in the United States; the specific foundation used for individual turbine locations would be determined by the soil conditions and wind turbine requirements. The first foundation type is a *mat* foundation. The second foundation type is a *pier* foundation. Mat foundations are wide and shallow, and pier foundations are narrow and deep. Mat foundations are typically 60 to 80 feet in diameter octagons with an approximate depth of 10 to 12 feet. Pier foundations are typically 15 to 18 feet in diameter with an approximate depth of 30 to 40 feet. There are variations on these foundations, and the exact foundation type to be used cannot be determined until a final turbine type is chosen and a detailed geotechnical investigation is completed. Because of the expected soil conditions in the Project Area, use of the mat foundation type is anticipated.

The turbine base consists of a steel ring and series of anchor bolt connections to fasten the wind turbine tower to the foundation. The turbine base is cast into the concrete reinforced structure that makes up the remainder of the foundation. An electrical grounding mat is typically cast in place when the foundation concrete is poured. The casting and the subsequent backfilling of the foundation is usually done prior to the delivery of the wind turbine components to allow the lowest sections of the wind turbine tower to be directly placed upon delivery.

2.2.3.4 Wind Turbine Installation

Installation of wind turbines requires specialized equipment and crews, and careful planning. During construction, turbine components would be delivered directly to each installation location as they arrive at the Project site. Lower tower sections would be set in place immediately on the foundation, with the remaining components placed around the tower site in planned laydown arrangements. Crane crews would erect the turbines once components arrive at the turbine location to minimize the amount of time the equipment is on the ground. Exceptions could occur if components arrive before the turbine location is available (e.g., because of snow on the site or other temporal constraints that prevent construction from occurring at that time). In this instance, some components could be placed at a temporary laydown area until turbine site access and crews are available to move and erect the turbine.

2.2.3.5 Meteorological Tower Installation

ConnectGen would install three permanent met towers within the Project site to collect accurate meteorological data, which are used to track the performance of the wind turbines. Such data would include wind speed and direction, barometric pressure, humidity, and ambient temperature. Each tower would be assembled on-site. Met towers would be self-supported, lattice-mast-style towers.

2.2.3.6 Substations Construction

The electrical collection system would deliver the power to one of the two Project substations. The Project substations would each be up to 5 acres in size. At the substation, the voltage of the energy would be stepped up from the collection system voltage of 34.5 kV to the transmission voltage of 345 kV. Capacitor banks and other equipment would be installed at each substation to provide the voltage support necessary to meet the interconnection requirements for the Project as determined by WAPA. A small control building would be built within each substation yard to house electrical metering equipment and the SCADA system for the wind turbines.

2.2.3.7 Gen-Tie Line Construction

Approximately 4 miles of new single circuit, 345-kV overhead gen-tie line would connect the eastern stage substation to the WAPA interconnection switchyard. The gen-tie line structures would be wood H-frame or steel monopoles, as determined by final engineering and design of the gen-tie line. Structure height would typically be 100 to 125 feet but could vary depending on terrain. The gen-tie line would be designed in consideration of Avian Power Line Interaction Committee (APLIC) guidance to avoid and minimize impacts to avian species.

2.2.3.8 Operations and Maintenance Building Construction

ConnectGen would construct an approximately 7,000 square foot O&M building in the Project Area. This building would house offices for Project staff, conference rooms, computers, telecommunications and control equipment for the wind turbines, SCADA equipment, emergency lodging quarters, storage for spare parts, and shop facilities. There would also be a graveled parking lot and storage area within a fenced, approximately 5-acre site. This building would be pre-engineered and assembled and finished on-site. The O&M building would be painted in an earth-tone color (such as light tan) to reduce visual impacts. The O&M building would also have an employee break room and bathrooms, and if connection to a sewer system is not feasible at the building site, a septic system would be installed. A supply of potable water for the O&M building would be provided through a connection to a nearby existing well or installation of a new well, as feasible.

2.2.3.9 Laydown Yards Construction

ConnectGen would develop two construction laydown yards of approximately 15 acres each where most general construction materials would be offloaded and stored. Five additional smaller laydown yards of approximately 2 acres each could be developed within the 1,000-foot turbine siting corridors, as necessary. In each 15-acre laydown yard, a 3-acre concrete batch plant would be installed with the capacity to produce up to 1,500 cubic yards of concrete daily.

The intent is for wind turbine components to be delivered directly to the pad site where they would be installed; although deliveries received before the turbine pads are available (either because of weather, road construction, or crew availability) would be off-loaded in the nearest laydown yard. Materials needed for the potential concrete batch plant, substation construction, or electrical collection system construction would be offloaded near the location of their intended use.

2.2.3.10 Commissioning and Acceptance Testing

Prior to Project operations, commissioning and testing would be conducted to ensure that all Project components are ready for operations. Trained technicians would test and inspect all wind turbine components, collection lines, substations, and communication systems to ensure they are working properly and safely. The wind turbines would be inspected and tested as they are completed. Substation testing would take place after main power transformer delivery and prior to energization. Interconnection switchyard testing would take place once Project construction is complete.

2.2.3.11 Construction Schedule

The exact schedule of construction has not yet been developed. It is dependent on completion of WAPA’s NEPA review and approval of an interconnection, and acquisition of all necessary permits for the Project. Other factors that could impact the construction schedule include weather-related construction constraints, the type and number of wind turbines ConnectGen elects to use, the required in-service date for the Project as determined by the interconnection agreement, and supplier delivery dates for turbines and components. In general, a typical schedule for the construction of wind energy projects of this scale is shown in table 2-5 and appendix A.

Table 2-5. Typical Construction Schedule of Wind Energy Projects

Activity	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mobilization	■											
Access roads and laydown areas		■	■	■	■	■						
Substation construction				■	■	■	■	■	■			
O&M building construction		■	■	■	■							
Collection system construction				■	■	■	■	■	■			
Gen-tie line construction							■	■	■	■		
Wind turbine foundations				■	■	■	■	■				
Wind turbine erection						■	■	■	■	■	■	■
Commissioning and acceptance testing											■	■

Source: ConnectGen (2020).

Note: Schedule would vary with the number of turbines to be installed.

2.2.3.12 Water Use During Construction

Water would be required to batch the concrete required for turbine foundations and for building and equipment foundations at the substations, interconnection switchyard, meteorological sites, and the O&M building. In addition, water would be used for dust suppression on access roads and other disturbed areas. It is estimated that up to 200 acre-feet of water would be required per year of active construction. Water could be acquired from temporary water wells or hauled in from available water sources located nearby. Water use would comply with State and county permitting requirements.

2.2.4 Operations and Maintenance Activities

2.2.4.1 Operations

The following sections describe the activities that would be required to operate and maintain the Project after completion of the construction stage.

Project Administration

Project administration includes the business aspects of running a utility-scale wind power generation facility. Such activities include staffing the Project, training staff, scheduling and facilitating maintenance, monitoring the performance of the Project, and preparing necessary documentation that is required by Federal, State, and local agencies. Several of these activities are discussed in more detail below.

The O&M facility would be staffed during normal business hours, and staff would include a supervisor and approximately 20 Project maintenance staff.

Orientation and Training

ConnectGen would develop site-specific training materials for the operations phase that all employees on the Project would complete. It is assumed that ConnectGen would employ experienced operators and maintenance staff per specific job requirements. Training materials could address safe work procedures on wind turbines and the specific tasks necessary to provide scheduled and unscheduled wind turbine maintenance. In addition, site personnel would be trained on the environmental management and monitoring requirements of the Project.

ConnectGen would also develop a safety orientation program that site visitors must complete prior to going out on the Project. This orientation would also address the aspects of environmental management that could be impacted during visitors' on-site activities. Topics would include general site procedures for the following:

- Avoidance of wildlife
- Species identification, protection, and avoidance
- Cultural resources and fossil protection and reporting
- Requirements for control of livestock (e.g., ensuring gates are closed)
- Noxious weed reporting and control (e.g., vehicle washing)
- Excessive dust avoidance
- Noise requirements

- Motorized access limited to site access roads
- Speed limits on site access roads
- Hunting awareness
- Worker health and safety
- Other procedures as appropriate for their on-site activities

Wind Project Performance Monitoring

Wind turbines generally operate automatically without the need for centralized plant operators. Wind turbine performance would be monitored 24 hours a day, 7 days a week at the Remote Operations Center located off-site, and manual control would only be initiated as necessary for maintenance and troubleshooting.

ConnectGen would analyze the performance trends of the wind turbines and associated facilities to evaluate the overall efficiency of Project operations. This analysis would use data collected from the wind turbines and the permanent met towers. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the Project based on the results of these analyses.

At times, wind turbines could draw power from the local utility company to optimize the direction of the nacelle. Supporting infrastructure (e.g., power lines) would be necessary to provide each turbine with the ability to draw power from local utility distribution lines. This includes an approximately 0.4-mile permanent 12-kV line from the distribution line to the O&M building, and a temporary, 0.2-mile, 12-kV line from the distribution line to the Project substation.

2.2.4.2 Maintenance Activities

As with any machinery, regularly scheduled preventive maintenance would help to ensure the safe and efficient long-term operation of the wind turbines. ConnectGen would develop the Project's Operations and Maintenance Plan, which would describe the scheduled minor and major maintenance activities and inspection requirements anticipated during the calendar year.

Staff periodically would analyze meteorological data and performance trends for the wind turbines and associated facilities to determine the overall efficiency of the operation. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the operation. Staff would have specific training regarding safe work on wind turbines and the specific tasks necessary to provide both scheduled and unscheduled wind turbine maintenance.

Road maintenance would be performed on an as-needed basis. Regular snow removal would occur during the winter months to maintain access to the wind turbines, substations, and O&M building. Care would be taken in siting the O&M building to avoid contributing to snow drifting on Boulder Ridge Road. Grading and blading would be performed as required in the spring to remove vehicle ruts. Similar surface work could be needed after heavy rainfall or unusually heavy maintenance traffic. Culverts, drains, and other water management features would be kept clear to allow for natural water flows.

There could be times during the year when portions of the Project site could not easily be accessed because of high winds, or heavy rain or snowstorms. A Health, Safety, Security, and Environment (HSSE) Plan would be developed for the Project to guide the staff's activities during these weather conditions.

Project Drive-By Inspections

Staff would drive the Project site frequently to conduct a visual inspection of the operations, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal or vandalism. The purpose of the inspections would be to identify obvious problems requiring maintenance or attention. Visual inspections would be a redundant check on the wind turbines. Each wind turbine would have internal sensors as part of the SCADA system to monitor its operating condition. Wind turbines requiring maintenance would be stopped remotely to allow the condition to be fixed.

Scheduled Facility Maintenance

Individual Project components, including the Project substations, would be inspected on a daily, weekly, monthly, or annual basis, as required by that equipment. The schedule would be part of the Operations and Maintenance Plan. Inspection results would be logged and used to plan future maintenance activities. Minor oil leaks, for example, would be promptly addressed to prevent a developing problem. Wind turbine maintenance events would be scheduled based on the manufacturer's specifications. They would be planned for the spring and summer each year, as practicable. Maintenance of the substation's transformers, switchgear, and buswork would require that the substation be de-energized, as applicable. Most scheduled substation maintenance activities could be performed during a single day each year. WAPA would perform switchyard maintenance activities similar to the substations discussed above.

Unscheduled Facility Maintenance

Unscheduled repair work could be either minor or major. Replacing faulty internal components on the wind turbines, for example, would be considered a minor repair done with small tools and the wind turbine's integrated winch system. Only a pickup or small truck would be needed to access the wind turbine using the existing Project access roads. Other potential, minor repairs include the following:

- Replacing wind turbine sensors
- Replacing small motors (e.g., for the yaw drive or fans)
- Replacing small pumps (e.g., for the hydraulic system or cooling system)
- Replacing gear oil
- Replacing coolant
- Replacing hydraulic fluid
- Replacing seals (e.g., on generators or gearboxes)

Major repairs would be far less common and could require a crane and heavy trucks. Typically, the crane pads used during construction would not be regraded, but only revegetated; in this case the vegetation would be cleared as necessary for crane operation. If the crane pad had been regraded to its original contours, grading could be necessary as well. The repair activity would be planned to minimize the crane's time on-site and the overall effects of the repair. Major repairs include the following:

- Replacing wind turbine blades
- Replacing a wind turbine generator (WTG)
- Replacing a wind turbine gearbox
- Replacing a wind turbine transformer

The need to replace an entire wind turbine prior to decommissioning is extremely unlikely. If a wind turbine tower or foundation fails, replacement of the wind turbine would require that the wind turbine be removed in the reverse order in which it was installed. Components not used for the replacement wind turbine would be loaded onto trucks and removed from the site. The new wind turbine would be installed using the appropriate combination of original and replacement parts with the construction methods described previously.

2.2.4.3 Water Use During Operations and Maintenance

Water would be needed for standard O&M activities. The O&M building would require a potable water supply for bathroom and breakroom facilities, as well as for vehicle washing and general shop use. Turbine maintenance would also require water for washing. It is estimated that these activities would require up to 2 acre-feet of water per year. Water would be acquired through connection to an existing nearby well or from a new water well permitted through the Wyoming SEO. Water use would comply with State and county permitting requirements.

2.2.5 Decommissioning

ConnectGen estimates that the Project would have a 35-year life based on the useful life of the wind turbines. After that time, ConnectGen would evaluate the continued operations of the Project and either upgrade and repower the facility with renegotiated leases or decommission it.

The Wyoming Industrial Development Information and Siting Act requires that a site and facility reclamation and decommissioning plan be included in the State's application to obtain an Industrial Siting Permit. This plan must indicate the planned life of the facility and the means by which the facility and its site will be decommissioned and reclaimed at the end of the facility's life. The Industrial Siting Permit will require reclamation bonding as a regular condition of approval. The plan must also comply with all requirements adopted by the Industrial Siting Council (ISC) and, if the permit is granted, the plan shall be updated every 5 years until reclamation and decommissioning is complete.

The goal of decommissioning would be to remove the power generation equipment and return the site to a condition as close to its preconstruction state as possible. Major activities required for decommissioning would typically occur in reverse order to construction and are listed below:

- Wind turbine, wind turbine foundation, and met tower removal down to depth of at least 36 inches belowgrade. Concrete and steel would be hauled off-site and recycled as appropriate. The portion of the foundations removed would be filled with native weed-free fill and soils.
- Electrical collection system removal for aboveground structures and decommissioning in place for belowground cables. The salvage value of raw material could facilitate removal of belowground cables.
- Substation and switchyard removal, including equipment, control buildings, and foundations. Perimeter fencing and fence posts would be removed. Nonnative aggregate would be removed. Native soils would be replaced over the site.
- Sale or demolition of the O&M building. The on-site septic system and well (if a new water well is constructed) would be abandoned consistent with State and local requirements, unless needed for a future use of the site.
- Transmission line removal down to 36 inches belowgrade. Foundation holes would be filled with native weed-free soil.

- Road removal (as required by permit and/or site control agreements by landowners). Road disturbances would be regraded to original contours where cut and fill made recontouring feasible. Any roads left in place would become the responsibility of the landowner.
- Grading.
- Weed control, revegetation, and revegetation monitoring to ensure establishment of native vegetation.

The specific requirements and approach for each activity are estimates because the technologies and construction techniques available when the Project is decommissioned are expected to have changed from their current state.

2.2.5.1 Wind Turbine/Meteorological Tower Removal

The decommissioning activity most notable to the public would be the removal of the wind turbines and met towers. The disassembly and removal of this equipment would essentially be the same as their installation, but in reverse order.

Crane Movement and Assembly

When a large crane would first arrive onto the Project site, it would be taken to the location for its first turbine removal. The crane would be assembled on that site, and then used to disassemble the wind turbine. Once the turbine at that site is disassembled, the crane would be walked to the next turbine site. If the requirements for walking the cranes cannot be met with the Project's roads, road improvements could be required. At locations where the road cannot be improved to within the tolerances for walking the crane, the crane would be disassembled, moved to the next site, and reassembled.

If the crane pads built for the construction of the Project are subsequently removed, or no longer meet the requirements for the crane, then temporary crane pads would need to be installed or improved for safe operation of the crane.

Wind Turbine/Meteorological Tower Disassembly

The large components that make up a wind turbine would be disassembled in the reverse order they were assembled. The rotor (hub and blades) would be removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Once the turbine rotor has been removed, a crew and small crane would disassemble it into the hub and three turbine blades for removal from the site. Next, the nacelle would be removed from the top of the tower, followed by each portion of the tower. The met tower would similarly be disassembled by a crane, starting with the upper tower sections and moving downward. The met tower sections would be disassembled on the ground into individual structural members for removal from the site. The met tower foundations would be removed to belowgrade as required in the lease agreements with the landowners.

Component Removal

The most efficient manner for component removal would be for each large component (other than the rotor) to be placed directly onto a truck's bed when it is removed from the turbine. These trucks could then immediately take the component off the site. This approach would limit the need for clearing an area around the turbine base to just enough area to set down the rotor.

When the rotor is disassembled, the blades would be placed into a carrying frame. The blades in the frame can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades.

2.2.5.2 Electrical System Removal

Buried Cable Removal

Between each of the turbine locations, there would be a buried electrical collector line cable and fiber optic cable. ConnectGen would discuss with the landowners whether to remove these cables or leave them in place at the time of decommissioning. Removing the cables would cause some environmental impacts that may need to be mitigated, but leaving them in place could impact future uses of the site.

If the cables are to be removed, a trench would be opened, and the cables would be pulled out. The cables would be cut into manageable sections and removed from the site. The trenches would then be backfilled with the removed material and compacted. The disturbed area would be revegetated with locally approved, weed-free, native seed mixes.

Substation Disassembly and Equipment Removal

Once the Project and gen-tie line is decommissioned, the substations would be disassembled. Major components would be removed from their foundations and placed onto trucks using a crane. The steel structures and control buildings would be disassembled and removed from the site. The fence would be taken down, and fence posts would be removed. Substation foundations would be removed to depth of 36 inches below ground surface. The gravel placed in the substation yards would be removed if it is not native rock. Native rock would be scattered on-site.

WAPA would require the removal of the switchyard foundation as described for the substation; however, the removal of the grounding grids would not be required.

Generation-Tie Line Removal

The gen-tie line would be disassembled and removed. Initially, the conductors and ground wires would be removed from the insulator strings and collected on reels for recycling. The structures would then be disassembled and removed, including grounding rods to 6 inches belowgrade. The areas around the poles, along with any access roads that were necessary, would be removed if it is not native rock. Native rock would be scattered and spread on-site.

2.2.5.3 Operations and Maintenance Building Removal

The O&M building would either need to be demolished and removed or sold. All equipment and furniture within the building, if demolished, would be removed. All debris from the demolition would be removed from the Project site. Any installed septic system would also be abandoned in a manner consistent with State and local health regulations, unless retained by any new owner of the O&M building.

2.2.5.4 Structural Foundation Removal

When the wind turbines, met towers, and substation components are removed from their foundations, the foundations need to be removed per the requirements of the lease agreement. The concrete and steel in the foundations would be broken up and removed to a depth of at least 36 inches belowgrade. All concrete and steel debris would be removed from the site.

2.2.5.5 *Decommissioned Facilities Disposal*

Materials resulting from the decommissioning and removal of facilities would be recycled to the extent practicable, with the remainder disposed of at authorized and compatible landfill sites.

2.2.5.6 *Civil Decommissioning Activities*

Road Removal

When the Project is decommissioned, the landowners would have the choice as to whether the Project access roads were to be removed. If the roads are left, maintenance of the roads would become the responsibility of the landowner.

Once all the necessary equipment and materials have been removed from an area and the road to that area is no longer needed, it can be removed. The road surface and bed materials would be removed down to grade. Any materials native to the Project Area would be scattered across the site, and foreign materials removed.

Regrading and Revegetation

For areas where equipment or materials were removed, those areas would be regraded back to preconstruction contours, to the extent possible. Holes where foundations have been removed to 36 inches below grade would be refilled with native soils. Removed roads would be regraded to original contours if cuts and fills make such regrading practical. Crane pads would also be regraded.

Areas of disturbed ground would be revegetated using locally approved, weed-free, native seed mixes.

2.2.6 *Environmental Protection Measures*

ConnectGen developed and would implement EPMs to avoid or minimize adverse effects on environmental resources from construction, O&M, and decommissioning of the Project (see table 2-6). Certain areas would be designated as environmentally sensitive and actions would be taken to avoid or minimize effects on these areas. For example, environmentally sensitive areas could include wetlands, certain waterbodies, cultural resources, or wildlife habitat. Project activities described herein would incorporate and be subject to the EPMs and requirements imposed as part of Federal, State, and local permits and authorizations. ConnectGen will comply with applicable Federal, State, and local laws, regulations, and ordinances related to environmental protection.

Table 2-6. ConnectGen’s Environmental Protection Measures

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
General (GEN)					
GEN-1	The Project will be designed, constructed, and operated in compliance with Albany County Zoning Regulations (as amended) and Albany County Wind Energy Siting Regulations. Construction and operations activities will comply with all Federal, State, and county environmental regulations, as applicable.	X	X	X	X
GEN-2	The Project will delineate environmentally sensitive areas (e.g., wetlands, waters, habitats) located within or adjacent to the Project Area and seek to avoid or minimize impacts to these areas during design and final siting. Environmentally sensitive areas will be identified in construction planning documents. Construction and operations personnel will be informed of the appropriate practices that may be applicable to avoid or minimize impacts when working in the vicinity of these areas.	X	X	X	X
GEN-3	Construction travel will be restricted to existing roads and permanent or temporary access roads identified in the final Project Site Plan.		X		
GEN-4	The Project will implement speed limits on construction and permanent access roads to minimize potential for fugitive dust, impacts to wildlife, and for safety purposes. Speed limit signs will be posted as appropriate.		X	X	X
GEN-5	Construction and operations equipment will be inspected periodically per the manufacturer’s specifications and maintained in good working condition.		X	X	X
GEN-6	Fences, gates, and other access controls (e.g., cattle guards) will be maintained in good working order during construction and operations activities. Damaged access controls will be repaired or replaced as soon as possible. Security guards or access attendants may be employed during the construction phase if needed.		X	X	X
GEN-7	Routine operations and maintenance activities will be scheduled and performed during daylight hours.			X	
GEN-8	Temporary sanitary facilities will be located in convenient locations throughout the site. Facilities will be located greater than 100 feet from any waterbody or wetland and will be regularly serviced and maintained.		X		X
Air Quality (AQ)					
AQ-1	A Fugitive Dust Control Plan will be prepared pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).	X	X		X
AQ-2	All unpaved roads and disturbed areas where construction activities are occurring, including temporary laydown areas, will be treated with water or other surfactants as frequently as necessary to control fugitive dust. Wind erosion control techniques such as windbreaks, water, WYDEQ-approved chemical dust suppressants, and/or vegetation will be applied to soil disturbance areas that could potentially result in wind-blown soils.		X		X
AQ-3	All construction equipment vehicle tires will be cleaned via track pad entrances as necessary to limit tracking of soil onto public roadways prior to leaving the construction site.		X		

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
AQ-4	All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible dust emissions on public roadways either will be covered or the materials sufficiently wetted in a manner to minimize fugitive dust emissions.		X		X
AQ-5	Idling equipment will be turned off when not in use.		X	X	X
AQ-6	Any stationary sources associated with construction or operations activities requiring WYDEQ–AQD permits or waivers will be controlled in accordance with relevant regulations and permit conditions.		X	X	X
Cultural Resources (CR)					
CR-1	An Unanticipated Discoveries Plan will be developed that describes procedures for responding to the discovery of archaeological or other cultural resources, including unmarked graves, during construction.	X	X		
CR-2	Conduct appropriate worker education concerning the recognition and protection of cultural resources for all on-site personnel.	X	X	X	X
CR-3	Conduct a new Class I records search for the Project and Class III cultural resources inventory for all work areas where ground disturbance may occur to comply with Section 106 of the NHPA. The Class III inventory should be performed subsequent to the draft EIS and after the Project design is finalized. The survey results will be shared with the Wyoming SHPO to identify and avoid resources eligible for the National Historic Register.	X			
CR-4	To the extent practicable, construction activities will avoid impacts to cultural resource sites that may be identified within the Project Area. Cultural resource sites and appropriate buffers will be delineated on construction drawings as restricted areas and will be flagged in the field with signage and/or temporary fencing to prevent unauthorized entry.		X		X
CR-5	Conduct a systematic architectural inventory of the Project Area and use setbacks to reduce impacts to historic architectural resources to the extent practicable.	X			
Hazardous Materials (HAZ)					
HAZ-1	Prior to commencing construction, a Hazard Communication Program will be developed to comply with OSHA requirements under the Hazard Communication Standard. Elements of the Hazard Communication Program include a hazard determination process, approval process, materials inventory system, and training for site personnel. At a minimum, hazardous materials will be properly labeled and stored and material safety data sheets will be available at the site.	X	X	X	X
HAZ-2	Care will be taken when selecting the location of hazardous materials storage areas within the site to avoid potentially sensitive areas.		X	X	X
HAZ-3	In compliance with the EPA’s Spill Prevention, Control and Countermeasure Regulation, secondary containment for hazardous materials that are stored on-site will be provided to minimize potential effects to the surrounding environment. Examples of secondary containment are concrete bermed areas and manufactured containment pallets.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
HAZ-4	Concrete washout would only be disposed of in properly designed concrete washout facilities.		X		
HAZ-5	A Spill Prevention Control and Countermeasure Plan (SPCC Plan) will be prepared per local, State, and Federal regulations and will be on-site during construction, operations, and maintenance. The SPCC Plan will define procedures for storage, cleanup, and disposal of petroleum-based products. The SPCC Plan will identify the types of equipment and materials that will be maintained on-site to facilitate a cleanup in the event of a spill. Construction and operations personnel will be trained to recognize and respond to accidental releases or spills in compliance with the SPCC Plan. Regularly scheduled training modules will be provided to ensure prevention and preparedness throughout the life of the Project.		X	X	X
HAZ-6	All refuse, wastes, or hazardous materials will be handled, processed, treated, stored, and properly disposed of in accordance with Federal, State, and local regulations.		X	X	X
HAZ-7	Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be characterized and the appropriate agency will be informed.		X	X	X
Public Health and Safety (PHS)					
PHS-1	All site personnel, regardless of job responsibilities, will receive Project orientation, including environmental and health and safety Project procedures, requirements, and site rules.		X	X	X
PHS-2	Rail Tie will coordinate with local emergency services, including the Tie Siding Volunteer Fire Department personnel and Laramie Fire Department in development of response or evacuation plans and procedures. Rail Tie personnel will continue routine coordination with local emergency services throughout the life of the Project.	X	X	X	X
PHS-3	Fueling of vehicles will be conducted in accordance with procedures that will minimize the risk of fires and spills.		X	X	X
PHS-4	Selected Rail Tie personnel and construction crew leads will be trained in first aid, automated external defibrillator operation, and CPR. Adequate materials and resources for on-site treatment, first aid, and stabilization will be available at all times.		X	X	X
PHS-5	A Health, Safety, Security and Environment (HSSE) Plan will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. All employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plan will include requirements for first aid and other emergency medical material to be stored on-site and in maintenance vehicles.		X	X	
PHS-6	Construction equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.		X		
PHS-7	Wind turbines will be operated in conformance with the manufacturer's operational parameters.			X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
PHS-8	Staff will perform routine inspections of the Project facilities, including wind turbines, roads, fencing, and other infrastructure, and will identify any incidences of waste disposal, theft, or vandalism.			X	
PHS-9	Chain-link security fencing will be installed at the substation and switchyard, and at the outdoor storage area adjacent to the operations and maintenance building to prevent unauthorized entry.		X	X	
PHS-10	During construction, temporary plastic mesh fencing will be installed to protect public and worker safety near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, or any other areas deemed hazardous. Open holes and trenches without fencing will be covered or fenced to deter wildlife and livestock from becoming trapped or injured.		X		
PHS-11	The general public will not be permitted access to the Project facilities. Most private property within the Project area is fenced off. If trespassers are identified on privately owned land, they will be escorted off the property. Some of the property that the Project will be constructed on is State-owned land that is open to the public. The Project will coordinate with the State land office to identify appropriate temporal or spatial access restrictions during construction and operation periods.		X	X	X
PHS-12	The Project will post any roads it constructs as being private roads only for use by authorized personnel in connection with Project operations.		X	X	X
PHS-13	An Emergency Response Plan will be prepared in coordination with Albany County emergency services to ensure that policies and procedures are consistent with those already established for the county.	X			
PHS-14	Wildfire Mitigation Measures will be developed in coordination with the Laramie Fire Department and Tie Siding Volunteer Fire Department and will be incorporated in the Project's Emergency Response Plan.	X			
PHS-15	On-site personnel will routinely inspect the wind Project facilities for fire hazards.			X	
PHS-16	Wind turbines will be outfitted with lightning protection systems that will reduce the chance of fires igniting from lightning strikes.		X	X	
PHS-17	The base of each turbine will be surrounded by a nonflammable, aggregate-based turbine pad. The turbine pad will be regularly inspected, maintained, and treated to prevent vegetative growth that could result in a fire hazard.			X	
PHS-18	All construction and maintenance vehicles will be equipped with fire extinguishers in the event of an equipment fire. Should an on-site fire occur, Project personnel will call 911 to alert the Laramie Fire Department and Tie Siding Volunteer Fire Department.		X	X	X
PHS-19	Fire suppression equipment, including a trailer-mounted tank of 500 gallons or more capacity with a gasoline powered pump, shall be maintained in the Project Area at all times during construction and operations.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
Noise					
NOISE-1	Construction vehicles and equipment will be maintained in proper operating condition and will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers and engine enclosures).		X		X
NOISE-2	Construction and hauling equipment will be maintained adequately and equipped with appropriate mufflers.		X		X
NOISE-3	Blasting or hydraulic hammering will be limited to daylight hours.		X		X
Geology and Soils (GEO)					
GEO-1	Temporary ground disturbance activities will be limited to the minimum amount necessary in order to safely construct project facilities.		X		
GEO-2	Ground disturbance activities in areas of highly erodible soils and steep slopes will be avoided to the extent practicable.		X		
GEO-3	Roads will be designed to follow existing contours and to avoid steep slopes that would require extensive cut-and-fill construction.	X			
GEO-4	Soils excavated from the turbine pads will be segregated into separate stockpiles for topsoil and subsoil. Subsoil will be used primarily as backfill while topsoil will be spread as the topmost layer of soil to support revegetation. Any unused soils or excavated rock will be removed from the site or disposed of in coordination with the landowner.		X		
GEO-5	An Erosion Control Plan (ECP) will be developed to identify areas of potentially higher erodibility due to excavation, grading, or ground disturbance. The ECP will define appropriate erosion control measures that may be implemented during and after construction.		X		
GEO-6	Erosion control measures will be periodically inspected, and as required after precipitation events. Erosion control measures will be repaired or replaced as necessary.		X	X	X
GEO-7	As soon as practicable following completion of ground disturbance activities, areas of temporary ground disturbance will be regraded and recontoured to blend with the natural terrain while maintaining existing drainage patterns.		X	X	X
GEO-8	All private landowner's existing drainage and erosion control structures such as diversions, irrigation ditches and tile lines shall be avoided by the Project, or in the alternative, appropriate measures are to be taken to maintain the design and effectiveness of the existing structures. Any structures disturbed during construction shall be repaired to as close to original condition as possible, as soon as possible.		X		
Paleontological Resources (PALEO)					
PALEO-1	Prior to construction, a pedestrian survey will be conducted by a qualified professional paleontologist in areas of high potential for fossil occurrence where ground disturbance activities are proposed to occur.	X			

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
PALEO-2	A Paleontological Unanticipated Discoveries and Mitigation Plan will be prepared that outlines appropriate actions in the event of an unanticipated discovery of fossils, including sampling investigation and reporting, and if needed, museum storage coordination for any specimen or data recovered.	X	X		
PALEO-3	Construction personnel involved with earthmoving activities will be informed of the possibility of encountering fossils, how to recognize fossils, and proper notification procedures. This worker training will be prepared by a qualified paleontologist and will be presented to all construction personnel during orientation.	X	X		
PALEO-4	If fossils are discovered in an active construction area, work would be stopped at that location and the construction project manager would be immediately notified.		X		
Recreation (REC)					
REC-1	City officials in Laramie and Fort Collins, and private campgrounds or mobile home park owners, will be coordinated with to identify facilities that are available to construction workers in order to avoid displacement of public recreational use at private campgrounds.	X	X		
REC-2	Recreational activities, such as hunting, may be restricted temporarily during construction for the safety of workers and recreationists; however, following construction, recreational activities may continue in conformance with the property lease agreements and/or land use regulations.		X	X	X
REC-3	To the extent practicable, construction and maintenance traffic will be limited to minimize disruption of normal land use and recreation activities.		X	X	X
Transportation (TRANS)					
TRANS-1	Rail Tie will coordinate with WYDOT and Albany County to implement a Transportation and Traffic Management Plan that minimizes risks and inconvenience to the public, while ensuring safe and efficient construction of the Project. The plan will focus on turbine component deliveries, traffic, and circulation primarily within and in the vicinity of the Project area. It will be designed to minimize potential hazards from increased truck traffic and worker traffic and to minimize impacts to traffic flow in the vicinity of the Project.	X	X		
TRANS-2	To minimize conflicts between Project traffic and background traffic, deliveries of project components will be scheduled around local volume peaks to the extent feasible.		X		
TRANS-3	Road clearances may include temporarily blocking road intersections via construction cones and/or staffing blocked intersections with a traffic-control flagger to allow haul trucks sole access to the road while delivering Project components. If required, public road closures are not expected to exceed 15 minutes during each/any road closure event.		X		X
TRANS-4	The Project will coordinate with WYDOT to determine whether temporary speed limit reductions during construction are applicable where Project access points intersect with U.S. 287.	X	X		

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
TRANS-5	Construction deliveries would be coordinated to avoid major traffic-generating events in Laramie, including on the University of Wyoming campus, to the extent practicable.		X		
TRANS-6	The Project would coordinate with local law enforcement to manage traffic flows and monitor traffic speed during deliveries.		X		X
TRANS-7	All staging activities and parking of equipment and vehicles would occur within the Project Area and would not occur on maintained Albany County roads.		X		
TRANS-8	Equipment and material deliveries to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and U.S. DOT, WYDOT, and Albany County regulations.		X		X
TRANS-9	Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (Albany County 2015) and coordinated with the Albany County Road and Bridge Department and WYDOT.		X		
Vegetation (VEG)					
VEG-1	A Reclamation Plan will be prepared prior to the onset of construction that will guide the revegetation of disturbed areas during and after the construction process.	X	X		
VEG-2	Revegetation will be implemented for all areas temporarily disturbed by construction or decommissioning of the facility in conformance with landowner agreements and in compliance with State and/or Federal permitting requirements. Temporarily disturbed areas will be revegetated as soon as practicable, either through natural revegetation practices or through the use of reseeding. If reseeding is required, plant species native to the affected ecosystems will be utilized.		X		X
VEG-3	The Reclamation Plan will identify locally approved, weed-free seed mixtures that prioritize plant species native to the ecosystems affected by site construction.	X	X		
VEG-4	The Project will develop and implement an Integrated Weed Management Plan that identifies appropriate controls to avoid, minimize, or treat the spread of noxious weeds directly resulting from construction, operations, and decommissioning.	X	X	X	X
VEG-5	The Project will perform a preconstruction survey of the project footprint to identify existing locations of noxious weeds. Any locations delineated will be identified in the Weed Management Plan, and appropriate controls will be applied to Project activities in these areas.	X			
VEG-6	Upon completion of construction, a postconstruction weed inventory survey will be performed to validate the effectiveness of the weed management program and ensure that invasive weed levels have not exceeded preconstruction levels.		X	X	
VEG-7	The Project will coordinate with the weed management contractor and host landowners regarding specific treatment methods on their respective properties.	X			
VEG-8	Any herbicide use as part of vegetation management activities will follow label instructions and relevant Federal, State, and local laws.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
Visual Resources (VIS)					
VIS-1	Collection lines will be buried and co-located with access roads to the extent practicable.	X	X		
VIS-2	The operations and maintenance building will be designed with rural and agricultural architectural elements to minimize contrast with existing structures. The building will be painted with earth-tone colors identified in the Bureau of Land Management (BLM) Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.	X	X	X	
VIS-3	Outdoor facility lighting will be designed with light caps and/or directed downward to minimize off-site glare.	X	X	X	
VIS-4	Turbine components will be painted with a light, nonreflective white color in accordance with the Albany County Wind Siting Regulations (Albany County 2015).	X	X	X	
VIS-5	The Project will follow Federal Aviation Administration (FAA) Obstruction Marking and Lighting requirements as defined by Advisory Circular No 70/7460-1L and will coordinate with the FAA on the feasibility of Aircraft Detection Lighting System (ADLS) to reduce the potential impact of nighttime lighting.	X	X	X	
Water Quality (WQ)					
WQ-1	The Project will identify, avoid, and/or minimize adverse effects to wetlands and waterbodies.	X	X	X	X
WQ-2	Woody vegetation in potentially disturbed wetlands will be cut at ground level to leave the root systems intact and encourage sprouting of the existing species following construction.		X		
WQ-3	Equipment operation in or directly adjacent to wetlands or waterbodies will be kept to the minimum necessary to safely perform the work. Prefabricated equipment matting will be used to avoid rutting, soil compaction, and other ground disturbance where temporary work areas occur in wetlands or waterbodies.		X		X
WQ-4	Wetland and aquatic resource boundaries will be clearly identified on all construction plans and will be posted with signs and flagging in the field.		X		X
WQ-5	Appropriate permits will be secured should any fill or dredge activities in wetlands or other waters of the United States (WOTUS) be required.	X	X	X	X
WQ-5	No parking or servicing of construction-related vehicles will occur within any wetland boundary.		X	X	X
WQ-6	Erosion control barriers and other measures, such as silt fencing, fiber logs, and/or hay bales will be placed immediately upgradient of wetlands and waterbodies to minimize sediment transport and deposition.		X		X
WQ-7	Access roads will be designed and constructed to minimize disruption of natural drainage patterns, including perennial, intermittent, and ephemeral streams.	X	X		

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
WQ-8	A Stormwater Pollution Prevention Plan (SWPPP) outlining specific erosion control measures will be prepared, and its requirements will be implemented on-site for the proposed Project. The SWPPP will comply with EPA and WYDEQ requirements.	X	X		
WQ-9	Construction activities shall be performed using methods that prevent entrance or accidental spillage of solid matter, contaminant debris, and other objectionable pollutants and wastes into flowing streams or dry watercourses, lakes, and underground water sources.		X		
WQ-10	Borrow pits, if required, shall be excavated so that the water will not collect and stand therein. Upon completion of construction, the sides of borrow pits will be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance.		X		
WQ-11	Waterbody crossings would incorporate WYGFD design specifications and professional engineering standards, as applicable. Open-bottom culverts will be used where appropriate to avoid changing stream morphology or removing suitable fish habitat. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any environmentally sensitive areas.	X	X	X	
WQ-12	Excavated material or other construction materials will not be stockpiled or deposited on or near stream banks, pond shorelines, or other watercourse perimeters where they can be washed away by storm runoff or can, in any way, encroach upon the actual waterbody itself.		X		
WQ-13	Water quality best management practices (BMPs) would be implemented at waterbody crossings to minimize any unforeseen impacts to the Platte River system's watershed and associated vegetation communities.		X		X
WQ-14	If new groundwater wells are required for construction or operations, the Project will coordinate with the WY State Engineer's Office to ensure withdrawal volumes will not adversely affect supplies for other uses.	X	X	X	
Wildlife (WL)					
WL-1	Initial vegetation clearing would be performed during the non-breeding season for birds (September 1 through April 15) if feasible. If vegetation clearing cannot occur during the non-breeding season, surveys will be performed in breeding bird habitat to identify avian nesting activity within the Project Area. Nest sites would be avoided until determined to be inactive.	X	X		
WL-2	The Project will develop and implement a Bird and Bat Conservation Strategy to avoid and reduce potential impacts to nonlisted bird and bat species that may result from the operations of the Project.	X	X	X	
WL-3	The Project will develop and implement eagle conservation practices and seek to avoid the unintentional take of eagles at wind energy facilities.	X	X	X	
WL-4	In consideration of the FWS' Land Based Wind Energy Guidelines (2012), the Project will perform postconstruction mortality surveys to calculate the fatality rate of birds and bats.			X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
WL-5	All trash and refuse will be disposed of in designated, covered waste receptacles and regularly removed from the site in order to avoid attracting scavengers.		X	X	X
WL-6	The overhead power to ground wire (OPGW) wires associated with the Project 345-kV gen-tie line will be marked with bird flight diverters consistent with methods suggested in the Avian Power Line Interaction Committee’s Reducing Avian Collisions with Power Lines (2012).		X		
WL-7	If overhead collection lines are included in the Project’s final design, the electric lines will be designed to incorporate appropriate spacing of energized parts to avoid or reduce the potential for electrocution risk to large birds, specifically raptors. The Project’s design would consider the Avian Power Line Interaction Committee’s Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 and Reducing Avian Collisions with Power Lines: The State of the Art in 2012.	X			
WL-8	The Project will notify the FWS within 24 hours of federally listed species or eagle mortality documented on the Project site.		X	X	
WL-9	The Project established a 1-mile spatial buffer around known, occupied eagle nests identified during the 2019 and 2020 raptor nest surveys. The area within the 1-mile buffers was excluded from the Project Siting Corridor, therefore wind turbine generators would be setback a minimum 1-mile from the identified eagle nests. If future nest surveys identify additional occupied eagle nests, the Project will coordinate with the FWS to identify appropriate nest-specific avoidance or minimization measures.	X			
WL-10	To the extent practicable, herptile habitats for Species of Greatest Conservation Need, such as fallen trees, prairie dog colonies, and potential basking rocks, will be left intact.		X	X	X
WL-11	Construction activities will be avoided between Nov 15 – April 30 in areas of Mule Deer Crucial Winter Range.		X		X

Source: ConnectGen (2020).

Note: AQD = Air Quality Division, CPR = cardiopulmonary resuscitation, OSHA = Occupational Safety and Health Administration, U.S. DOT = U.S. Department of Transportation.

2.2.6.1 Project Plans

ConnectGen would develop and implement the environmental-related plans listed in table 2-7 and appendix A to detail the implementation of the measures noted above to avoid or minimize adverse effects on environmental resources from construction, O&M, and decommissioning. Each of these plans would be prepared in the time frame noted and with the agencies noted for coordination or approval.

Table 2-7. ConnectGen’s Future Environmental-Related Plans

Plan	Anticipated Preparation	Agency Coordination or Review
Bird and Bat Conservation Strategy	Prior to construction	Coordination with FWS and WYGFD
Blasting Plan	Prior to construction	Compliance with all applicable local, State, and Federal regulations
Decommissioning and Reclamation Plan	Developed in support of Albany County and ISC permit applications	Compliance with Wyoming Industrial Development Information and Siting Act and WYDEQ regulations and Albany County Zoning Resolution
Eagle Conservation Plan	Prior to operation	Coordination with FWS
Emergency Response Plan	Developed in support of Albany County and ISC permit applications	Coordination with Albany County Fire Warden, Emergency Management Coordinator, and County Sheriff
Erosion Control Plan	Prior to construction	Compliance with measures outlined in Wyoming Pollutant Discharge Elimination System construction stormwater permit
Fugitive Dust Plan	Prior to construction	Developed pursuant to Wyoming Air Quality Standards and Regulations
HSSE Plan	Prior to construction	Compliance with Occupational Safety and Health Administration regulations
Historic Properties Treatment Plan	Prior to construction	Compliance with NHPA Section 106 and Programmatic Agreement (PA)
Lighting Plan	Prior to construction	Compliance with FAA lighting requirements
Spill Prevention, Control and Countermeasures Plan	Prior to construction	Compliance with Spill Prevention, Control, and Countermeasure Rule (40 CFR part 112)
Stormwater Pollution Prevention Plan	Prior to construction	Approval by WYDEQ
Transportation and Traffic Management Plan	Developed in support of Albany County and ISC permit applications	Coordination with Wyoming Department of Transportation and Albany County Road and Bridge Department
Unanticipated Discoveries Plan	Prior to construction	Compliance with NHPA Section 106 and PA
Waste Management Plan	Developed in support of Albany County and ISC permit applications	Compliance with ISC regulations and Albany County Zoning Resolution
Weed Management Plan	Developed in support of ISC permit application	Coordination with Albany County Weed and Pest District
Wind Energy Monitoring Plan	Developed in support of ISC permit application	Coordination with WYGFD and participating landowners

Source: ConnectGen (2020).

2.2.7 Rail Tie Wind Project Planning

ConnectGen considered numerous factors to determine the most suitable location for the Project. The factors listed below were the most important to selection of the Project site:

- Access to high-quality wind resource (10 m-per-second at turbine hub height)
- Proximity to existing high-voltage transmission capacity
- Minimization of impacts to sensitive wildlife and habitats
- Avoidance of protected lands
- Interest from local landowners and compatible land use
- Access to highways for materials delivery
- Constructability of terrain

In addition, the southwestern portion of the Project Area was previously studied in detail in the Hermosa West Wind Farm Project Draft EIS (WAPA 2012). The previous study provided a wealth of information on the baseline conditions for approximately half of the areas that are proposed for development of this Project, which has been incorporated into this EIS by reference, where applicable.

2.3 Summary of Impacts (*table*)

Table 2-8. Summary of Impacts

Resource	No Action Impact	Project Impact
Aesthetics and Visual Resources	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the characteristic landscape would occur and the existing conditions and trends for the resource would continue.	There would be approximately 354,850 acres of visible Class A, B, and C areas (approximately 14 percent of the analysis area) that would be impacted directly by the Project because of the visibility of Project components within the landscape, which would reduce the overall scenic quality for the area. The degree of contrast associated with the introduction of Project components for both the minimum and maximum turbine heights from key observation points (KOPs) ranges from no contrast to strong contrast based on distance from the Project and intervening topography. The degrees of visual change for maximum turbine height would be moderate to strong from 76 percent of identified KOPs as compared to 54 percent associated with the minimum turbine height. The landscape would appear substantially to severely altered; Project components would introduce form, line, color, texture, or scale uncommon in the landscape and would be visually prominent to dominant in the landscape; Project components would attract or demand attention; and Project component would begin to dominate or dominate the visual setting. The degree of visual change for travelers, tourists, and residents ranged from none to strong, depending on distance from the Project and the observation point. The reduced activation time, as well as the short-duration, synchronized flashing of the ADLS, would have substantially fewer significant visual effects (duration) at night than the standard continuous, or synchronized flashing, medium-intensity red strobe FAA warning system, which would reduce the potential degrees of visual change of nighttime lighting depending on viewer location and proximity. One location was identified within the analysis area where there would be a maximum predicted shadow flicker of 25 hours and 6 minutes per year. This represents approximately 0.6 percent of the potential available daylight hours. Based on the overall analysis of these issues, the introduction of wind turbines and associated infrastructure would result in significant impacts as compared to the characteristic landscape.
Air Quality and Climate	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue. Without clean energy generation, increased energy demands would likely be met using the existing mix of fossil fuels and renewable energy. Continuation of fossil fuel-generated energy would result in more air emissions, increased impacts to air quality, and a greater likelihood of catastrophic climate change.	Construction would impact air quality because construction equipment, earthmoving, and travel on paved and unpaved roads would emit quantities of criteria pollutants and fugitive dust. The concrete batch plants would emit fugitive dust and require air permits from the state air permitting agency (WDEQ). The air permit would provide enforceable limits and potential air pollution mitigation measures to reduce air emissions impacts from operation of the batch plants. Air quality impacts because of Project construction would be temporary, ceasing when construction of the Project is complete. The total pollutants emitted from Project construction would be a negligible portion of each county's total projected annual emissions. Estimated Project construction emissions would be well below the General Conformity de minimis thresholds and would not exceed Federal or State ambient air quality standards. Project operations would impact air quality because of operations and maintenance activities that would generate air pollutant emissions from equipment and vehicle exhaust and fugitive dust from soil disturbance and travel on unpaved roads. Estimated emissions from operations and maintenance activities are significantly lower than construction emissions. Project operations and maintenance activity emissions of nonattainment pollutants are well below the General Conformity de minimis thresholds, and Project operations would not exceed Federal or State ambient air quality standards. The Project would generate energy from a renewable resource and would result in significantly fewer emissions than if the same amount of energy generated by fossil fuels. Based on the analyses of these issues, no significant impacts to air quality would be anticipated.

Resource	No Action Impact	Project Impact
Aquatic and Terrestrial Wildlife and Special-Status Species	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.	The Project would slightly decrease available habitat for big game species. Ground disturbance would temporarily remove vegetation used by big game as forage and the noise associated with construction activities would temporarily deter big game from using available habitat. Noise and activities associated with operations would also temporarily deter big game from using available habitat during operation. Three HMUs completely overlap the Project Area, which amounts to approximately 2.4 percent of the total acreage of the three HMUs. Considering the percentage of impacts relative to available habitat, big game individuals could be impacted by Project construction and operations, but impacts would not be anticipated at the population or community levels. Impacts from noise and activities associated with construction and operations would cease when the activity was over, and impacts associated with ground disturbance would end when the disturbance was reclaimed as part of Project decommissioning. Habitat fragmentation would not be anticipated to affect wildlife communities or populations. Increased vehicle and equipment traffic on new and existing access roads would increase the risk of vehicle collisions. These impacts would be minimized through the establishment of a speed limit of 25 miles per hour (mph) on access roads, and risk would be further reduced with the completion of construction activities, but would remain at a lower level for the duration of Project O&M. Throughout the life of the Project, most wildlife would be able to effectively cross roads during times of inactivity; vehicle mortalities would not be anticipated to affect communities or populations of a species. Construction across or near stream channels or other waterbodies that increase turbidity, sedimentation, or salinity would temporarily degrade aquatic habitat. These effects would dissipate shortly after construction activities ceased and sediment settles and would not be anticipated to affect downstream aquatic species habitat or aquatic species populations. It is conservatively anticipated that the volume of water required for construction of the Project would not exceed 200 acre-feet over the course of an 18-month construction period and could be acquired by entering into temporary water use agreements with landowners with existing water sources. Water also could be acquired by drilling temporary water wells that are not hydrologically connected to the Platte River so that no new depletions to the Platte River occur during construction and no effects to aquatic resources would be anticipated. No new water depletions are expected for Project O&M and, therefore, no effects on aquatic resources would be anticipated from water withdrawals during that time. Project construction and operations activities and vehicle traffic during construction and operations would disturb habitat for small game and nongame species and increase predation on these species from the introduction of new perching opportunities for avian predators until the disturbance was reclaimed as part of Project decommissioning and would not be expected to effect populations of species. For one special-status species, the Preble's meadow jumping mouse, the FWS's Area of Influence overlaps a portion of the Project Area. There is moderate and moderately high suitable habitat present in that portion of the Project Area, but the species is not known to occur in the Project Area. The identified moderate and moderately high suitable habitat would be avoided to the extent practicable during Project construction. The analysis of potential impacts to Preble's meadow jumping mouse is ongoing. Consultation with the FWS will be initiated in accordance with Section 7 of the Endangered Species Act if it is determined that the species may be affected. Based on the analysis, no significant impacts would be anticipated to terrestrial and aquatic wildlife and special-status species.

Resource	No Action Impact	Project Impact
Avian and Bat Species	<p>Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.</p>	<p>Ground-disturbing construction and operations activities would impact avian and bat habitat through the removal of vegetation used for nesting, foraging, and brood-rearing for birds. Construction disturbance and operations infrastructure would impact 1,471.3 acres of habitat (5.6 percent of the Project Area) until those areas were reclaimed following construction and again during decommissioning.</p> <p>Anticipated bird fatalities from collisions with vehicles and met towers, and electrocution from aboveground collector lines, would be negligible. There would be no expected population or community-level effects. As required under NEPA, the Project would develop and implement a Bird and Bat Conservation Strategy (BBCS), in consultation with the FWS, to avoid and reduce potential impacts that may result from Project operations; therefore, collision and electrocution effects are not anticipated to impact communities or populations and would end with decommissioning.</p> <p>Project construction and, to a lesser extent, O&M activities in the siting corridors would disturb prey habitat and individual prey animals until construction activities ceased or disturbed areas are reclaimed during decommissioning and are not anticipated to impact individual raptors or communities or populations. Construction activities would remove vegetation with the potential to serve as substrate for nesting avian species in the siting corridors until disturbed areas were reclaimed. Although some birds would be displaced from nesting in the siting corridors, it is anticipated that they would use suitable habitat outside the siting corridors during construction disturbance. Noise and increased human presence from construction and O&M activities, equipment, and personnel would affect some individual birds nesting success because of nest abandonment, direct mortality, reduced fitness and survivorship, and disturbance of nesting vegetation. Effects would decrease with the end of construction activities and cease with reclamation during decommissioning. A BBCS and an Eagle Conservation Plan would be developed and implemented to avoid and reduce potential impacts to avian and bat species. Avian and bat species of concern would be impacted by habitat loss and fragmentation, increased activity, and vehicular traffic in the same ways described for avian and bat species more generally; populations would not be anticipated to be affected. The Project would develop and implement eagle conservation practices to minimize the unintentional take of eagles, including setting wind turbines back at least 1 mile from known, occupied eagle nests. The risk of bird and bat mortality from turbine blade collision would be slightly increased for the Siemens Gamesa 6.0 MW turbines because they would have more total wind-swept area compared to the Vestas 5.6 MW turbines and GE 3.0 MW turbines. The relationship between turbine height and bat mortality risk is unclear for the range of turbines being considered. Project construction and O&M would disturb roost sites and hibernacula for bats if present in the siting corridors in rocky outcrops (0.48 percent of the siting corridors) or forested habitat (0.82 percent of the siting corridors); however, bats could avoid these areas during construction and O&M activities and return when construction activities ceased and reclamation was completed during decommissioning. Based on the analysis of these issues, impacts are expected to individual birds and bats, but populations are not expected to be affected, and the impacts would not be significant.</p>
Cultural Resources and Native American Concerns	<p>Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to cultural resources would occur from the Project and existing conditions and trends that cultural resources are undergoing would continue. Therefore, the No Action Alternative would result in no added sources of, and would not cause, new impacts or adverse effects on cultural resources.</p>	<p>The Project would not physically impact known NRHP-eligible cultural resources or known resources of potential traditional or religious cultural importance to Native Americans, as avoidance of these significant resources, as well as other resources, where possible, is planned. If not avoidable, the PA would address the minimization and mitigation of impacts and adverse effects. The Project would result in nonphysical impacts to known NRHP-eligible cultural resources where setting and/or feeling are important characteristics contributing to the site's NRHP eligibility, and possibly to resources of potential tribal importance, should these be identified within the 10-mile zone of the APE during the consultation process, or newly identified within the Project footprint during Class III survey. Implementation of measures specified under the PA would resolve all adverse effects under the NHPA, satisfying the mitigation of physical and nonphysical impacts under NEPA.</p>

Resource	No Action Impact	Project Impact
Geology, Soil, and Mineral Resources	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance would occur from the Project and the existing conditions and trends for the resource would continue.	The Project would not restrict access for mineral development as the likelihood of development is low and access would still be available for much of the Project Area. The Project is in areas with soils appropriate for construction and the Project would be designed and constructed so as not to increase the likelihood of geologic hazards or soil erosion. The impacts to unique or productive soils would be limited—approximately 164 acres of the prime farmland or farmland of statewide important soils would be permanently converted by the Project, which equates to approximately 2.5 percent of these soil types present within the siting corridor. Based on the analyses of these issues, no significant impacts would be anticipated to these resources.
Land Uses	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.	The Project would not conflict with existing, applicable zoning designations, land use plans, regulations, or conservation plans. Existing land uses would be preserved to the extent possible. Land uses would be reestablished during decommissioning of the Project. The 0.3 acre of prime farmland and 1.7 acres of farmland of statewide importance (if irrigated) that would be converted to Project disturbance during O&M would be reclaimed during decommissioning. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.
Paleontological Resources	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue. Therefore, there would be no impacts to paleontological resources.	Impacts to paleontological resources would result from the discovery of fossils during construction activities or because of increased erosion during Project operations. The Project includes appropriate measures for minimizing negative impacts to important paleontological resources (PALEO-1 through PALEO-4). Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

Resource	No Action Impact	Project Impact
Public Health and Safety	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for public health and safety would continue.	<p>The Project would not result in risks to public health and safety. Potential risks to worker health and safety would be unavoidable; however, these risks would be minimized to the extent possible, and injury rates associated with the Project are not expected to exceed national occupational injury and illness rates. Fire risks and the potential for illegal or criminal activities associated with the Project would be minimized and would not increase the risk of public or worker exposure to health or safety risks. The Project would not exceed the capacities or materials or existing emergency responders that service the Project Area, nor would Project activities result in traffic delays that would lead to degradation of emergency response times. The Project would not increase the public's exposure to EMFs or corona sources, and workers would not be exposed to Project-related EMFs or corona sources. Based on the analyses of these issues, no significant impacts would be anticipated related to public or worker health and safety.</p> <p>Construction of the Project would directly and unavoidably impact noise levels at sensitive receptors, but the impacts would be short term, ceasing with the end of construction. Because construction noise is exempt from the Albany County Wind Energy Siting Regulations, construction of the Project would not violate any allowable noise levels established by Federal, State, or local laws, regulations, or guidelines. Vibration from activities associated with Project construction would not be noticeable at the nearest NSA. If any blasting is required during Project construction, it would be limited to the hours between sunrise and sunset and comply with State and local blasting regulations, including the use of properly licensed personnel and obtaining necessary permits and authorizations. Acoustic modeling demonstrated that noise generated by Project operations would not exceed 55 dBA at any sensitive receptors. The acoustic modeling of the worst-case scenario indicated a possibility that there would be some locations of common property lines between nonparticipating private property and a participating property where the sound level might reach slightly above 55 dBA; however, it is highly unlikely that the actual noise levels at these locations would be as high as the worst-case scenario modeled. If the worst-case scenario occurs and if written landowner permission cannot be obtained at the locations where the sound level slightly exceeds 55 dBA, micrositing of turbines could be necessary to comply with the Albany County Wind Energy Siting Regulations. Based on the analyses of these issues, no significant noise impacts would be anticipated.</p>
Recreation Resources	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.	The Project could temporarily restrict or close portions of recreation areas in the Project Area; however, the use of recreation areas would not be entirely precluded. Noise during Project construction, O&M, and decommissioning would be unavoidable. Based on existing research, it is not known if Project noise would lead to the avoidance of the area by big and small game. However, if avoidance occurred, once construction and decommissioning activities are complete, it is anticipated that big and small game would return to the area; therefore, the quality of hunting opportunities are anticipated to remain similar to existing conditions. Increased demands on recreation resources from Project workers would not exceed the capacities or availability of existing recreation resources. Based on the analyses of these issues, no significant impacts would be anticipated to recreation resources.

Resource	No Action Impact	Project Impact
Social and Economic Resources (including Environmental Justice)	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing social and economic conditions and trends would continue. Population, employment, public services, housing, property values, and tax revenues in the analysis area would continue to be influenced by local, regional, national, and, in some aspects, global economic and social influences.	The temporary population increase during construction is estimated to be about 1 percent of the current population of Albany County, and it would not result in a demand for housing or public services that could not be met by existing housing and capacity of public services. Construction and operations of the Project would provide increases in state and local tax revenues. The Project would not be expected to materially decrease the property values for nearby homes; relevant studies of the effects of wind facilities on residential property values have shown small increases and decreases that are not statistically significant related to the announcement or presence of wind facilities, and that any predicted or observed changes are influenced by other multiple factors. Analysis of U.S. Census data do not indicate that there are high minority or high low-income populations in the immediate vicinity of the Project. Based on the analysis of these issues, no significant adverse socioeconomic impacts would be anticipated from the Project, including impacts to environmental justice populations.
Transportation and Access	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new traffic, traffic patterns, or changes to transportation infrastructure would occur from the Project and the existing conditions and trends for transportation and access to the analysis area would continue.	The Project would contribute to changes in traffic volumes on roadways; however, there would be no degradation to the LOS for routes used for Project activities. The Project would increase traffic volumes at primary intersections and would result in degradation of LOS at two intersections from A to B during construction and decommissioning. These degradations of LOS would be limited to construction and decommissioning periods and would be expected to return to baseline conditions following completion of these Project phases. In addition, LOS B would not restrict flows or result in declines in convenience at levels noticeable to drivers and would not exceed an LOS threshold that warrants mitigation. The Project would minimize the extent and duration of access restrictions and changes to traffic patterns. The Project would not exceed the capacity of existing railroads and would not disrupt existing and ongoing rail operations. The Project would not conflict with airport use or planning areas or airspace. Based on this analysis, no significant impacts to transportation and access would be anticipated.
Vegetation	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.	Construction activities would remove vegetation and disturb soils, increasing the potential for noxious and invasive plant species establishment. Measures to monitor (VEG-6) and treat (VEG-7) noxious and invasive species would minimize this risk. Following construction, 88 percent of disturbed vegetation would be reclaimed, and an additional 11 percent of disturbed vegetation would be reclaimed during decommissioning. Reclamation is expected to be successful in restoring native vegetation cover based on the primary vegetation types in the analysis area and through the implementation of best practices such as the Reclamation Plan, Weed Management Plan, and other relevant EPMs. Fugitive dust from vehicles would affect plants growing in localized areas along access roads, and effects would diminish with the end of construction, occurring only occasionally during O&M. Based on this analysis, no significant impacts would be anticipated for vegetation.

Resource	No Action Impact	Project Impact
Wetland and Water Resources	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to wetland and water resources would occur from the Project and the existing conditions and trends for the resource would continue.	Previous field investigations described in the Surface Waters Assessment Report for the Hermosa West Wind Farm Project noted that that project was not expected to contribute marked changes in sediment load (Environmental Resources Management Southwest, Inc. [ERM] 2010b). The Project would not reduce water availability because Project activities would not connect groundwater aquifers and aquifers in the area have a high recharge rate. Construction would disturb approximately 9.9 acres of wetlands during construction and 0.8 acres of wetlands during operations. The Project would include 109 stream crossings for a total of 6,653.6 linear feet. Of these stream crossings, seven would be perennial and 102 would be ephemeral or intermittent. Several of the ephemeral waterbodies within the siting corridors could be considered non-WOTUS by the ACE and jurisdictional status would need to be determined. If WOTUS could be impacted, ConnectGen would complete a formal WOTUS delineation prior to construction and would use these results to further microsite the Project to avoid or minimize potential impacts to jurisdictional WOTUS, to the extent practicable, and support final CWA Section 404 and EO 11990 permitting requirements (WQ-5). ConnectGen has committed to minimizing and mitigating potential impacts to wetlands and WOTUS through use of EPMS and would comply with Section 404 permitting for any potential impacts to wetlands and/or WOTUS. ConnectGen has committed to spill containment and hazardous materials storage and use measures to minimize potential impacts to surface water and wetlands. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.
Wildland Fire	Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the wildland fire environment would occur from the Project and the existing conditions and trends for wildfires would continue.	Construction and operations of the Project would increase the potential risk of wildfire ignitions. The Project would comply with Wyoming electrical safety codes and standards, including the National Electric Code, and would implement setbacks and other measures that would mitigate this risk. Should a fire occur in the Project Area, local fire departments would respond. The incidence of turbine-ignited fires is rare, and wildfire ignitions in the Project Area are infrequent. A SCADA system would detect any fire impacting infrastructure and shut down affected systems. Local fire departments would respond to fires in the Project Area to prevent fire from spreading and extinguish them. Based on this analysis, no significant impacts to wildland fire would be anticipated

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter contains the analysis of potential impacts that would occur from the Project. The chapter is organized by resource groups, and within each resource there are descriptions of the existing conditions for resources of concern as well as discussion of the potential issues that were raised during the scoping process.

Information on existing conditions has been compiled from published literature, publicly available data, information provided by cooperating agencies and other interested parties, and from technical reports provided by ConnectGen, as noted in the individual resource sections. The technical reports provided by ConnectGen were reviewed by WAPA and its NEPA contractor to verify that the information was collected with valid methodologies and represents the best available science. These reports are available on WAPA's Project website at <https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/rail-tie-wind-project.aspx>.

3.2 Aesthetics and Visual Resources

The term aesthetic and visual resources (visual resources) refers to the composite of basic terrain, geologic and hydrologic features, vegetative patterns, and built features that influence the visual appeal of a landscape. This section describes the existing context of the visual environment and assesses the potential impacts from the construction and operations of the Project.

3.2.1 Regulatory Background

The CEQ regulations for implementing NEPA identify aesthetic effects as a type of impact to be addressed in a review under NEPA, and state that EISs should include discussion of the design of the built environment (40 CFR 1502.16, 1508.8). The DOE NEPA Implementing Procedures (10 CFR 1021.103) identifies that the DOE adopts the regulations for implementing NEPA as identified in 40 CFR 1500–1508 to comply fully with CEQ regulations.

The Federal Government has not adopted laws or regulations that provide specific protection for visual resources on privately owned lands or specific direction for assessment of impacts to such resources. NEPA and its implementing regulations include visual resources as an element of the human environment to be considered in assessing the impacts of an action, but they do not specify how that assessment is to be conducted. Although various Federal laws, regulations, and guidelines address treatment of visual resources on Federal lands, those measures are specific to the Federal lands under the jurisdiction of Federal land management agencies such as the Bureau of Land Management (BLM) and the Forest Service (FS).

To provide a systematic basis for evaluating visual resources, the description of existing visual resources and the assessment of potential impacts to those resources associated with the Project are based on the BLM Visual Resource Management System (Tetra Tech 2020a).

3.2.2 Data Sources

Data used to characterize the baseline and analyze the impacts to visual resources from the Project include the following sources:

- EPA: Level IV ecoregions of Wyoming and Colorado
- BLM: visual resource inventory – Wyoming Rawlins Field Office and Colorado, Royal Gorge Field Office
- FS: Medicine Bow-Route National Forest Scenery Management System (SMS)

Further information, research, and data used in the following analysis can be found within the *Rail Tie Wind Project Visual Impact Assessment* and the *Rail Tie Wind Project Shadow Flicker Assessment Technical Report* (Tetra Tech 2020a, 2020b).

3.2.3 Analysis Area

The analysis area for visual resources is defined as the area of visibility up to 30 miles from the Project Area. This analysis area was determined following research conducted by Argonne National Laboratory and the BLM in *Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes* (Sullivan et al. 2012).

Sullivan et al.'s findings determined that wind facilities with turbine heights ranging from approximately 300 to 400 feet under favorable viewing conditions would be a major focus of visual attention for up to 12 miles and are likely to be noticed by casual observers up to approximately 23 miles during the day. Findings suggest that for wind facilities of this height, an appropriate radius for visual impact analysis would be 30 miles and that wind facilities would be unlikely to be missed by casual observers up to 20 miles and that wind facilities could be a major source of visual contrast up to 10 miles from wind facilities (Sullivan et al. 2012). Although the distance thresholds in the referenced study applied to turbines that are smaller in scale and can be considered conservative in this analysis, more recent studies have not been conducted to validate the prominence of larger turbines in the western landscape. Based on precedents set by studies for other wind energy facilities in Wyoming, the visual analysis area of 30 miles was determined appropriate for this analysis (Tetra Tech 2020a).

To investigate the potential visual impacts of the Project, a viewshed analysis was conducted to determine the extent to which the Project (wind turbines) would potentially be visible within the 30-mile analysis area. Within the 30-mile analysis area, three distance zones were established: foreground (0–5 miles), middle ground (5–15 miles), and background (15–30 miles). The analysis identified where Project components would be visible based on topographic variability and if there were no vegetation or structures to screen a viewer from Project components. This analysis, based on “bare earth” visibility, reflected the conservative scenario in determining sensitive viewing locations and potential visual impacts.

3.2.4 Baseline Description

The following provides a description of the information used to establish existing visual conditions and evaluate potential impacts from the Project. The impacts to visual resources from the construction and operations of the Project follow two primary steps: (1) establishing existing visual character and inherent scenic quality and identifying locations where people commonly view the landscape, and (2) assessing the change to the landscape and the effects on views from key locations.

3.2.4.1 Landscape Character and Scenic Quality

EPA Level IV ecoregions of Wyoming and Colorado were used to develop a description of the existing landscape character within the analysis area. Ecoregions are derived based on elements similar to physiographic provinces which are used by the BLM's visual resource inventory process for comparatively assessing scenic quality. The visual analysis area encompasses the Laramie Basin division of the Wyoming Basin Ecoregion; the Mid-Elevation Forests and Shrublands, Foothill Shrublands, and Subalpine Forests divisions of the Southern Rockies Ecoregion; and Moderate Relief Plains and Front Range Fans divisions of the High Plains Ecoregion (Tetra Tech 2020a).

Scenic or visual quality is the inherent visual appeal of a landscape. The landscape is measured in terms of its distinctiveness (or memorability), scarcity, and variety of the landform, vegetation, water, color, adjacent scenery, and human-made features and how well these features fit together. The inherent scenic quality of the analysis area was established by applying existing BLM visual resource inventories for BLM and non-BLM-managed lands in southern Wyoming and northern Colorado (figure 3-1).

Additionally, areas within the analysis area not inventoried as part of the BLM inventory process include the city of Laramie and lands within Medicine Bow-Routt National Forests under the jurisdiction of the FS. Data for the Laramie and Roosevelt Mountains within Colorado were not available. Based on similar features as those in Wyoming, it is assumed that the inherent scenic quality would be comparable to ratings in Wyoming (Tetra Tech 2020a). Based on the above information, approximately 294,613 acres (12 percent) of the analysis area is considered to have Class A or Distinctive scenic quality; approximately 1,035,260 acres (42.0 percent) has Class B or Typical scenic quality; 821,424 acres (33.5 percent) is characterized as Class C or Indistinctive; and the remaining 307,213 acres (12.5 percent) is characterized as not inventoried or other landownership.

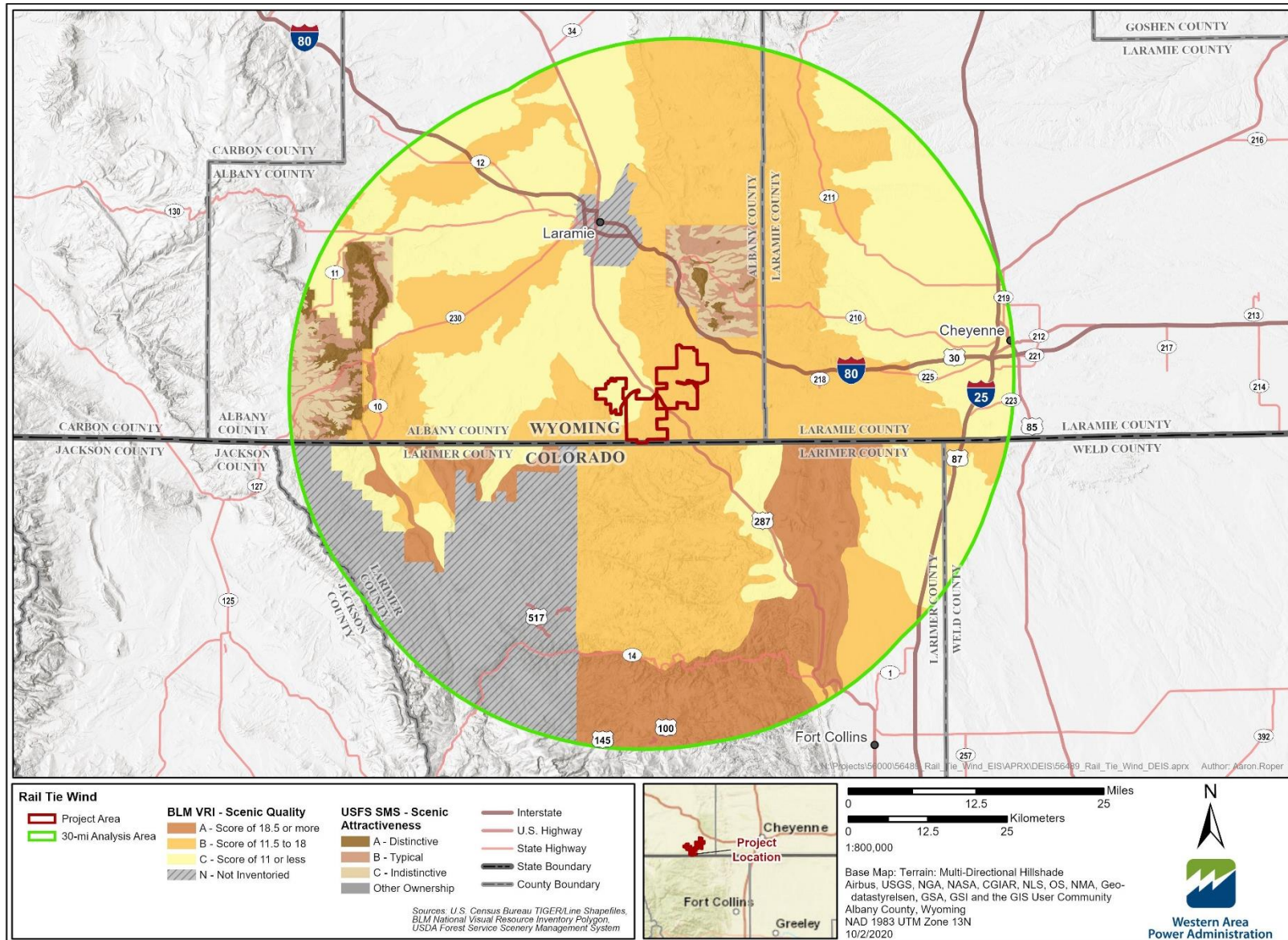


Figure 3-1. Scenic quality in the analysis area for visual resources.

3.2.4.2 Visual Sensitivity

Visual sensitivity reflects attitudes and perceptions held by people regarding the landscape and, in general, reflects the public’s level of sensitivity for noticeable visible change within the landscape.

Sensitive Viewer Groups

Sensitive viewer groups identified within the analysis area have been categorized based on their expected sensitivity to visual change within the characteristic landscape as well as activity type and potential duration of time they would be expected to remain within the analysis area. These viewer groups, which may overlap or have dual representation based on location and or use, are used in determining from where in the analysis area the Project could be viewed from a representative public.

Sensitive viewer groups are categorized by the following:

- **Travelers** – origin/destination travelers that use roadways from which the landscape is viewed.
- **Tourists and Recreational Users** – local and seasonal residents engaged in recreational activities, and tourists and recreational users visiting from outside of the local area.
- **Residents** – people who live and work within the visual analysis area. Generally, they view the landscape from their properties and homes and often from places of employment while engaged in daily activities.

Key Observation Points

Key observation points (KOPs) represent viewing locations where the sensitive viewer types could typically view the Project both from stationary platforms (e.g., residential areas, tourists, or recreation sites) or linear platforms (e.g., highways or major roadways). Thirteen KOPs were identified (table 3-1 and figure 3-2) based on locations within the analysis area that would have potential views of the Project and represent the most critical viewpoints using the criteria above.

Table 3-1. Key Observation Points within Analysis Area

KOP Number	Name	Sensitive Viewer Group	Approximate Distance from Project (miles)
1	Tie Siding	Residents/Travelers	0.0
2	The Buttes	Residents/Travelers	5.4
3	Ames Monument	Tourists and Recreational/Residents	0.4
4	Cherokee Park Road and Fish Creek Road	Residents/Travelers	0.8
5	Virginia Dale Monument	Tourists and Recreational/Travelers	6.3
6	Laramie/City Ranch Road	Residents	11.0
7	Mortenson Lake National Wildlife Refuge	Tourists and Recreational/Travelers	14.0
8	Medicine Bow–Routt National Forest/Vedauwoo Recreation Area	Tourists and Recreational	2.5
9	Interstate 80	Travelers	4.5
10	Arapaho and Roosevelt National Forest/ Prairie Divide Road	Tourists and Recreational/Residents	9.1
11	Snowy Range Road/Big Hollow Road	Travelers	22.0
12	U.S. Highway 30 – Willow Trail	Travelers	20.0
13	Bath Brothers Ranch/Herrick Road	Tourists and Recreational	25.0

Source: Tetra Tech (2020a).

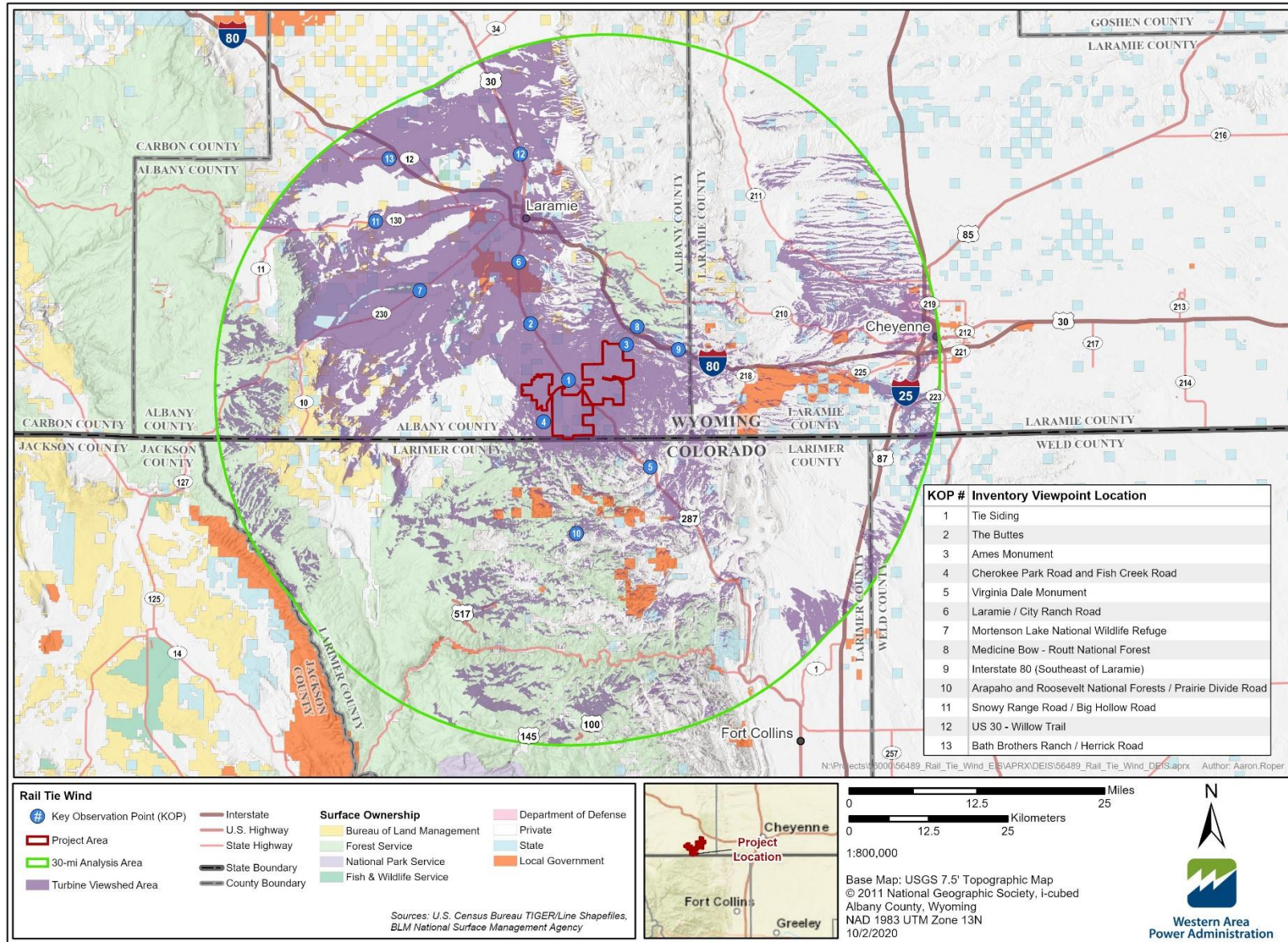


Figure 3-2. Location of KOPs in the analysis area for visual resources.

3.2.5 Impacts to Resource

This section describes the potential impacts to visual resources associated with construction, O&M, and decommissioning of the Project.

3.2.5.1 Impact Indicators

For the purposes of this analysis, an impact to visual resources could result if degrees of visual change for casual observers exceed moderate levels. Because individual viewers have different perspectives about what they value visually on the landscape, the Project was evaluated based on design elements and compared to the existing landscape. Table 3-2 defines the degrees of visual change for casual observers at KOPs and contrasted with the existing landscape’s character and inherent scenic quality and are referenced in the following impact summaries.

Table 3-2. Criteria for Assessing Level of Impacts to Visual Resources

Degrees of Visual Change	Contrast Perceived by Viewers	Magnitude of Change to Landscape Character/Scenic Quality
None	Project components would repeat elements/patterns common in the landscape Project components would not be visually evident	Landscape would appear to be intact and not attract attention Project components would repeat form, line, color, texture, or scale common in the landscape and not be visually evident (no contrast)
Weak	Project components would introduce elements/patterns common in the landscape that would be visually subordinate Project components would create weak contrast compared with other features in the landscape	Landscape would be noticeably altered and begin to attract attention Project components would introduce form, line, color, texture, or scale common in the landscape and would be visually subordinate (weak contrast)
Moderate	Project components would introduce elements/patterns not common in the landscape Project components would be visually prominent in the landscape and would create moderate contrast, compared with other features in the landscape	Landscape would appear to be substantially altered Project components would introduce form, line, color, texture, or scale not common in the landscape and would be visually prominent in the landscape (moderate contrast) Project components would attract attention Project components would begin to dominate the visual setting
Strong	Project components would introduce elements/patterns that would be visually dominant and create strong contrast, compared with other features in the landscape	Landscape would appear to be severely altered Project components would introduce form, line, color, texture, or scale not common in the landscape and would be visually dominant in the landscape (strong contrast) Project components would demand attention Project components would dominate in the visual setting

Sources: BLM (1986); Tetra Tech (2020a).

3.2.5.2 Methods of Analysis

An analysis of visual dominance, scale, and contrast of the maximum (6.0 MW) and minimum (3.0 MW) turbine size scenarios was completed to determine to what degree the Project would attract attention and to assess the relative change in landscape character and inherent scenic quality within the analysis area, compared with the existing characteristic landscape. Specifically:

- The existing visual character was evaluated from locations where people commonly view the landscape in conjunction with previous scenic quality inventories.
- Changes to the characteristic landscape were evaluated based on the criteria in table 3-2.

- The visibility of Project lighting and degree of contrast when viewed at night from KOPs was evaluated to determine how Project lighting, including aircraft warning lighting, could affect sensitive viewers and night skies.
- The degree of visual contrast was evaluated to determine the effect of shadow flicker on sensitive receptors.

3.2.5.3 Proposed Action

Issue Statement #1: Would the introduction of Project components alter the existing visual character and scenic quality within the analysis area as well as when viewed from sensitive viewing platforms (i.e., key observation points) within the analysis area?

Construction

The existing visual character of the analysis area (area of visibility up to 30 miles from the Project Area) would be affected during the period of construction by the generation of fugitive dust; movement of equipment and vehicles in and out of the Project Area; and the presence and operation of construction cranes and other heavy equipment, transmission line stringing, and material stockpiles. The construction activities would introduce forms, lines, colors, textures, and motion not common in the landscape that would temporarily demand attention and create strong contrast with the existing setting. Removal of vegetation would expose lighter-color soils in the cleared areas for laydown/staging, underground electrical collection system trenches, new access roads, distribution lines, and turbine tower bases. The assembly of turbines within the Project Area would be visually dominant and would be the primary focus of attention for viewers due to the introduction of the large, vertical forms of turbine towers and associated construction cranes, as well as the introduction of geometric nacelles and rotors, all of which would create strong contrast within the characteristic landscape. The Project would use existing rights-of-way (ROWS) where possible, and collection lines would be buried and co-located with access roads to the extent practical (Visual Resources [VIS]-1). The O&M building would be designed with rural and agricultural architectural elements to minimize contrast with existing structures. The building would be painted with earth-tone colors identified in the BLM Standard Environmental Colors palette (BLM 2015) or as required by Albany County to reduce visual contrasts from color (VIS-2). Turbine components would be painted with a light, nonreflective white color in accordance with the Albany County Wind Siting Regulations (Albany County Zoning Resolution Chapter V, Section 8) (VIS-4). The construction-related changes to the characteristic landscape would be more perceivable to the casual observer within foreground area (0–5 miles) and range from weak to strong (see table 3-2) within the analysis area based on the type of construction activity taking place, and time of day.

Operations and Maintenance

Visual effects during Project operations would result from the visibility of the aboveground components associated with the Project, including wind turbines, met towers, electrical collection system, substations and switchyard, overhead transmission line, O&M facility, and access roads. The magnitude of change to the landscape character within the Project Area would introduce numerous elements not currently common in the landscape.

The large stature and white coloring of the wind turbines, along with the rotational motion of the wind turbine blades would demand attention, create a strong magnitude of change (see table 3-2) to the existing landscape character, and result in a strong visual contrast when viewed within the foreground area. The overhead transmission and collection lines and dirt access roads would introduce elements common in the

landscape and would be visually subordinate compared to the visual scale and dominance of the wind turbines. Within the middle ground (5–15 miles) and background areas (15–30 miles) of the Project, the magnitude of change to the existing landscape character and scenic quality would vary depending on the distance, scale, and intervening terrain and/or vegetation and would range from moderate to none.

Decommissioning

The effects of Project decommissioning would be similar to those discussed above under Construction. Degrees of visual change from decommissioning would differ from construction in that lands previously disturbed during the life of the Project would likely become less visible over time because of reclamation activities and revegetation. Removal of Project infrastructure would be more immediate, which would influence the degrees of visual change to preconstruction characteristics in a shorter duration of time as a result. But there would be an unknown duration of time for the Project footprint to be no longer visible and for the vegetation within the Project Area to return to its preconstruction state.

Effects on Landscape Character and Scenic Quality

The magnitude of change in landscape character associated with the Project would be strong (see table 3-2) within the Project Area as well as within the foreground area (0–5 miles) of the Project within the analysis area because of the dominant and prominent scale and form of the wind turbines in comparison to the relatively flat to undulating landforms, low-stature vegetation, and minimal built features found in the existing landscape that would be of comparable scale. Magnitude of change to landscape character within the middle ground (5–15 miles) and background (15–30 miles) areas of the Project within the analysis area would range from moderate to none because intervening topography, distance, and the introduction of Project components within the greater landscape context would begin to decrease as distance from the Project increases.

Within the analysis area, the magnitude of change to inherent scenic quality would be strong to weak in areas visible within the Project Area and foreground and middle ground areas of the Project based on visibility analysis. These areas would be impacted directly because the visibility of Project components within the landscape, which would reduce the overall scenic quality due to the introduction of Project components not common in the landscape. There would be approximately 138,930 acres of change to Class A, B, and C areas (approximately 6 percent of the analysis area) within the Project Area and visible areas of the foreground of the Project within the analysis area, and 215,920 acres of change to Class A, B, and C areas (approximately 9 percent of the analysis area) within visible areas of the middle ground of the Project within the analysis area. Although the Project components would be visible in the background areas of the Project within the analysis area, approximately 439,172 acres (18 percent of the analysis area) of the inherent scenic quality for areas within the background would have weak to no degrees of visual change because of distance and the ability to perceive the Project in relation to other existing visual elements within the landscape.

The improvements to existing access roads and the construction of new access roads within the Project Area where current public uses occur could create opportunities for people to access previously inaccessible areas. This could result in trampling vegetation and additional resource damage (such as increased erosion), which could affect scenic quality in these areas. New access roads within the Project Area would not be open for public uses. The degrees of visual change would be weak to strong for the existing scenic quality and landscape character resulting from O&M activities.

Effects on Sensitive Viewer Groups

Travelers

MINIMUM TURBINE HEIGHT

Degrees of visual change would be strong (see table 3-2) for locations in the foreground (0.0–0.8 mile) of the Project Area. The wind turbines would demand attention and dominate the landscape in the foreground of KOPs 1 and 4. The landscape from these KOPs would appear to be severely altered because of the dominance of the wind turbine structures in scale, color, line, texture, and form, as well as the motion of the turbine blades, which would create strong contrast in the setting. Degrees of visual change would be moderate for the number of turbines visible and the rotational motion of the turbine blades visible from KOP 2. Because of intervening topography, the lower portions of many turbines would be obscured, leaving only the nacelle and blades visible on the horizon, which would still attract attention and begin to dominate the visual setting. Weak to no degrees of visual change would result from either intervening topography or distance, which reduces the overall contrast and magnitude of change to the landscape character perceivable by the casual observer from KOPs 5, 7, 9, 11, and 12. Table 3-3 provides a summary of degrees of visual change for travelers by KOP.

Table 3-3. Degrees of Visual Change for Travelers – Minimum Turbine Height

KOP Number	Name	Approximate Distance from Project (miles)	Degrees of Visual Change ¹
1	Tie Siding	0.0	Strong
2	The Buttes	5.4	Moderate
4	Cherokee Park Road and Fish Creek Road	0.8	Strong
5	Virginia Dale Monument	6.3	None
7	Mortenson Lake National Wildlife Refuge	14.0	Weak
9	Interstate 80	4.5	Weak
11	Snowy Range Road/Big Hollow Road	22.0	Weak
12	U.S. Highway 30 – Willow Trail	20.0	None

Note: KOPs 3, 6, 8, 10, and 13 are not categorized within the Traveler sensitive viewer group (see table 3-1).

¹ See table 3-2.

MAXIMUM TURBINE HEIGHT

Degrees of visual change at KOPs resulting from the Maximum Turbine Height scenario would be similar to those associated with the Minimum Turbine Height scenario identified above with the exception of KOP 7, which would result in moderate degrees of visual change as a result of taller wind turbines that would attract greater attention and begin to dominate the visual setting along the horizon.

Tourists and Recreational Users

MINIMUM TURBINE HEIGHT

Strong degrees of visual change (see table 3-2) would be associated with locations in the foreground (0.4–0.8 mile) of the Project Area. The wind turbines would demand attention and dominate the landscape in the foreground of KOPs 3 and 4. The landscape would appear to be severely altered because of the dominance of the wind turbine structures in scale, color, line, texture, and form, as well as the motion of the turbine blades, which would create strong contrast in the setting. Weak to no degrees of visual change would result from either intervening topography or distance, which reduces the overall contrast and

magnitude of change to the landscape character perceivable by the casual observer from KOPs 5, 7, 8, 9, 10, and 13. Table 3-4 provides a summary of degrees of visual change for tourists and recreational users by KOP.

Table 3-4. Degrees of Visual Change for Tourists and Recreational Users – Minimum Turbine Height

KOP Number	Name	Approximate Distance from Project (miles)	Degrees of Visual Change ¹
3	Ames Monument	0.4	Strong
4	Cherokee Park Road and Fish Creek Road	0.8	Strong
5	Virginia Dale Monument	6.3	None
7	Mortenson Lake National Wildlife Refuge	14.0	Weak
8	Medicine Bow–Routt National Forest/Vedauwoo Recreation Area	2.5	Weak
9	Interstate 80	4.5	Weak
10	Arapaho and Roosevelt National Forest/Prairie Divide Road	9.1	None
13	Bath Brothers Ranch/Herrick Road	25.0	None

Note: KOPs 1, 2, 6, 11, and 12 are not categorized within the Tourists and Recreational sensitive viewer group (see table 3-1).

¹ See table 3-2.

MAXIMUM TURBINE HEIGHT

Degrees of visual change for KOPs resulting from the Maximum Turbine Height scenario would be similar to those associated with the Minimum Turbine Height scenario identified above with the exception of KOP 7, which would have moderate degrees of visual change as a result of taller wind turbines that would attract attention and begin to dominate the visual setting along the horizon.

Residents

MINIMUM TURBINE HEIGHT

Strong degrees of visual change (see table 3-2) would be associated with locations in the foreground (0.0–0.8 mile) of the Project. The wind turbines would demand attention and dominate the landscape in the foreground of KOPs 1, 3, and 4. The landscape from these KOPs would appear to be severely altered because of the dominance of the wind turbine structures in scale, color, line, texture, and form, as well as the motion of the turbine blades, which would create strong contrast in the setting. Moderate degrees of visual change would be associated with the number of turbines visible and the rotational motion of the turbine blades perceived from KOP 2. Because of intervening topography, the lower portions of many turbines would be obscured, leaving only the nacelle and blades visible on the horizon, which would still attract attention and begin to dominate the visual setting. Weak to no degrees of visual change would result from either intervening topography or distance, reducing the overall contrast and magnitude of change to the landscape character perceivable by the casual observer from KOPs 6 and 10. Table 3-5 provides a summary of degrees of visual change for residents by KOP.

Table 3-5. Degrees of Visual Change for Residents—Minimum Turbine Height

KOP Number	Name	Approximate Distance from Project (miles)	Degrees of Visual Change¹
1	Tie Siding	0.0	Strong
2	The Buttes	5.4	Moderate
3	Ames Monument	0.4	Strong
4	Cherokee Park Road and Fish Creek Road	0.8	Strong
6	Laramie/City Ranch Road	11.0	Weak
10	Arapaho and Roosevelt National Forest/Prairie Divide Road	9.1	None

Note: KOPs 5, 7, 8, 9, 11, 12, and 13 are not categorized within the Residents sensitive viewer group (see table 3-1).

¹ See table 3-2

MAXIMUM TURBINE HEIGHT

Degrees of visual changes for KOPs resulting from the Maximum Turbine Height scenario would be similar to those associated with the Minimum Turbine Height scenario identified above with the exception of KOP 6, which would have moderate degrees of visual change (see table 3-2) because taller wind turbines would attract attention and begin to dominate the visual setting along the horizon.

Issue Statement #2: How would lighting associated with Project construction, operations, and decommissioning (including aircraft warning lights) affect sensitive viewers and night skies?

Effects on Night Skies

Wind Turbines

To avoid collisions with aircraft, the proposed turbines must be lighted at night. Night sky contrasts can be substantial in rural, undeveloped areas similar to the night sky environment of the analysis area because there are few other light sources and the dark background is uniform and generally featureless. This analysis is based on the implementation of the FAA Type L-864 red lights. FAA warning lights could be visible for more than 20 miles depending on atmospheric conditions (Tetra Tech 2020a). The required FAA lights would introduce visual contrast to the landscape during nighttime hours. Should the Project turbines be constructed, there would potentially be 84 to 149 flashing red lights within the Project Area (depending on the turbine model selected), located approximately 292 to 410 feet above the ground. These lights would simultaneously flash 20 to 40 times per minute (Tetra Tech 2020a). FAA lights associated with the Project would introduce a dense horizontal cluster of flashing lights into a rural landscape that is relatively dark at night and would, therefore, introduce strong degrees of visual change (see table 3-2) within the night sky environment. Although the Project would follow FAA Obstruction Marking and Lighting requirements as defined by Advisory Circular No 70/7460-1L, ConnectGen would coordinate with the FAA on the feasibility of implementing an Aircraft Detection Lighting System (ADLS) to reduce the potential effects of nighttime lighting (VIS-5).

An ADLS (or a similar system) would remain off until activated by the detection of nearby aircraft and would then turn on/turn off again after the aircraft leaves the area. Implementation of an ADLS is dependent upon several factors, including flight paths, proximity of airports, commercial availability, technical feasibility, and agency review and approval. ConnectGen is working with the FAA (separate process, outcome unknown) on approval of an ADLS that would consider flight volume and patterns. The synchronized flashing of the ADLS, if implemented, would result in strong, shorter-duration night sky effects to the surrounding landscape. If approved during the FAA permit and process, the short-duration synchronized flashing of the ADLS would have substantially fewer visual effects at night than the

standard continuous, medium-intensity red strobe FAA warning system, which would help to reduce the potential degrees of visual change of nighttime lighting to either moderate or weak (see table 3-2) depending on viewer location and proximity.

Other Light Sources

In addition to the FAA lights associated with the wind turbines, other proposed nighttime light sources associated with the Project include manually activated emergency and security lighting located at the two substations and the switchyard and security lighting at the O&M facility. Outdoor facility lighting would be designed with light caps and/or directed downward to minimize off-site glare (VIS-3). The amount and character of the light generated by the substations and O&M facility would be consistent with either residential yard lighting that is common in the area or similar to commercial facilities that might employ similar lighting within the analysis area, such as the Mountain Cement Company. In addition, the proposed security lights would also be consistent with existing light sources within the analysis area, including small-scale exterior lighting around residences, outbuildings, and commercial buildings near Tie Siding, Boulder Ridge, and along U.S. 287 (Tetra Tech 2020a).

Issue Statement #3: How would the introduction of wind turbines and associated shadow flicker impact sensitive receptors?

A wind turbine's moving blades can cast a moving shadow on locations within a certain distance of a turbine. These moving shadows are called shadow flicker. The extent of shadow flicker depends on the time of year and day (which determine the sun's azimuth and altitude angles) and the wind turbine's physical characteristics (height, rotor diameter, blade width, and orientation of the rotor blades). Shadow flicker does not occur when the sun is obscured by clouds or fog, at night, or when the source turbine(s) are not operating. Shadow flicker intensity is defined as the difference in brightness at a given location in the presence and absence of a shadow. Shadow flicker intensity diminishes with greater receptor-to-turbine separation distance. Shadow flicker intensity for receptor-to-turbine distances beyond 6,562 feet (approximately 1.24 miles) is very low and generally considered imperceptible. In general, shadow flicker could become more noticeable as one gets closer to turbines, with the largest number of shadow flicker hours, along with greatest shadow flicker intensity, occurring nearest the wind turbines (Tetra Tech 2020b).

The shadow flicker analysis area includes sensitive receptors (e.g., residences, businesses, historic sites, etc.) within 2 miles of Project Area; 184 potential sensitive receptor locations were evaluated within and surrounding the Project Area (Tetra Tech 2020b). Sensitive receptor locations included occupied or potentially occupied residences, one fire station, one business, and two NRHP-listed cultural resources: Ames Monument National Historic Landmark and Dale Creek Bridge (Tetra Tech 2020b). Visual impacts to cultural and historic properties are further described in section 3.6, "Cultural Resources and Native American Concerns."

Sensitive receptor locations had modeled shadow flicker as less than 30 hours per year for each potential turbine location, which is within the acceptable industry standard range for avoiding nuisance. The sensitive receptor with the highest level of shadow flicker for any layout scenario was Receptor 19, a participating landowner located in the southern portion of the Project Area, where there would be a maximum predicted shadow flicker of 25 hours and 6 minutes per year. This represents approximately 0.6 percent of the potential available daylight hours (Tetra Tech 2020b). Further information related to the modeling methodology and industry standards can be found in the March 2020 Shadow Flicker Assessment Technical Report (Tetra Tech 2020b).

3.2.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the characteristic landscape would occur and the existing conditions and trends for the resource would continue.

3.2.6 Aesthetics and Visual Resources Conclusion

There would be approximately 354,850 acres of visible Class A, B, and C areas (approximately 14 percent of the analysis area) that would be impacted directly by the Project because the visibility of Project components within the landscape, which would reduce the overall scenic quality for the area. The degree of contrast associated with the introduction of Project components for both the minimum and maximum turbine heights from KOPs ranges from no contrast to strong contrast based on distance from the Project and intervening topography. The degrees of visual change for maximum turbine height would be moderate to strong from 76 percent of identified KOPs as compared to 54 percent associated with the minimum turbine height. The landscape would appear substantially to severely altered; Project components would introduce form, line, color, texture, or scale uncommon in the landscape and would be visually prominent to dominant in the landscape; Project components would attract or demand attention; and Project component would begin to dominate or dominate the visual setting. The degree of visual change for travelers, tourists, and residents ranged from none to strong, depending on distance from the Project and the observation point. The reduced activation time, as well as the short-duration, synchronized flashing of the ADLS, would have substantially fewer significant visual effects (duration) at night than the standard continuous, or synchronized flashing, medium-intensity red strobe FAA warning system, which would reduce the potential degrees of visual change of nighttime lighting depending on viewer location and proximity. One location was identified within the analysis area where there would be a maximum predicted shadow flicker of 25 hours and 6 minutes per year. This represents approximately 0.6 percent of the potential available daylight hours. Based on the overall analysis of these issues, the introduction of wind turbines and associated infrastructure would result in significant impacts as compared to the characteristic landscape.

3.3 Air Quality and Climate

This section describes air quality conditions that occur within the region surrounding the Project.

3.3.1 Regulatory Background

3.3.1.1 Ambient Air Quality Standards

Federal regulations that govern air quality resources have established the following National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The NAAQS are presented in table 3-6. The EPA assigns classifications to geographic areas based on monitored ambient air quality conditions. Areas that meet the standards of a pollutant subject to NAAQS are classified as being in attainment for that pollutant. Areas that do not meet the NAAQS for a pollutant are designated as being in nonattainment for that pollutant. Areas that cannot be classified based on available information for a pollutant are designated as being unclassified. An area's attainment status is designated separately for each criteria pollutant; one area could have all three classifications. Previously designated nonattainment areas for one of the NAAQS that have since met the NAAQS standards are referred to as attainment areas with a maintenance plan. To ensure that the air quality in those areas continues to meet the standards, a maintenance plan is developed and implemented.

Under the provisions of the Clean Air Act, any state can have requirements that are more stringent than those of the national program. In addition to the NAAQS established by the EPA, Wyoming has additional ambient air quality standards that apply. The Wyoming Ambient Air Quality Standards are codified in WYDEQ *Air Quality Division Standards and Regulations*, Chapter 2. The National and Wyoming Ambient Air Quality Standards are presented in table 3-6.

Table 3-6. Ambient Air Quality Standards

Pollutant	Averaging Time	National	Wyoming
Carbon monoxide (CO)	1 hour	35 ppm	35 ppm
	8 hour	9 ppm	9 ppm
Lead (Pb)	3 months (rolling)	0.15 µg/m ³	0.15 µg/m ³
Nitrogen dioxide (NO ₂)	Annual	53 ppb	53 ppb
	1 hour	100 ppb	100 ppb
Ozone (O ₃)	1 hour	–	–
	8 hour	0.07 ppm	0.07 ppm
Particulate matter 10 microns in diameter or smaller (PM ₁₀)	24 hour	150 µg/m ³	150 µg/m ³
	Annual	–	50 µg/m ³
Particulate matter 2.5 microns in diameter or smaller (PM _{2.5})	24 hour	35 µg/m ³	35 µg/m ³
	Annual	12 µg/m ³	12 µg/m ³
Sulfur dioxide (SO ₂)	1 hour	75 ppb	75 ppb
	3 hour	0.50 ppm	0.50 ppm

Sources: EPA (2020a); WYDEQ *Air Quality Division Standards and Regulations*, Chapter 2.

Note: µg/m³ = micrograms per cubic meter, ppm = parts per million, ppb = parts per billion.

The General Conformity Rule was established under the Clean Air Act Section 176(c)(4) and serves to ensure that Federal actions do not inhibit states’ attainment plans for areas designated as nonattainment or maintenance. The rule effectively applies to all Federal actions that take place in areas designated as nonattainment or maintenance. De minimis levels, established under the General Conformity Rule, are based on the severity of an area’s air quality problem and establish a threshold for determining if a general conformity determination must be performed. Activities below this threshold level are assumed to have no significant impact to air quality. De minimis levels for hazardous air pollutants (HAPs) and GHGs are not yet defined. Exceptions to the General Conformity Rule include the following: actions covered under the transportation conformity rule, actions with associated emissions below specified de minimis levels, and other actions that are exempt or presumed to conform.

In 1999, the EPA announced an effort, known as the Regional Haze Rule (EPA 1999), to improve air quality and visibility in 156 national parks and wilderness areas designated as Class I. Regional haze reduces long-range visibility over a wide region. Section 169A of the Clean Air Act sets forth a national goal for visibility. The rule requires states to demonstrate reasonable progress toward the “prevention of any future, and the remedying of any existing, impairment in Class I areas which impairment results from manmade air pollution.” There are several Class I areas near the Project Area. The nearest Class I area is the Rawah Wilderness 23 miles southwest of the Project Area. Rocky Mountain National Park is 32 miles south of the Project Area. The Mount Zirkel Wilderness lies 55 miles west-southwest of the Project Area.

3.3.2 Data Sources

The National Oceanic and Atmospheric Administration (NOAA) catalogues meteorological and climatological data from weather stations across the United States, including stations near the analysis area.

The National Emissions Inventory is a detailed annual estimate of criteria pollutants and HAPs from air emission sources. Data are collected from State, local, and tribal air agencies and supplemented with data from the EPA (EPA 2020b). The emissions inventory includes estimates of emissions from many sources, including point sources, nonpoint sources, on-road sources, nonroad sources, and event sources. When combined, the emission estimates from these sources create as complete an inventory as possible.

3.3.3 Analysis Area

For air quality, the analysis area contains portions of five counties: Albany and Laramie Counties in Wyoming, and Jackson, Larimer, and Weld Counties in Colorado (figure 3-3). Air pollutants tend to disperse into the atmosphere, becoming more spread out as they travel away from a source of pollution, and, therefore, cannot be confined within defined boundaries such as the boundary of the Project Area or county lines. Because of the nature of air pollutants, the air quality analysis area extends approximately 31 miles (50 kilometers) in all directions beyond the Project Area. A 31-mile radius was chosen to be consistent with minimum air quality analysis required for major source air quality permitting.

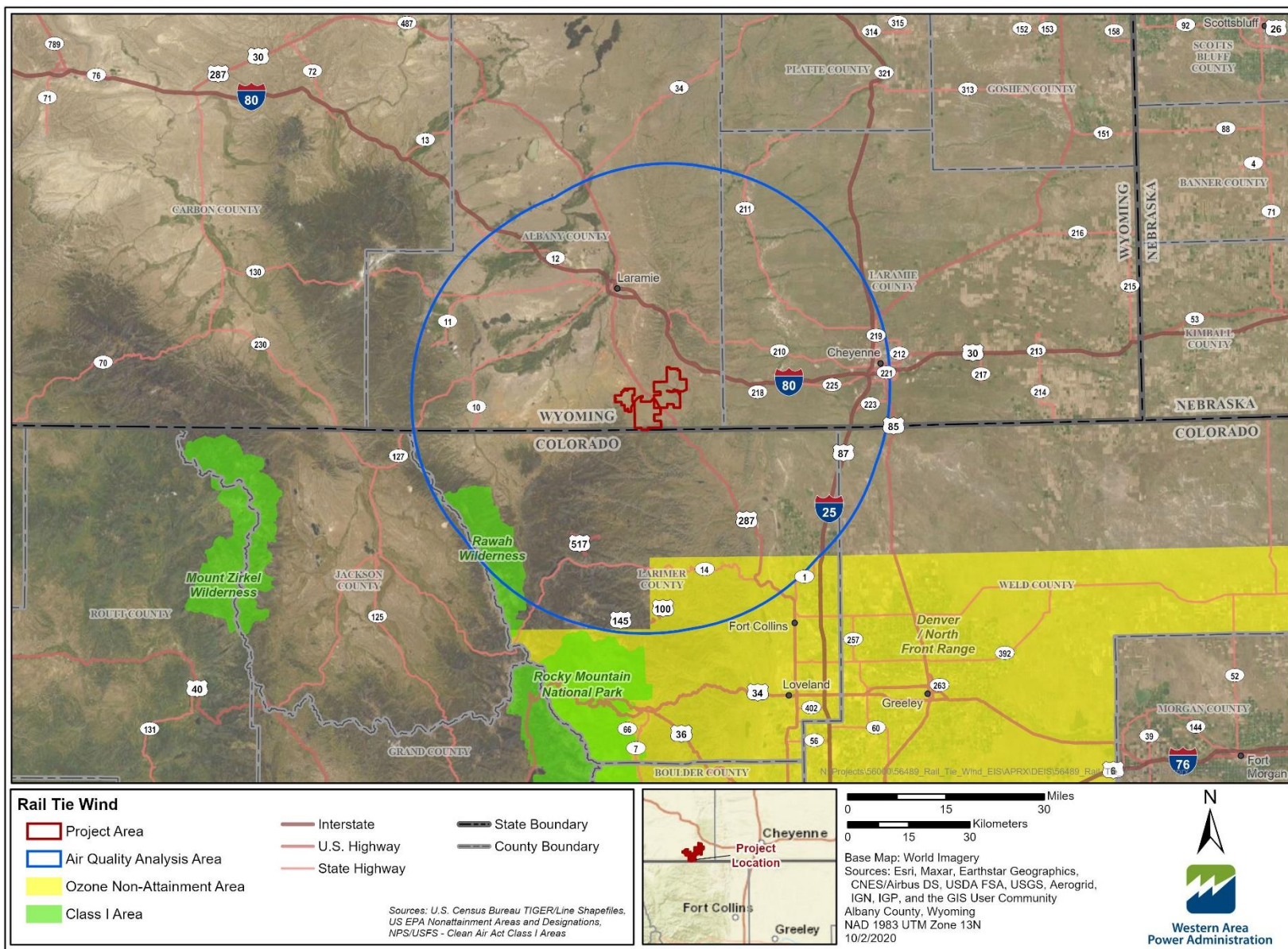


Figure 3-3. Air quality analysis area.

3.3.4 Baseline Description

3.3.4.1 Meteorology and Climate

Wyoming and Colorado are in the interior of the United States, exposing them to a climate with large ranges in temperature. The Project Area experiences cold winters and mild to warm summers. The proximity to the jet stream brings frequent storm systems. The lack of nearby oceans results in a semiarid climate (NOAA 2020a). In winter, the jet stream is either directly above or to the north of Wyoming, which accounts for the frequent strong winds, blasts of arctic air, and sudden precipitation events that occur. In summer, the jet stream retreats northward over Canada, leaving the Project Area's weather mild and pleasant. The average winter temperature (December–February) is 22°F in the Project Area, whereas the average summer temperature (June–August) is 61°F (NOAA 2020b). The Project Area receives approximately 11 inches of precipitation annually. Snowfall averages approximately 50 inches annually in the Project Area (NOAA 2020b).

3.3.4.2 Ambient Air Quality

Albany and Laramie Counties in Wyoming and Jackson County in Colorado are in attainment for all criteria pollutants; therefore, the General Conformity Rule does not apply. Portions of Weld and Larimer Counties are not in attainment with the standard for ozone. The portion of Weld County that is designated as in nonattainment with the ozone NAAQS is outside of the 31-mile analysis area. But the analysis area does extend to a portion of the nonattainment area in Larimer County, CO, northeast of Fort Collins. The Denver-Boulder-Greeley-Fort Collins-Loveland area is in serious nonattainment of the 2008 8-hour ozone NAAQS. The Denver Metro/North Front Range area is in marginal nonattainment of the 2015 8-hour ozone NAAQS. The ozone nonattainment area is indicated on figure 3-3.

3.3.4.3 Emission Inventories for Counties in the Analysis Area

Emission inventories are useful in comparing emission source categories to determine which industries or practices are contributing to the general level of pollution in the five counties included in the analysis area. Emission inventories provide an overview of the types of pollution sources in the area, and the amount of pollution being emitted on an annual basis by said sources. For the purposes of this assessment, the most recent National Emissions Inventory conducted in 2017 was summarized. This inventory is a good estimate of how much each county and state is contributing to air pollution each year. The emission inventory data for 2017 for each county are presented in table 3-7.

Table 3-7. 2017 County Emissions Inventories (tons per year)

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	HAPs	GHGs ¹
Albany County, WY	21,943	7,422	16,781	3,062	347	13,502	2,642	1,213,601
Laramie County, WY	17,270	9,356	29,944	4,083	369	9,555	1,933	2,311,544
Jackson County, CO	8,073	771	2,016	778	42	10,528	1,242	99,082
Larimer County, CO	49,504	7,146	9,646	2,614	1,008	24,755	3,290	4,158,686
Weld County, CO	61,567	30,096	29,164	5,887	354	95,465	9,855	5,082,301

Source: EPA (2020b).

Note: Column totals may not sum exactly because of rounding. NO_x = nitrogen oxides, VOC = volatile organic compound.

¹ CO₂e (CO₂ equivalent) assumes an EPA-recommended global warming potential of 25 for methane (CH₄) and 298 for nitrous oxide (N₂O).

Of the five counties within the analysis area, Weld County, CO, contributed the most to carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter 2.5 microns in diameter (PM_{2.5}), volatile organic compound (VOC), HAPs, and GHG pollution in 2017. Laramie County, WY, contributed the most particulate matter 10 microns in diameter (PM₁₀) pollution. Larimer County, CO, contributed the most sulfur dioxide (SO₂) pollution.

3.3.4.4 Greenhouse Gases/Climate Change

Climate change is a global issue that results from several factors, including the release of GHGs, land use management practices, and the albedo effect, or reflectivity of various surfaces (including reflectivity of clouds). Specific to this Project, GHGs are produced and emitted by various sources during the construction and operational stages of wind power generation.

The recently released second volume of the Fourth National Climate Assessment focuses on the human welfare, societal, and environmental elements of climate change and variability for 10 regions of the United States (Hayhoe et al. 2018). Global climate is changing rapidly. Evidence for these changes consistently points to human activities, especially emission of GHGs, as the dominant cause. Global average temperature has increased by approximately 1.8°F from 1901 to 2016. Without significant emission reductions, annual average global temperatures could increase by 9°F or more by the end of this century (compared to preindustrial temperatures) (Hayhoe et al. 2018).

3.3.5 Impacts to Resource

This section describes the potential impacts to air quality and climate associated with the construction, operations, and maintenance of the Project. Impacts to air quality and climate are discussed in terms of Project emissions of criteria air pollutants and GHGs. The primary sources of criteria air pollutants associated with wind power are from fuel combustion in equipment and vehicles used during construction and maintenance and concrete batch plant emissions. The GHGs associated with wind power are carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O). The primary sources of these GHGs are from fuel combustion in equipment and vehicles used during construction and maintenance, concrete batch plant emissions, and operational emissions of sulfur hexafluoride (SF₆) associated with potential leakage from gas-insulated circuit breakers.

3.3.5.1 Impact Indicators

For the purposes of this analysis, an impact to air quality and climate could result if any of the following were to occur from the construction, O&M, and decommissioning of the Project:

- Emission estimates for regulated pollutants and GHGs exceed applicable regulations
- Project emission estimates exceed county emission inventories
- Emission estimates for O&M exceed General Conformity de minimis levels

3.3.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to air quality and climate.

Estimates of emissions from Project construction were compared against the applicable general conformity de minimis levels (CO and ozone nonattainment). Emissions estimates for construction and operations of the Project were conducted using the following:

- The most recent version of the EPA's Motor Vehicle Emission Simulator (MOVES) tool was used to develop motor vehicle and construction equipment exhaust emission factors (EPA 2015).
- EPA's Compilation of Air Pollution Emission Factors, AP-42 (EPA 2009).

- Western Regional Air Partnership, Fugitive Dust Handbook, revised 2006 (Western Regional Air Partnership 2006).
- WAPA draft EIS, Hermosa West Wind Energy Project. (WAPA 2012).
- Project-specific information provided by ConnectGen for the emissions analysis, including engineering and/or process-specific data and construction and/or operations data (e.g., manpower schedules, equipment schedules, operations schedules, etc.).

3.3.5.3 Proposed Action

Issue Statement #1: How would criteria pollutant and fugitive dust created during construction affect air quality?

Construction activities would result in air pollutant emissions from equipment exhaust, vehicle exhaust from travel to and from the Project Area, delivery truck exhaust, and fugitive dust from soil disturbance and travel on unpaved roads. Table 3-8 summarizes the estimated construction-related Project emissions.

Table 3-8. Estimated Project Construction Emissions (tons per year)

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	GHGs
Road construction	0.7	1.9	0.1	0.1	0.0	0.1	1,393.0
Foundation excavation	0.9	2.1	0.2	0.2	0.0	0.2	908.0
Rebar	0.4	0.6	0.1	0.1	0.0	0.1	154.0
Concrete placement	0.2	0.6	0.1	0.1	0.0	0.1	1,570.0
Foundation backfill	0.3	1.0	0.1	0.1	0.0	0.1	692.0
Wind turbine unloading	0.3	1.1	0.1	0.1	0.0	0.1	230.0
Wind turbine base installation	0.5	2.2	0.1	0.1	0.0	0.1	443.0
Wind turbine tower installation	0.5	2.2	0.1	0.1	0.0	0.1	443.0
Wind turbine nacelle/rotor installation	0.7	2.4	0.1	0.1	0.0	0.2	562.0
Collection system	0.4	0.6	0.1	0.1	0.0	0.1	266.0
Substation	0.2	0.3	0.0	0.0	0.0	0.1	98.0
Miscellaneous	0.7	1.4	0.1	0.1	0.0	0.1	1,330.0
Equipment/supplies deliveries (total)	0.3	0.5	0.0	0.0	0.0	0.1	251.0
Equipment/supplies deliveries (nonattainment areas)	0.0	0.0	0.0	0.0	0.0	0.0	21.0
Worker commute	18.7	1.6	0.0	0.1	0.0	1.6	964.0
Concrete batch plant	0.0	0.0	2.4	0.5	0.0	0.0	0.0
Equipment activity (bulldozers)	0.0	0.0	3.8	2.0	0.0	0.0	0.0
Fugitive dust – site unpaved roads	0.0	0.0	5.2	0.5	0.0	0.0	0.0
Wind erosion – disturbed areas	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Project Construction Emissions	24.8	18.5	12.7	4.3	0.0	3.1	9,325
Albany County, WY, emissions inventory (EI) total	21,943.0	7,422.0	16,781.0	3,062.0	347.0	13,502.0	1,213,601.0
<i>Percent of Albany County EI total</i>	<i>0.1%</i>	<i>0.3%</i>	<i>0.1%</i>	<i>0.1%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.8%</i>
Laramie County, WY, EI total	17,270.0	9,356.0	29,944.0	4,083.0	369.0	9,555.0	2,311,544.0
<i>Percent of Laramie County EI total</i>	<i>0.1%</i>	<i>0.2%</i>	<i>0.0%</i>	<i>0.1%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.4%</i>
Jackson County, CO, EI total	8,073.0	771.0	2,016.0	778.0	42.0	10,528.0	99,082.0
<i>Percent of Jackson County EI total</i>	<i>0.3%</i>	<i>2.4%</i>	<i>0.6%</i>	<i>0.5%</i>	<i>0.2%</i>	<i>0.0%</i>	<i>9.4%</i>
Larimer County, CO, EI total	49,504.0	7,146.0	9,646.0	2,614.0	1,008.0	24,755.0	4,158,686.0
<i>Percent of Larimer County EI total</i>	<i>0.1%</i>	<i>0.3%</i>	<i>0.1%</i>	<i>0.2%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.0%</i>

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	GHGs
Weld County, CO, EI total	61,567.0	30,096.0	29,164.0	5,887.0	354.0	95,465.0	5,082,301.0
<i>Percent of Weld County EI total</i>	<i>0.0%</i>	<i>0.1%</i>	<i>0.0%</i>	<i>0.1%</i>	<i>0.0%</i>	<i>0.0%</i>	<i>0.2%</i>

Source: Tetra Tech (2020c).

The Project would be constructed in compliance with applicable environmental regulations and would comply with all Federal, State, and county environmental regulations (General [GEN]-1). During construction, air emissions would be generated from fossil fuel combustion from construction vehicles and equipment, the two portable concrete batch plants, soil disturbance, and construction traffic on unpaved access roads. The main emissions from the operation of the concrete batch plants would be fugitive dust. The concrete batch plants would require air permits from the state air permitting agency (WDEQ). The air permit would provide enforceable limits and potential air pollution mitigation measures to reduce air emissions impacts from the operation of the batch plants. Construction vehicles and equipment would be inspected periodically per the manufacturer’s specifications, maintained in good working condition (GEN-5), and would be turned off when not in use (Air Quality [AQ]-5).

Prior to the start of construction, a Fugitive Dust Control Plan would be prepared pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f) (AQ-1). All unpaved roads and disturbed areas where construction activities would occur, including temporary laydown areas, would be treated with water or other surfactants as frequently as necessary to control fugitive dust. Wind erosion control techniques such as windbreaks, water, WYDEQ-approved chemical dust suppressants, and/or vegetation would be applied to soil disturbance areas that could potentially result in wind-blown soils (AQ-2).

Overall, the total pollutants emitted from Project construction would be a negligible portion of each county’s total projected annual emissions. Larimer County is classified as a serious nonattainment for 2008 ozone standard and marginal nonattainment for the 2015 ozone standard. The General Conformity de minimis threshold is 50 tons per year (tpy) of VOC or NO_x for serious nonattainment and is 100 tpy of VOC or NO_x for marginal nonattainment. (40 CFR 93.153(b)(1)). Emissions from delivery of equipment and materials for Project construction could occur in the nonattainment area. All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible dust emissions on public roadways either would be covered or the materials sufficiently wetted in a manner to minimize fugitive dust emissions (AQ-4). Project construction emissions would be well below the General Conformity de minimis thresholds. Project construction emissions would cease upon completion of construction activities. Construction emissions would not exceed Federal or State ambient air quality standards.

Issue Statement #2: How would emissions from equipment and vehicles used during operations affect air quality?

O&M activities would result in air pollutant emissions from equipment exhaust, vehicle exhaust from travel to and from the Project site for routine inspections, and fugitive dust from soil disturbance and travel on unpaved roads. Table 3-9 summarizes the estimated O&M-related Project emissions.

Table 3-9. Estimated Project Annual Operations and Maintenance Emissions (tons per year)

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	GHGs
Road maintenance	0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01	25
Delivery of equipment/supplies	0.06	0.09	< 0.01	< 0.01	< 0.01	0.02	46
Worker commute	3.52	0.30	0.01	0.01	< 0.01	0.31	182
Emergency generator	3.16	6.18	0.18	0.18	0.01	0.72	584

Category	CO	NO _x	PM ₁₀	PM _{2.5}	SO ₂	VOC	GHGs
Fugitive dust – site unpaved roads	–	–	1.56	0.16	–	–	–
Wind erosion – disturbed areas	–	–	0.01	0.03	–	–	–
Total Project Operations and Maintenance Emissions	6.75	6.59	1.77	0.39	0.01	1.05	837
Albany County, WY, emissions inventory (EI) total	21,943	7,422	16,781	3,062	347	13,502	1,213,601
<i>Percent of Albany County EI total</i>	0.03%	0.09%	0.01%	0.01%	< 0.01%	0.01%	0.07%
Laramie County, WY, EI total	17,270	9,356	29,944	4,083	369	9,555	2,311,544
<i>Percent of Laramie County EI total</i>	0.04%	0.07%	0.01%	0.01%	< 0.01%	0.01%	0.04%
Jackson County, CO, EI total	8,073	771	2,016	778	42	10,528	99,082
<i>Percent of Jackson County EI total</i>	0.08%	0.85%	0.09%	0.05%	0.02%	0.01%	0.84%
Larimer County, CO, EI total	49,504	7,146	9,646	2,614	1,008	24,755	4,158,686
<i>Percent of Larimer County EI total</i>	0.01%	0.09%	0.02%	0.01%	< 0.01%	< 0.01%	0.02%
Weld County, CO, EI total	61,567	30,096	29,164	5,887	354	95,465	5,082,301
<i>Percent of Weld County EI total</i>	0.01%	0.02%	0.01%	0.01%	< 0.01%	< 0.01%	0.02%

Source: Tetra Tech (2020c).

Emissions from vehicle travel and equipment exhaust during O&M would be minimal. Vehicles and equipment used during O&M activities would be inspected periodically per the manufacturer’s specifications and maintained in good working condition (GEN-5) and would be turned off when not in use (AQ-5). Mileage for vehicle travel to and around the Project for routine inspections would be much less than during construction. Potential SF₆ emissions from circuit breaker leaks were not estimated because the concept of leakage over time is speculative and assumes that equipment would be allowed to fall into disrepair. All circuit breakers would be maintained in proper working order and would meet all regulatory requirements (GEN-5).

Emissions from O&M activities would be significantly lower than construction emissions. The impacts to air quality from operations would continue for the operational life of the Project. Larimer County is classified as a serious nonattainment for 2008 ozone standard and as a marginal nonattainment for the 2015 ozone standard. The General Conformity de minimis threshold is 50 tpy of VOC or NO_x for serious nonattainment and is 100 tpy of VOC or NO_x for marginal nonattainment (40 CFR 93.153(b)(1)). Project O&M activity emissions of nonattainment pollutants would be well below the General Conformity de minimis thresholds. Pollutants generated by Project operations would not exceed Federal or State ambient air quality standards. The Project would generate energy from a renewable resource and would result in significantly fewer emissions than if the same amount of energy were generated by fossil fuels.

3.3.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue. Without clean energy generation, increased energy demands would likely be met using the existing mix of fossil fuels and renewable energy. Continuation of fossil fuel-generated energy would result in more air emissions, increased impacts to air quality, and a greater likelihood of catastrophic climate change.

3.3.6 Air Quality and Climate Conclusion

Construction would impact air quality because construction equipment, earthmoving, and travel on paved and unpaved roads would emit quantities of criteria pollutants and fugitive dust. Air quality impacts because of Project construction, including fugitive dust emissions from the two portable concrete batch plants, would be temporary, ceasing when construction of the Project is complete. The concrete batch plants would require air permits from the state air permitting agency (WDEQ). The air permit would provide enforceable limits and potential air pollution mitigation measures to reduce air emissions impacts from the operation of the batch plants. The total pollutants emitted from Project construction would be a negligible portion of each county's total projected annual emissions. Estimated Project construction emissions would be well below the General Conformity de minimis thresholds and would not exceed Federal or State ambient air quality standards. Project operations would impact air quality because of O&M activities that would generate air pollutant emissions from equipment and vehicle exhaust and fugitive dust from soil disturbance and travel on unpaved roads. Estimated emissions from O&M activities are significantly lower than construction emissions. Project O&M activity emissions of nonattainment pollutants are well below the General Conformity de minimis thresholds, and Project operations would not exceed Federal or State ambient air quality standards. The Project would generate energy from a renewable resource and would result in significantly fewer emissions than if the same amount of energy were generated by fossil fuels. Based on the analyses of these issues, no significant impacts to air quality would be anticipated.

3.4 Aquatic and Terrestrial Wildlife and Special-Status Species

This section describes the existing context of aquatic and terrestrial wildlife and special-status species, including nongame species, small game, big game, fisheries and other aquatic species, and aquatic and terrestrial wildlife species of concern to assesses potential effects on these biological resources from the construction and operation of the Project. The category of special-status species includes federally listed endangered, threatened, or candidate species under the ESA; all special-status wildlife and plant species are discussed in this section, including avian and bat species as well as plants. Sensitive species and those in need of conservation measures (collectively referred to as "species of concern") that are not ESA-listed are discussed in their respective resource sections. Species of concern include state-designated Species of Greatest Conservation Need (SGCN) and other pertinent conservation designations.

Aquatic and terrestrial wildlife does not include avian or bat species analysis with the aforementioned exception of special-status species; avian and bat special-status species discussion is included in this section. Considering the documented impacts of wind facilities to avian and bat species, these biological resources are robustly assessed separately (section 3.5, "Avian and Bat Species").

3.4.1 Regulatory Background

Various Federal laws and regulations provide protection for wildlife species. The ESA, as amended (16 United States Code 1536), is intended to protect and recover species at risk for extinction and the habitat upon which they depend. The ESA directs all Federal agencies to review their actions to determine whether they may affect endangered or threatened species or critical habitat by determining whether a listed species or critical habitat is present and whether there are potential effects to those resources. Consultation with the FWS is required if the action agency determines that a proposed action may affect a listed species or critical habitat. If no species or critical habitat are present or affected, no consultation is required.

Although the State of Wyoming does not have any statutes establishing species as threatened or endangered, it does have State-issued wildlife management guidance documents intended to protect certain classes of wildlife. These State of Wyoming wildlife management guidance documents consist of the following:

- The State Wildlife Action Plan (SWAP), which is a comprehensive wildlife conservation strategy coordinated between wildlife and natural resource agencies and organizations to support the maintenance, management, and diversity of wildlife within the state, including preventing the need for future listings under the ESA (WYGFD 2017a). The Wyoming SWAP lists SGCN and categorizes them based on conservation priority: Tier I species (highest priority), Tier II species (moderate priority), and Tier III species (lowest priority).
- Wyoming Governor's Office EO 2020-1, the Migration Corridor EO, offers a science-based approach for identifying potential big game migration corridors for consideration when managing these species and lays out the process for designating future migration corridors in the state.
- The Wyoming Game and Fish Department's Wildlife Protection Recommendations for Wind Energy Development in Wyoming (WYGFD 2010), which provides recommendations for collecting baseline data prior to project siting to avoid potential conflicts with wildlife; construction and operations monitoring; and mitigating impacts to affected wildlife.

3.4.2 Data Sources

The information presented in this section comes from various sources, including technical biological survey reports developed for the Project, academic and peer-reviewed literature sources, publicly available geographic information system (GIS) data, and governmental resources.

3.4.3 Analysis Area

Several factors influence the geographical occurrence and abundance of wildlife species, including vegetation, environmental conditions, population connectivity, and habitat quality. Therefore, the analysis area for potential effects on aquatic and terrestrial wildlife resources and special-status species varies depending on the resource type and what Project-related effects are assessed.

The following analysis areas have been identified to evaluate the extent to which potential effects from the Project could occur on aquatic and terrestrial wildlife species and special-status species:

- Species occurrences accounts for nongame, small game, big game, fisheries and other aquatic species, special-status species, and aquatic and terrestrial wildlife species of concern: The Project Area, defined as the approximately 26,000 acres encompassed within the Project boundary, is the analysis area. This analysis area and type is especially appropriate for species groups where publicly available spatial data are lacking and the overall breadth of the species category necessitates a generally qualitative approach to analysis.
- Presence or absence of habitat and general landscape alterations for special-status species and aquatic and terrestrial wildlife species of concern: The Project Area is the analysis area for determining the overall habitat value to special-status species and aquatic and terrestrial wildlife species of concern.
- Presence or absence of critical and seasonal habitat for big game species and WYGFD Herd Management Units (HMUs): The Project Area is the analysis area because big game typically require large tracts of habitat and are managed accordingly.
- Native habitat converted to Project infrastructure for nongame, small game, big game, special-status species, and aquatic and terrestrial wildlife species of concern: The siting corridors (representing areas of potential new ground disturbance such as access roads, turbine pads, and

laydown yards) are the analysis area in order to capture all potential native habitat converted to Project-related features and to provide context for overarching changes to the landscape such as habitat fragmentation. This analysis area is transferable to disturbance-specific analysis when Project infrastructure is categorized and differentiated during analysis.

- Potential for equipment collisions for nongame, small game, big game, special-status species, and aquatic and terrestrial wildlife species of concern: The siting corridors are the analysis area to capture any potential for impacts from disturbance such as vehicle collisions.
- Human-activity disturbances for nongame, small game, big game, special-status species, and aquatic and terrestrial wildlife species of concern: The siting corridors are the analysis area to capture any potential for impacts from disturbance such as noise.
- Potential alterations in stream flow from water withdrawal and impacts to water quality, and thus aquatic habitat, for fisheries and other aquatic species: The subwatersheds in which the Project Area lies are the analysis area because they encompass a reasonable downstream extent for consideration of secondary effects on water quantity that could result from Project construction and operations. This analysis area comprises two subwatersheds, the Harney Creek-Laramie River and Dale Creek subwatersheds, and they fall within both the South Platte and North Platte hydrologic subregions in the Missouri region.

3.4.4 Baseline Description

The *Biological Resources Evaluation* (Tetra Tech 2020d) technical report prepared for the Project provides background information on the habitat types and wildlife resources present within the Project Area. Specifically, it describes the Project Area as split between two EPA Ecoregions, the Laramie Basin and Crystalline Mid-Elevation Forests Level IV Ecoregions (Chapman et al. 2004). The Laramie Basin Ecoregion encompasses much of the western portion of the Project Area and consists of an intermontane valley with mixed-grass prairie. The Crystalline Mid-Elevation Forests Ecoregion constitutes the central and eastern portions of the Project Area and consists primarily of mountain slopes and outwash fans containing Ponderosa pine forest with areas of Douglas-fir forest. Vegetation communities that occur within the Project Area, and more specifically the siting corridors, are discussed and analyzed in detail in section 3.14, “Vegetation.”

Because the Project includes a variety of habitat types within two ecoregions, a diversity of species has the potential to occur within the Project Area. Below is a brief description for each of these major groups of animals.

3.4.4.1 Nongame Species

Nongame species are the most varied and abundant of the five major species groups covered here. They consist of reptiles, nongame mammals (not including bats; see section 3.5, “Avian and Bat Species”), and terrestrial invertebrate species. Nongame species expected to occur in the analysis area include bullsnake (*Pituophis catenifer*), several species of small rodent (e.g., Ord’s kangaroo rat [*Dipodomys ordii*]), and northern raccoon (*Procyon lotor*) among others. Nongame species observed in the analysis area during field-based surveys include coyote (*Canis latrans*), swift fox (*Vulpes velox*), striped skunk (*Mephitis mephitis*), least chipmunk (*Tamias minimus*), thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*), Wyoming ground squirrel (*Urocyon elegans*), wandering gartersnake (*Thamnophis elegans*), North American porcupine (*Erethizon dorsatum*), and white-tailed jackrabbit (*Lepus townsendii*) (Tetra Tech 2020d, 2020e, 2020f). Invertebrates are likely the most diverse and abundant group of animals that inhabit the analysis area, which has the potential to support a multitude of invertebrates such as butterflies, moths, beetles, and bees.

3.4.4.2 **Small Game Species**

A variety of common small game mammal species inhabit the southern Wyoming shrublands and forest vegetation communities that constitute the analysis area. Small game species likely to occur in the analysis area include furbearers such as American badger (*Taxidea taxus*), American mink (*Vison vison*), and desert cottontail (*Sylvilagus audubonii*) (Crowe 1986). Small game species observed in the analysis area during field-based surveys include bobcat (*Lynx rufus*) (Tetra Tech 2020e). Avian game species are addressed in section 3.5, “Avian and Bat Species.”

3.4.4.3 **Big Game Species**

Big game are ungulate species managed for hunting and recreational purposes. Habitat for elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*) is present within the analysis area, and all three species were observed in the analysis area during the field-based habitat assessment (Tetra Tech 2020d). Additionally, the WYGFD has mapped moose (*Alces alces*) year-long range and white-tailed deer (*Odocoileus virginianus*) nonwinter range within the analysis area.

WYGFD defines and manages big game seasonal habitats in Wyoming to promote species survivorship and has delineated seasonal ranges for all three big game species confirmed present in the analysis area, including year-long range, crucial winter range, and parturition (i.e., fawning or calving) areas. Crucial winter range is habitat used by big game in the harsh winter months when resources are scarce and functions as a determining factor in the population’s ability to maintain itself over the changing seasons, whereas migration corridors are areas used by big game for seasonal movements between summer and winter ranges. Mule deer is currently the only big game species with State-designated migration corridors; the State-designated mule deer migration corridor does not overlap the analysis area. The big game analysis area contains the following big game seasonal habitats:

- Crucial winter/year-long range: mule deer

No big game species have mapped parturition areas in the analysis area. Big game species with mapped range in the analysis area (elk, mule deer, pronghorn, moose, and white-tailed deer) have associated HMUs designated by the WYGFD that overlap the analysis area. Additionally, bighorn sheep (*Ovis canadensis*) constitute an HMU that overlaps the analysis area, although this species is not expected to occur based on the level topography and open habitat types that largely make up the Project Area.

3.4.4.4 **Fisheries and Other Aquatic Species**

This section addresses fish and other aquatic species groups such as amphibians, crustaceans, and mollusks known to occur or with potential to occur in the streams, herbaceous wetlands, and wet meadow habitat types within the Project Area. Named stream features in the Project Area include Government Creek, Forest Creek, Boulder Creek, Willow Creek, Fish Creek, Dale Creek, and Pump Creek. Of these named streams, four are considered perennial streams (Willow Creek, Fish Creek, Dale Creek, and Pump Creek). Perennial streams are more likely to support aquatic species populations than intermittent or ephemeral hydrological features because of year-round stream flow. Additionally, the Project Area contains 79.6 acres of wetland. See section 3.15, “Wetland and Water Resources,” for additional discussion on hydrological features and wetland habitat in the Project Area.

Within the analysis area, the following fish species have the potential to occur within the streams and associated tributaries: brassy minnow (*Hybognathus hankinsoni*), common shiner (*Luxilus cornutus*), white sucker (*Catostomus commersonii*), Johnny darter (*Etheostoma nigrum*), brook trout (*Salvelinus fontinalis*), longnose sucker (*Catostomus catostomus*), and creek chub (*Semotilus atromaculatus*) (Baxter and Stone 1995). Aquatic invasive species that have the potential to occur within the streams and associated

tributaries of the analysis area include brook stickleback (*Culaea inconstans*); this species spread into Wyoming through bait introductions, accidental introductions with aquaculture species, and via water currents (WYGFD 2014). See section 3.11.4.2, “Fishing,” for discussion on recreational fisheries.

Amphibian species groups expected to occur in the analysis area include frogs, toads, and salamanders (Baxter and Stone 1985). One amphibian species, the western tiger salamander (*Ambystoma mavortium*), was observed during field-based habitat assessments (Tetra Tech 2020d). Aquatic invertebrates expected to occur in the analysis area include northern crayfish (*Orconectes virilis*) (Durland Donahou 2020).

3.4.4.5 Special-Status Species

Special-status species include those listed as threatened, endangered, or candidate species under the ESA. Seven ESA-listed wildlife and plant species have the potential to occur within the analysis area or to be impacted by Project activities (table 3-10). No critical habitat for federally listed species is present in the analysis area.

Table 3-10. Special-Status Wildlife and Plant Species with Potential to be Impacted by the Project

Common Name	Scientific Name	Listing Status	Potential for Impact ¹
Least tern ²	<i>Sternula antillarum</i>	Endangered	Unlikely
Pallid sturgeon ²	<i>Scaphirhynchus albus</i>	Endangered	Unlikely
Piping plover ²	<i>Charadrius melodus</i>	Threatened	Unlikely
Preble’s meadow jumping mouse ³	<i>Zapus hudsonius preblei</i>	Threatened	Low
Western prairie fringed orchid ²	<i>Platanthera praeclara</i>	Threatened	Unlikely
Whooping crane ²	<i>Grus americana</i>	Endangered	Unlikely
Wyoming toad	<i>Anaxyrus baxteri</i>	Endangered	Unlikely

Source: Tetra Tech (2020d); FWS (2019a).

¹ Potential for Impact: Unlikely—species’ range does not overlap with Project and/or no suitable habitat in the Project Area, and/or no downstream Platte River impacts; Low—species’ range overlaps with the Project and marginally suitable habitat in the Project Area; Moderate—species’ range overlaps with the Project and suitable habitat present in the Project Area; High—species’ range overlaps with the Project and highly suitable habitat in the Project Area, and/or known populations/observations within the Project Area.

² Platte River species.

³ Although moderately suitable habitat is present, the species is not known to occur in the Project Area.

Most species in table 3-10 are unlikely to be affected by Project activities; this is because habitat in the analysis area is not suitable for the species and/or the analysis area is not within the species’ known range, or the species is considered a Platte River Species. Platte River Species are threatened and endangered species potentially inhabiting the downstream reaches of the Platte River system outside Wyoming (FWS 2019b). In 1997, Colorado, Wyoming, Nebraska, and the Department of the Interior partnered together to develop the Platte River Recovery Implementation Program. Under the Platte River Recovery Implementation Program, projects that include water-related activities in the Platte River Basin that have a Federal nexus may be subject to consultation under Section 7 of the ESA. These activities include new or expanded wells, reservoirs, or diversions whose water supply is solely derived from sources that are considered hydrologically connected to the Platte River and that meet or exceed the de minimis threshold of 0.1 acre-foot per year of depletions in flow to the nearest surface water tributary to the Platte River system. It is anticipated that any water-related activities associated with the Project will be covered under the Wyoming Depletions Plan. Water for the Project would be obtained by entering into temporary water use agreements with landowners with existing water sources within or near the Project, and/or from drilling new wells from areas that have been determined to not be hydrologically connected to the Platte River system (Cowley 2020). As such, no impacts are expected to Platte River Species.

The Wyoming toad is known only from Mortensen Lake National Wildlife Refuge (NWR) and two private properties covered under the Wyoming Toad Safe Harbor Agreement (FWS 2015). The analysis area is not within the historical range of Wyoming toad (FWS 2015), and the nearest population is approximately 15 miles northwest at the Mortensen Lake NWR. As such, impacts to this species are not anticipated and it was not brought forward for impact analysis.

Preble's meadow jumping mouse is a small rodent that inhabits riparian areas with dense herbaceous and shrub cover, typically adjacent to undisturbed grassland communities and a nearby water source. Suitable riparian habitat typically includes a dense combination of grasses, forbs, and shrubs that provide adequate cover with the potential for a tree and shrub canopy often associated with willow (*Salix* sp.), and occasionally aspen (*Populus tremuloides*) or spruce (*Picea pungens*) in montane areas (FWS 2018). It has been found to regularly use uplands at least as far out as 328 feet beyond the 100-year floodplain, though these upland habitats are extremely variable and range from open grasslands to woodlands (FWS 2018, 2020a). The Preble's meadow jumping mouse has been found within the North Platte, South Platte, and Arkansas River drainages of Colorado and Wyoming (FWS 2008a), and its range extends along the eastern flank of the Rocky Mountains from Douglas, WY, to Colorado Springs, CO, below 8,100 feet in elevation in Wyoming (FWS 2018). Based on trapping efforts conducted between 1989 to 2014, there are no capture records of Preble's meadow jumping mouse within the Project Area, though there are records of positive capture approximately 1.2 miles southeast of the Project Area in 1998 (FWS 2018; Tetra Tech 2020g). The FWS was unable to confirm whether genetic confirmation of the 1998 capture was conducted (Tetra Tech 2020g), although it is included the FWS's recovery plan (FWS 2018), whereas other purported historic Preble's meadow jumping mouse captures were not.

During the September 2019 field reconnaissance, several areas of dense herbaceous riparian vegetation suitable for Preble's meadow jumping mouse habitat were observed in the analysis area (Tetra Tech 2020d). These habitat areas were generally restricted to portions of the perennial stream features within the Project Area (section 3.4.4.4 "Fisheries and Other Aquatic Species") where well-developed wetland fringes, a shrub/tree canopy, and adjacent grasslands were present. Results of a *Preble's Meadow Jumping Mouse Habitat Suitability Assessment* conducted for the Project indicate that nine locations out of 25 surveyed within the Project Area have moderate to moderately high habitat suitability for the Preble's meadow jumping mouse (Tetra Tech 2020g). None of the 25 survey locations were recorded as having high habitat suitability for the Preble's meadow jumping mouse. The 25 survey locations were established in areas where potential disturbance activities may occur and by using results of an initial desktop analysis in combination with results of a field-based surface water resources reconnaissance conducted for the Project.

No Preble's meadow jumping mouse individuals were observed during the habitat suitability assessment for the Project. Trapping efforts in 2009 and 2013 along Dale Creek north of the Project Area and Johnson Creek within the Project Area, respectively, found only the western jumping mouse (*Zapus hudsonius*) (Tetra Tech 2020g). These creeks are both in the South Platte drainage. The 2013 trapping effort reportedly found Preble's meadow jumping mouse along the Laramie River north of the Project Area (Tetra Tech 2020g); however, the FWS did not include those detections in its 2018 recovery plan (see figure 2 in FWS 2018), apparently reversing its earlier assessment of Preble's meadow jumping mouse distribution in Albany County (see figure 1 in FWS 2007a). Regardless, the Laramie River is in the North Platte drainage and not hydrologically connected to survey locations exhibiting suitable habitat in the Project Area, which are located in the South Platte drainage, precluding connectivity with any potential Preble's meadow jumping mouse source population along the Laramie River.

3.4.4.6 Species of Concern

Aquatic and terrestrial wildlife species of concern are those species listed as SGCN under the Wyoming SWAP and/or as Species of Concern (SOC) by the Wyoming Ecological Services Field Office (WYESFO), which provides biological advice to Federal and State agencies, industry, and members of the public concerning the conservation of fish and wildlife and their habitat that could be affected by development activities (FWS 2020b). An extensive list of reptile, amphibian, fish, mammal, and game species of concern potentially occurring within the analysis area is provided in the *Biological Resources Evaluation* developed for the Project (Tetra Tech 2020d).

There are 32 Wyoming SGCN and one WYESFO aquatic and terrestrial SOC with potential to occur in the analysis area (table 3-11). Only one of these SGCN species (Wyoming toad) is a Tier I conservation priority.

Table 3-11. Aquatic and Terrestrial Wildlife Species of Concern with Potential to Occur in the Project Area

Common Name	Scientific Name	Status	Recorded During Field-Based Habitat Assessment
Mammals			
American pygmy shrew	<i>Sorex hoyi</i>	SGCN Tier III	No
Abert's squirrel	<i>Sciurus aberti</i>	SGCN Tier III	No
Eastern spotted skunk	<i>Spilogale putorius</i>	SGCN Tier II	No
Moose	<i>Alces americanus</i>	SGCN Tier II	No
Olive-backed pocket mouse	<i>Perognathus fasciatus</i>	SGCN Tier III	No
Plains harvest mouse	<i>Reithrodontomys montanus</i>	SGCN Tier II	No
Plains pocket mouse	<i>Perognathus flavescens</i>	SGCN Tier III	No
Sagebrush vole	<i>Lemmyscus curtatus</i>	SGCN Tier II	No
Swift fox	<i>Vulpes velox</i>	SGCN Tier II	Yes
Uinta chipmunk	<i>Tamias umbrinus</i>	SGCN Tier III	No
Western spotted skunk	<i>Spilogale gracilis</i>	SGCN Tier III	No
White-tailed prairie dog	<i>Cynomys leucurus</i>	SGCN Tier II, SOC	No
Amphibians			
Northern leopard frog	<i>Lithobates pipiens</i>	SGCN Tier II	No
Plains spadefoot toad	<i>Spea bombifrons</i>	SGCN Tier II	No
Western tiger salamander	<i>Ambystoma mavortium</i>	SGCN Tier III	Yes
Wyoming toad	<i>Anaxyrus baxteri</i>	SGCN Tier I	No
Reptiles			
Plains gartersnake	<i>Thamnophis radix</i>	SGCN Tier III	No
Prairie rattlesnake	<i>Crotalus viridis</i>	SGCN Tier III	No
Red-sided gartersnake	<i>Thamnophis sirtalis parietalis</i>	SGCN Tier III	No
Fish			
Brassy minnow	<i>Hybognathus hankinsoni</i>	SGCN Tier III	No
Common shiner	<i>Luxilus cornutus</i>	SGCN Tier III	No
Iowa darter	<i>Etheostoma exile</i>	SGCN Tier II	No
Crustaceans			
Calico/papershell crayfish	<i>Orconectes immunis</i>	SGCN Tier III	No
Constricted fairy shrimp	<i>Branchinecta constricta</i>	SGCN Tier II	No
Couse tadpole shrimp	<i>Lepidurus couesii</i>	SGCN Tier III	No
Longtail tadpole shrimp	<i>Triops longicaudatus</i>	SGCN Tier III	No

Common Name	Scientific Name	Status	Recorded During Field-Based Habitat Assessment
Mollusks			
Ash gyro	<i>Gyraulus parvus</i>	SGCN Tier III	No
Forest disc	<i>Discus whitneyi</i>	SGCN Tier III	No
Marsh rams-horn	<i>Planorbella trivolvis</i>	SGCN Tier III	No
Prairie fossaria	<i>Fossaria bulimoides</i>	SGCN Tier III	No
Quick gloss snail	<i>Zonitoides arboreus</i>	SGCN Tier III	No
Umbilicate sprite	<i>Promenetus umbilicatellus</i>	SGCN Tier III	No

Sources: Tetra Tech (2020d, 2020e); WYGFD (2017b); FWS (2020b).

Note: SGCN Tier I = highest priority, SGCN Tier II = moderate priority, SGCN Tier III = lowest priority.

The western tiger salamander (SGCN Tier III) and swift fox (SGCN Tier II) were observed within the analysis area during field-based surveys (Tetra Tech 2020d, 2020e). Observations of northern leopard frog (SGCN Tier III) have also been recorded in the Project Area, although this species was not recorded during field-based surveys for the Project (Losch 2020). Three small white-tailed prairie dog (SGCN Tier II, WYESFO SOC) colonies, totaling approximately 0.5 acre, were observed in the northwestern part of the Project Area during field surveys for the Hermosa West Wind Farm Project (WAPA 2012). These three previously recorded prairie dog colonies were not observed within the siting corridors during the September 2019 field reconnaissance (Tetra Tech 2020d).

3.4.5 Impacts to Resource

This section describes the potential impacts to aquatic and terrestrial wildlife and special-status species from the construction, O&M, and decommissioning of the Project.

3.4.5.1 Impact Indicators

The following impact indicators were assessed to determine expected impacts to aquatic or terrestrial wildlife special-status species from construction, O&M, or decommissioning of the Project:

- Acres of terrestrial habitat lost because of construction-related and operations-related ground disturbance or because of clearing of vegetation during construction, and the presence of Project-related infrastructure during operations.
- Miles of new access roads that could lead to habitat fragmentation, increased risk of vehicular collisions, and potential for mortality during construction activities.
- Miles of new transmission line that could lead to increased predation risk.
- Number stream crossings and river miles affected within 164.0 feet upstream to 656.2 feet downstream of stream crossings that could affect aquatic species habitat. Stream crossings are buffered to account for potential secondary effects to aquatic species habitat both upstream and downstream from construction and operations activities.

Effects on aquatic and terrestrial wildlife and special-status species are considered at the individual, community, and population levels for species.

3.4.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to aquatic and terrestrial wildlife and special-status species:

- The potential for species occurrence in the analysis area was evaluated based on publicly available data, field-based technical reports, and observed habitat.
- Big game habitat, including crucial winter range, parturition areas, seasonal ranges, and migration corridors were reviewed to determine if Project infrastructure (siting corridors and access roads) or Project-related activities would result in a decrease in available habitat, conflict with migration corridors, or would deter big game from using the area.
- The boundaries of HMUs were reviewed to determine if Project infrastructure (siting corridors and access roads) and construction activities would displace big game species, fragment habitat, or decrease survival of individual animals.
- Stream and river locations were mapped with Project infrastructure (siting corridors and access roads) and technical reports were reviewed to identify important aquatic resources in the Project Area and determine if the Project would affect native fisheries and aquatic resources.
- Sources of water required for water-consumptive Project activities and the methods, amount, duration, and location (i.e., hydrologic basin) of water withdrawal during construction and operations was evaluated to determine effects on aquatic species habitat during construction and operations.
- Natural histories of nongame species, small game species, and fish and other aquatic species expected to occur in their respective analysis areas were evaluated to determine if Project construction and operations would result in habitat loss or specific effects on each species group.
- Habitat for special-status species and aquatic and terrestrial wildlife species of concern were mapped with the Project Area and Project infrastructure (siting corridors and access roads) to identify habitat in the analysis areas and determine if the Project would result in population declines for any such species.

3.4.5.3 Proposed Action

Issue Statement #1: Would Project construction and operations lead to decreases in available habitat for big game species affecting crucial season survivorship, causing displacement, and ultimately affecting herd management units within the analysis area?

Project construction and operations activities would have the potential to cause stress or displace big game from parts of their crucial winter range and seasonal ranges for the duration of the activity. The intensity of big game avoidance would depend on the scale of the activity, proximity to big game use areas, and the seasonal timing of construction activities. Big game species would be further affected by Project construction and operations if there were a loss of important seasonal ranges and by the timing of construction activities. Vegetation removal and ground disturbance during construction and the presence of O&M-related infrastructure would reduce habitat for big game within the analysis area. See section 3.14, “Vegetation,” for discussion on impacts to vegetation resources, and thus habitat, from construction and operations of the Project. The fitness and survivorship of individual animals or groups of animals could be reduced if they are displaced from critical or seasonal habitats during sensitive periods by construction activities.

Design features and EPMs (section 2.2.6, “Environmental Protection Measures”) for aquatic and terrestrial wildlife would reduce loss of important habitats from construction and operations activities. Important wildlife habitats, such as surface water, wetlands, and riparian areas, would be avoided to the greatest extent practicable to minimize the loss of these critical landscape features (GEN-2, Wildlife [WL]-10). Construction activities will be avoided between November 15 and April 30 in areas of mule

deer crucial winter range (WL-10). Additionally, ground-disturbance activities would be limited to the minimum amount necessary to safely construct Project facilities (Geology and Soils [GEO]-1), and construction travel would be restricted to existing roads and permanent or temporary access roads (GEN-3). Prior to the start of construction, a Weed Management Plan and Reclamation Plan would be developed to guide the management of noxious weeds during construction and operations activities, and reclamation of disturbed areas that do not contain operations infrastructure would occur following the construction process using locally approved, weed-free, native seed mixes (Vegetation [VEG]-3, VEG-4).

The Project Area intersects crucial or seasonal habitat and year-long habitats for big game. During construction of the Project, ground-disturbance activities in big game habitat would temporarily prevent big game from foraging, resting, migration, or parturition; big game would likely return to these areas when construction activities are over or when these areas have been reclaimed. Ground disturbance in big game habitat would temporarily remove vegetation cover, reducing forage resources until reclamation successfully reestablishes vegetation cover. The installation of underground collection lines and the use of crane paths would affect big game habitat during the construction stage only, whereas the construction and use of access roads and substations would affect habitat during construction and O&M.

Mule deer, moose, white-tailed deer, pronghorn, and elk HMUs completely overlap the analysis area (i.e., the Project Area): approximately 1.6 percent of the Sheep Mountain mule deer HMU, approximately 0.6 percent of the Snowy Range/Sierra Madre moose HMU, approximately 0.3 percent of the Southeast Wyoming white-tailed deer HMU, and approximately 2.9 percent of the Centennial pronghorn HMU overlap the analysis area. Approximately 0.9 percent and 0.6 percent of the Iron Mountain and Snowy Range elk HMUs, respectively, overlap the analysis area. The Douglas Creek bighorn sheep HMU overlaps approximately 13,567 acres (0.9 percent of the total HMU) within the analysis area southwest of U.S. 287. The only big game species with WYGFD-mapped crucial winter range in the analysis area is mule deer (figure 3-4). In total, there are approximately 1,651 acres of mule deer crucial winter range in the analysis area, of which approximately 292 acres (17.7 percent) falls within the siting corridors. This is approximately 0.001 percent of the total mapped crucial winter mule deer range in Wyoming. Considering the percentage of impacts relative to available habitat, big game individuals would be impacted by Project construction and operations, but impacts would not be anticipated at the population or community levels.

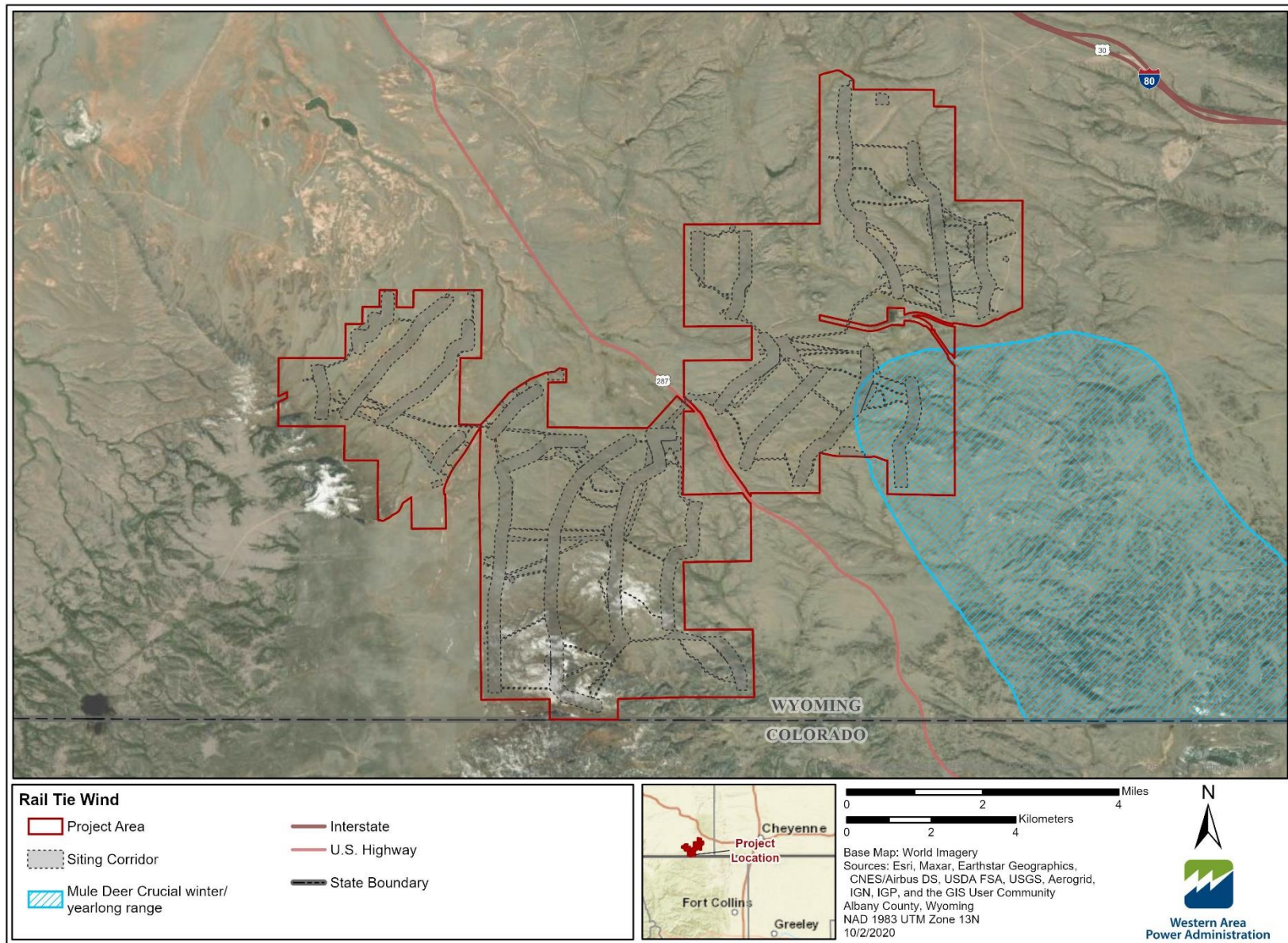


Figure 3-4. Mule deer crucial winter range in the Project Area.

Issue Statement #2: Would big game species be affected by habitat fragmentation, increased activity, and vehicular traffic during construction and operations of the Project?

Habitat fragmentation is linked to reductions in population sizes and connectivity, leaving species more vulnerable to demographic or environmentally stochastic events (World Conservation Monitoring Centre 1992; Burkey and Reed 2006), although level of sensitivity to habitat fragmentation differs by taxonomic group and even by species within the same taxonomic group (Prugh et al. 2008). Effects from habitat fragmentation would be expected where ground disturbance occurs, specifically where operational Project features would be built such as turbine generators, access roads, met towers, the O&M building, and transmission line structures. Habitat fragmentation could result in the physical separation of wildlife individuals within a given population and separation of groups of individuals, potentially limiting reproductive effectiveness and gene flow within and between populations (World Conservation Monitoring Centre 1992). Fragmentation could also alter wildlife communities, as species more adaptable to human disturbances establish themselves, whereas species requiring undisturbed, contiguous habitat could relocate or experience higher mortality from competition or predation. These effects vary by species, with some species affected more than others, and have the potential to cause population declines.

Project infrastructure, noise, and other human-activity disturbances associated with construction and operations of the Project, such as the presence of construction workers or facility personnel, could limit mobility of wildlife, disrupt life-cycle activities because wildlife species may avoid work areas during construction activities and operational facilities such as buildings, and increase energy expenditure. Although wildlife preexisting in proximity to human disturbance could already be habituated to roads, noise, and other human-activity disturbances, changes to these baseline activities could still result in an increased expenditure of energy during critical life stages because sensitivity to disturbance varies by species, and the intensity of species avoidance depends on the scale of the human activity.

Research on big and small game avoidance of wind turbines during operations is limited (Lovich and Ennen 2013; Smith et al. 2020). A recent study on pronghorn response to wind energy development found that during winters, pronghorns avoided operational wind turbines within their winter home ranges (Smith et al. 2020); however, this study concluded that additional, long-term studies are needed. A 2017 study (Sawyer et al. 2017) on mule deer demonstrated long-term avoidance of oil and gas infrastructure, which could have some applicability to other energy infrastructure, including WTGs. Conversely, observations and studies of big game at operating wind facilities have demonstrated that big game species do not necessarily abandon habitats within or adjacent to wind energy facilities (Tetra Tech 2020d; Walter et al. 2004).

Construction of the Project, specifically increased vehicle and equipment traffic on new and existing access roads or during surface-disturbing activities, has the potential to increase the risk of vehicular collisions or compaction by construction equipment. A review of existing literature contends that roads and the associated human presence are generally associated with negative effects on biotic integrity in both terrestrial and aquatic ecosystems (Trombulak and Frissell 2000). These potential effects would be significantly reduced with the completion of construction activities but would not altogether cease as ongoing O&M activities necessitate the use of access roads.

EPMs relative to minimizing impacts from habitat loss, discussed above, are also applicable to minimization of effects from habitat fragmentation. Further EPMs would be put in place to reduce the likelihood of vehicular collisions with wildlife through the establishment of a speed limit of 25 miles per hour (mph) on access roads (GEN-4). Additionally, construction vehicles and equipment would be maintained in proper operating condition and would be equipped with manufacturers' standard noise control devices or better (e.g., mufflers or engine enclosures), and blasting or hydraulic hammering would be limited to daylight hours (NOISE-1, NOISE-3).

The effects of habitat fragmentation correlates to ground disturbance within the analysis area during the construction and operations of the Project (see table 2-1). Because big game species occurring in the analysis area would still be able to cross access roads and other Project-related infrastructure effectively, habitat fragmentation from construction and operations is not likely to affect communities or populations; however, individuals would be at increased risk of vehicular collision.

Potential effects from noise and other human-activity disturbances would generally vary by species group. For example, research in Wyoming has demonstrated that big game species that are consistently exposed to noise and human activity become desensitized and rarely modify their behavior when these disturbances occur (Brown et al. 2012). But meta-analysis studies have demonstrated that anthropogenic noise regularly adversely affects a wide range of species from a variety of taxonomic groups (Kunc and Schmidt 2019). Given the sporadic and localized nature of Project-related noise and other human-activity disturbances, the associated effects are likely to affect individuals of a species rather than communities or populations; these effects could lead to reproductive failure for one season or to increased stress on individuals, which could affect their overall ability to survive. These effects would be considerably reduced with the completion of construction activities but would not altogether cease as operations activities would necessitate ongoing human presence in the analysis area.

Acres of ground disturbance during construction represent the potential for equipment compaction, and miles of new access road represent the potential for vehicle or equipment collisions (see table 2-1). See section 3.13, "Transportation and Access," for a discussion on anticipated vehicle and road use for the Project. Mortality from vehicle collision or equipment compaction would be infrequent but would affect individuals of a species. Vehicle impacts are more likely to occur during Project construction because of higher traffic volume on access roads and active displacement of individuals by construction activities. Vehicle impacts are not anticipated to affect communities or populations of a species.

Issue Statement #3: Are construction activities expected to affect native fisheries and other aquatic resources within the analysis area?

Potential adverse effects on fisheries and other aquatic species from the Project are loss or degradation of habitat. Fish and other aquatic species would be affected by Project construction if there are effects on water quality and quantity within the Harney Creek-Laramie River and Dale Creek subwatersheds (analysis area). Construction across stream channels or other waterbodies could affect native fisheries and other aquatic resources by increasing turbidity and sedimentation, increasing salinity, or by potential introduction of aquatic invasive species, which could degrade aquatic habitat. See section 3.15, "Wetland and Water Resources," for additional discussion on how turbidity, sedimentation, and increases in salinity affect water resources more generally.

Environmentally sensitive areas in or adjacent to the Project Area, including wetlands and aquatic habitat, would be delineated and avoided to minimize impacts to these areas during construction and operations (GEN-2). Wetland and aquatic resource boundaries would be clearly identified on all construction plans and would be posted with signs and flagging in the field (Water Quality [WQ]-4). Prior to the start of construction, a Stormwater Pollution Prevention Plan (SWPPP) would be developed to detail erosion control measures, such as placement of barriers such as silt fencing, fiber logs, and/or hay bales, which would be implemented to minimize sediment transport and deposition in wetlands and aquatic habitats (WQ-6, WQ-8). Waterbody crossings would incorporate WYGFD design specifications and professional engineering standards, as applicable (WQ-11). Water quality best management practices would be implemented at waterbody crossings to minimize any unforeseen impacts to the Platte River system's watershed and associated vegetation communities (WQ-13). Open-bottom culverts would be used where appropriate (such as where fish passage is a concern) to avoid changing stream morphology or removing suitable fish habitat. In addition, waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion and deposition and minimizes impacts to any environmentally sensitive areas

(WQ-9). Furthermore, the implementation of vegetation restoration activities during and after construction of the Project would minimize potential erosion. But if initial restoration activities were not successful, erosion could continue to impact water quality for fish and aquatic species until vegetation could re-establish itself naturally.

Construction activities could cause runoff resulting in fine sediments entering the water source, which could increase sedimentation and turbidity; the severity would be dependent upon soil type, soil moisture, weather events, and the magnitude of disturbance and its proximity to the water source. Salinity could increase in aquatic habitats if the soils being disturbed within the watershed are saline soils and are transported into water resources. There are seven perennial stream crossings associated with construction of the Project, and approximately 454.6 linear feet of perennial stream crossing (see section 3.15.5.3 for additional discussion on impacts to surface water). Although stream crossings during construction activities could cause sedimentation or increased salinity that adversely affect aquatic species habitat, the effects would dissipate shortly after the construction activity ceased and once sediment was allowed to settle. Such effects are not anticipated to be of a magnitude to create far-reaching downstream effects on aquatic species habitat. For stream crossings where operations-related features are sited, appropriate EPMs such as the use of open-bottom culverts to aid fish passage would decrease the intensity of effects. Analyses have demonstrated that adequately sized, open-bottom arch culverts are very good for fish passage because they allow natural streambed material to be maintained in new installations (Federal Highway Administration 2007). Movement of construction equipment between stream crossings could create the potential for the spread of aquatic invasive species from one body of water to another, adversely affecting aquatic species habitat in the analysis area for the native species present. Appropriate best management practices would help mitigate these effects. As such, effects on aquatic species are not expected at the population or community level but are possible at the individual level.

Issue Statement #4: Are construction activities expected to require water withdrawals, and if so, how might such activities affect native fisheries and aquatic resources within the analysis area?

As discussed in section 3.4.4.5 “Special-Status Species,” no new water depletions are expected for the Project. It is conservatively anticipated that the volume of water required for construction of the Project would not exceed 200 acre-feet over the course of an 18-month construction period. An estimated 10 acre-feet would be used for mixing concrete, and the remainder would be used for civil activities (e.g., dust control, road compaction). Water required for construction could be acquired by entering into temporary water use agreements with landowners with existing water sources or by drilling temporary water wells that are not hydrologically connected to the Platte River so that no new depletions to the Platte River occur during construction. During operations, water use would be minimal and would occur at the O&M building for restrooms and washing; Project operations are estimated to consume less than 2 acre-feet of water per year. No new water depletions are expected for Project construction or O&M; water for the Project would be obtained by entering into temporary water use agreements with landowners with existing water sources in or near the Project Area, drilling new wells in areas not hydrologically connected to the Platte River system, purchasing from an off-site source within Albany County, or a combination thereof. As such, effects on aquatic species from water withdrawals are not expected at the individual, population, or community levels. For a discussion on potential effects on Blue Ribbon and Red Ribbon streams in the analysis area, and resultant effects on fisheries, see section 3.11.4.2, “Fishing.”

Issue Statement #5: Would nongame species be affected by habitat loss and fragmentation, increased activity, and vehicular traffic during construction and operations of the Project resulting in population declines?

Potential adverse effects on nongame species from the Project include loss, degradation, and/or fragmentation of habitat; loss of important habitat features such as burrows or riparian areas; vehicle collisions; compaction from construction equipment; and increased noise and disturbance levels. Nongame species would be further affected by Project construction and operations if there is an increase in predation because of new perching opportunities and nesting habitat for avian predators along the 345-kV electric transmission line and aboveground collection lines. Effects on invertebrates would be similar to those described above, such as habitat loss. See section 3.14, "Vegetation," for a discussion on impacts to vegetation resources, and thus habitat, from construction and operations of the Project.

In order to avoid attracting scavengers such as common ravens (*Corvus corax*) that could opportunistically use transmission line structures as perches, Project trash and refuse would be disposed of in designated, covered waste receptacles and regularly removed from the Project site (WL-5).

Habitat loss and fragmentation from transmission line construction would have a greater impact to invertebrates with very limited geographic distributions, limited localized populations, and specific foraging and reproductive requirements. Transmission line structures are landscape features during operations, so associated effects from increases in mortality from avian predators would only occur during the operations stage of the Project. Adverse effects on invertebrates could occur at the individual, community, and population level, depending on species. Impacts from construction and O&M of the Project are not expected to result in population or community level declines for nongame species given the relatively small amount of disturbance compared to available habitat.

Issue Statement #6: Would small game species be affected by habitat loss and fragmentation, increased activity, and vehicular traffic during construction and operations and maintenance of the Project resulting in population declines?

Potential adverse effects on small game species during construction and O&M of the Project would include habitat loss, degradation, and/or fragmentation; loss of important habitat features such as burrows or riparian areas; mortality from vehicle collisions; compaction from construction equipment; and increased noise and disturbance levels. Small game species could also experience increased predation risk as discussed above for nongame species. Although potential adverse effects would affect individuals, population or community level declines would not be expected because small mammal species generally have high reproductive rates sufficient for them to repopulate an area after construction. Impacts from construction and O&M of the Project are not expected to result in population or community level declines given the propensity for small mammal species to repopulate disturbed areas, their high reproductive rates, and the relatively small amount of disturbance compared to available habitat. See section 3.14, "Vegetation," for a discussion on impacts to vegetation resources, and thus habitat, from construction and operations of the Project.

Issue Statement #7: Would special-status species and aquatic and terrestrial wildlife species of concern be affected by habitat loss and fragmentation, increased activity, and vehicular traffic during construction and operations of the Project resulting in population declines?

Potential effects on special-status species and aquatic and terrestrial wildlife species of concern include habitat loss, degradation, and/or fragmentation; loss of important habitat features such as burrows or riparian areas; vehicle collisions; compaction from construction equipment; and increased noise and

disturbance levels. In general, effects specific to species groups (i.e., big game, small game) can largely be applied to special-status species and aquatic and terrestrial wildlife species of concern that fall within those specific species groups, such as increased predation risk.

If a special-status species fatality does occur, the FWS would be notified within 24 hours of the federally listed species documented on the Project site (WL-8). The only special-status wildlife or plant species that is being considered for impacts is the Preble's meadow jumping mouse, which was assessed as having low potential for impact in the analysis area (see table 3-10). The *Preble's Meadow Jumping Mouse Habitat Suitability Assessment* conducted for the Project indicates that there are areas of moderate to moderately high habitat suitability for the Preble's meadow jumping mouse within the Project Area (Tetra Tech 2020g), and portions of the Project Area fall within the FWS Preble's meadow jumping mouse Area of Influence (FWS 2021). The Project Area is also within portions of, but near the edges of, the USGS Cache la Poudre hydrologic unit code (HUC) 8 recovery unit for this species (FWS 2021). There are no capture records of Preble's meadow jumping mouse within the Project Area, and even negative survey findings, based on trapping conducted between 1989 and 2014 (Tetra Tech 2021). As discussed, important wildlife habitats such as riparian areas, including moderate and moderately high suitable habitat for Preble's meadow jumping mouse, would be avoided to the greatest extent practicable to minimize the loss of these critical landscape features (GEN-2). FWS staff have been engaged for technical assistance related to this species.

In addition to the general EPMs noted above, ConnectGen has further committed to species-specific conservation measures that would be implemented within the identified moderate or moderately high habitats during the construction phase of the Project, which were adapted from FWS recommended conservation measures for Preble's meadow jumping mouse (ConnectGen 2021):

- Plan project construction activities in suitable habitat during the species' hibernation season (November 1 through April 30).
- Prior to ground disturbance activities within suitable habitat, trim woody vegetation to ground level using hand tools during the active season to discourage PMJM from hibernating in construction areas for those sites. Cut vegetation will be removed and disposed of in an area outside of those suitable habitats and associated upland buffer zones.
- Any vegetation clearing within suitable habitat during the PMJM active season (May 1 through October 31) would be performed during daylight hours to avoid disrupting PMJM nocturnal activities.

Based on the above noted factors of the Project being located near the edge of the Area of Influence, the lack of occurrence data and negative survey findings in the Project Area, and the commitments to avoid construction in moderate or moderately high habitats, WAPA has determined the Project would have no effect to the Preble's meadow jumping mouse.

Species of concern would experience the incremental loss of habitat (vegetation cover) and increased habitat fragmentation. In areas of ground disturbance, loss of habitat would occur until reclamation activities were completed and native vegetation successfully re-established. This is especially impactful for special-status species and aquatic and terrestrial wildlife species of concern that depend on vegetation cover, and thus habitat, that recovers slowly. Grassland and herbaceous habitat types would recover relatively quickly, whereas shrubland and forest communities would take a comparatively longer time to return to predisturbance cover. See section 3.14, "Vegetation," for a discussion of impacts from vegetation removal and reclamation potential. Most areas of ground disturbance would occur within threetip sagebrush habitat, and the species composition of that vegetation community is favorable toward reclamation efforts; therefore, residual impacts from threetip sagebrush removal and habitat fragmentation are not anticipated to have population-level or community-level effects for any aquatic and terrestrial wildlife species of concern that require such habitat.

3.4.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.

3.4.6 Aquatic and Terrestrial Wildlife and Special-Status Species Conclusion

The Project would slightly decrease available habitat for big game species. Ground disturbance would temporarily remove vegetation used by big game as forage and the noise associated with construction activities would temporarily deter big game from using available habitat. Noise and activities associated with operations would also temporarily deter big game from using available habitat. Three HMUs completely overlap the Project Area, which amounts to approximately 2.4 percent of the total acreage of the three HMUs. Considering the percentage of impacts relative to available habitat, big game individuals would be impacted by Project construction and operation, but impacts would not be anticipated at the population or community levels. Impacts from noise and activities associated with construction and operations would cease when the activity was over, and impacts associated with ground disturbance would end when the disturbance was reclaimed as part of Project decommissioning. Habitat fragmentation would not be anticipated to affect wildlife communities or populations. Increased vehicle and equipment traffic on new and existing access roads would increase the risk of vehicle collisions. These impacts would be minimized through the establishment of a speed limit of 25 mph on access roads, and risk would be further reduced with the completion of construction activities, but would remain, at a lower level, for the duration of Project O&M. Throughout the life of the Project, most wildlife would be able to effectively cross roads during times of inactivity; vehicle mortalities would not be anticipated to affect communities or populations of a species.

Construction across or near stream channels or other waterbodies that increase turbidity, sedimentation, or salinity and provide for potential spread of aquatic invasive species would temporarily degrade aquatic habitat. These effects would dissipate shortly after construction activities cease and sediment settles and would not be anticipated to affect downstream aquatic species habitat or aquatic species populations. It is conservatively anticipated that the volume of water required for construction of the Project would not exceed 200 acre-feet over the course of an 18-month construction period. Water could be acquired by entering into temporary water use agreements with landowners with existing water sources or by drilling temporary water wells that are not hydrologically connected to the Platte River so that no new depletions to the Platte River occur during construction and no effects to aquatic resources would be anticipated. No new water depletions are expected for Project O&M and, therefore, no effects on aquatic resources would be anticipated from water withdrawals during that time.

Project construction and operations activities and vehicle traffic during construction and operations would disturb habitat for small game and nongame species and increase predation on these species from the introduction of new perching opportunities for avian predators until the disturbance was reclaimed as part of Project decommissioning and would not be expected to effect populations or communities of a species.

For one special-status species, the Preble's meadow jumping mouse, the FWS's Area of Influence overlaps a portion of the Project Area. There is moderate and moderately high suitable habitat present in that portion of the Project Area, but the species is not known to occur in the Project Area. The identified moderate and moderately high suitable habitat would be avoided to the extent practicable during Project construction. Based on the analysis of these issues, no significant impacts would be anticipated to terrestrial and aquatic wildlife and special-status species.

3.5 Avian and Bat Species

This section describes the existing context of winged wildlife, including raptors, migratory birds, bats, and associated species of concern and assesses potential impacts to these biological resources from the construction and operations of the Project. For discussion on impacts to aquatic and terrestrial wildlife and all special-status species (including avian and bat special-status species), see section 3.4, “Aquatic and Terrestrial Wildlife and Special-Status Species.”

3.5.1 Regulatory Background

In addition to the Federal laws and regulations mentioned in section 3.4.1, “Regulatory Background,” that offer some legal protections to wildlife species, such as the ESA, there are various other laws and regulations that provide further protections for select avian species. These Federal statutes consist of the following:

- The Migratory Bird Treaty Act of 1918, as amended, a multilateral international agreement intended to ensure the sustainability of populations of all protected migratory bird species and that prohibits the “take” (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the FWS.
- The BGEPA, a Federal statute that prohibits the “take” of an eagle without a permit, and further protects their feathers and parts, nests, nest trees, and winter/nighttime roosts. The BGEPA also addresses impacts that result from anthropogenic disturbance or alterations around an eagle nest site that may disrupt normal breeding, feeding, or sheltering habits, and cause injury, death, or nest abandonment to an eagle.

To provide direction and best practices for wildlife conservation amidst wind energy development, the FWS released a series of guidance documents recommending voluntary preconstruction, construction, and postconstruction environmental survey efforts and siting practices for wind facilities. Additionally, the FWS issued guidance identifying avian species in need of conservation relative to habitat types. These FWS management documents consist of:

- The FWS’s *Land-Based Wind Energy Guidelines* (WEG), which provides a standardized approach for addressing wildlife conservation concerns with attention toward “species of concern” during all stages of land-based wind energy development while promoting effective communication between wind energy developers and governmental agencies and tribes (FWS 2012). In the WEG, “species of concern” are defined as migratory birds; bats; bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and other birds of prey; and listed, proposed, or candidate endangered and threatened species (FWS 2012). The FWS’s definition of “species of concern” differs from the definition of species of concern used throughout this document.
- The FWS’s *Eagle Conservation Plan Guidance, Module 1—Land-based Wind Energy, Version 2* is a supplemental document to the WEG and provides specific in-depth guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities (FWS 2013).
- The FWS’s *Birds of Conservation Concern* (BCC) identifies species within ecological Bird Conservation Regions (BCRs) that are priorities for conservation action with the intent to prevent or remove the need for ESA listing by taking proactive management and conservation actions (FWS 2008b). The Project Area intersects two BCRs, the Northern Rockies BCR (10) and the Southern Rockies/Colorado Plateau BCR (16).

As discussed in section 3.4.1, “Regulatory Background,” the State of Wyoming does not have any rules or regulations establishing species as threatened or endangered at the state level, but it has issued EOs and guidance documents that support prevention of ESA listing for at-risk avian and bat species and provides guidance on wildlife conservation for wind energy developers, similar to the FWS. These State of Wyoming EOs and management documents specific to avian and bat species consist of the following:

- The Wyoming Governor’s Office EO 2019-3 ultimately aims to prevent ESA listing of the greater sage-grouse (*Centrocercus urophasianus*) (State of Wyoming 2019). This EO defines Core Population Areas for greater sage-grouse, which are geographical extents with the highest densities of breeding greater sage-grouse in the state, as well as areas important for connectivity between populations. These core population areas divide Wyoming into individual working group areas to facilitate and implement local conservation plans that benefit greater sage-grouse and its habitats.
- The Wyoming Game and Fish Department’s Wildlife Protection Recommendations for Wind Energy Development in Wyoming (WYGFD 2010), which provides recommendations for collecting baseline data prior to Project siting to avoid potential conflicts with wildlife; construction and operations monitoring; and mitigating impacts to affected wildlife.

3.5.2 Data Sources

The information presented in this section comes from various sources, including technical biological survey reports developed for the Project, academic and peer-reviewed literature sources, publicly available GIS data, and governmental resources.

3.5.3 Analysis Area

Several factors influence the potential for avian and bat species to occur and persist in a given area, including the availability of suitable habitat, prey and forage, and nesting or roosting substrate, and the level of disturbance present. Therefore, the analysis areas for potential effects on avian and bat wildlife resources vary by resource type and the Project-related effects being assessed.

The following analysis areas have been identified to evaluate the extent to which potential effects from the Project could occur on avian and bat species:

- Species occurrences accounts for all avian and bat species: The Project Area, defined as the approximately 26,000 acres encompassed within the Project boundary, is the analysis area. This analysis area and type is especially appropriate for species groups where publicly available spatial data are lacking, and the overall breadth of the species category necessitates a generally qualitative approach to analysis.
- Presence or absence of habitat and general landscape alterations for avian and bat species of concern: The Project Area is the analysis area in order to understand the overall habitat value to avian and bat species of concern.
- Native habitat converted to Project infrastructure and general landscape alterations: The siting corridors (representing areas of potential new ground disturbance such as access roads, turbine pads, and laydown yards) are the analysis area to capture all native habitat converted to Project-related features and provide context for overarching changes to the landscape such as habitat fragmentation. This analysis area is transferable to disturbance-specific analysis when Project infrastructure is categorized and differentiated during analysis.
- Potential for equipment collisions: The siting corridors are the analysis area to capture any potential for impacts from vehicle collision or compaction by construction equipment, as well as potential turbine and transmission line collisions.

- Current attractants for avian species in the form of concentrated prey bases and nesting substrate: The siting corridors are the analysis area to provide context for ground disturbance likely to affect these resources.
- General disturbance from Project-related activities: The siting corridors and a 328-foot (100-m) buffer are the analysis area to capture effects from generalized disturbances, such as noise from construction equipment, by applying a standardized buffer of 328 feet around ground disturbance areas.
- Disturbances to nesting non-eagle raptors: The Project Area and a 1-mile buffer are the analysis area in keeping with survey methodology for a technical report prepared for the Project and survey recommendations for non-eagle raptor nests set forth by the FWS (Western EcoSystems Technology [WEST] 2019a, FWS 2012).
- Disturbances to nesting eagles: The Project Area and a 2-mile buffer are the analysis area to commensurate with updated survey recommendations for eagle nests set forth by the FWS (FWS 2020c).
- Current attractants for bat species in the form of potential cavern-like roosts: The Project Area and a 2-mile buffer are the analysis area to provide an understanding of the overall habitat value of the Project Area to bat species; this analysis area for bats was selected because 2 miles is the maximum expected foraging distance from a roost for many bat species.

3.5.4 Baseline Description

The Project Area contains suitable habitat for avian and bat species. The avian and bat species known or expected to occur in the Project Area based on habitat type and resource availability are discussed in detail below.

3.5.4.1 Avian Species

The Project Area lies within the Central Flyway, a migratory corridor for bird species during their spring and fall migrations established to facilitate management between the FWS, States, and Canadian partners (FWS 2020d). The Central Flyway extends from northern Canada south through Mexico and encompasses all or parts of Montana, Wyoming, Colorado, New Mexico, Texas, Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota. This migratory corridor supports a wide variety of avian species and facilitates seasonal movement for those that migrate. Resident and migratory birds could use the Project Area for breeding, nesting, foraging, hunting, roosting, and shelter. The shrublands, rangelands, forested areas, wetlands, and rocky outcrops in the Project Area provide habitat, nesting and foraging areas, and migratory stopover areas for a variety of raptor and migratory bird species. For a detailed description on habitat types and vegetation classes in the Project Area, see section 3.14, “Vegetation.”

From January 2019 through December 2019, 242 avian use surveys were conducted for the Project and 42 bird species were recorded (WEST 2019b). Biologists used the fixed-point count methodology described in the WEG (FWS 2012) and *Eagle Conservation Plan Guidance, Module 1—Land-based Wind Energy, Version 2* (FWS 2013). The methodology and results of these surveys are detailed in *Avian Use Study, Rail Tie Wind Project, Albany County, Wyoming: Final Report, January–December 2019* (WEST 2019b).

Small Birds

Twenty-four species of small birds were recorded during avian use surveys conducted for the Project; nearly all species were passerines (WEST 2019b) and of those, sparrows and other grassland species were most frequently recorded.

Upland Game Birds

Upland game birds expected in the Project Area include mourning dove (*Zenaida macroura*) and wild turkey (*Meleagris gallopavo*). No upland game birds were observed during avian use surveys conducted for the Project (WEST 2019b). See section 3.5.4.3, “Species of Concern,” for a discussion on greater sage-grouse.

Waterfowl and Waterbirds

In general, waterfowl and waterbirds do not have suitable nesting habitat in the Project Area because of the absence of large lentic water features such as reservoirs and lakes; however, these species could pass through during migration and possibly use the wetland habitats and perennial streams within the Project Area as migratory stopover locations (section 3.15, “Wetland and Water Resources”). During avian use surveys conducted for the Project, two species of waterfowl and waterbirds that were identifiable to species were observed in the analysis area (American white pelican [*Pelecanus erythrorhynchos*] and Canada goose [*Branta canadensis*]). Three other observations were generalized as ducks, geese, and gulls (WEST 2019b).

Vultures

During avian use surveys conducted for the Project, only one species of vulture was observed: turkey vulture (*Cathartes aura*) (WEST 2019b).

Large Corvids

During avian use surveys conducted for the Project, all four species of large corvid expected to occur in the Project Area were observed: American crow (*Corvus brachyrhynchos*), Clark’s nutcracker (*Nucifraga columbiana*), common raven, and black-billed magpie (*Pica hudsonia*) (WEST 2019b).

Raptors

Raptors are protected under the Migratory Bird Treaty Act and bald and golden eagles are protected under the BGEPA (section 3.4.1, “Regulatory Background”). Twenty-two diurnal raptor species are known to occur in Wyoming (Orabona et al. 2016). Several of these species (e.g., Mississippi kite [*Ictinia mississippiensis*]) occur only rarely in Wyoming and are not expected to occur in the Project Area based on general habitat requirements and occurrence data. Based on known range and distribution and results of technical field surveys developed for the Project, 16 raptor species are likely to occur within the Project Area. Some raptor species occur seasonally in the Project Area and others occur year-round.

The Project Area’s habitat profile indicates that diurnal raptor species typical of pastoral landscapes, such as golden eagle, Swainson’s hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), northern harrier (*Circus hudsonius*), and ferruginous hawk (*Buteo regalis*), could be present during the nesting season. Wintering species found in this habitat profile in southeastern Wyoming would include some species found during the nesting season and others, including rough-legged hawk (*Buteo lagopus*) and merlin (*Falco columbarius*).

During avian use surveys conducted for the Project, 11 diurnal raptor species were observed and identifiable to species, and unidentified individuals in four species groups were observed: unidentified buteos, unidentified falcons, unidentified eagles, and unidentified raptors (WEST 2019b). Bald eagles were rarely observed whereas golden eagles were more frequently observed within the Project Area; in total, 55 eagle observations were recorded during 1 year of avian use surveys for the Project. The highest eagle usage was recorded in the fall and winter. Eagles were observed at 10 out of the 13 point-count

locations during the entire survey period with much of the eagle use occurring in the southwestern portion of the Project Area (WEST 2019b). A full account of raptor species that were identified during field-based surveys or that are expected to occur in the Project Area based on availability of suitable habitat is provided in table 3-12.

Table 3-12. Raptor Species Expected to Occur in the Project Area or Recorded During Surveys

Common Name	Scientific Name	Recorded During Surveys?
American kestrel	<i>Falco sparverius</i>	Yes
Bald eagle	<i>Haliaeetus leucocephalus</i>	Yes
Broad-winged hawk	<i>Buteo platypterus</i>	No
Cooper's hawk	<i>Accipiter cooperii</i>	No
Ferruginous hawk	<i>Buteo regalis</i>	Yes
Golden eagle	<i>Aquila chrysaetos</i>	Yes
Merlin	<i>Falco columbarius</i>	Yes
Northern goshawk	<i>Accipiter gentilis</i>	Yes
Northern harrier	<i>Circus hudsonius</i>	Yes
Osprey	<i>Pandion haliaetus</i>	No
Peregrine falcon	<i>Falco peregrinus</i>	No
Prairie falcon	<i>Falco mexicanus</i>	Yes
Red-tailed hawk	<i>Buteo jamaicensis</i>	Yes
Rough-legged hawk	<i>Buteo lagopus</i>	Yes
Sharp-shinned hawk	<i>Accipiter striatus</i>	Yes
Swainson's hawk	<i>Buteo swainsoni</i>	Yes

Sources: Orabona et al. (2016); WEST (2019a); Tetra Tech (2020f).

All raptors observed are likely to use the entire Project Area to forage. Scientific literature, field surveys, and incidental field observations indicate that the analysis area supports populations of common wildlife species that could provide foraging opportunities for eagles and other raptor species such as jackrabbits (*Lepus* spp.), cottontails (*Sylvilagus* spp.), ground squirrels, and numerous species of mice and voles (section 3.4.4.1, “Nongame Species,” and section 3.4.4.2, “Small Game Species”). In addition to these prey resources, there are also concentrated prey bases within the Project Area that are available to, and likely to attract, eagles and other raptor species. Big game crucial winter range is potentially a concentrated prey base for eagles because of higher relative numbers of individuals congregating in that portion of the species range during the winter and concentrated area of winter-killed animals as a source of carrion. The Project Area contains approximately 1,650.5 acres of mule deer crucial winter range (section 3.4.5.1, “Impact Indicators;” see figure 3-4). Waterbodies and wetlands can also function as prey bases for raptor species because they provide localized sites where waterfowl, shorebirds, and other avian species could concentrate, and provide fish populations. In total, the Project Area contains approximately 424.1 acres of wetlands and approximately 7.1 acres of mapped waterbodies (figure 3-5). White-tailed prairie dog colonies can support widely variable numbers of individuals based on habitat, available forage, spread of disease, and human control efforts, among other factors, and are considered a concentrated prey base with possible value to eagles and other raptor species. While previous surveys completed for the Hermosa West Wind Farm Project (WEST 2011) documented the presence of white-tailed prairie dog colonies within the Project Area, these previously recorded prairie dog colonies were not observed within the siting corridors during the September 2019 field reconnaissance and are assumed no longer extant (Tetra Tech 2020d).

Raptor nest surveys were conducted within a 1-mile buffer around the Project Area for non-eagle raptor species and a 10-mile buffer around the Project Area for eagle species in 2019. These raptor nest surveys consisted of two rounds of aerial nest surveys using a helicopter (WEST 2019a). The analysis area for eagle nests is a 2-mile buffer to commensurate with updated survey recommendations for eagle nests set forth by the FWS (FWS 2020c). Non-eagle species observed with active nests within the 1-mile buffer were red-tailed hawk (three nests) and great horned owl (*Bubo virginianus*) (one nest). No active nests for non-eagle species were found within the Project Area. During nest surveys, one active golden eagle nest was observed within the Project Area and analysis area more generally (WEST 2019a) (figure 3-6).

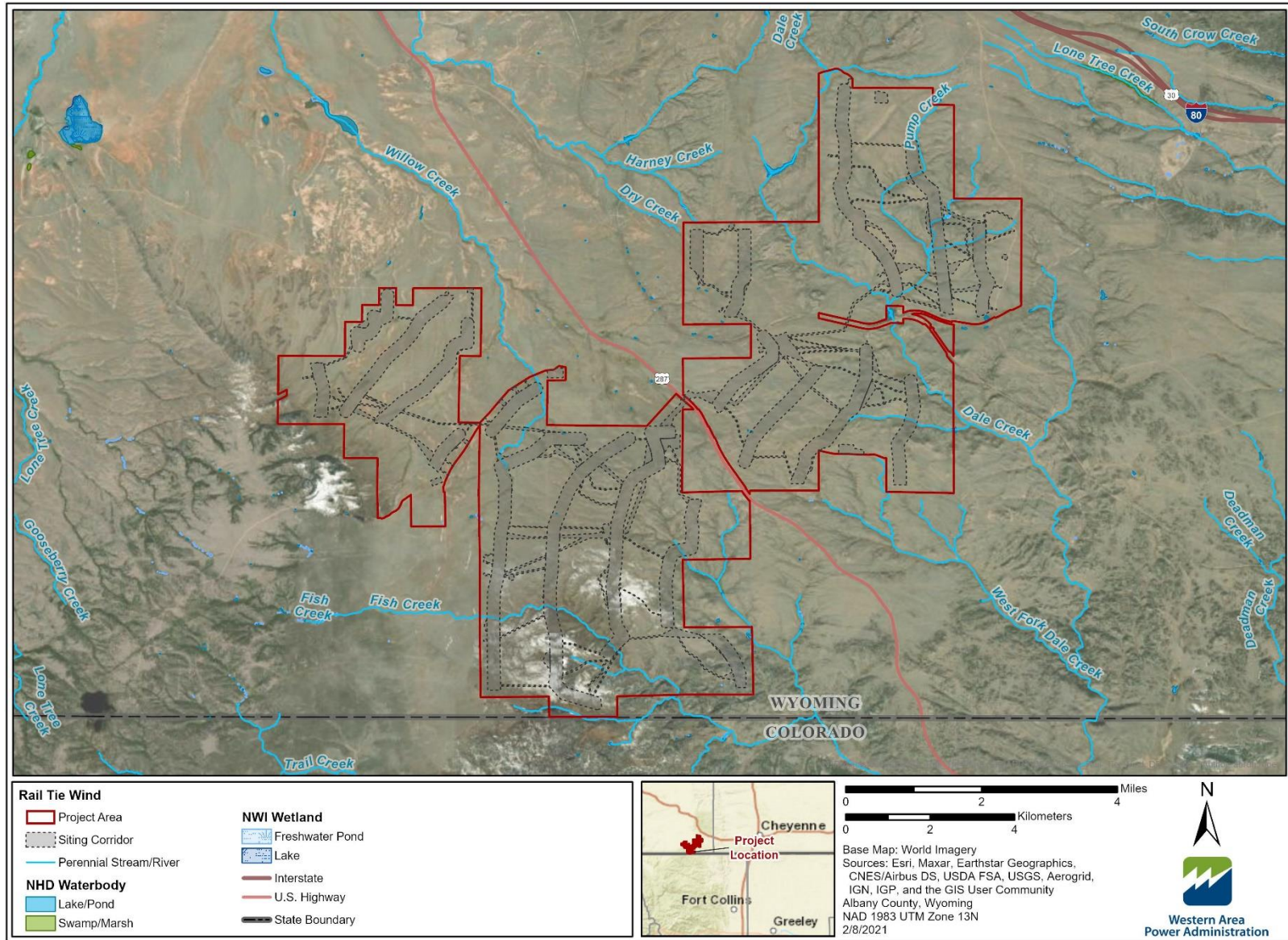


Figure 3-5. Potential prey bases for raptors within the Project Area.

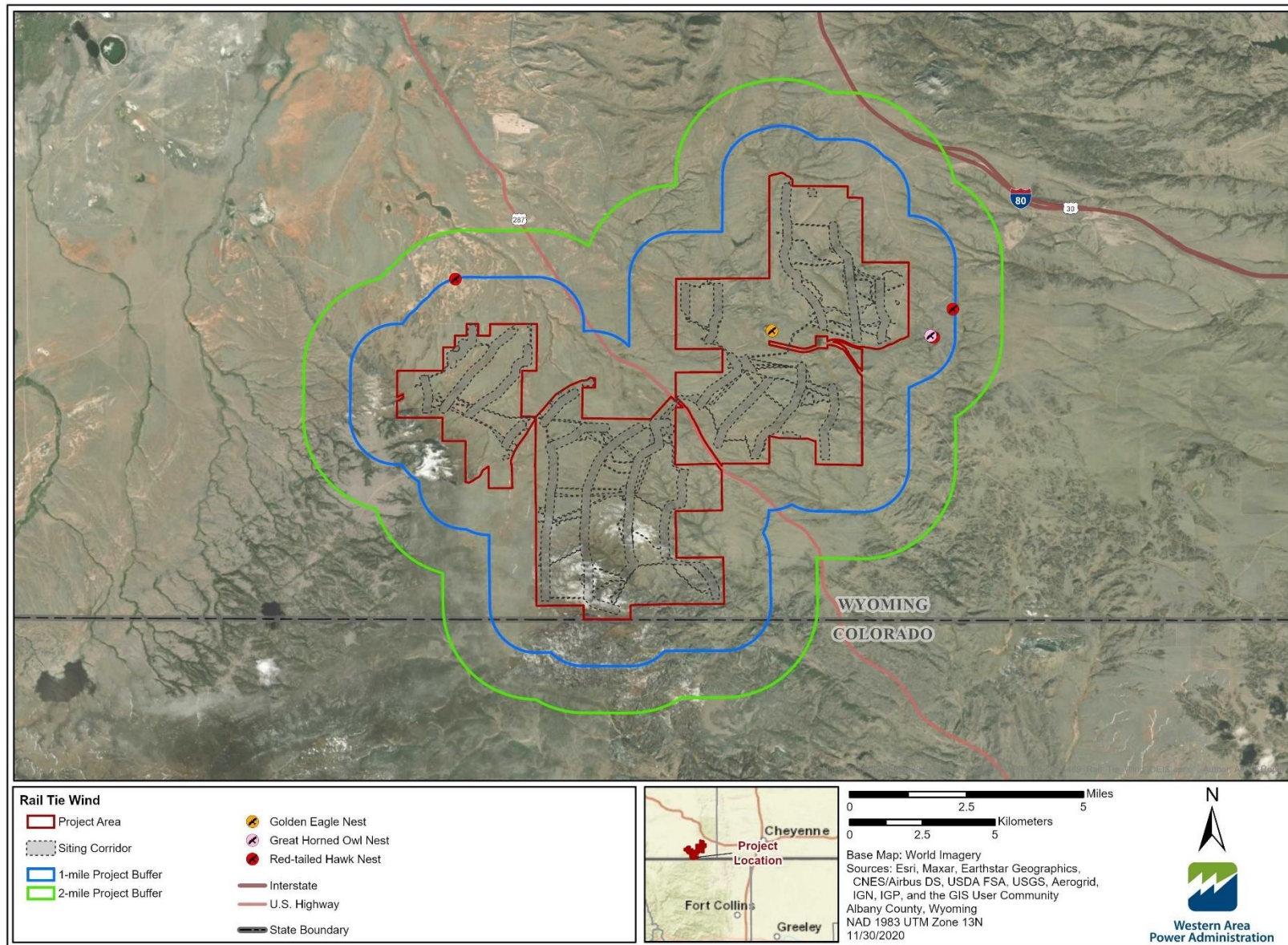


Figure 3-6. Observed raptor nests by species within a 2-mile buffer of the Project Area.

3.5.4.2 Bat Species

Bats use roosts and hibernacula for shelter, raising young, and hibernation (for those species that hibernate). Environments used for roosting and hibernacula could vary widely and include caves, rock crevices, cliffs, tree cavities, loose bark, abandoned mines, buildings, bridges, culverts, and bat houses. Potential bat roosts and hibernacula in the Project Area are likely restricted to human settlements, rock outcrops, and wooded areas, if present. Species that have highly specific maternity or roost site requirements, such as cavern-like structures, and those that require caves or crevices are less likely to occur in the Project Area than species with affinities for human structures or trees and that are migratory and less habitat-specific. Bats could travel longer distances from their roosts to their foraging areas and thus require calorically dense diets for survival. Wooded riparian corridors, rocky outcrops, and slow-moving streams provide the best habitat for bat species in the Project Area because they provide food sources, drinking water, and potential roost sites.

Eighteen bat species are known to occur in Wyoming (Orabona et al. 2016), and 12 of those species have potential to occur in the Project Area based on known distributions and available habitat (table 3-13). Bat acoustic surveys for the Project recorded bat calls from 10 of these 12 species through automated identification software (WEST 2019c); typically, recorded bat calls are not conclusive evidence of presence or absence in the Project Area as automated call identification is imperfect, and each identification has an associated error rate. However, a qualified bat biologist verified calls through manual verification of calls, reclassifying them, and confirming that seven of those ten species with recorded bat calls (big brown bat, eastern red bat, hoary bat, silver-haired bat, western long-eared myotis, little brown myotis, and fringed myotis) were present in the Project Area during bat acoustic surveys for the Project (WEST 2019c).

Table 3-13. Bat Species Expected to Occur in the Project Area or Recorded in Surveys

Common Name	Scientific Name	Confirmed by Acoustic Analysis
Big brown bat	<i>Eptesicus fuscus</i>	Yes
Eastern red bat	<i>Lasiurus borealis</i>	Yes
Fringed myotis	<i>Myotis thysanodes</i>	Yes
Hoary bat	<i>Lasiurus cinereus</i>	Yes
Little brown myotis	<i>Myotis lucifugus</i>	Yes
Long-legged myotis	<i>Myotis volans</i>	No
Pallid bat	<i>Antrozous pallidus</i>	No
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Yes
Spotted bat	<i>Euderma maculatum</i>	No
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	No
Western long-eared myotis	<i>Myotis evotis</i>	Yes
Western small-footed myotis	<i>Myotis ciliolabrum</i>	No

Sources: Orabona et al. (2016); WEST (2019c).

Some bat species prefer cave formations for winter hibernacula, summer maternity roosts, day roosts, and night roosts. Natural caves in Wyoming are primarily composed of karst (readily dissolved soluble rocks) features and are considered a nonrenewable resource (Hester and Grenier 2005). The Project Area has the potential to contain karst features; however, no caves or karst features were observed in the Project Area during field-based surveys (Tetra Tech 2020d). Abandoned underground mines share characteristics with caves that make them important roosting sites for bats; approximately one in three mines surveyed in Wyoming by the WYGFDD contained bats (Hester and Grenier 2005). Twenty-six possible mines were identified in the analysis area for potential cavern-like bat roosts. At least one abandoned surface mine

was confirmed as present within the Project Area, though not within the siting corridors, and is unsuitable roosting substrate for bats as it is not subsurface (Abandoned Mine Land Division 2020). Bat species with potential to occur in the Project Area that could use mines or caves for roosting include western small-footed myotis (*Myotis ciliolabrum*), western long-eared myotis (*Myotis evotis*), little brown myotis (*Myotis lucifugus*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), big brown bat (*Eptesicus fuscus*), Townsend’s big-eared bat (*Corynorhinus townsendii*), and pallid bat (*Antrozous pallidus*) (Hester and Grenier 2005).

3.5.4.3 Species of Concern

Special-status species include those that are listed under the ESA and are discussed in section 3.4.4.5, “Special-Status Species.” The WYESFO identifies SOC and SGCN in the Wyoming SWAP. For avian species, BCC and eagles are also considered species of concern. The Project Area intersects the Northern Rockies BCR (BCR 10) and the Southern Rockies/Colorado Plateau BCR (BCR 16).

There are 56 Wyoming avian and bat SGCN with the potential to occur in the Project Area. There are also 18 avian BCC, and 11 WYESFO SOC (table 3-14) with the potential to occur in the Project Area. Only four of the 56 SGCN species expected to occur in the Project Area (northern goshawk [*Accipiter gentilis*], burrowing owl [*Athene cunicularia*], common loon [*Gavia immer*], and mountain plover [*Charadrius montanus*]) are categorized as Tier I conservation priorities. Although northern goshawk was recorded during avian use surveys (WEST 2019b), the Project Area does not provide suitable nesting habitat for the species and it is expected to occur irregularly during migratory and winter seasons. Surveys for burrowing owl were conducted at 73 survey locations throughout the Project Area in May, June, and July 2020, and no burrowing owls or signs of burrowing owl (e.g., pellets, whitewash) were observed (Tetra Tech 2020f). These survey results combined with the absence of observations of burrowing owl during avian use surveys conducted for the Project (WEST 2019b) suggest that burrowing owl are typically not present within the Project Area.

Table 3-14. Wyoming Avian and Bat Species of Greatest Conservation Need, Birds of Conservation Concern, and Species of Concern with Potential to Occur in the Project Area

Common Name	Scientific Name	Special Status	Recorded on Survey?
Avian			
American kestrel	<i>Falco sparverius</i>	SGCN Tier III	Yes
American pipit	<i>Anthus rubescens</i>	SGCN Tier III	Yes
American white pelican	<i>Pelecanus erythrorhynchos</i>	SGCN Tier II	Yes
Bald eagle	<i>Haliaeetus leucocephalus</i>	SGCN Tier II, BCC, SOC	Yes
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	SGCN Tier II	No
Black-crowned night-heron	<i>Nycticorax</i>	SGCN Tier II	Yes
Black rosy-finch	<i>Leucosticte atrata</i>	SGCN Tier II, BCC	Yes
Black tern	<i>Chlidonias niger</i>	SGCN Tier II	No
Black-throated gray warbler	<i>Setophaga nigrescens</i>	SGCN Tier II	No
Bobolink	<i>Dolichonyx oryzivorus</i>	SGCN Tier II	No
Brown-capped rosy-finch	<i>Leucosticte australis</i>	SGCN Tier II, BCC	No
Brewer’s sparrow	<i>Spizella breweri</i>	SGCN Tier II, BCC	Yes
Burrowing owl	<i>Athene cunicularia</i>	SGCN Tier I, BCC, SOC	No
Calliope hummingbird	<i>Selasphorus calliope</i>	SGCN Tier II, BCC	No
Canyon wren	<i>Catherpes mexicanus</i>	SGCN Tier II	No
Chestnut-collared longspur	<i>Calcarius ornatus</i>	SGCN Tier II	No

Common Name	Scientific Name	Special Status	Recorded on Survey?
Clark's grebe	<i>Aechmophorus clarkii</i>	SGCN Tier II	No
Clark's nutcracker	<i>Nucifraga columbiana</i>	SGCN Tier II	Yes
Common loon	<i>Gavia immer</i>	SGCN Tier I	No
Common nighthawk	<i>Chordeiles minor</i>	SGCN Tier III	No
Common yellowthroat	<i>Geothlypis trichas</i>	SGCN Tier III	Yes
Ferruginous hawk	<i>Buteo regalis</i>	SGCN Tier II, BCC, SOC	Yes
Forster's tern	<i>Sterna forsteri</i>	SGCN Tier II	No
Golden eagle	<i>Aquila chrysaetos</i>	SGCN Tier II, BCC, SOC	Yes
Grasshopper sparrow	<i>Ammodramus savannarum</i>	SGCN Tier II, BCC	No
Great blue heron	<i>Ardea herodias</i>	SGCN Tier II	Yes
Greater sage-grouse	<i>Centrocercus urophasianus</i>	SGCN Tier II, SOC	No
Lewis's woodpecker	<i>Melanerpes lewis</i>	SGCN Tier II, BCC	Yes
Loggerhead shrike	<i>Lanius ludovicianus</i>	SGCN Tier II, BCC	Yes
MacGillivray's warbler	<i>Geothlypis tolmiei</i>	SGCN Tier II	Yes
McCown's longspur	<i>Rhynchophanes mccownii</i>	SGCN Tier II, BCC	Yes
Merlin	<i>Falco columbarius</i>	SGCN Tier II	Yes
Mountain plover	<i>Charadrius montanus</i>	SGCN Tier I, BCC, SOC	No
Northern goshawk	<i>Accipiter gentilis</i>	SGCN Tier I, SOC	Yes
Peregrine falcon	<i>Falco peregrinus</i>	SOC	No
Prairie falcon	<i>Falco mexicanus</i>	BCC, SOC	Yes
Pygmy nuthatch	<i>Sitta pygmaea</i>	SGCN Tier II	No
Red crossbill	<i>Loxia curvirostra</i>	SGCN Tier II	No
Red-eyed vireo	<i>Vireo olivaceus</i>	SGCN Tier II	No
Sage thrasher	<i>Oreoscoptes montanus</i>	SGCN Tier II, BCC	Yes
Short-eared owl	<i>Asio flammeus</i>	SOC	No
Snowy egret	<i>Egretta thula</i>	SGCN Tier II	No
Swainson's hawk	<i>Buteo swainsoni</i>	SGCN Tier II, BCC, SOC	Yes
Virginia rail	<i>Rallus limicola</i>	SGCN Tier III	No
White-faced ibis	<i>Plegadis chihi</i>	SGCN Tier II	No
Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>	SGCN Tier II, BCC	No
Willow flycatcher	<i>Empidonax traillii</i>	SGCN Tier III, BCC	No
Bats			
Eastern red bat	<i>Lasiurus borealis</i>	SGCN Tier III	Yes
Fringed myotis	<i>Myotis thysanodes</i>	SGCN Tier II	Yes
Little brown myotis	<i>Myotis lucifugus</i>	SGCN Tier II	Yes
Long-legged myotis	<i>Myotis volans</i>	SGCN Tier III	No
Pallid bat	<i>Antrozous pallidus</i>	SGCN Tier II	No
Spotted bat	<i>Euderma maculatum</i>	SGCN Tier III	No
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	SGCN Tier II	No
Western long-eared myotis	<i>Myotis evotis</i>	SGCN Tier III	Yes
Western small-footed myotis	<i>Myotis ciliolabrum</i>	SGCN Tier II	No

Sources: WYGFD (2017b); FWS (2008b, 2020b); WEST (2019b, 2019c); Tetra Tech (2020f).

Note: SGCN Tier I = highest priority, SGCN Tier II = moderate priority, SGCN Tier III = lowest priority. SOC = Species of Concern as defined by the WYESFO.

Fourteen SGCN avian species were observed within the Project Area during avian use surveys (WEST 2019b), and four SGCN bat species calls were confirmed during bat acoustic survey analysis (WEST 2019c) (see table 3-14).

Greater sage-grouse require large contiguous areas of sagebrush habitat that include a variety of semiarid shrub-grassland (shrub steppe) habitats, particularly big sagebrush (*Artemisia tridentata*) (WYGFD 2017a). The southern portion of the Project Area contains areas of Inter-mountain Basins Montane Sagebrush Steppe; however, this area is likely not extensive enough to support greater sage-grouse. No greater sage-grouse or leks (breeding areas) were observed during surveys conducted for the Hermosa West Wind Farm Project (WEST 2011) or during avian point count surveys and other field surveys conducted in 2019 for the Project (WEST 2019b). The nearest designated Core Population Area (see section 3.5.1, “Regulatory Background”) is approximately 22 miles north of the Project Area.

3.5.5 Impacts to Resource

This section describes the potential impacts to avian and bat wildlife species from the construction, O&M, and decommissioning of the Project.

3.5.5.1 Impact Indicators

The following impact indicators were assessed to determine expected impacts to avian and bat species from construction, O&M, or decommissioning of the Project:

- Potential occurrence of species based on publicly available data, field-based technical reports, and observed habitat.
- Acres of construction-related and operations-related ground disturbance, or lost terrestrial habitat, from clearing of vegetation during construction and operations and the presence of Project-related infrastructure during operations and the potential for mortality from construction activities.
- Acres of construction-related and operations-related ground disturbance within potential prey bases, or raptor and eagle attractants, including mule deer crucial winter range and waterbodies, wetlands, and perennial streams.
- Count and location of raptor and eagle nests within respective analysis areas.
- Miles of new access roads that could lead to habitat fragmentation, increased risk of vehicular collisions, and potential for mortality during construction activities.
- Miles of new transmission line that could lead to increased predation risk and potential for collision or electrocution.
- Count of new meteorological equipment that could pose a collision risk.
- Results from an assessed risk exposure index of avian use surveys conducted for the Project.
- Analysis of potential bat hibernacula in the analysis area and acres of construction-related and operations-related ground disturbance within potential roosting habitat.
- Number and type of concentrated prey bases in the Project Area and acres of disturbance of concentrated prey bases for construction and operations activities.
- Results of postconstruction bat fatality monitoring for similar projects and results of literature review on impacts of bats at wind farms.

Effects on avian or bat species and associated species of concern are considered at the individual, community, and population levels.

3.5.5.2 *Methods of Analysis*

- Natural histories of avian and bat species and observations from field-based technical surveys were evaluated to determine if Project infrastructure (siting corridors and access roads) or Project-related activities would result in a decrease in available habitat or would deter such species from using the area, fragment habitat, or decrease survival of individual animals.
- Spatial data were evaluated to determine if the Project would result in habitat loss of important landscape features such as prey bases or hibernacula for each respective species group from Project construction and operations.
- Nest locations mapped during field-based technical surveys and potential nesting substrate were qualitatively evaluated to determine if Project infrastructure (siting corridors and access roads) or Project-related activities would result in a decrease in available nesting opportunities or disturbance to nesting species.
- Project disturbance types were differentiated and analyzed to determine acres or miles of disturbance relative to disturbance types as well as the potential for mortality from direct strikes, increased predation, or electrocution.
- Habitat for avian and bat species of concern were mapped within the Project Area to determine if the Project would result in population declines for any such species.
- Relevant literature relating to other wind facilities within an approximately 150-mile area to the Project was gathered and reviewed to determine postconstruction avian and bat mortality studies at those wind facilities. This analysis allows for a general comparison of impacts to avian and bat species at similar, regional facilities.
- An assessed risk exposure index of avian use surveys conducted for the Project.

3.5.5.3 *Proposed Action*

Issue Statement #1: Would construction and operations affect avian and bat habitat and, if so, are all habitat types for affected species reclaimable through reclamation efforts?

Construction, O&M, and decommissioning of the Project would include surface-disturbing activities that would remove vegetation communities (section 3.14, “Vegetation”) required by avian species to meet their life history needs (i.e., nesting, foraging, and brood-rearing). Disturbed vegetation communities could benefit species that use denuded sites or anthropogenic habitats (e.g., the O&M building), such as horned lark (*Eremophila alpestris*) and European starling (*Sturnus vulgaris*). Surface-disturbing activities could also affect habitat used by bats for roosting and foraging.

The applicant has committed to limit temporary ground-disturbing activities to the minimum amount necessary to safely construct Project facilities (GEO-1). Environmentally sensitive areas (e.g., wetlands, habitats) in and adjacent to the Project Area would be delineated to avoid or minimize impacts to these areas during final siting and design (GEN-2). Initial vegetation clearing would be performed during the nonbreeding season for birds (September 1–April 15) if feasible. If vegetation clearing cannot occur during the nonbreeding season, surveys would be performed in breeding bird habitat to identify avian nesting activity within the Project Area and nest sites would be avoided until determined to be inactive. Immediately after construction, disturbed ground surfaces would be reclaimed and restabilized by native vegetation (VEG-2). Reclamation of disturbed areas would promote the re-establishment of native vegetation for use by avian and bat species by identifying locally approved, weed-free seed mixtures that prioritize plant species native to the ecosystems affected by site construction (VEG-3). Prior to the start of

construction, the Project would also develop and implement a Weed Management Plan that identifies appropriate controls to avoid, minimize, or treat the spread of noxious weeds (VEG-4).

Construction disturbance and operations infrastructure would affect up to 1,471.3 acres of habitat (5.6 percent of the Project Area) for a variety of avian and bat species because bat and avian species forage over several land cover types (table 3-15). Of that, 1,287.2 acres would be reclaimed after construction activities cease. The remaining 184.1 acres would be reclaimed during decommissioning. See section 3.14, “Vegetation,” for a discussion on reclamation potential for vegetative resources that are disturbed during construction and operations activities. Reduction of habitat from construction and O&M of the Project is not expected to result in population or community-level declines for avian or bat species given the relatively small amount of disturbance compared to available habitat.

Table 3-15. Expected Project Disturbance by Disturbance Type

Disturbance Type	Amount of Disturbance
Acres of construction ground disturbance to be reclaimed upon completion of construction	1,287.2
Acres of operations infrastructure ground disturbance	184.1
Miles of new access roads	58.0
Miles of new transmission line	4.4
Count of new meteorological equipment	3.0

Source: ConnectGen (2020).

Issue Statement #2: Would noise and dust generated from construction and operations activity, equipment, and personnel affect avian behavior?

The analysis area for this issue is the siting corridors plus a 328.1-foot buffer around the siting corridors. Noise and other human-activity disturbances associated with construction and operations of the Project, such as the presence of construction workers or facility personnel, could change habitat use patterns for some avian species and could temporarily disrupt life-cycle activities because many species would likely avoid work areas during construction activities. The effects of construction activity and noise on avian species and bats would be similar to those described for aquatic and terrestrial wildlife species (section 3.4.5.3, “Proposed Action”). The EPMS described in section 3.4.5.3, “Proposed Action,” would also mitigate the effects of human activity and noise on avian and bat species.

During O&M, some individuals could relocate away from the source(s) of the disturbance to adjacent or nearby habitats, which could lead to increased competition for resources within these areas and thus create a community-level effect. In total, there are 12,997 acres of potential noise and human activity disturbance areas for avian species in the analysis area. Given the sporadic and localized nature of Project-related noise and other human-activity disturbances, the associated effects are likely to affect individuals of an avian species rather than communities or populations; they could lead to reproductive failure for one season or to increased stress on individuals, which could affect their overall ability for survival. These effects would be considerably reduced with the completion of construction activities but would not altogether cease as operations activities necessitate ongoing human presence in the analysis area. Human activities and noise would decrease once construction ceased but would continue into the operational stage of the Project, though sporadically and at less intensity than during the construction stage. Individuals would likely return to disturbed areas when activities ceased, or when the area was successfully reclaimed.

Issue Statement #3: Would construction and operations activities and equipment increase mortality to avian species via direct strikes, increased predation risk, or electrocution?

Aboveground power lines could provide perching opportunities for some avian species, positively impacting those that use these structures for hunting perches, such as diurnal raptors and owls, and negatively impacting their avian prey species. The presence of construction-related trash and debris could be an attractant for some avian nest predators, such as American crow and common raven. Increased vehicle and equipment traffic on new and existing access road networks could increase the risk of vehicular collisions with avian species. Avian collisions with met towers would be minimized because self-supporting met towers without guy wires would be used for the Project. Potential bird collisions would be expected to be reduced compared to guyed towers (Erickson et al. 2005). Eagles and raptors would not be at risk of electrocution on transmission lines because spacing of conductors to grounds is too great to allow wing contact or arcing for even the largest birds. Electrocution risk on aboveground collector lines, where conductor-to-ground spacing is less, would be minimized or avoided entirely by following APLIC design recommendations (APLIC 2006). Anticipated bird losses from these potential causes of fatality would therefore be expected to be negligible in terms of individuals and there would be no expected population or community-level effects. Wind turbine collision fatalities during the operational stage of the Project are expected to be the primary adverse effect on avian species; this is discussed in more detail below.

A Bird and Bat Conservation Strategy (BBCS) would be developed and implemented to avoid and reduce potential impacts to avian and bat species that could result from the Project. Construction-related trash and debris would be covered and properly disposed of to avoid attracting avian nest predators (WL-5). The overhead power to ground wires associated with the 345-kV gen-tie line would be marked with bird flight diverters consistent with methods suggested in the APLIC's *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012) (WL-6), as appropriate. If overhead collection lines are required because of geology or topography constraints, they would be designed to incorporate appropriate spacing of energized parts to avoid or reduce the potential for electrocution risk to large birds, specifically raptors, in accordance with the APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) (WL-7). With successful implementation of these EPMs and the BBCS, the risk of collision and electrocution with the transmission line would be minimized.

Approximately 4.4 miles of 345-kV aboveground electric transmission line would be built within the siting corridors (see table 3-15). Some individual birds could collide with the transmission line or be preyed upon by birds using the line as a hunting perch; however, these impacts are unlikely to reach population or community levels. These effects would persist through the operational life of the Project and end during decommissioning. Three self-supported, lattice-mast style met towers would be installed in the Project Area that also pose a potential collision risk (see table 3-15). See section 3.13, "Transportation and Access," for a discussion on anticipated vehicle and road use for the Project.

A relative exposure index for turbine collision was calculated for diurnal raptor species observed in the Project Area based on flight height observations and relative abundance; this index used avian use data collected for the Project from January to December 2019 (WEST 2019b). A rotor swept zone of 82 to 689 feet encompassing the lowest and highest extent of the rotor blades inclusive of the three turbine models was used for this calculation. Swainson's hawk had the highest relative exposure index at 0.21, followed by golden eagle at 0.16, red-tailed hawk at 0.13, and American kestrel at 0.11. Ferruginous hawk and prairie falcon had an exposure index at 0.07, rough-legged hawk at 0.05, bald eagle at 0.02, and northern harrier at 0.01. All observations of merlin and northern goshawk were below the lowest reach of turbine blades (below 82 feet) and, therefore, had exposure indices at zero.

Total wind-swept area—the area where collisions could occur—for the GE 3.0 MW turbine and the Vestas 5.6 MW turbine is less than the total wind-swept area for the Siemens Gamesa 6.0 MW turbine (table 3-16), indicating that the Siemens Gamesa 6.0 MW turbine would have an increased mortality risk compared to the other models. Erickson et al. (2014) conducted a metanalysis of postconstruction bird fatality data at numerous wind facilities across North America and found no linear correlation between turbine height and the fatality rates estimated for turbines with hub heights between 118.1 and 262.5 feet. Alternatively, other aggregations of postconstruction avian fatality data have found support for an increase in bird mortality with increasing turbine hub height when comparing turbines with hub heights between 118.1 and 262.5 feet (Loss et al. 2013). No publicly available metanalysis studies have been published for turbines with hub heights between 80 and 125 meters however, to assess whether increased hub height has any impact on bird fatality rates.

Table 3-16. Size and Estimated Wind-Swept Area of Potential Turbines

Turbines	GE 3.0 MW	Vestas 5.6 MW	Siemens Gamesa 6.0 MW
Number of towers ¹	149	90	84
Hub height	292 feet (89 m)	410 feet (125 m)	377 feet (115 m)
Total turbine height	502 feet (153 m)	676 feet (206 m)	656 feet (200 m)
Blade (rotor) diameter	417 feet (127m)	531 feet (162 m)	558 feet (170 m)
Wind-swept area per tower	136,572 square feet	221,452 square feet	244,545 square feet
Total wind-swept area	20,349,228 square feet	19,930,680 square feet	20,541,780 square feet

Source: ConnectGen (2020).

¹ Between 84 and 149 turbines would be included in the Project. The total number of wind turbines would depend on the turbine model selected and final design. Calculations are estimations based on this range.

The closest wind-energy facility to the Project with public postconstruction fatality data is Foote Creek Rim I, located approximately 50 miles northwest of the Project (WEST 2019c). This Project is in a landscape dominated by mixed grass prairie and sagebrush shrubland. At Foote Creek Rim I, 92 percent of avian fatalities were passerine species; raptor casualties were very low despite high raptor use estimates for the site. Avian fatality rates ranged from 1.2 to 2.0 non-raptor birds/turbine/year and 0.0 to 0.1 raptors/turbine/year (Young et al. 2003). Although bird mortality at turbines is well documented at many wind energy facilities, effects on avian populations have not been reported because many factors typically contribute to avian population declines, and it is challenging for researchers to isolate a single causal factor. Avian fatalities from turbine strikes could affect individual birds but are not anticipated to be of a magnitude that would affect populations or communities of avian species.

Issue Statement #4: Are there important resources for raptors in the form of concentrated prey bases in the analysis area, and if so, is there potential for disturbance of prey bases due to construction and operations of the Project?

Raptor prey bases within the analysis area (siting corridors) include mule deer crucial winter range and waterbodies, wetlands, and perennial streams (table 3-17). Project construction and operations activities have the potential to disturb prey habitat and individual prey animals.

Table 3-17. Potential Project Disturbance by Prey Base Type

Prey Base	Amount of Prey Base in Siting Corridors	Percentage of Prey Base in Siting Corridor
National Wetlands Inventory wetlands	79.6 acres	18.8
National Hydrography Dataset ponds	2.6 acres	0.2
Perennial streams	2,109.6 linear feet	–
Mule deer winter range	292.2 acres	17.7

Sources: Tetra Tech (2020d).

The Project would identify, avoid, and/or minimize adverse effects on wetlands and waterbodies to the extent practicable (WQ-1). Measures to minimize effects on big game are described in section 3.4.5.3, “Proposed Action.” Considering that the percentage of prey bases potentially affected by Project construction and operations is relatively low compared to total available prey bases, and avian species would still have opportunities to forage at unimpacted prey bases within the analysis area, impacts are not anticipated at the individual, community, or population levels.

Issue Statement #5: Would construction activities involve the removal of trees or vegetation with potential to serve as substrate for nesting avian species?

Construction activities would remove vegetation, including some trees, with the potential to serve as nesting substrate for avian species. Ground disturbance could affect ground-nesting species through the removal of potential nesting substrate (e.g., shrubs, trees, and rock outcrops) (see table 3-15).

Temporary ground disturbance activities would be limited to the minimum amount necessary to safely construct Project facilities (GEO-1). Initial vegetation clearing would be performed during the nonbreeding season for avian species (September 1–April 15), if feasible. If vegetation clearing cannot occur during the nonbreeding season, surveys would be performed in breeding bird habitat to identify avian nesting activity in the Project Area and nest sites would be avoided until determined to be inactive (WL-1). Wind turbine generators would be set back at least 1 mile from known, occupied eagle nests based on existing and future nest surveys, and the Project would continue to coordinate with the FWS to identify appropriate nest-specific avoidance or minimization measures (WL-9).

The siting corridors contain approximately 52.6 acres (0.81 percent) of forested areas, approximately 177.4 acres of foothill shrublands (2.75 percent), approximately 5,883.1 acres (91.4 percent) of sagebrush shrublands, and approximately 31.0 acres (0.48 percent) of granite rock outcrops with sparse vegetation that could contain suitable nest substrate for avian species (Tetra Tech 2020d). Considering that the percentage of impact within siting corridors for land cover types that may contain potential nesting substrate is relatively low compared to available potential nesting substrate in the area more generally, impacts are not anticipated at the community or population levels. Individuals, specifically those with nest fidelity, may still be impacted if existing nesting locations are disturbed.

Issue Statement #6: Would noise and human presence from construction and operations activities, equipment, and personnel affect nesting success of avian species, including raptors?

Noise and increased human presence from Project construction and operations activities, equipment, and personnel has the potential to disrupt nesting avian species, including raptors. Nest abandonment or direct mortality could result from surface-disturbing construction activities. Human activities and use of equipment could displace nesting birds, cause birds to abandon nests, or reduce fitness and survivorship because of increased alertness or changes in activity patterns (e.g., fleeing disturbed areas).

During the nesting season, avian species are most vulnerable to human-activity disturbances (e.g., noise and human presence), which could result in mortality. Effects on nesting species from Project construction and operations include nest abandonment or direct mortality from construction activities such as vegetation removal.

Initial vegetation clearing would be performed during the nonbreeding season for birds (September 1 through April 15), if feasible. If vegetation clearing cannot occur during the nonbreeding season, surveys would be performed in breeding bird habitat to identify avian nesting activity in areas where disturbance is anticipated. Nest sites would be avoided until determined to be inactive (WL-1).

There was only one active raptor nest observed within the Project Area during aerial nest surveys: an active golden eagle nest (WEST 2019a). The area within 1 mile of this nest was not included in the turbine siting corridors; therefore, WTGs would be set back a minimum of 1 mile from known eagle nests (WL-9). Other Project features, such as collection lines, may still be constructed within 1 mile of this eagle nest, creating potential for disturbance during the construction phase of the Project. There remains potential for direct mortality of ground-nesting avian species during construction activities. Ground disturbance could affect ground-nesting species through human disturbance or the potential for direct mortality (see table 3-16). As such, impacts are expected at the individual level but are not anticipated to be of a magnitude to affect species at a population or community level.

Issue Statement #7: Would avian and bat species of concern be affected by habitat loss and fragmentation, increased activity, and vehicular traffic during construction and operations of the Project resulting in population declines?

Avian and bat species of concern would be affected by habitat loss and fragmentation, increased activity, and vehicular traffic during construction and operations of the Project in the same ways as described for avian and bat species more generally in Issue Statement #1.

In addition to the EPMs described with Issue Statement #1, the Project would develop and implement eagle conservation practices as part of its BBCS to comply with regulatory requirements and seek to minimize the unintentional take of eagles (WL-3). If an eagle fatality does occur due to Project construction or O&M, the Project would notify the FWS within 24 hours (WL-8). The Project could pursue a voluntary Eagle Incidental Take Permit (EITP) authorized under the BGEPA with the FWS. Issuance of an EITP is considered a Federal action subject to NEPA review separate from this EIS. An EITP requires development of an Eagle Conservation Plan, which could include eagle-specific conservation measures in addition to those identified in this EIS to meet the preservation standard required for issuance of an EITP (FWS 2016).

Issue Statement #8: What is the anticipated bat mortality associated with the Project from turbine blade collision or other wind facility operations impacts (i.e., barotrauma) that could be expected from the range of turbines being considered?

Fatalities resulting from collisions with turbines are expected to be the primary adverse effect on bat species. Bat fatality rates at the Foote Creek Rim Windpower Project in Wyoming have ranged from 0.6 to 2.4 bats/turbine/year (Young et al. 2003). It is also documented that bats are killed near turbines due to barotrauma caused by rapid air-pressure reduction near moving turbine blades that damages tissue and internal organs. The magnitude of effects of barotrauma on bats at wind facilities is not well known considering the many variables that could also cause fatality to bats at wind facilities, such as turbine collisions. One study at a wind facility in Canada concluded that 90 percent of bat fatalities involved individuals that showed signs of internal hemorrhaging consistent with barotrauma, but direct contact with turbine blades could be attributed as the cause of mortality for only approximately half of those bats, suggesting barotrauma was the cause of mortality for the remaining bats (Baerwald et al. 2008).

Prior to the start of construction, a BBCS would be developed and would outline measures to avoid and minimize bat mortality via direct strikes (WL-2). The Project would also perform postconstruction mortality surveys to calculate the fatality rate of bats (WL-4).

Total wind-swept area—the area where collisions and barotrauma could occur—for each potential turbine model is discussed in Issue Statement #3 (see 3-16). Barclay et al. (2007) concluded that taller towers are associated with increases in fatalities of bats when comparing turbines with hub heights between 78.7 and 308.4 feet. In a meta-analysis of 40 studies of North American wind energy facilities, Thompson et al. (2017) found no evidence that turbine height influences bat mortality although the authors excluded shorter lattice-style turbines used in Barclay et al. (2007). No publicly available metanalysis studies have been published for turbines with hub heights between 262.5 and 410.0 feet, however, to assess whether increased hub height has any impact on bat fatality rates.

Fatality estimates based on studies of other wind energy facilities in western North America should be considered tentative because each facility has unique ecological conditions and Project-specific features making it challenging to draw robust conclusions about the relationship between bat mortality and turbine size.

Issue Statement #9: Are there important resources for bats in the form of roost sites or hibernacula in the analysis area and, if so, is there potential for disturbance of these sites due to construction and operations of the Project?

There are formations in the analysis area that can develop karsts. Based on the climate in which they are located (arid/semiarid), the likelihood of karst features forming and providing suitable caves for bat roosting is low. There is also potential for abandoned mines to serve as cave roosts in the analysis area, but the likelihood of bats using these sites is low because most mapped mine features are not underground. For a full discussion on mine resources in and near the Project Area, see section 3.7.4.1, “Geology.”

A BBCS would be developed and would outline measures to avoid and minimize impacts to roost sites and hibernacula (WL-2). Environmentally sensitive areas in and near the Project Area would be identified and the Project would seek to avoid or minimize impacts to these areas. Construction and operations personnel would be informed of the appropriate practices that could be applicable to avoid or minimize impacts when working in the vicinity of these areas (GEN-2). Routine O&M activities would only take place during daylight hours when bats are not active (GEN-7).

Project construction could also disturb rocky outcrops (approximately 31 acres [0.48 percent] within the siting corridors; Tetra Tech 2020d) and forested areas (approximately 53 acres [0.82 percent] within the siting corridors; section 3.14.4.1, “Land Cover”) that could provide roosting habitat for bats. Considering that the percentage of impacts within siting corridors for land cover types that may contain potential roosting substrate is relatively low compared to available potential roosting substrate in the area more generally, impacts are not anticipated at the individual, community, or population levels.

3.5.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.

3.5.6 Avian and Bat Species Conclusion

Ground-disturbing construction and operations activities would impact avian and bat habitat through the removal of vegetation used for nesting, foraging, and brood-rearing for birds. Construction disturbance and operations infrastructure would impact 1,471.3 acres of habitat (5.6 percent of the Project Area) until those areas were reclaimed following construction and again during decommissioning.

Anticipated bird fatalities from collisions with vehicles and met towers, and electrocution from aboveground collector lines, would be negligible, and there would be no expected population or community-level effects. The Project would develop and implement a Bird and Bat Conservation Strategy to avoid and reduce potential impacts that may result from Project operations; therefore, collision and electrocution effects are not anticipated to impact communities or populations and would end with decommissioning.

Project construction and, to a lesser extent, O&M activities in the siting corridors, would disturb prey habitat and individual prey animals until construction activities cease or disturbed areas are reclaimed during decommissioning and are not anticipated to impact individual raptors or raptor communities or populations. Construction activities would remove vegetation with the potential to serve as substrate for nesting avian species in the siting corridors until disturbed areas were reclaimed. Although some birds would be displaced from nesting in the siting corridors, it is anticipated that they would use suitable habitat outside the siting corridors during construction disturbance. Noise and increased human presence from construction and O&M activities, equipment, and personnel would affect some individual birds' nesting success because of nest abandonment, direct mortality, reduced fitness and survivorship, and disturbance of nesting vegetation. Effects would decrease with the end of construction activities and cease with reclamation during decommissioning. A BBCS would be developed and implemented to avoid and reduce potential impacts to avian and bat species. Avian and bat species of concern would be impacted by habitat loss, increased activity, and vehicular traffic in the same ways described for avian and bat species more generally; populations would not be anticipated to be affected. The Project would develop and implement eagle conservation practices to minimize the unintentional take of eagles, including setting wind turbines back at least 1 mile from known, occupied eagle nests.

The risk of bird and bat mortality from turbine blade collision would be slightly increased for the Siemens Gamesa 6.0 MW turbines because they would have more total wind-swept area compared to the Vestas 5.6 MW turbines and GE 3.0 MW turbines. The relationship between turbine height and bird and bat mortality risk is unclear for the range of turbines being considered. Project construction and O&M would disturb roost sites and hibernacula for bats if present in the siting corridors in rocky outcrops (0.48 percent of the siting corridors) or forested habitat (0.82 percent of the siting corridors); however, bats could avoid these areas during construction and O&M activities and return when construction activities have ceased and reclamation has been completed during decommissioning. Based on the analysis of these issues, impacts are expected to individual birds and bats, but populations are not expected to be affected. The impacts would not be significant.

3.6 Cultural Resources and Native American Concerns

Cultural resources are locations that contain the physical evidence of past human behavior that allow for its interpretation, including prehistoric or historic sites, buildings, structures, objects, or districts, and any associated artifacts, records, and material remains (Advisory Council on Historic Preservation [ACHP] 2009). Such resources are identifiable through field survey, historic documentation, or other sources such as oral history. Significant cultural resources are generally referred to as historic properties. A historic property is any prehistoric or historic district, site, building, structure, or object included in, or eligible for

inclusion in, the NRHP maintained by the Secretary of the Interior (36 CFR 800.16(l)(1)). For clarification purposes, such resources are hereafter referred to as NRHP-eligible cultural resources. Resources of traditional religious and cultural significance to Native American tribes could be deemed eligible for listing on the NRHP (ACHP 2009). Additionally, Native American tribes, ethnic or religious groups, organizations, communities, or the public could consider specific cultural resources to be of cultural, historic, or religious importance, regardless of their NRHP eligibility.

3.6.1 Regulatory Background

The Project's interconnection with WAPA's Ault-Craig 345-kV transmission line constitutes a Federal undertaking pursuant to the regulations guiding Section 106 of the NHPA, as amended (36 CFR 800). Pursuant to NEPA and Section 106 compliance, WAPA is required to consider effects (or impacts in the terms of this EIS) on NHRP-eligible cultural resources from its undertaking and the Project as a connected action. Section 106 compliance would be achieved for the undertaking through consultation with consulting parties (36 CFR 800.3), identification of cultural resources (36 CFR 800.4), assessment of impacts to cultural resources per the criteria of adverse effects (36 CFR 800.5), and development and implementation of a programmatic agreement (PA) (section 1.3.4, "State Requirements") to address any identification efforts and assessment of effects that could not fully be determined prior to the approval of the undertaking (36 CFR 800.14), and for implementing the avoidance, minimization, or mitigation of adverse effects (36 CFR 800.6) to complete the Section 106 process in coordination with NEPA (36 CFR 800.8). The draft PA is provided in appendix B for public review. The publication of the DEIS with the draft PA is further part of public involvement process, meeting both the requirements of NEPA and Section 106.

As defined in Title 36 CFR 60.4, to be eligible for the NRHP, a resource must generally be over 50 years old; meet at least one of four criteria of eligibility for their association with either significant events, significant persons, distinctive character of composition, or information value; and possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and/or association (National Park Service [NPS] 1995). Regulations for the listing of properties in the NRHP are provided by 36 CFR 60, whereas the process of formally determining the eligibility of properties is defined by 36 CFR 63.

Additionally, Section 110(f) of the NHPA and the NHPA Section 106 process (36 CFR 800.10) require that Federal agencies exercise a higher standard of care when considering undertakings that could directly and adversely affect National Historic Landmarks (NHLs). NHLs are cultural resources recognized to possess exceptional value commemorating or illustrating the history of the United States. The law and regulations require that agencies, "to the maximum extent possible, undertake such planning and actions as could be necessary to minimize harm to such landmark."

3.6.2 Data Sources

Data sources that provide information on identified cultural resources include the following:

- The Wyoming SHPO's Cultural Records Office (WYCRO) and Colorado SHPO's Office of Archaeology and Historic Preservation (OAHP) spatial and tabular file search data for the overall analysis area, including NRHP-listed historic properties, NHLs, and National Historic Trails
- Previous Class III field survey results for the Project siting corridors, including the Hermosa West Wind Farm Project (ERM 2010a)
- Tribal information regarding the presence/location of cultural resources of traditional religious and cultural importance to them, Traditional Cultural Properties or Places (TCPs) or resources of concern that may not be included in the WYCRO, OAHP, or previous investigation data and other data or data sources indicated by consulting party consultation or in comment to Project scoping

3.6.3 Analysis Area

The cultural resources analysis area is the area of potential effects (APE) for the Project, as defined by WAPA (per 36 CFR 800.16(l)(1)). The APE is the area within which NRHP-eligible cultural resources could sustain loss of integrity (as defined in 36 CFR 60.4) by alteration or destruction caused by the Project. The APE includes

- horizontally, the Project footprint, which entails the physical footprint of Project facilities within an approximately 26,000-acre area where Project facilities could be built;
- vertically, a maximum depth of 15 feet for the construction of the wind turbine foundations and a maximum height of 675 feet for construction of wind turbines; and
- a 10-mile zone from the Project Area boundary within which NRHP-eligible cultural resources where “setting” and/or “feeling” are determined critical to the resource’s NRHP eligibility (figure 3-7; see section 3.6.5.2, “Methods of Analysis”).

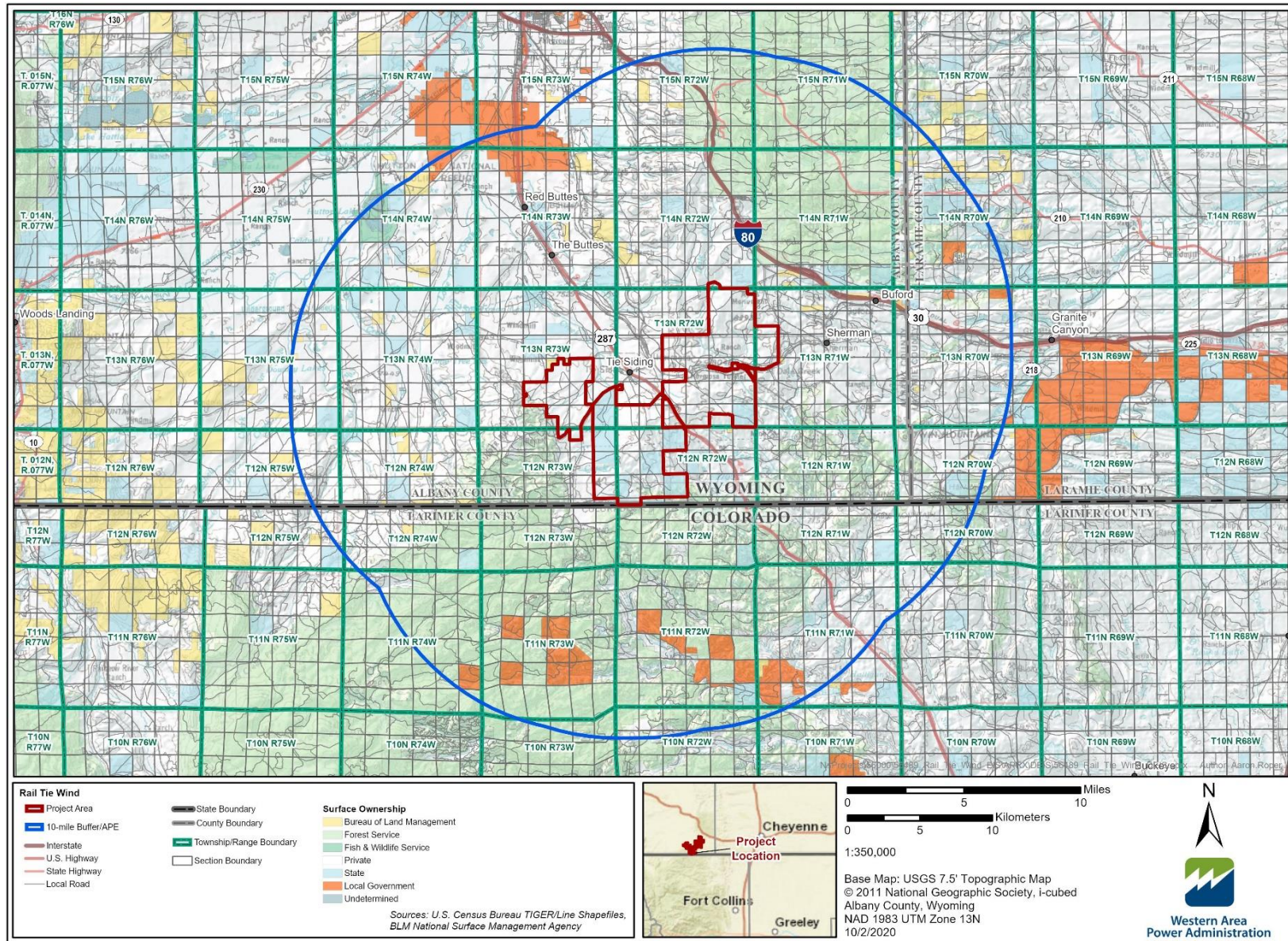


Figure 3-7. Cultural resources analysis area.

3.6.4 Baseline Description

The prehistoric chronology for southeastern Wyoming and northeastern Colorado is categorized into five major periods based on adaptive strategies and technological developments (table 3-18). These major periods are the Paleoindian, Early Archaic, Middle Archaic, Late Archaic, and Late Prehistoric (McNees et al. 2010). The end of the Late Prehistoric period generally also recognizes or overlaps a transition to the Contact and Historic periods. Previous investigations have shown that prehistoric peoples used the landscape throughout the entirety of the Prehistoric period and into the Historic period (McNees et al. 2010). Occasional surface finds of Clovis and Folsom projectile points indicate that humans have lived in southeastern Wyoming at least since at least the end of the Pleistocene geologic epoch.

Dating of the Paleoindian period in the region ranges between 12,000 and 8000 radiocarbon years before present (B.P.) or 13,900 to 8,900 calendar years ago (Y.A.); however, evidence of the big game foraging tradition, which has formed the essential definition of Paleoindian adaptation, is generally scant.

The historic chronology of Wyoming and northern Colorado is divided into six periods: Early Historic, Pre-Territorial, Territorial, Expansion, Depression, and Modern (Wyoming SHPO 2016) (see table 3-18). The themes that are present through these various periods include Exploration, Transportation, Military, Resource Extraction, Settlement, and Ranching/Farming.

Westward U.S. expansion on the Emigrant Trails—including the Cherokee, Oregon, Lodge Pole Creek, and Overland Trails across southern Wyoming led to increased conflicts with the Native Americans who occupied the region and the establishment of many military forts there, such as Fort Sanders, Fort Steele, and Fort Halleck. The Union Pacific Transcontinental Railroad in 1862 brought more travelers and permanent settlers to southeast Wyoming. Railroad expansion increased stockraising, homesteading, and ranching activities throughout the territory. The invention of the automobile in the early twentieth century changed transportation and encouraged development of improved roads, such as the Lincoln Highway, leading to the development of the modern interstate system across the state.

Table 3-18. Characteristics of Cultural Periods in Southeastern Wyoming and Northeastern Colorado

Cultural Period	Date Range	Primary Characteristics
Paleoindian	12,000–8000 B.P. (13,900–8,900 Y.A.)	Highly mobile big game foragers characterized by large lanceolate projectile points, including fluted Clovis and Folsom projectile points.
Early Archaic	8000–5000 B.P. (8,900–5,800 Y.A.)	Hearths with little associated material culture; characterized by large side-notched projectile points/knives—typically referred to as early side-notched points.
Middle Archaic	5000–3000 B.P. (5,800–3,300 Y.A.)	Increase in activity across the landscape, probably a higher population density, and the increased frequency of deep, stylized pits and ground stone. Large side-notched points replaced with lanceolate and stemmed lanceolate (i.e., Duncan/Hanna and McKean) points.
Late Archaic	3,000–1500 B.P. (3,300–1,400 Y.A.)	Open camps containing large numbers of hearths and ground stone. Large, corner-notched projectile points, side-notched projectile points, and occasional cord-marked pottery.
Late Prehistoric	1,500–500 B.P. (1,400–500 Y.A.)	Introduction of new technology in the form of the bow and arrow and ceramics. Intensive exploitation of several important subsistence resources, including weedy seeds, tubers, pronghorn, and bison.
Protohistoric or Contact	A.D. 1500–1800	Introduction of the horse; changes in social organization. Diverse assemblages include metal knives, projectile points, glass beads, copper implements, and other European trade goods.
Early Historic	A.D. 1800–1842	Exploration and establishment of the Rocky Mountain Fur Trade, trading forts.
Pre-Territorial	A.D. 1842–1868	Emigrant Trails, wagon trails, establishment of mineral/mine prospects, first military forts/presence in region, passing of the Homestead Act.

Cultural Period	Date Range	Primary Characteristics
Territorial	A.D. 1868–1890	Arrival of the transcontinental railroad, establishment of Indian Territories; ranching, cattle and sheep herding, coal mining.
Expansion	A.D. 1890–1920	Railroad expansion, Stock Raising Homestead Act, World War I.
Depression	A.D. 1920–1939	End of World War I, Great Depression, droughts and agricultural recessions; energy exploration.
Modern	A.D. 1939–present	World War II, ranching, energy exploration, modern developments.

Sources: Modified from McNees et al. (2010) and Wyoming SHPO (2016).

WYCRO and OAHP file search results indicate that a total of 478 cultural resources (390 in Wyoming and 88 in Colorado) have been previously recorded within the overall APE. Of these, nine are within the Project siting corridors, and 469 are within the 10-mile zone.

Linear resources, consisting of historic trails, railroads, and wagon roads—of which there are 12—were counted as single resources, rather than the 55 individually recorded segments being counted separately. The resources identified within the file searches encompass a wide range of site types. Prehistoric resources are archaeologically identified as lithic scatters, open camps, hunting blinds, bison and pronghorn kill sites, stone circle and cairns, rock art, rockshelters, and complex multi-occupational open camps. Historic resources are archaeologically and historically identified as debris scatters, temporary to long-term stockherding and livestock raising sites, homesteads, trails, roads, bridges, railroads, stage stations, and tunnels, townsites, cemeteries, and monuments.

According to WYCRO and OAHP data, these 478 resources include 81 NRHP-eligible cultural resources (six of which are listed in the NRHP, including an NHL); 310 resources that have either been recommended or determined not eligible for inclusion in the NRHP, or are noncontributing segments of eligible linear resources; and 87 resources that remain unevaluated for the NRHP. WYCRO and OAHP data indicate that these 478 resources include at least two TCPs and 18 additional resources containing feature types of potential traditional religious cultural significance to Native Americans; one of which is near and could intersect Project siting corridors.

3.6.4.1 Cultural Resources Identified in Engagement of the Public or Consulting Parties

Parties participating in the initial Project scoping and Section 106 consultation processes additionally commented regarding several cultural resources of potential concern such as the following:

- Ames Monument NHL (48AB97) and Reed’s Rock
- Dale Creek Bridge (48AB359)
- Tie Siding Cemetery (48AB2728/48AB295)
- Willow Springs Bison Pound (48AB130)
- Cherokee Trail (48AB1447)
- Hermosa/Sherman Tunnel (48AB453)
- Sherman Townsite (48AB42)
- Union Pacific Railroad (UPRR) (48AB357)
- Overland Trail (48AB157)
- Lincoln Highway (48AB117)

These resources are included in the overall 478 cultural resources identified through analysis of WYCRO and OAHP data. In addition, the Wyoming SHPO identified Reed's Rock within the APE; Reed's Rock is not documented in WYCRO data. This resource is associated with quarrying stone for the Ames Monument NHL. Other data sources such as the NRHP database, National Historic Trail studies, BLM General Land Office plat maps, and the Hermosa West Wind Farm Project provided no additional information beyond those cultural resources identified in the WYCRO and OAHP file searches.

3.6.5 Impacts to Resource

This section describes the potential impacts to cultural resources associated with construction, O&M, and decommissioning of the Project. Impacts to cultural resources are considered adverse when the federal undertaking could alter any of the characteristics that qualify the resource for inclusion in the NRHP in a manner that would diminish the integrity of the resource's location, design, setting materials, workmanship, feeling, or association (36 CFR 800.5(a)(1)). Only impacts to NRHP-eligible cultural resources are assessed as adverse effects under Section 106 of the NHPA. Adverse effects might be direct, indirect, or cumulative, including reasonably foreseeable effects caused by the undertaking that could occur later in time or be farther removed in distance (36 CFR 800.5(a)(1)). This includes the potential for impacts to aspects that make a resource of traditional or religious importance to concerned Native American tribes, should such resources be identified by stakeholders for inclusion in the NRHP.

3.6.5.1 Impact Indicators

Impacts to cultural resources, including those of Native American concern, could result should the following result from construction, O&M, or decommissioning of the Project:

- Physical or nonphysical change to the characteristics that make a cultural resource eligible for the NRHP or to the aspects of an existing resource of traditional or religious importance to concerned Native American tribes.

Physical and Nonphysical Impact Indicators

Physical impacts to cultural resources could include Project activities, such as ground disturbance from construction within the boundaries of an NRHP-eligible cultural resource, which could destroy or alter the characteristics that qualify the resource for inclusion in the NRHP.

Nonphysical impact indicators include introduction of visual or other intrusions into the setting of an NRHP-eligible cultural resource or alteration of the original feeling of the property. This could include the construction of new aboveground infrastructure, such as WTGs, that is visible or otherwise perceptible (auditorily, atmospherically) from an NRHP-eligible cultural resource, intruding on the integral setting of the resource or altering the integral feeling of the resource as experienced by the common observer—where setting and feeling are characteristics of the resource that contribute to its eligibility for inclusion in the NRHP. Nonphysical impacts would only be assessed for such resources that fall within the Project's limit of visibility within the 10-mile zone, or viewshed, for the major elements of Project development, which are the turbines, because resources not within the viewshed would not be exposed to potential visual impacts (figure 3-8). The distance of these visual impacts would be of greater range than and encompasses the extent of potential noise (auditory) or haze from construction dust or vehicle exhaust (atmospheric) impacts for the Project, and, therefore, would serve for analysis of all perceivable nonphysical impacts.

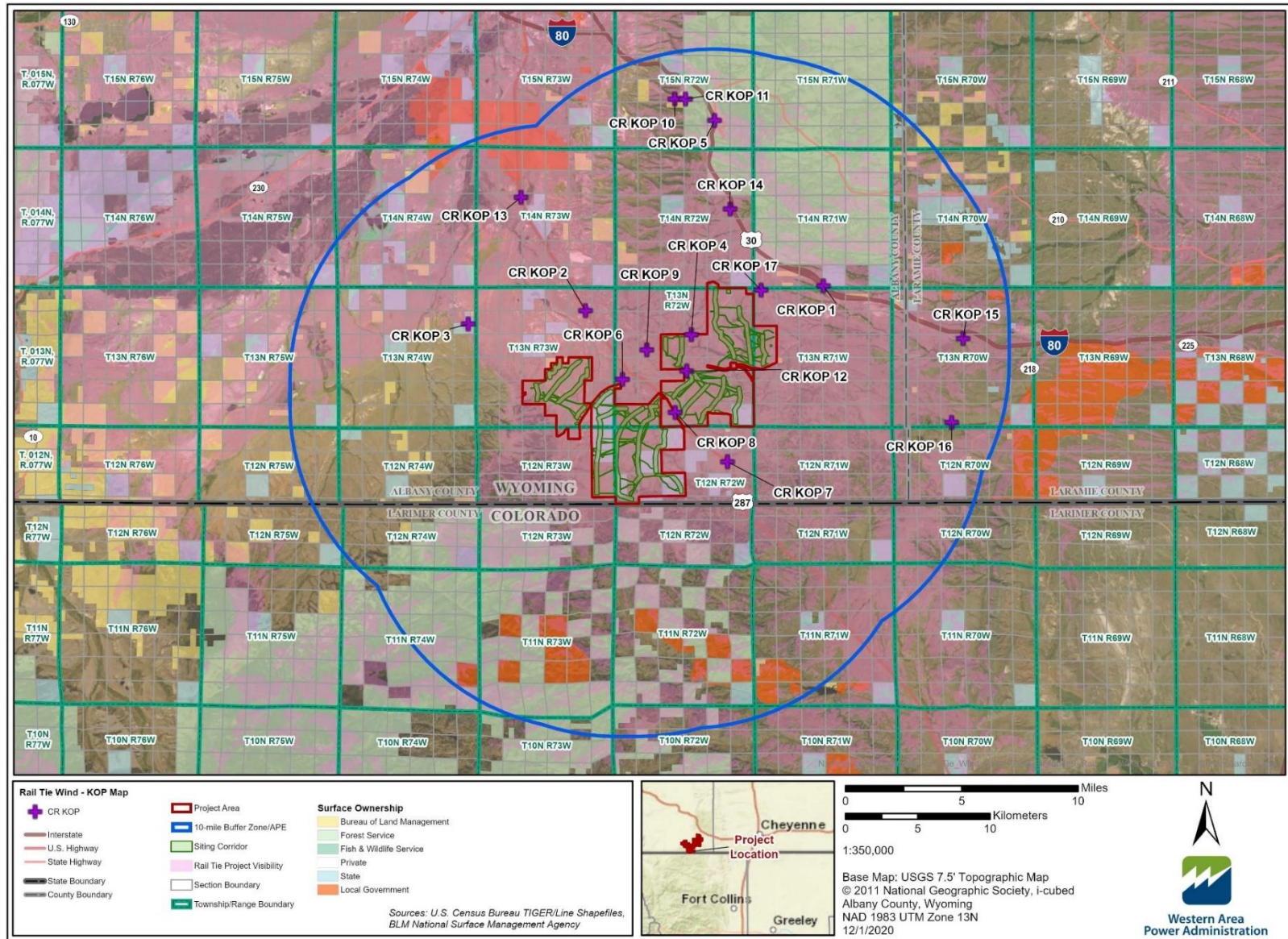


Figure 3-8. Cultural resources key observation points.

3.6.5.2 *Methods of Analysis*

The following steps were completed to analyze potential impacts to cultural resources:

- Existing records pertaining to cultural resources within the APE, as discussed below, were reviewed to determine if the Project would potentially result in physical or nonphysical impacts that could alter the characteristics of the resource that make it eligible for listing in the NRHP.
- Based on the review of existing records, an analysis of potential impacts to cultural resources was performed in relation to where the Project could result in physical ground disturbance or structural alteration on a NRHP-eligible cultural resource or nonphysical aboveground intrusion on a NRHP-eligible cultural resource where setting contributes to its NRHP eligibility, such as the visibility of Project facilities, including WTG development. The maximum potential impact from turbine design options was considered in the analyses.
- The physical impact analysis assesses potential impacts resulting from ground disturbance or structural alteration on previously identified cultural resources and the potential for unidentified cultural resources. This analysis gathers a list of known cultural resources and recommendations for avoidance of physical or nonphysical impacts to NRHP-eligible cultural resources, where practicable. Further planning measures are included per NHPA Section 106 regulations to address any inadvertent discovery of previously unidentified cultural resources, should they arise, during Project activities.
- The nonphysical impact analysis assesses potential impacts resulting from the visual intrusion of Project infrastructure, prominent turbine structures in particular, where the alteration of setting or feeling on a NRHP-eligible cultural resource would result in a significant loss or reduction of characteristics that make the resource eligible for NRHP listing. This analysis gathers a list of NRHP-eligible cultural resources identified where installation of aboveground Project infrastructure could result in nonphysical impacts. Once assessed, impacts are addressed through avoidance, minimization, or mitigation under the Section 106 process.

Area of Potential Effects

Within the APE, the potential for physical impacts to cultural resources is analyzed within the Project siting corridors located within the Project Area boundary, equated with areas of potential Project ground disturbance, including overland vehicle traffic (see figure 3-8). The potential for nonphysical impacts to cultural resources is analyzed within the Project viewshed (see figure 3-8). The extension of analysis beyond the Project Area boundary to this 10-mile zone considers the limit of visual preeminence for nonphysical impacts from the Project, as visual preeminence is defined in *Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes* (Sullivan et al. 2012). The limit of visual preeminence is the determined cultural resource analysis area for potential visual impacts by WAPA, in consultation with Wyoming SHPO (WAPA 2020; Wyoming SHPO 2020).

For the Project, turbine towers and blades represent the most prominent sources of potential visual impacts to cultural resources. Sullivan et al. (2012) note that it is at distances under 10 miles that turbine structures could become major sources of visual contrast and identify this as the limit of visual preeminence. It is within 10 miles where “the wind facility is a major focus of visual attention, drawing and holding visual attention. The facility could occupy a substantial portion of the field of view, with the repeated vertical lines of the towers contrasting strongly with horizontal landforms and blade motion and color contrasts also strongly attracting visual attention in some circumstances” (Sullivan et al. 2012). Beyond 10-mile mark, Sullivan et al. (2012) note that wind turbines could be visible but do not tend to dominate viewer focus on the landscape; they begin to blend with the background. Furthermore, when major landforms such as mountains dominate the landscape, as with the current Project Area, the wind

facility would not be visually dominant. Specifically, Sullivan et al. (2012) state that “despite the size of wind turbines and wind facilities, the open nature of the turbine layout could make it difficult for a wind facility to dominate views with prominent landforms, such as mountain ridges, because the wind turbines lack ‘visual weight.’” At distances where wind turbines could be visible but do not tend to dominate viewer focus on the landscape, and therefore present weak contrast within the setting of cultural resources, no adverse impacts would result consistent with Wyoming SHPO guidance (see the Historic Properties Visual Impact Assessment [HPVIA] [Tetra Tech 2020h]). For this reason, the APE for cultural resources extends to 10 miles, whereas the visual analysis area extends for greater distances (see section 3.2., “Aesthetics and Visual Resources”).

Based on a review of existing cultural resources data, including any tribal or applicable ethnographic information received throughout the consultation process, the analysis of potential impacts to cultural resources addresses all known cultural resources within the APE. NRHP-eligible cultural resources within the Project siting corridors, where physical impacts could occur, are listed in table 3-19 (see figure 3-8). For NRHP-eligible cultural resources identified within the Project viewshed in the 10-mile zone, KOPs were selected where suitable to analyze the potential nonphysical impact to the NRHP-eligible cultural resource (SWCA Environmental Consultants [SWCA] 2020a; Tetra Tech 2020h) (table 3-20; see figure 3-8). A HPVIA was conducted for this purpose to assess potential visual impacts of the Project on cultural resources where setting and feeling are important aspects contributing to the resource’s NRHP eligibility (Tetra Tech 2020h). The HPVIA further found that the Project would not result in significant impacts to the setting of two sites, the NRHP-listed Barn at Oxford Ranch (48AB527) and the archaeological site 48LA207 (prehistoric hunting blinds) (Tetra Tech 2020h).

The HPVIA assessment concluded that the following sites identified during public scoping or in Section 106 consultation, including Sherman Townsite, Willow Spring Station, Tie Siding Cemetery, and Willow Springs Bison Pound, are archaeological resources where setting is not an important factor to their NRHP eligibility. Likewise, the Dale Creek Bridge and the Hermosa/Sherman Tunnel are eligible primarily for their engineering, and setting is not an important factor to their NRHP eligibility. Although the Dale Creek Bridge and the Hermosa/Sherman Tunnel do not themselves have significant setting concerns, these sites are features along the UPRR where setting is important to its NRHP eligibility.

The HPVIA found adverse effects to the Overland Trail, Segments 225 and 226 (48AB157), and Ames Monument NHL (48AB97) (Tetra Tech 2020h). Although the HPVIA (Tetra Tech 2020h) left the assessment of impacts to the UPRR (48AB357) and Cheyenne Pass Road (48AB543) undetermined, the NEPA analysis herein finds that the historic UPRR will receive strong visual impacts from Project turbine development due to the proximity of the railroad route, which crosses the Project area, and that the Cheyenne Pass Road has contributing segments in the Project viewshed and 10-mile APE that will receive moderate visual impacts due to potential turbine proximity (within just over 3.0 miles).

Project impacts to NRHP-eligible cultural resources, including resources of traditional religious or cultural significance to Native American tribes or TCPs, that are determined to be adverse effects would require avoidance, minimization, or mitigation of these effects in accordance with the NHPA Section 106 process (36 CFR 800). A PA is being developed in accordance with the Section 106 process to address the further identification of NRHP-eligible cultural resources in the APE, ensure consideration of effects on all NRHP-eligible cultural resources, and direct the treatment of NRHP-eligible cultural resources to a resolution of adverse effects from the undertaking in completing the Section 106 process (section 3.6.1, “Regulatory Background”). The PA additionally addresses special protections requirements for the Ames Monument as an NHL under Section 110(f) of the NHPA and the NHPA Section 106 process (36 CFR 800.10), weighing its exceptional value in commemorating or illustrating the history of the United States.

Table 3-19. Summary of Known NRHP-Eligible Cultural Resources within the Project Siting Corridors where Adverse Physical Impacts Could Occur if Not Avoided, Minimized, or Mitigated

Smithsonian Number	Description	NRHP Status
48AB152_31	Lincoln Highway 1912	Unevaluated segment, eligible resource
48AB357	UPRR	Eligible
48AB453	Hermosa/Sherman Tunnel	Eligible

¹Potential disturbance from Project construction.

Table 3-20. Summary of Known NRHP-Eligible Cultural Resources within the Analysis Area (the 10-mile zone of the APE) where Adverse Nonphysical Impacts Could Occur if Not Avoided, Minimized, or Mitigated

Smithsonian Number	Description	NRHP Status	KOP Number (HPVIA KOP Number ¹)
48AB1067	Tree Rock	Eligible, WY SHPO concurrence	1 (HPVIA KOP 1)
48AB1447	Cherokee Trail	Eligible, WY SHPO concurrence	2 and 3 (HPVIA KOP 2 and 3)
48AB153	Lincoln Monument	Eligible	5 (HPVIA KOP 4)
48AB157_1, _14, _225, _226	Overland Trail	Contributing segments, eligible resource	6 (at Segment 1) (HPVIA KOP 5) 7 (at Segment 14) (HPVIA KOP 6) 8 (at Segments 225 and 226) (HPVIA KOP 7)
48AB354_1, _12	Lodgepole Creek Trail	Contributing segments, eligible resource	10/11 (HPVIA KOP 8/9)
48AB357	UPRR	Eligible, WY SHPO concurrence	4, 9, 12, and 13
48AB543_1	Cheyenne Pass Road	Contributing segment, eligible resource	14 (HPVIA KOP 10)
48LA117_22	Lincoln Highway 1920	Contributing segment, eligible resource	15 (HPVIA KOP 11)
48LA613	Cheyenne-Twin Mountains Wagon Road	Eligible, WY SHPO concurrence	16 (HPVIA KOP 12)
48AB97	Ames Monument NHL	NHL, listed (A and C), WY SHPO concurrence	17 (HPVIA KOP 13)

¹KOP numbers corresponding to those used in the HPVIA (Tetra Tech 2020h)

3.6.5.3 Proposed Action

Issue Statement #1: How would ground disturbance from the Project potentially have physical impacts on cultural resources?

Project construction activities could result in potential impacts to cultural resources. Ground-disturbing construction activities could physically alter or destroy cultural resources in part or in whole. In terms of NRHP-eligible cultural resources and/or resources of traditional or religious cultural significance to Native American tribes, such impacts could alter the characteristics of the resource—including integrity of setting or feeling—that make it eligible for NRHP listing.

Intensive field surveys for cultural resources identification would proceed within areas of proposed Project ground disturbance within the Project siting corridors as an EPM. Any NRHP-eligible cultural resources identified during survey that could be adversely affected would have adverse effects resolved pursuant to Section 106 of the NHPA before the Project would be permitted to proceed in the area of the NRHP-eligible cultural resource. Additionally, other previously unidentified cultural resources, such as buried archaeological materials, could be discovered through ground-disturbing activities after permitting. Any

adverse effects resulting from Project impacts to cultural resources after permitting would be addressed in accordance with an inadvertent discovery plan specified in the PA. All adverse effects to significant cultural resources from the Project would be resolved through a Historic Properties Treatment Plan (HPTP) under the PA and in accordance with the regulations guiding the Section 106 process (36 CFR 800).

EPMs/construction practices for protection of cultural resources related to avoidance of physical impacts include Project design or micro-siting to relocate or reroute ground-disturbing infrastructure away from the resource (GEN-2). Construction travel would be restricted to existing roads and permanent or temporary access roads identified in the final Project Site Plan (GEN-3). When physical avoidance is not possible, additional measures would include boring subsurface infrastructure such as utility lines away from significant cultural resources, where reasonable, and co-location with existing similar infrastructure or in areas of previous or existing disturbance to limit introduction of additional elements of alteration on the cultural resource. Where avoidance is not fully possible, EPMs/construction practices for cultural resources would seek to minimize impacts to NRHP-eligible cultural resources by minimizing the area and choosing the placement of ground disturbance to reduce potential impacts. Applicable EPMs to the avoidance and minimization of impacts to cultural resources include Cultural Resources (CR)-1, CR-2, CR-3, CR-4, CR-5, Hazardous Materials (HAZ)-2, GEO-1, GEO-2, GEO-5 (see table 2-6). Other measures for avoidance, minimization, and mitigation for resolving adverse effects are addressed in the PA, and will be included in the treatment plan(s) tiering to the PA (appendix B).

A total of nine previously recorded cultural resources are located either within or in immediate proximity to the Project siting corridors and could be exposed to physical impacts from ground-disturbing Project activities if not avoided by Project design or treated by minimization or mitigation measures under the PA. These cultural resources include three known NRHP-eligible cultural resources, presented above in table 3-19. The remaining six resources include two segments of the historic Overland Trail (48AB157_17 and 48AB157_133), that do not contribute to that trail's NRHP eligibility, and three prehistoric cultural resources (48AB34, 48AB1935, 48AB1936) and two historic cultural resources (48AB1861 and 48AB1937) that are not eligible for inclusion in the NRHP.

Approximately 1,840 acres of disturbance is planned within the Project siting corridors (see table 2-1). Within the 2,198 acres of Class III cultural resources survey conducted for the Hermosa West Wind Farm Project in the current Project vicinity, and which used similar siting corridors, six cultural resources (excluding isolated resources) were identified. Cultural resources survey for areas of Project disturbance within the Project siting corridors is planned to identify and evaluate any additional cultural resources within this area, and assess potential physical (and potentially nonphysical) impacts to those resources evaluated as eligible for the NRHP or those that contain features of potential significance to Native American tribes.

Issue Statement #2: How would Project components potentially have nonphysical impacts to cultural resources?

The introduction of aboveground infrastructure for the Project could result in potential impacts to significant cultural resources. Postconstruction aboveground infrastructure could cause nonphysical impacts to cultural resources (such as visual, auditory, or atmospheric impacts). Nonphysical impacts could alter the characteristics of an NRHP-eligible cultural resource that make it eligible for the NRHP, at properties where integrity of setting or feeling are important to their NRHP eligibility.

EPMs/construction practices for protection of cultural resources related to avoidance or minimization of nonphysical impacts would include placement of aboveground infrastructure to blend in with the surrounding vegetation/environment, using setbacks to distance infrastructure from sensitive cultural resources, co-location of infrastructure with other existing disturbances/similar infrastructure, alterations

to aspects of artificial nighttime lighting, and reclamation and revegetation of ground disturbance and landscapes to approximate original conditions. Applicable EPMs include VIS-1, VIS-2, VIS-3, VIS-4, and VIS-5 (see table 2-6). Other measures for avoidance, minimization, and mitigation are addressed resolving adverse effects on NRHP-eligible cultural resources in the PA for the Project and the treatment plan(s) tiering to the PA.

The 10 known NRHP-eligible cultural resources that could be nonphysically impacted by aboveground Project infrastructure and their associated KOPs (if suitable) are presented in table 3-21 (see also table 3-20). Field assessments from the designated KOPs for NRHP-eligible cultural resources and desktop assessment for nonphysical impacts to these NRHP-eligible cultural resources have been conducted. For cultural resources, the visual contrast rating (VCR) process is the same as that conducted for Aesthetics and Visual Resources, where the degrees of visual change ranges from none to strong (see table 3-2); however, the focus of the VCR analysis for cultural resources is placed on assessing impacts to each resource’s integrity. Based on the VCR for these resources, the impacts would range from the potential for no impact (“No”) to the potential for strong impact (“Strong”) (see table 3-2).

Table 3-21. Assessment of Nonphysical Impacts to NRHP-Eligible Cultural Resources

Smithsonian Number	Description	KOP Number	Approximate Nearest Distance to Project Siting Corridor (miles)	Level of Impact ¹ (Section 106 Effects)
48AB1067	Tree Rock	1	3.3	Weak (No Adverse Effect)
48AB1447	Cherokee Trail	2 and 3	2.0 and 3.8	Strong ² (Adverse Effect)
48AB153	Lincoln Monument	5	7.2	Weak (No Adverse Effect)
48AB157_1, _14, _225, _226	Overland Trail	6 (at Segment 1) 7 (at Segment 14) 8 (at Segments 225 and 226)	0.2, 1.6, and 0.3	Strong (Adverse Effect)
48AB354_1, _12	Lodgepole Creek Trail	10/11	8.3 and 8.2	Weak (No Adverse Effect)
48AB357	UPRR	4, 9, 12, and 13	0.3, 0.7, 0.0, and 7.1	Strong (Adverse Effect)
48AB543_1	Cheyenne Pass Road	14	3.4	Moderate (Adverse Effect)
48LA117_22	Lincoln Highway 1920	15	8.2	Weak (No Adverse Effect)
48LA613	Cheyenne-Twin Mountains Wagon Road	16	8.4	No (No Adverse Effect)
48AB97	Ames Monument NHL and Reed’s Rock	17	1.1	Strong (Adverse Effect)

¹ See table 3-2.

² Assuming a sufficiently intact segment can be identified; this site currently lacks field verification.

Programmatic Agreement

Further planning measures for avoidance, minimization, or mitigation of physical and nonphysical impacts to NRHP-eligible cultural resources and resources of traditional religious or cultural significance to Native American tribes or TCPs—per NHPA Section 106 regulations—would be developed in accordance with the PA and ConnectGen’s Project Description (see chapter 2), as would measures to address any inadvertent discovery of unidentified subsurface cultural resources should they arise during ground-disturbing activities.

Avoidance of impacts through design and micrositing of Project infrastructure is preferred. If avoidance is not feasible, minimization measures would be implemented, including boring subsurface infrastructure away from significant cultural resources where reasonable, co-location with existing similar infrastructure

or in areas of previous or existing disturbance, placement of aboveground infrastructure to blend in with the surrounding vegetation and/or environment, using setbacks to distance infrastructure from sensitive cultural resources, alterations to aspects of lighting (or similar practices), and/or reclamation and revegetation of ground disturbance and landscapes to approximate original conditions. These treatment measures could be further supported by monitoring or introduction of protection measures such as temporary construction fencing as appropriate. Where avoidance and minimization measures would not eliminate adverse effects, an HPTP would be developed pursuant to the stipulations of the PA. The HPTP would define all avoidance, minimization, and mitigation measures for impacts to NRHP-eligible cultural resources, and would include and be further supported by a Monitoring and Discoveries Plan under the PA. The PA would specify steps by WAPA and other consulting parties to be taken prior to construction and during O&M of the Project to comply with the NHPA. The final PA would be included as an appendix to the final EIS and/or record of decision. With the implementation of mitigation measures under the PA, the impact intensity of the Project would be reduced to nonsignificant under NEPA; however, resulting impacts to NRHP-eligible cultural resources could be permanent and long term.

3.6.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to cultural resources would occur from the Project and existing conditions and trends that cultural resources are undergoing would continue. Therefore, the No Action Alternative would result in no added sources of, and would not cause, new impacts or adverse effects on cultural resources.

3.6.6 Cultural Resources and Native American Concerns Conclusion

The Project would not physically impact known NRHP-eligible cultural resources or known resources of potential traditional or religious cultural importance to Native Americans, as avoidance of these significant resources, as well as other cultural resources, where possible, is planned. If not avoidable, the PA would further address the minimization and mitigation of physical impacts and adverse effects. The Project would result in nonphysical impacts to known NRHP-eligible cultural resources where setting and/or feeling are important characteristics contributing to the site's NRHP eligibility, and possibly to resources of potential tribal importance, should these be identified in the extent of the Project viewshed within the 10-mile zone of the APE during the consultation process, or newly identified during Class III survey for the Project. Implementation of measures specified under the PA would resolve all adverse effects under the NHPA, satisfying the mitigation of physical and nonphysical impacts under NEPA.

3.7 Geology, Soil, and Mineral Resources

This section describes the existing physiographic conditions and the potential impacts to geology, geologic hazards, soils, and mineral potential.

3.7.1 Regulatory Background

There are several Federal and State laws that provide the regulatory framework for understanding the context of geology and soils for the Project.

3.7.1.1 Federal Regulations

The federal law governing locatable minerals (metallic and nonmetallic minerals, including gold, silver, lead, copper, zinc, mica, gypsum, etc.) is the General Mining Law of 1872, which declared all valuable mineral deposits on public lands belonging to the United States to be open to exploration and purchase (BLM 2020a). The Mineral Leasing Act of 1920 is a Federal law that authorizes and governs leasing of public lands for developing deposits of leasable minerals, including coal, petroleum, natural gas, and other hydrocarbons, in addition to phosphates, sodium, sulfur, and potassium. Saleable minerals are common mineral materials, not identified as locatable or leasable, that include sand, gravel, roadbed, ballast, and clay and are sold by contract with the Federal government. Saleable minerals are regulated under the Mineral Material Act of July 23, 1947 as amended, and the Surface Use and Occupancy Act of July 23, 1955 (BLM 2020a).

3.7.1.2 State Regulations

The Wyoming Office of State Lands and Investments helps administer oil and gas, metallic/nonmetallic, and coal lease assignments on Wyoming State lands for the Board of Land Commissioners. Oil and gas leasing on State Trust Lands is guided by Wyoming Statutes (W.S.) 36-6-101 as well as Chapter 18 of the Rules and Regulations of the Board of Land Commissioners (Wyoming Office of State Lands and Investments 2020a). Solid mineral leasing on State land is guided by W.S. 36-6-101, as well as Chapters 19–25 of the Rules and Regulations of the Board of Land Commissioners (Wyoming Office of State Lands and Investments 2020b).

Wyoming has a severed mineral estate. Under W.S. 30-5-402(a), any oil and gas operator having the right to underlying resources could locate and enter the land for all necessary reasons to conduct oil and gas operations or to develop oil and gas resources underlying the surface.

3.7.2 Data Sources

Data used to characterize the baseline and analyze the impacts to geologic and soil resources from the Project include the following sources:

- WYDEQ for information regarding mines (WYDEQ 2020a)
- USGS for seismic hazards (USGS 2020)
- BLM for land and mineral system reports (BLM 2020b)
- Publicly available GIS data

3.7.3 Analysis Area

For the purposes of evaluating impacts to geology, soils, and mineral resources, the analysis area is the Project Area.

3.7.4 Baseline Description

3.7.4.1 Geology

The Project Area is west of the Laramie Range, which is composed of Precambrian-age rocks that also underly the analysis area (WSGS 2007). Pennsylvanian and Permian sedimentary rocks and Quaternary deposits overlay the Precambrian rocks in the west and central portions of the analysis area. The younger sedimentary rocks overlying the much older Precambrian rocks indicate a long period of erosion associated with the episodic uplift of the Ancestral Rocky Mountains (Erathem-Vanir Geological Consultants 2010), a complex of northwesterly uplifts of Late Paleozoic age. As a result of the Ancestral Rocky Mountains uplift, all Paleozoic-aged rocks older than Pennsylvanian age were eroded from the analysis area.

3.7.4.2 Geologic Units within the Project Area

According to recent geologic mapping, the following four categories of geologic units are present in the analysis area (Ver Ploeg and Boyd 2007) (figure 3-9):

- **Younger alluvium** – alluvial sediments consisting of poorly and unconsolidated silt, sand, and gravel that date from the Holocene (no more than 11,700 years old). These sediments are found as small deposits scattered across the Project Area, primarily associated with modern drainages and streams.
- **Older alluvium** – alluvium sediments deposited as part of alluvial fans or terraces that consist of poorly sorted silt, sand, and gravel with cobbles and boulders, sometimes associated with debris flows, that date from the Pleistocene (11,700 years old–2.58 million years old [Ma]). These sediments are found primarily in the west of the Project Area and are usually no more than 10 feet (3.05 m) deep.
- **Casper and Fountain formations, undivided** – sandstones interbedded with limestone and dolomite units that date from the Pennsylvanian (Casper Formation) to Permian (Casper and Fountain formations) (323–251 Ma). These formations are often mapped as a single unit and represent deposition during the retreat of a shallow seaway that was present across much of western North America but had fully retreated by the Permian and preserves a range of depositional environments from shallow marine to fully terrestrial. These sediments are found in the western Project Area, both at the surface and likely underlying the alluvial sediments in this area.
- **Igneous and metasedimentary rocks** – Plutonic igneous rocks formed from the slow cooling of magma in the crust, called the Sherman Granite, are present across much of the central and eastern Project Area, where they likely underlie soil formation. Small outcrops of metasedimentary rocks, primarily gneiss, which formed from the high temperature and pressure alteration of parent rocks, are present in the northern part of the central Project Area.

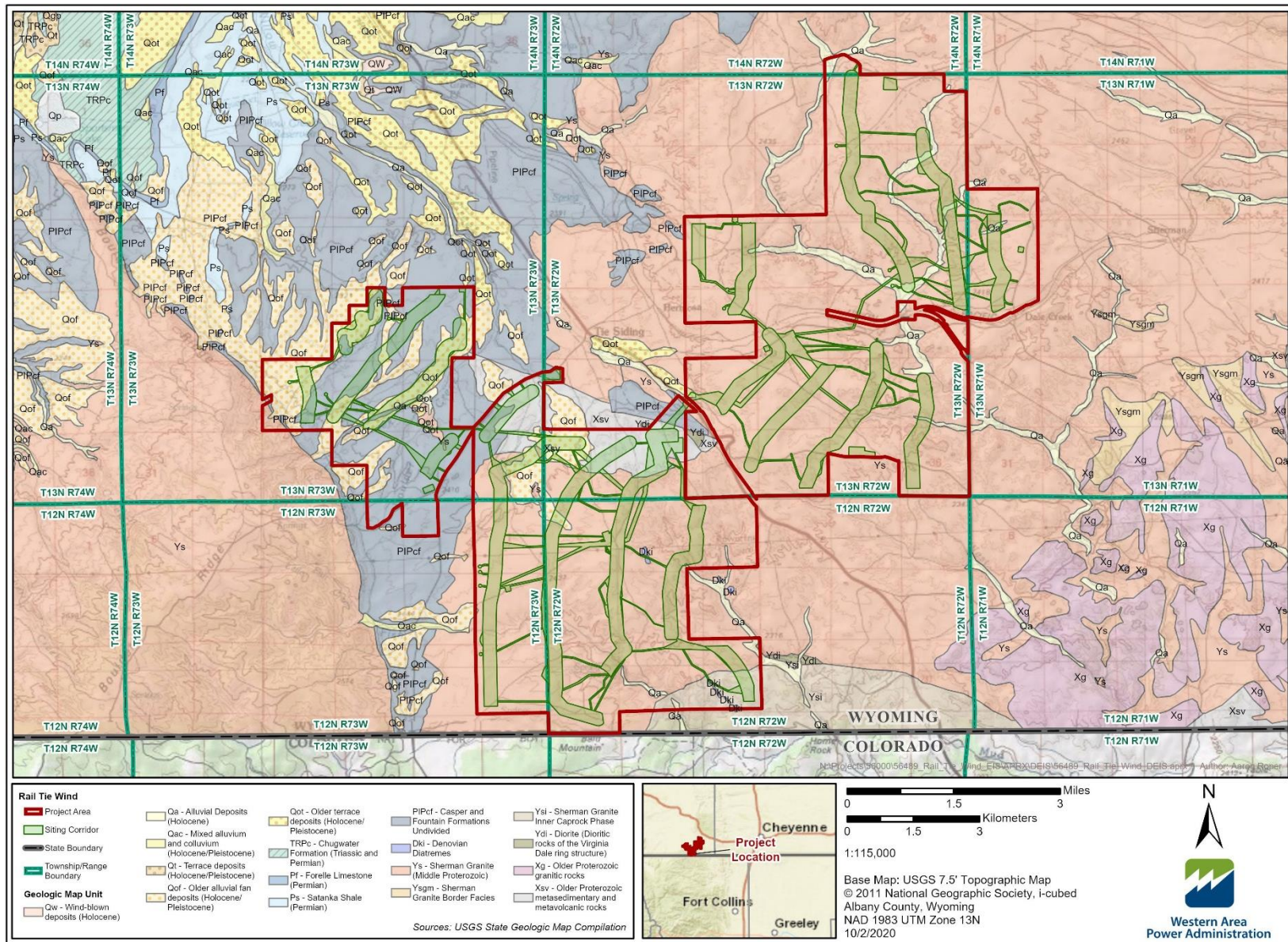


Figure 3-9. Mapped geologic units within the Project Area.

Geologic Hazards

A geologic hazard is one of several types of geologic conditions that can cause damage or loss of property and life. Geologic hazards vary widely by region and range from volcanic eruptions to earthquakes to avalanches. The geologic hazards with the highest likelihood to occur in Albany County, WY, include earthquakes, landslides, and subsidence. The closest known landslide hazard areas are located approximately 20 miles to the west of the analysis area in the Laramie Range. No areas of subsidence hazards have been mapped or identified within the analysis area.

The analysis area is within a region of very low to moderately low earthquake risk (USGS 2020). There are several mapped faults in the analysis area between 40 and 70 million years old, but no Quaternary-aged faults are mapped within Albany County. Quaternary faults are often an indication of possible recent seismic activity, but the area has experienced earthquakes historically. Since 1871, more than 30 magnitude 3.0 and greater earthquakes and hundreds of smaller magnitude earthquakes have been felt in Albany County with the largest being a magnitude 6.2 to 6.5 event in 1882 between Laramie, WY, and Estes Park, CO (USGS 2002).

Mineral Development

Aggregates (sand and gravel) and other saleable minerals have the most likely development scenario for the analysis area. The unconsolidated nature of the sedimentary surface geology and the presence of alluvial deposits near the surface provide opportunities for aggregate development. The Casper Formation is quarried locally for limestone and gravel (Daub and Associates, Inc. 2010). Multiple historic gravel pits are present within the analysis area but there are no active aggregate mining operations (WYDEQ 2020a).

Devonian and Precambrian kimberlite pipes (i.e., vertical structures of kimberlite) in the analysis area have the potential for economic development because they could contain diamonds and semiprecious indicator minerals. No historic or active kimberlite mines are located within the analysis area, but diamond-producing kimberlites have been discovered nearby. The Kelsey Lake Diamond Mine was a kimberlite mine across the border in Colorado, approximately 1 mile south of the analysis area, that was mined for diamonds for 6 years and produced both gem quality and industrial diamonds but closed in 2002 because of a lack of financial viability (Daub and Associates, Inc. 2010).

Petroleum reserves have been found in other areas of Wyoming within the Casper Formation, a Pennsylvanian to Permian-aged sedimentary rock that exists within the analysis area; however, it is unlikely that any oil deposits are present in the analysis area because the Casper Formation is too close to the surface to have trapped hydrocarbons in this area. The closest developed oil fields, the Little Laramie, Big Hollow, and Herrick Fields, are located approximately 30 miles northwest of the analysis area (Daub and Associates, Inc. 2010). No active oil and gas wells are present within the analysis area.

Other minerals with the potential to occur in the analysis area or that have been identified nearby include uranium, gypsum, natural gas, coal, coalbed methane, and carbon dioxide. Uranium deposits have been identified approximately 3 miles east of the analysis area, but uranium is not currently mined in the area (Daub and Associates, Inc. 2010). None of these minerals are thought to have the potential for being commercially produced from the formations present in the analysis area.

An economic analysis of mineral resources in the analysis area concluded that except for a few isolated locations with sand and gravel resources, existing economic conditions do not support mineral resource development opportunities in the Project Area (Daub and Associates, Inc. 2010).

3.7.4.3 Soils

Soils present are generally shallow (less than 40 inches to bedrock) and derived from weathered bedrock and alluvial deposits. The southeastern portion of the analysis area contains shallow, gravelly soils derived from granite bedrock whereas the western portion of the analysis area contains soils derived from limestone. Rock outcrops are present and common throughout the analysis area. Just three individual soil series cover approximately 66 percent of the Project Area. Approximately 38 percent of the soils in the analysis area are associated with bedrock outcrops. Only one soil map unit (Tieside-Pilotpeak-Rock outcrop complex) was identified with moderate to moderately high susceptibility to erosion by water (K-factor of 0.32), which covers approximately 1,678 acres of the analysis area. Soils with moderate to high susceptibility to erosion by wind cover 4,868 acres of the analysis area. No unique farmland soils are found within the analysis area, and approximately 4.2 percent of the soils in the analysis area are associated with prime farmland (2 percent) and farmland of statewide importance (2.2 percent), none of which is currently being used for agriculture.

3.7.5 Impacts to Resource

This section describes potential impacts to soil and mineral resources and the potential for geologic hazards associated with construction of the Project. O&M and decommissioning activities are not expected to have any effect on geologic, soil, or mineral resources.

3.7.5.1 Impact Indicators

The following indicators have been estimated to provide the context and intensity of impacts expected from the Project as they relate to geology, soils, and mineral resources:

- Acres of construction disturbance within documented landslide areas.
- Restriction or limitation of future access to mineral exploration and development.
- Acres of construction disturbance in soils lacking suitable geotechnical characteristics for construction.
- Acres of construction disturbance in undisturbed, highly erodible soils.
- Acres of construction disturbance in prime farmland and soils with low reclamation potential.

3.7.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to geologic, soil, and mineral resources.

- Acres of land with high landslide potential were reviewed to determine if Project construction would increase the potential for landslides or seismic hazards.
- Federal subsurface mineral rights were identified in the analysis area and cross-referenced with future mineral extraction opportunities to determine mineral (and petroleum) resource potential and if Project construction would limit or restrict access to them.
- Soil survey maps were reviewed to determine if existing soil types have geotechnical and chemical characteristics suitable/unsuitable for construction activities.
- Soil survey maps were reviewed to determine if existing soil types are highly erodible prone to soil erosion from ground disturbance.
- Soil survey maps were reviewed to determine if existing soil types are sensitive and if they would have low reclamation potential following ground disturbance.

3.7.5.3 Proposed Action

Issue Statement #1: Would construction of the Project lead to increased potential for geologic hazards, (i.e., landslides, seismic activity) in the Project Area?

Potential impacts to the Project resulting from geological hazards include landslides and the potential for seismic activity to occur within the Project Area. As discussed in section 3.7.4.1, “Geology,” the potential for seismic activity in the Project Area is very low based on historical data and the absence of Quaternary-aged faults. Landslide potential in the Project Area is also low with the nearest landslide hazard area approximately 20 miles from Project infrastructure.

Design features and EPMs (see table 2-6) would reduce the likelihood of landslides and the impact of potential seismic events. Geotechnical engineering would identify and avoid any localized unstable slopes and minimize the potential for damage from seismic activity during facility design. Structures would be built to Federal- and State-required standards and industry best management practices (BMPs) for unstable slopes and seismicity. Roads would be designed to avoid steep slopes (GEO-3).

Issue Statement #2: Would construction of the Project limit or restrict access to minerals and/or oil and gas exploration or development in the Project Area?

As discussed in section 3.7.4.1, “Geology,” oil, gas, aggregate, and other mineral extraction activities are not currently occurring within the Project Area. Petroleum deposits are considered unlikely within the Project Area, and other minerals, including uranium, gypsum, natural gas, coal, coalbed methane, and carbon dioxide are not thought to be present in quantities that would support commercial production. Kimberlite containing deposits likely exist within the analysis area; however, studies indicate potential deposits are not within the siting corridors. There are no historical or currently operating kimberlite mines identified within the analysis area, and kimberlite outcrops are rare and localized.

An economic analysis of mineral resources (Daub and Associates, Inc. 2010) concluded that except for a few localities of sand and gravel resources, existing economic conditions do not support mineral resource extraction within the analysis area. Based on this analysis, impacts resulting from construction and operations of the Project are expected to be minimal due to the lack of economically viable mineral resources.

The Wyoming Industrial Development Information and Siting Act (W.S. 35-12) requires wind energy projects of the scale of the Project to be reviewed and approved by the State’s ISC. The ISC provides protection to mineral rights owners by requiring all jurisdictional wind energy projects to notify all mineral rights owners prior to receiving an Industrial Siting Section 109 permit (ISC Rules Ch. 1, 9(g)). To the extent practicable, all mineral rights owners would be notified of Project plans and persons to contact for additional information prior to the initiation of Project construction. ConnectGen would also place public notices in local newspapers for those mineral rights owners who cannot be identified.

Issue Statement #3: Are the soils in the Project Area suitable for the infrastructure proposed for the Project?

Soils in the Project Area are suitable for the Project infrastructure. As described in section 3.7.4.3, “Soils,” no soil map units exhibit high susceptibility to wind and/or water erosion. Of the 1,471 acres of construction disturbance for the Project, 379 acres (25.8 percent) are classified as having moderately low susceptibility to wind and water erosion, and 1,092 acres (74.2 percent) are classified as having moderate susceptibility to wind and water erosion (table 3-22).

Table 3-22. Soils in the Project Area

Soil Map Unit Name	Soil Map Unit Symbol	K-Factor	Wind Erodibility Group	Acres
Access Roads				
Boyle-Rock outcrop complex, 5 to 25 percent slopes	124	0.23	5	7.1
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	110.7
Silas, gravelly substratum-Vensora loams, 0 to 6 percent slopes	227	0.24	6	8.7
Rock outcrop-Rogert complex, 25 to 99 percent slopes	215	0.24	8	21.6
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	170.2
Wycolo-Tieside sandy loams, 3 to 10 percent slopes	243	0.27	3	28.1
Byrnie-Rock outcrop complex, 10 to 50 percent slopes	130	0.27	3	4.0
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	0.28	3	1.3
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	39.0
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	133.4
Canburn loam, 1 to 4 percent slopes	132	0.29	4L	0.6
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	33.9
Rock outcrop-Cathedral complex, 20 to 40 percent slopes	212	0.36	N/A	6.5
Access Road Loops				
Boyle-Rock outcrop complex, 5 to 25 percent slopes	124	0.23	5	1.7
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	8.9
Rock outcrop-Rogert complex, 25 to 99 percent slopes	215	0.24	8	2.9
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	17.6
Byrnie-Rock outcrop complex, 10 to 50 percent slopes	130	0.27	3	0.0
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	0.28	3	0.8
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	0.4
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	9.9
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	0.0
Collection Lines				
Boyle-Rock outcrop complex, 5 to 25 percent slopes	124	0.23	5	3.8
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	72.0
Silas, gravelly substratum-Vensora loams, 0 to 6 percent slopes	227	0.24	6	5.8
Rock outcrop-Rogert complex, 25 to 99 percent slopes	215	0.24	8	14.1
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	90.4
Wycolo-Tieside sandy loams, 3 to 10 percent slopes	243	0.27	3	10.5
Byrnie-Rock outcrop complex, 10 to 50 percent slopes	130	0.27	3	1.2
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	0.28	3	3.4
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	12.3
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	72.1
Canburn loam, 1 to 4 percent slopes	132	0.29	4L	1.6
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	27.0
Rock outcrop-Cathedral complex, 20 to 40 percent slopes	212	0.36	N/A	2.2
Crane Paths				
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	2.5
Silas, gravelly substratum-Vensora loams, 0 to 6 percent slopes	227	0.24	6	3.1
Rock outcrop-Rogert complex, 25 to 99 percent slopes	215	0.24	8	3.3
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	56.2

Soil Map Unit Name	Soil Map Unit Symbol	K-Factor	Wind Erodibility Group	Acres
Wycolo-Tieside sandy loams, 3 to 10 percent slopes	243	0.27	3	4.1
Byrnie-Rock outcrop complex, 10 to 50 percent slopes	130	0.27	3	0.5
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	0.28	3	3.0
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	3.2
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	43.2
Canburn loam, 1 to 4 percent slopes	132	0.29	4L	0.6
Rogert-Lakehelen-Rock outcrop complex, 8 to 40 percent slopes	219	0.3	5	0.3
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	6.8
Interconnections				
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	7.4
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	2.2
Laydown Yards				
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	15.3
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	14.7
Met Access Roads				
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	3.3
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	2.7
Met Towers				
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	1.8
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	0.9
O&M Sites				
Wycolo-Tieside sandy loams, 3 to 10 percent slopes	243	0.27	3	7.0
Substations				
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	7.1
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	7.1
Transmission Lines				
Boyle-Rock outcrop complex, 5 to 25 percent slopes	124	0.23	5	2.0
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	10.2
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	20.6
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	0.28	3	0.9
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	16.2
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	2.0
Turbines				
Boyle-Rock outcrop complex, 5 to 25 percent slopes	124	0.23	5	3.8
Boyle-Lininger association, 1 to 15 percent slopes	125	0.24	5	51.0
Silas, gravelly substratum-Vensora loams, 0 to 6 percent slopes	227	0.24	6	1.2
Rock outcrop-Rogert complex, 25 to 99 percent slopes	215	0.24	8	21.8
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	0.25	5	89.2
Wycolo-Tieside sandy loams, 3 to 10 percent slopes	243	0.27	3	11.7
Byrnie-Rock outcrop complex, 10 to 50 percent slopes	130	0.27	3	0.1
Wycolo-Alcova complex, 3 to 10 percent slopes	241	0.29	3	20.4
Rogert-Rock outcrop-Amesmont complex, 5 to 25 percent slopes	220	0.29	5	74.1
Canburn loam, 1 to 4 percent slopes	132	0.29	4L	0.0

Soil Map Unit Name	Soil Map Unit Symbol	K-Factor	Wind Erodibility Group	Acres
Tieside-Pilotpeak-Rock outcrop complex, 3 to 10 percent slopes	234	0.34	3	20.7
Rock outcrop-Cathedral complex, 20 to 40 percent slopes	212	0.36	N/A	4.7
Disturbance in Low to Moderately Erodible Soils				379.0
Disturbance in Moderately Erodible Soils				1,091.8
Total Disturbance				1,470.8

Note: N/A = not available.

Issue Statement #4: Would construction of the Project cause severe erosion? Could erosion damage Project facilities?

Design features, EPMs (see table 2-6), geotechnical engineering, and a SWPPP (section 3.15.1.2, “State Regulations”), would reduce potential impacts to soil resources and Project facilities. Geotechnical engineering would identify areas with highly erodible soils and steep slopes; ground disturbance in these areas would be avoided (GEO-2), preventing severe erosion. Additionally, Project facilities and infrastructure would be built to Federal- and State-required standards and industry BMPs, thereby minimizing potential impacts to soil resources and erosion damage to Project facilities. Geotechnical engineering would also identify surface and subsurface conditions that would be unsuitable to support placement of turbine foundations or other infrastructure, including linear features such as roads and electrical transmission; these areas would be avoided.

Additionally, an Erosion Control Plan would be developed to identify areas of potentially higher erodibility, disturbance would be minimized in these steep or unstable areas and within highly erodible soils (GEO-2), and appropriate erosion control measures would be implemented during and after construction, thereby minimizing severe erosion from construction of the Project (GEO-5).

Issue Statement #5: Would construction of the Project cause the loss of unique or productive soils?

Potential impacts to soil resources within the analysis area would be associated with removal and/or loss of topsoil, wind and water erosion, and soil compaction. Impacts would be more likely in unsuitable, highly erodible, and/or sensitive soils. No unique farmland soils are found within the analysis area. Approximately 4 percent of the soils in the analysis area are considered prime farmland or farmland of statewide importance. The overall permanent footprint of the Project associated with the siting corridor would impact approximately 34 acres (0.5 percent) of prime farmland soils and approximately 130 acres (2 percent) of farmland of statewide importance, none of which is currently being used for agriculture.

Design features, EPMs (section 2.2.6, “Environmental Protection Measures”), geotechnical engineering, and a SWPPP (section 3.15.1.2, “State Regulations”) would reduce potential impacts to unique or productive soil resources. Additionally, Project facilities and infrastructure would be built to Federal and State required standards and industry BMPs, thereby minimizing potential impacts to soil resources.

3.7.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance would occur from the Project and the existing conditions and trends for the resource would continue.

3.7.6 Geology, Soil, and Mineral Resources Conclusion

The Project would not restrict access for mineral development as the likelihood of development is low and access would still be available for much of the Project Area. The Project is in areas with soils

appropriate for construction and the Project would be designed and constructed so as not to increase the likelihood of geologic hazards or soil erosion. The impacts to unique or productive soils would be limited—approximately 164 acres of the prime farmland or farmland of statewide important soils would be permanently converted by the Project, which equates to approximately 2.5 percent of these soil types present within the siting corridor. Based on the analyses of these issues, no significant impacts would be anticipated to these resources.

3.8 Land Use

This section describes land cover and existing land uses, including agricultural resources, and analyzes potential impacts to land use from construction, O&M, and decommissioning of the Project. For this analysis, land use is described in terms of land ownership, management of lands, and land use authorizations. Agricultural resources are described in terms of agricultural conservation easements, farmland and rangeland, and prime and unique agricultural lands.

3.8.1 Regulatory Background

The following Federal, State, and local regulations establish requirements, standards, and guidelines for the management of land uses and agricultural resources and are applicable to the Project:

- The Federal Farmland Protection Policy Act of 1981 establishes a set of programs and policies to protect farmland from urban sprawl and governs projects that could irreversibly convert farmland to nonagricultural uses. The Act also provides a system for classifying farmland uses that includes prime farmland, unique farmland, and farmland of statewide or local importance.
- A special-use lease is required by the Wyoming State Lands Office for a ROW on State Trust Lands under the provisions of W.S. 36-5-101, et seq. Special-use leases are authorized under Chapter 5 of the Special Use Leasing of the Board of Land Commissioners Rules and Regulations promulgated under the authority of W.S. 36-2-107 and W.S. 36-5-114 through W.S. 36-5-116. Special use means any use of State land other than for grazing, agriculture, extraction of minerals, or uses authorized under easements granted pursuant to Chapter 3 of the Rules and Regulations, or hunting, fishing, and general recreational uses pursuant to Chapter 13 of the Rules and Regulations. Wind energy projects on State Trust Lands require a special-use lease.
- A Wind Energy Conversion System Use Permit is required under the Albany County Wind Energy Siting Regulations for facilities with an aggregate generating capacity greater than 25 kilowatts. The permit requires applicants to certify that the Project would comply with all applicable State and county zoning and land use regulations, including land use plans.
- The Albany County Comprehensive Plan guides development throughout the county and includes a Long Range Growth Plan that identifies Priority Growth Areas (PGA) and land use objectives (Albany County 2008). Four PGAs are identified as growth and development areas: PGA 1—City of Laramie Urban Growth Area; PGA 2—Water and/or Sewer Service; PGA 3—Community Centers and other Growth-Efficient Nodes; and PGA 4—Agricultural and Natural and Environmental Resource Areas. Land use objectives identified in the plan include the following:
 - Land Use (LU) 1—Promote development patterns that are growth efficient and logically sequenced to be efficiently served by public services. Direct development to specific areas, facilitating this by phasing infrastructure and service investments.
 - LU2—Preserve open spaces, agricultural lands, and environmentally sensitive areas that are not currently suitable for development. Open space is broadly defined by Albany County (2008) as land not used for buildings or structures.

- LU3—Fulfill needs for various kinds of housing and employment opportunities for current and future residents.
- LU4—Provide recreational opportunities.
- The Albany County Zoning Resolution establishes a zoning system that classifies land into four categories: agricultural, residential, commercial, and industrial. Federal and State lands within Albany County are exempt from these classifications.

Additional information on the land use regulatory background applicable to the Project is included in the *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.8.2 Data Sources

Data sources used to characterize existing (i.e., baseline) conditions and analyze potential impacts to land uses from the Project include the following:

- EPA Level IV ecoregions (Chapman et al. 2004); National Land Cover Database (NLCD) (Yang et al. 2018)
- NWRs (FWS 2019c.); state wildlife management areas (WMAs) (WYGFD 2020a)
- Albany County Comprehensive Plan (Albany County 2008) and Albany County Zoning Resolution (Albany County 2015)
- Wyoming Stock Growers Land Trust (WSGALT) Conservation Easements (WSGALT 2019); Farm Service Agency (FSA) Conservation Reserve Program Lands (FSA 2019); NRCS Agricultural Conservation Easement Program lands (NRCS 2020)
- National Agricultural Statistic Service (NASS) Census of Agriculture (NASS 2017)
- Aerial photographs for characterizing agricultural resources

The analysis of land cover and land use is also based on land cover data collected as part of a field-based habitat assessment completed in 2019, which, along with additional details on the above data sources, is described in *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.8.3 Analysis Area

The Project Area was selected as the analysis area for land use to capture the extent to which potential impacts from the Project could occur. County-level (Albany County) agricultural resource information was used to characterize agricultural resources within the Project Area.

3.8.4 Baseline Description

The following summarizes existing land cover, land uses, and agricultural resources within the analysis area. Additional details on these land uses are provided in the *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.8.4.1 Land Cover

Land cover within the analysis area consists primarily of shrub/scrub vegetation (approximately 24,500 acres or 94 percent of the analysis area), with the remaining areas consisting of a variety of vegetation types such as pasture/hay and barren land. Additional information on land cover within the analysis area is provided in section 3.14, “Vegetation.”

3.8.4.2 Local Land Use

The analysis area includes both State and private lands zoned as exempt and agricultural, respectively, within unincorporated Albany County. Land use in the analysis area consists primarily of rangeland with scattered residences and residential structures throughout the analysis area that are generally associated with ranching activities.

Two parallel transmission lines owned and operated by WAPA traverse the center of the analysis area in an east-to-west direction. The UPRR Central Corridor traverses the center of the eastern portion of the analysis area and splits into two lines running northeast and southeast near the eastern boundary of the analysis area. Other easements and ROWs are present in the Project Area, including those associated with utilities, roads (as detailed in section 3.13, “Transportation and Access”), and trails (as detailed in section 3.11, “Recreation Resources”).

3.8.4.3 National Parks, Forests, Lands, and Wildlife Refuges

There are no national parks or forests, Federal lands, or wildlife refuges within the land use analysis area. As a result, these resources are not further discussed.

3.8.4.4 State Lands, Parks, Wildlife Management Areas, and Other Conservation Lands

There are approximately 4,756 acres of State Trust Land within the Project Area. State Trust Lands are shown in figure 3-10.

There are no state parks, WMAs, or other conservation lands or easements within the analysis area. As a result, these resources are not further discussed under land use.

3.8.4.5 Agricultural Resources

The analysis area is designated as Agricultural (A, 40 acres or greater; PGA 4) in the Albany County Comprehensive Plan (Albany County 2008). Agricultural land is defined as land for commercial farming and ranching operations. This designation allows for active production and management of livestock, production and storage of commercial and grain crops, and related functions. The town of Tie Siding, immediately north of the analysis area, is designated as an existing PGA 3 (Albany County 2008). Most of the county is categorized as agricultural, including the analysis area, as defined in the Albany County Zoning Resolution (Albany County 2015). Agricultural resources within the analysis area are shown in figure 3-10.

Agricultural Conservation Easements

Agricultural conservation easements in Wyoming include conservation easements managed by WSGALT, lands managed by FSA under the Conservation Resource Program, and conservation easements managed by the NRCS under the Agricultural Conservation Easement Program (WSGALT

2019; FSA 2019; NRCS 2020). At the time of this analysis, there are no lands within the analysis area enrolled in or managed under agricultural conservation easement programs. As a result, these resources are not further discussed.

Farmland and Ranchland

Agricultural uses within the analysis area include nonirrigated private cattle ranches and State Trust Land leased for cattle grazing. There are approximately 177 acres of irrigated farmland within the analysis area, including approximately 7 acres within the siting corridors and 170 acres outside of the siting corridors.

According to the 2017 Census of Agriculture (NASS 2017), agricultural land use within Albany County consists of 451 farms on 1.4 million acres, with an average farm size of 3,119 acres. Livestock, poultry, and other animal products, such as milk and wool, comprised the majority (88 percent) of the market value of agricultural products sold with crop sales comprising the remaining 12 percent. Predominant livestock inventory items included cattle and calves, sheep and lambs, and horses and ponies. Forage crops, including land used for hay and haylage, grass silage, and greenchop, made up most crops harvested in Albany County (76,614 acres) (NASS 2017).

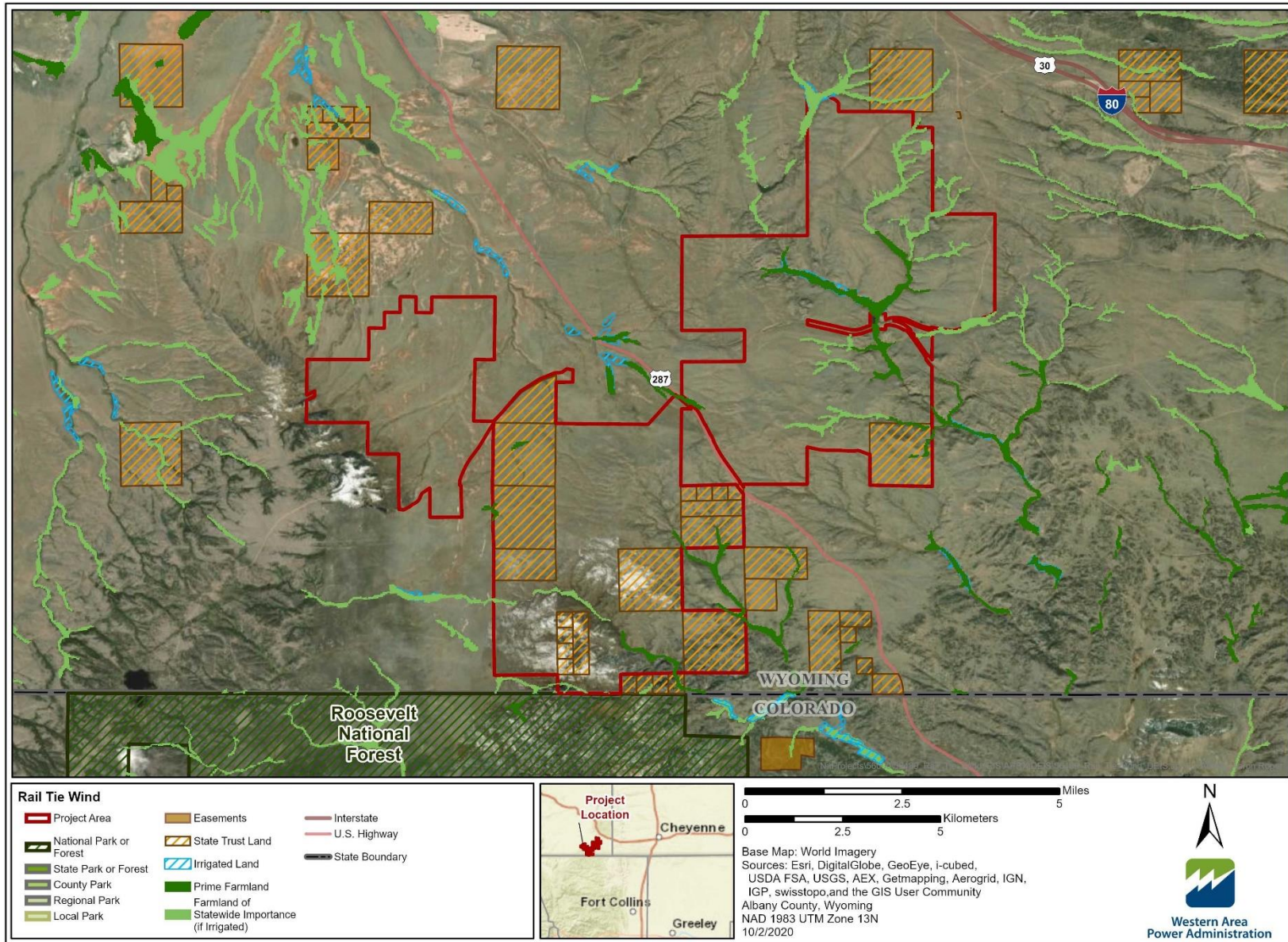


Figure 3-10. Land use in and around the Project Area.

Prime Farmland, Unique Farmland, and Farmland of Statewide Importance

Prime farmland, unique farmland, and farmland of statewide importance are defined by the U.S. Department of Agriculture and administered by the NRCS. These farmlands meet criteria related to soil health and crop productivity. Prime farmland has the most suitable combination of physical and chemical characteristics for producing food and other agricultural crops. Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops. Farmland not meeting the criteria for prime or unique farmland but still important to produce food, feed, fiber, forage, and oilseed crops is considered farmland of statewide importance. There are approximately 521 acres of prime farmland and approximately 570 acres of farmland of statewide importance (if irrigated) within the analysis area. None of the lands with these designations in the analysis area are currently under agricultural production. No unique farmland is found within the analysis area and as a result is not further discussed.

3.8.5 Impacts to Resource

This section describes the potential impacts to land use associated with construction, O&M, and decommissioning of the Project.

3.8.5.1 Impact Indicators

For the purposes of this analysis, an impact to land use could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Conflict of the Project with applicable existing local land use plans, ordinances, zoning resolutions, comprehensive plans, regulations, or policies.
- Acquisition, disturbance of, or conflict with private lands, existing corridors, or utility ROWs.
- Disturbance, preclusion, or conversion of existing land uses.

3.8.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to land use:

- Local land use plans, ordinances, and policies were reviewed to determine if the Project conforms or conflicts with existing and planned uses.
- Uses of the Project during construction, operations and maintenance, and decommissioning were evaluated to determine if existing land uses would be restricted, precluded, or converted.

3.8.5.3 Proposed Action

Issue Statement #1: Would the Project conflict with existing zoning designations or applicable plans, policies, goals, or regulations?

The analysis area for land use includes both State and private lands. State lands within the analysis area are zoned as exempt from classifications under the Albany County Zoning Resolution. Private lands within the analysis area are categorized as agricultural under the Albany County Zoning Resolution. Per the county's zoning resolution, commercial wind energy projects are considered a permitted use within the Agriculture Zone, and the Project would, therefore, be in conformance with applicable zoning resolutions.

Agricultural lands within the analysis area are identified in the *Albany County Comprehensive Plan* as PGA 4—Agricultural and Natural and Environmental Resource Areas (Albany County 2008). Land use objectives in the *Albany County Comprehensive Plan* applicable to PGA 4 and the Project’s actions relative to these objectives are listed below:

- LU 1 emphasizes the promotion of efficient, sequenced, and phased development. The Project has been designed to be efficient, using phased development and decommissioning as appropriate (section 2.3, “Summary of Impacts”). The Project Proponent would plan, coordinate, and conduct each Project stage in a manner that is efficient and protects the quality of the environment. As a result, the Project would conform to this land use objective.
- LU 2 is aimed at preserving open spaces, agricultural lands, and environmentally sensitive areas. The Project has been designed to limit ground disturbance to the minimum amount necessary to accommodate Project facilities (see table 2-6; GEO-1). As described for LU 1, the planning, coordination, and execution of the Project would be completed in a manner that protects the quality of the environment. The Project would delineate environmentally sensitive areas and implement practices necessary to avoid or minimize impacts to these areas (GEN-2). Although the Project would preserve existing land uses to the extent practicable, it would not altogether avoid ground disturbance in open spaces or agricultural lands. As a result, the Project would not conform to this land use objective.
- LU 3 is aimed at fulfilling housing and employment opportunities for current and future residents. The intent of the Project is not to fulfill housing demands; however, the Project was designed to limit ground disturbance and, therefore, the need to displace existing residences. There are four residences within the Project Area. The Project has been designed to avoid these properties to the extent practicable and would not require the acquisition of these residences. The Project would provide approximately 200 to 300 construction jobs and approximately 20 O&M jobs, many of which would be available to the local population. As a result, the Project would conform to this land use objective.
- LU 4 emphasizes providing recreational opportunities. Limiting ground disturbance to accommodate the Project would reduce the need for restrictions or closures to recreation areas, to the extent practicable, and there would be no permanent restrictions to or closures of recreation areas that would affect recreational opportunities (section 3.11, “Recreation Resources”). Because of this, the Project would support the continuation of recreation opportunities and would be in conformance with this objective.

The Project would be constructed and operated in compliance with applicable zoning and siting designations and Federal, State, and county environmental regulations (GEN-1), which would include compliance with any applicable habitat conservation plans or natural community conservation plans. As described above, the Project would not conform with *Albany County Comprehensive Plan* land use objective LU 2 because it would not avoid ground disturbance in open spaces or agricultural lands. The *Albany County Comprehensive Plan* was developed to be used as a guide for other actions and regulations (Albany County 2008). Since the adoption of the *Albany County Comprehensive Plan*, other regulations, including the Albany County Zoning Resolution, which under Section 12 includes regulations specific to wind energy siting in Albany County (Albany County 2015), supersedes the *Albany County Comprehensive Plan*, and the Project has been designed to be consistent with the Albany County Zoning Resolution. Therefore, the Project’s nonconformance with the *Albany County Comprehensive Plan* would not represent a conflict. As a result, the Project would not conflict with existing, applicable zoning designations, land use plans, regulations, or conservation plans.

Issue Statement #2: Would the Project disturb, preclude, or convert existing land uses?

The Project Area encompasses approximately 26,000 acres of rangeland, including four residences associated with ranching activities, on private and Wyoming State Lands. There are several ROWs in the Project Area associated with the two parallel transmission lines, owned and operated by WAPA, that traverse the center of the analysis area. The UPRR rail line traverses the center of the eastern portion of the analysis area. Other easements and ROWs are present throughout the Project Area, including utility lines, roads, and trails.

Construction and maintenance traffic associated with the Project would be limited to minimize disruptions to existing land uses (Recreation [REC]-3). Activities during construction, such as heavy equipment use, could disturb ranching or residential activities because of noise; however, these disturbances would end after the conclusion of construction and would not preclude or convert existing land uses. Construction would require the use of temporary laydown yards that together would encompass approximately 30 acres. Land use in the laydown yards would be precluded during construction but would be restored following the conclusion of construction.

The Project would include infrastructure throughout the operational life of the Project consisting of an interconnection switchyard with fencing (8 acres); turbines (9.7 acres); electrical substations with fencing (10 acres); an O&M facility with fencing (5 acres); transmission lines (10.6 acres), and access roads (140.7 acres). In total, the operational footprint of the Project would encompass approximately 184.1 acres of the Project Area.

The Project would preserve existing land uses to the extent possible. As described under Issue Statement #1, the Project would be compliant with applicable zoning, siting, and Federal, State, and county environmental regulations (GEN-1). The Project has been designed to limit ground disturbance to the minimum amount necessary to accommodate Project facilities (GEO-1), and execution of the Project would be completed in a manner that protects the quality of the environment. Practices would be implemented as necessary to avoid or minimize impacts to existing land uses, including environmentally sensitive areas (GEN-2). In general, access roads would be located within the turbine siting corridors to the extent possible and/or along existing two-track dirt roads. Collection lines would be buried and collocated with access roads to the extent possible (VIS-1). The use of rangelands or private lands would be coordinated with landowners and implemented through lease agreements. Existing structures owned by private landowners, including existing drainage and erosion control structures, would be avoided by the Project, or if disturbed during construction, would be repaired to as close to the original condition as soon as possible (GEO-8). As described under Issue Statement #1 and section 3.11, "Recreation Resources," there would be no permanent restrictions to or closures of recreation areas. Because of this, restrictions to and changes to land uses in the analysis area would be limited to the operational footprint of facilities (approximately 184.1 acres), which would encompass less than approximately 0.7 percent of the overall analysis area. Land uses would be reestablished during decommissioning, and as a result, there would be no permanent conversions of land uses.

Approximately 4.2 percent of the analysis area encompasses prime farmland (approximately 521 acres, or 2 percent) and farmland of statewide importance (if irrigated; approximately 570 acres, or 2.2 percent) within the analysis area; however, none of the lands with these designations in the analysis area are currently under agricultural production. The overall footprint of operational facilities would encompass approximately 184.1 acres including approximately 0.3 acres (0.2 percent) of prime farmland and approximately 1.7 acres (0.9 percent) of farmland of statewide importance (if irrigated); potential conversions of farmlands would be limited. Because the Project could irreversibly convert farmland to nonagricultural use, the Project would be subject to NRCS review to evaluate Farmland Protection Policy Act requirements and identify any additional minimization measures to reduce impacts to prime farmland and farmland of statewide importance.

3.8.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.

3.8.6 Land Use Conclusion

The Project would not conflict with existing, applicable zoning designations, land use plans, regulations, or conservation plans. Existing land uses would be preserved to the extent possible. Land uses would be reestablished during decommissioning of the Project. The 0.3 acres of prime farmland and 1.7 acres of farmland of statewide importance (if irrigated) that would be converted to Project disturbance during O&M would be reclaimed as part of Project decommissioning. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

3.9 Paleontological Resources

Paleontological resources are any fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth (16 United States Code 470aaa (4)). Paleontological resources are afforded protection under Federal and State laws, ordinances, and regulations. These resources include the rocks in which fossils are preserved because the geologic character of the rock record preserves the ecological, geographic, and evolutionary context of past life represented by fossils themselves. Scientific importance could be attributed to the actual fossil specimen, to fossil context (e.g., location in time and space or intimate association with other evidence of scientific importance), or to fossil preservation.

3.9.1 Regulatory Background

Within the Wyoming Antiquities Act, Section 36-1-114 through Section 36-1-116 protects archaeological and paleontological material on State lands. Any excavation of paleontological deposits in the state of Wyoming on any State lands requires authorization to be obtained from the State Board of Land Commissioners.

3.9.2 Data Sources

The information presented in this section comes primarily from the *Paleontological Resources Assessment Technical Report* prepared by PaleoWest (2020) for the Project. That report compiled publicly available geologic mapping and scientific literature, as well as a records search from the University of Wyoming Department of Geology and Geophysics and BLM Potential Fossil Yield Classification (PFYC) rankings for the geologic units within the Project Area.

3.9.3 Analysis Area

The analysis area for paleontological resources includes the Project siting corridors and a 0.5-mile buffer. Because paleontological resources could be encountered throughout a geologic unit, the analysis extends to geologic units that could be impacted by Project activities, whether at the surface or in the subsurface.

3.9.4 Baseline Description

A summary of the existing geologic units present in the analysis area is included in section 3.7.4.2, “Geologic Units within the Project Area.” The assessment of impacts to paleontological resources from the construction and operations of the Project follows two primary steps: (1) determining the geologic units present in the Project Area that are likely to be impacted by Project activities, and (2) assessing the potential of those geologic units to preserve important paleontological resources.

3.9.4.1 *Paleontological Sensitivity of the Geologic Units*

The BLM has developed a system of classification for the potential of geologic units to preserve fossil resources and associated management recommendations (BLM 2016). The State of Wyoming has applied these rankings to the geologic units mapped in the analysis area (figure 3-11). These rankings are explained in table 3-23.

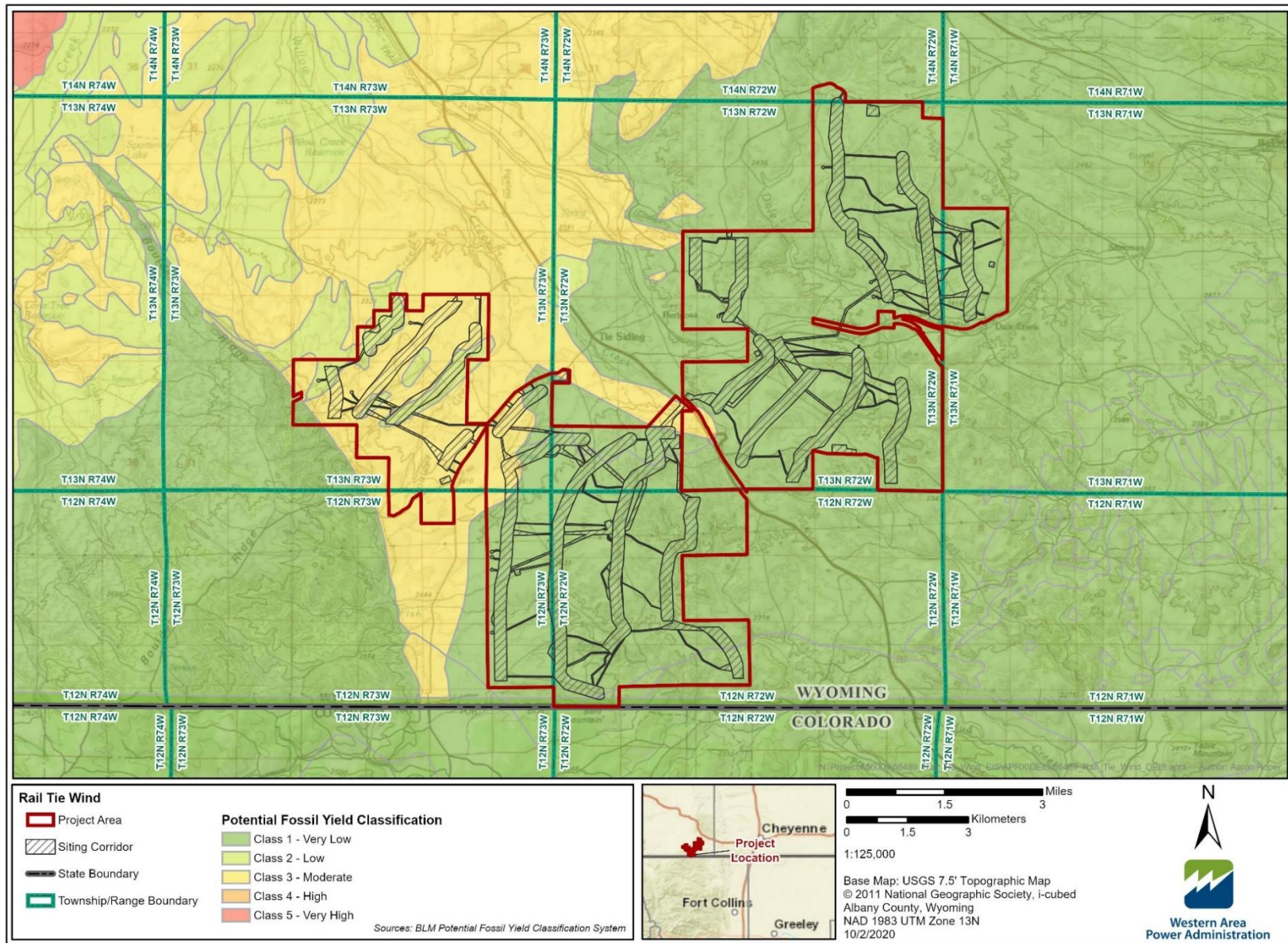


Figure 3-11. Potential Fossil Yield Classification rankings in the Project Area.

Table 3-23. Paleontological Sensitivity of the Geologic Units within the Project Area

Geologic Unit	Age	BLM PFYC Ranking	PFYC Explanation	Occurrence in Project Area
Younger alluvium	Holocene (0–11,700 years old)	2, low	Younger alluvium is generally too young to preserve fossil resources (fossils are considered by the BLM (2016) as being Pleistocene or older in age).	Scattered throughout, found at the surface.
Older alluvium	Pleistocene (11,700 years old–2.58 Ma)	2, low	The lithology in the Project Area is indicative of a high-energy depositional environment, which is usually not conducive to the preservation of fossils.	Scattered across western portion, found at the surface.
Casper and Fountain Formations, undivided	Pennsylvanian – Permian (323–251 Ma)	3, moderate	These units, particularly the Casper Formation, have been documented to be locally fossiliferous and could preserve a variety of common invertebrate fossils.	Western portion, found at the surface and likely in the subsurface underlying alluvial sediments.
Igneous and metasedimentary rocks	Middle-early Proterozoic (over 1,400 Ma)	1, very low	Formation conditions (magma cooling or extreme temperatures and/or pressures) precludes fossil preservation (it should be noted that PFYC 1 is the lowest ranking on the BLM’s scale).	Eastern and central portion.

Source: PaleoWest (2020).

3.9.5 Impacts to Resource

This section describes the potential impacts to paleontological resources associated with construction, O&M, and decommissioning of the Project.

3.9.5.1 Impact Indicators

For the purposes of this analysis, an impact to paleontological resources could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Disturbance of surficial geologic units with moderate, high, and very high potential to contain paleontological resources (e.g., BLM’s PFYC 3, 4, and 5).
- Disturbance of previously recorded localities.
- The outcomes of these disturbances can be either positive or negative. Positive impacts to paleontological resources could result from the discovery, salvage, and curation of fossil resources that would otherwise have remained unknown to science. Negative impacts to paleontological resources could result from the uncovering of fossil resources that were then damaged or destroyed and thus lost to science.

3.9.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to paleontological resources:

- SWCA used PaleoWest’s *Paleontological Resources Assessment Technical Report* analysis of the paleontological sensitivity of the Project Area, as compared to the mapped siting corridors in the Project Area, to identify where ground disturbance associated with the Project intersects with paleontologically sensitive geologic units.

3.9.5.3 Proposed Action

Issue Statement #1: How would construction related to ground-disturbing activities affect known or unknown paleontological resources?

Ground-disturbing activities have the potential to uncover fossil resources. Any ground disturbance, including anticipated activities such as foundation excavation, road construction, and excavations for underground collection lines, could encounter fossil resources when these activities occur in areas of moderate or high paleontological sensitivity. In the analysis area, that includes the Casper and Fountain formations. Within the Project Area, 851 acres within the siting corridors are mapped as belonging to the Casper or Fountain formations at the surface. This value only represents the surficial, mapped exposure of the Casper and Fountain formations and does not include the subsurficial extent of these units, which could also be present underlying the alluvial sediments in the Project Area. Given the depth of disturbance of up to 40 feet anticipated for some Project components, it is likely that these excavations in alluvium could exceed the depth of the alluvium and enter underlying geologic units, such as the Casper or Fountain formations.

The outcomes of encountering paleontological resources can be either positive or negative. Positive impacts to paleontological resources could result from the discovery, salvage, and curation of fossil resources that would otherwise have remained unknown to science. Negative impacts to paleontological resources could result from the uncovering of fossil resources that were then damaged or destroyed and thus lost to science.

To minimize negative impacts to paleontological resources, a preconstruction survey would be conducted for any areas mapped as the Casper or Fountain formations where ground disturbance is planned (Paleontological Resources [PALEO]-1). An Unanticipated Discoveries and Mitigation Plan would be developed prior to the onset of construction to specify the appropriate means of identifying, protecting, and mitigating any unanticipated fossil discoveries across the Project Area during construction (PALEO-2). This plan would be developed by a qualified paleontologist and address specific locations and depths of ground disturbance in relation to the variable paleontological sensitivity of the Project Area. Construction crew members would also receive training in the identification of fossil resources and proper steps to follow in the event of their discovery (PALEO-3). Should fossils be encountered during construction, work would halt in the vicinity of the find until a paleontologist can assess the significance of the finds and determine the appropriate steps to take (PALEO-4). With the implementation of these EPMs, impacts to fossil resources would be mitigated.

Issue Statement #2: How would an increase in human activity during and after construction affect known and unknown paleontological resources?

Negative impacts to paleontological resources could result from the illegal collection of fossil resources encountered during Project construction. The Unanticipated Discoveries and Mitigation Plan developed before the onset of construction would outline the specific actions for identifying, protecting, and mitigating any unanticipated fossil discoveries across the Project Area during and after construction (PALEO-2).

Operations and Maintenance

Impacts to paleontological resources during O&M for the Project could result from any additional ground disturbance that is necessary, if that disturbance is into paleontologically sensitive sediments. Before the start of construction, an Unanticipated Discoveries and Mitigation Plan would be developed to describe the appropriate means of identifying, protecting, and mitigating any unanticipated fossil discoveries across the Project Area during additional ground disturbance during maintenance (PALEO-2). Impacts

during O&M could result from increased erosion, which could expose fossils that would otherwise have remained buried. These fossils could then be subject to increased risk of damage or illegal collection, which would constitute a negative impact. Should these fossils be identified and, if significant, collected and curated, this would constitute a positive impact.

Decommissioning

Impacts to paleontological resources from decommissioning of the Project are likely to be minimal because ground disturbance is anticipated to be in areas with existing infrastructures that were previously disturbed during the construction of the Project. Additional impacts to paleontological resources would only be expected should ground disturbance occur in previously undisturbed areas.

3.9.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue. Therefore, there would be no impacts to paleontological resources.

3.9.6 Paleontological Resources Conclusion

Impacts to paleontological resources would result from the discovery of fossils during construction activities or because of increased erosion during Project operations. The Project includes appropriate measures for minimizing negative impacts to important paleontological resources (PALEO-1 through PALEO-4). Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

3.10 Public Health and Safety

This section describes emergency service providers and existing health and safety risks and analyzes potential impacts to public and worker health and safety from construction, O&M, and decommissioning of the Project.

3.10.1 Regulatory Background

The following Federal, State, and local regulations establish requirements, standards, and guidelines related to public and worker health and safety and are applicable to the Project:

- Regulations aimed at minimizing workplace dangers have been established under the Occupational Safety and Health (OSHA) Act of 1970, as amended. These include general industry standards (29 CFR 1910) and construction industry standards (29 CFR 1926).
- In accordance with Section 18 of the OSHA Act of 1970, as amended, the State of Wyoming has developed an occupational safety and health program with mandatory requirements to minimize risks to workers.
- An Electrical Wiring Permit is required by the Wyoming Department of Fire Prevention and Electrical Safety for all electrical features of a facility not regulated by Wyoming Public Service Commission (W.S. 35-9-120 and 90-2 of the International Electric Code). The person or contractor installing the electrical wiring is responsible for obtaining the wiring permit. An electrical utility may not energize the electrical service until a wiring permit has been obtained.

- A Rural Address Permit is required by the Albany County Planning Department that includes assignment of a rural address for all new developments so that in the event of an emergency, personnel can efficiently find the site. The Rural Address Permit is received after the Zoning Certificate is issued.
- The Albany County Hazard Mitigation Plan outlines guidance and requirements for responding to natural disasters and hazardous materials spills (Albany County 2019). The Albany County Emergency Management Office is responsible for implementing the plan, which is coordinated by the Laramie Fire Department.
- The Albany County Wind Energy Siting Regulations limit noise from commercial wind energy facilities to 55 A-weighted decibels (dBA) as measured at a point along the common property lines between a nonparticipating property and a participating property. This limit includes the following conditions:
 - a. This level may be exceeded during short-term events such as utility outages, severe weather events, and construction or maintenance operations.
 - b. This standard shall not apply along any portion of the common property line where the participating property abuts Federal or State property.
 - c. Noise levels may exceed the 55 dBA limit along common property lines if written permission, as recorded with the Albany County Clerk, is granted by the affected adjacent nonparticipating property owners.

Additional information on the health and safety regulatory background applicable to the Project is included in the *Rail Tie Wind Project Health and Safety Technical Report* (Tetra Tech 2020j).

3.10.2 Data Sources

Data sources used to characterize existing (i.e., baseline) conditions and analyze potential impacts to health and safety from the Project include the following:

- Publicly available information contained on websites, databases, maps, and scientific literature to identify
 - fire, police, and other emergency service providers, including locations, staffing, and service areas (Albany County Emergency Management Agency and Carbon County Emergency Management Agency 2019; Albany County Fire District #1 2020; American Hospital Directory 2020; Federal Bureau of Investigation [FBI] 2018b, 2018c; Ivinson Memorial Hospital 2020; Laramie Wyoming 2020a, 2020b; Rawlins Interagency Dispatch Center 2020);
 - emergency response equipment (Laramie Wyoming 2020b);
 - locations of schools and hospitals (Ivinson Memorial Hospital 2020);
 - county land ownership, zoning (Albany County 2015);
 - locations of sewer, water, and solid waste facilities;
 - Albany County setback requirements (Albany County 2015);
 - occupational illness/injury rates (U.S. Bureau of Labor Statistics [BLS] 2018a); and
 - national and state (Wyoming) crime rates (FBI 2018a, 2019; Uniform Crime Reporting Statistics 2020; U.S. News 2020a).
- Digitized aerial imagery
- Previous studies of existing ambient noise (WAPA 2012)
- Information provided by the turbine manufacturer related to noise, potential ice throw from turbine blades and electric and magnetic fields (EMF)

3.10.3 Analysis Area

The following analysis areas have been identified to evaluate the extent to which potential impacts from the Project could occur on public and worker health and safety:

- Accidents or injuries: The analysis area for evaluating accidents and injuries is the Project Area, which captures the extent to which Project activities or infrastructure could lead to public or worker safety risks during construction, O&M, and decommissioning.
- Fires: The analysis area for evaluating fire hazards is the Project Area and a 1-mile buffer around the Project Area to capture the extent to which accidental or incidental fires could occur during construction, O&M, and decommissioning and lead to public or worker safety risks. This analysis area also captures the extent to which risks of damage to Project facilities could occur from wildfires.
- Emergency services: The analysis area for evaluating changes to emergency services is the Project Area plus Wyoming emergency service provider response areas that overlap the Project Area to capture the extent to which demands to, or capacities of, emergency service providers could be affected as a result of construction, O&M, and decommissioning of the Project.
- Criminal activities: The analysis area for evaluating hazards related to criminal activities is the Project Area, which captures the extent to which criminal or illegal activities could occur and lead to safety risks associated with Project facilities to those parties, the public, or workers.
- Noise and vibration: The analysis area for evaluating noise and vibration is a 2-mile buffer in all directions from siting corridors.
- EMF and corona: The analysis area for evaluating EMF and corona is the Project Area and a 1-mile buffer around the Project Area to capture the extent to which the public or workers could be exposed to EMF or corona and associated health and safety risks.

3.10.4 Baseline Description

As described in section 3.8, “Land Use,” the analysis area is made up of private- and State-owned lands. Access to private land is restricted by landowners, although State land is accessible to the public if accessible from public roads. The analysis area is rural and consists of open scrub/shrub and grassland/herbaceous rangeland. Within the Project Area, there are four residences, all of which are owned by participating landowners. There are 57 residences within 1 mile of the Project Area.

The following summarizes existing emergency service providers with service to the analysis area, worker injury and illness rates, criminal statistics, and existing sources of EMF and corona, in addition to a summary of other safety considerations. Additional details on these resources and topics are provided in the *Rail Tie Wind Project Health and Safety Technical Report* (Tetra Tech 2020j).

Within the analysis area, primary sources of noise include U.S. 287 and the Union Pacific railroad. A survey of the ambient sound (i.e., the all-encompassing sound in a particular environment or community) of the western portion of the Project Area was conducted in November 2010 and June 2011 (WAPA 2012). The study presented equivalent sound levels (L_{eq}) based on a 24-hour period and showed that the existing ambient noise levels ranged from 45 dBA L_{eq} to 53 dBA L_{eq} (WAPA 2012).

3.10.4.1 Emergency Service Providers

Emergency service providers that service the analysis area are shown in figure 3-12 include the following:

- There are 45 sworn officers providing services to Albany County (FBI 2018b) and 45 sworn offices providing services to the city of Laramie (FBI 2018c). The Albany County Sheriff's Office has 45 sworn law enforcement officers (FBI 2019) and provides law enforcement services to Albany County.
- The Laramie Police Department has 45 sworn law enforcement officers (FBI 2019) and services the city of Laramie.
- The Tie Siding Volunteer Fire Department is located approximately 3.2 miles from the Project Area in Albany County Fire District #1 (ACFD #1). This fire department responds to a 220-square-mile service area with a population of approximately 400. The department operates one fire station staffed by 11 unpaid volunteer firefighters and works cooperatively with other volunteer fire departments throughout Albany County.
- The Vedauwoo Volunteer Fire Department is located approximately 1.9 miles from the Project Area in ACFD #1. This fire department serves a population of approximately 500 and operates one fire station staffed by seven unpaid volunteer firefighters. The department works cooperatively with other volunteer fire departments throughout Albany County.
- The Laramie Fire Department services the city of Laramie and, through a mutual aid agreement with the ACFD #1, services southern Albany County. This fire department serves a population of approximately 32,000 people and operates three fire stations staffed by 48 full-time firefighters. The Laramie Fire Department provides emergency medical services for Albany County (Laramie Wyoming 2020b). The Laramie Fire Department also responds to natural disasters and hazardous material incidents within Albany County and maintains specialized response trailers that carry most necessary equipment for a hazardous material incident (Laramie Wyoming 2020b).
- The Ivinson Memorial Hospital in Laramie is the closest hospital to the Project Area, located approximately 17.6 miles from the Project Area. The hospital is a State-Certified Area Trauma Level III Hospital and has 24-hour in-house physicians covering medical, surgical, and extended care units (Ivinson Memorial Hospital 2020). Ivinson Memorial Hospital has 506 total employees and 99 licensed hospital beds (American Hospital Directory 2020; Ivinson Memorial Hospital 2020).
- The Rawlins Interagency Dispatch Center, a division of the BLM's High Desert District, dispatches wildfire services to six counties in southern Wyoming, including Albany County, on behalf of the counties, and provides fire response services to four BLM field offices, the State of Wyoming, Wyoming State Forestry Division, the NPS, and the FWS (Rawlins Interagency Dispatch Center 2020).
- The Wyoming State Forestry Division is responsible for fire suppression on Wyoming State land. The Wyoming State Forestry Division, Casper Interagency Dispatch Center in Casper, WY, provides fire response services to Albany County and would, therefore, service the Project Area (Wyoming State Forestry Division 2019).

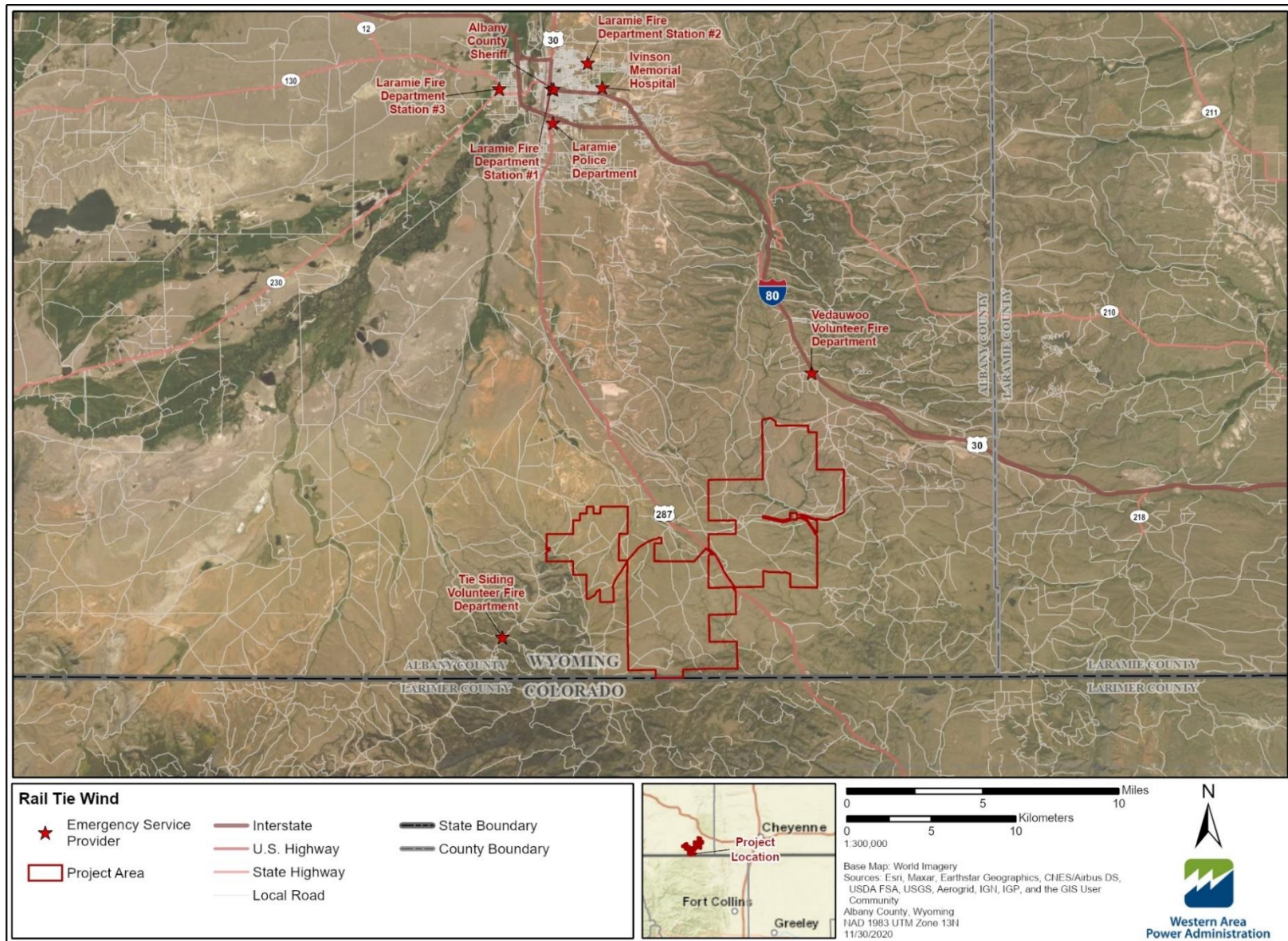


Figure 3-12. Emergency service providers.

3.10.4.2 Worker Injury and Illness Rates

Table 3-24 summarizes average national occupational injury and illness rates for construction workers, the electric power generation, transmission, and distribution industry, and all other industries in 2018. Occupational injury and illness rates specific to wind energy generation are not available; however, data are available for the larger electric power generation, transmission, and distribution industry (BLS 2018a). Construction worker injuries and illnesses account for approximately 6 percent of injuries and illnesses for all industries. The total recordable case rate for construction workers (2.8) is similar although slightly higher than that for all industries (2.4). Injury and illness rates for the power industry are better than the average rates of all industries for 2018 (BLS 2018a).

Table 3-24. National Occupational Injury and Illness Rates in 2018

Industry	2018 Average Annual Employment ¹ (thousands)	Total Recordable Cases (thousands)	Total Recordable Case Rate	Lost Workday Cases ² (thousands)	Lost Workday Case Rate
Construction	7,225.9	199.1	2.8	77.5	1.1
Electric power generation, transmission, and distribution	390.8	6.8	1.7	3.7	1.0
All industries	146,131.8	3,544.4	2.4	1,915.2	1.3

Source: BLS (2018a, 2018b).

¹ Employment is expressed as an average and is derived primarily from the BLS-Quarterly Census of Employment and Wages program.

² Days-away-from-work cases include those that result in days away from work with or without job transfer or restriction.

3.10.4.3 Wildfire

Wildfire hazard potential in and around the Project Area is categorized as very low to moderate, although there are some scattered areas where wildfire hazard potential is high to very high. See section 3.16, “Wildland Fire,” for a detailed analysis of wildland fire impacts.

3.10.4.4 Criminal Statistics

The Laramie City Police Department reported 705 cases of property crime and 48 cases of violent crime in 2014, with a property crime rate of approximately 2,200 per 100,000 people and a violent crime rate of approximately 150 per 100,000 people (Uniform Crime Reporting Statistics 2020). In 2017, Wyoming was ranked ninth nationally for public safety based on a ranking of 14th for low property crime rate and 10th for low violent crime rate (FBI 2018a, 2019; U.S. News 2020a, 2020b). The 2017 national average of property crime was 2,362.2 offenses per 100,000 inhabitants, and violent crime was 394 offenses per 100,000 inhabitants (FBI 2018a, 2019). In 2017, the rates of property crime and violent crime in Wyoming were 1,830.4 per 100,000 inhabitants and 237.5 per 100,000 inhabitants, respectively.

3.10.4.5 Electric and Magnetic Fields and Corona

EMFs are invisible fields of energy associated with the use of electrical power and various forms of natural and human-made lighting (National Institute of Environmental Health Sciences [NIEHS] 2020). All electric devices produce EMFs, which are categorized by their frequency as either nonionizing, which includes low-level radiation generally perceived as harmless to humans (e.g., radios and televisions), or ionizing, which includes high-level radiation with the potential for cellular and deoxyribonucleic acid (DNA) damage (e.g., sunlight, X-rays, etc.). EMFs present within the analysis area include the existing 345-kV and 230-kV transmission lines and electric distribution lines. Transmission and distribution lines operate at low frequencies, compared to other common household electric devices such as radios, televisions, cell phones, and microwaves (American Cancer Society 2020).

Alternating current voltage on any wire that acts as a conductor produces an electric field, the intensity of which is proportional to the voltage of the transmission line. The flow of electrical current on a wire produces a magnetic field, the intensity of which is proportional to the current flow through the conductors. As a result, the strength of EMFs decreases dramatically with increasing distance from the source. EMFs from transmission lines would be similar to typical background levels at a distance of 300 feet (NIEHS 2002). In addition, electric fields could be shielded or weakened by buildings, trees, and other objects (NIEHS 2020).

There is no Federal or Wyoming State standard for transmission line EMFs. Early research focused on EMF health risks produced weak associations between EMF field strength and childhood leukemia, and no research to date has shown evidence of a link between EMF exposure and adult cancers such as leukemia, brain cancer, and breast cancer (NIEHS 2020).

Corona is an effect caused by the electrical breakdown of air at sharp points (e.g., nicks, scrapes, or burrs) on conductors or loose suspension hardware. Corona can lead to radio or television interference, humming or buzzing sounds underneath transmission lines, and a bluish glow surrounding conductors at night under certain conditions, which can be increased through water droplets, dust particles, bugs, and loose hardware (WAPA 2012). Corona has been documented as capable of producing small amounts of ozone very near conductors; however, this concentration would be limited to a few parts per million and would not be measurable at any distance from the conductor (WAPA 2012). Existing transmission lines within the analysis area are the only existing sources capable of producing corona.

Because corona effects are largely an issue of nuisance, and workers or members of the public would not be in close proximity to sources of corona capable of producing ozone (i.e., conductors) for any length of time that could lead to health impacts, this topic is not further discussed.

3.10.4.6 Noise and Vibration

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although prolonged exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Noise could also disrupt wildlife life-cycle activities of foraging, resting, migrating, and other patterns of behavior. Although wildlife already existing in proximity to human development could already be habituated to noise from land use and human disturbance, changes to these baseline activities could still result in wildlife disruption. Additionally, sensitivity to noise varies from species to species, making it difficult to identify how a noise source would affect all wildlife in an area.

The following sections discuss local noise regulations, how noise levels and increases in noise levels are perceived by the general human population, and causes and effects of vibration.

Perception of Noise Levels

The general human response to changes in noise levels that are similar in frequency content (such as comparing increases in continuous [Leq] traffic noise levels) are summarized as follows:

- A 3-decibel (dB) change in sound level is considered to be a barely noticeable difference.
- A 5-dB change in sound level typically is noticeable.
- A 10-dB increase is considered to be a doubling in loudness.

Community sound levels are generally presented in terms of dBA. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels. Table 3-25 presents A-weighted sound levels and the general subjective responses associated with common sources of noise in the physical environment.

Table 3-25. Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	Sound Level (dBA)	Qualitative Description
Carrier deck jet operation	140	N/A
Civil defense siren (100 feet)	130	Pain threshold
Jet takeoff (200 feet)	120	Deafening
Auto horn (3 feet)	110	Maximum vocal effort
Pile driver (50 feet)		
Rock music concert environment		
Jet takeoff (2,000 feet)	100	N/A
Shout (0.5 foot)		
Ambulance siren (100 feet)		
Newspaper press (5 feet)		
Power lawn mower (3 feet)		
Heavy truck (50 feet)	90	Annoying; hearing damage (8 hour, continuous exposure)
Power mower		
Motorcycle (25 feet)		
Propeller plane flyover (1,000 feet)		
Pneumatic drill (50 feet)	80	Very loud
Garbage disposal (3 feet)		
High urban environment		
Passenger car, 65 mph (25 feet)	70	Loud/intrusive (telephone use difficult)
Living room stereo (15 feet)		
Vacuum cleaner (3 feet)		
Air conditioning unit (20 feet)	60	N/A
Human voice (3 feet)		
Department store environment		
Light auto traffic (50 feet)	50	Moderate/quiet
Residential air conditioner (50 feet)		
Private business office environment		
Living room/bedroom	40	N/A
Bird calls (distant)		
Library soft whisper (5 feet)	30	Very quiet
Quiet bedroom environment		
Broadcasting/recording studio	20	Faint
--	10	Just audible
--	0	Threshold of human audibility

Source: Adapted from Table E, "Assessing and Mitigating Noise Impacts" (New York Department of Environmental Conservation 2001) and *Handbook of Environmental Acoustics* (Cowan 1993).

Note: N/A = not available.

Definition of Noise Sensitive Receptors

Noise-sensitive receptors generally are defined as locations where people reside or where the presence of unwanted sound could adversely affect the existing land use. Typically, noise-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature and wildlife preserves, recreational areas, and parks. The nearest noise sensitive area (NSA) is located 1,880 feet from a WTG. This NSA is a participating landowner.

Existing Environment

The Project is located in the southern portion of Albany County. Ambient acoustic environment refers to the all-encompassing sound in a given environment or community. Albany County is generally considered a rural agricultural area. Existing ambient sound levels are expected to be relatively low, although sound levels would be higher near roadways such as U.S. 287 as well as near the UPRR. The existing WAPA transmission lines are also in the vicinity of the Project and could generate corona noise. Other human activity such as farming and ranching operations would seasonally contribute to sound levels in the area associated with farm animals and equipment. Background sound levels are expected to vary both spatially and temporally depending on natural sounds and proximity to area sound sources such as roadways. A main contributor to the natural sounds is the wind through the analysis area. Typically, background sound levels are quieter during the night than during the daytime, except during periods when evening and nighttime insect noise could contribute to the soundscape, predominantly in the warmer seasons.

The Project Area is windy with wind being a primary background noise source. The western portion of the Project Area is composed of lands previously analyzed for the former Hermosa West Wind Farm Project. An ambient sound survey for the Hermosa West Wind Farm Project was conducted in November 2010 and June 2011. The study presented Leq noise levels based on a 24-hour period. The noise levels in the study showed that the existing ambient noise levels ranged from 45 dBA Leq to 53 dBA Leq (WAPA 2012).

In outdoor settings, the rate at which noise attenuates (decreases) is influenced by the distance separating noise sources and noise receptors, as well as local conditions such as traffic, topography, and weather. Generally, when noise is emitted from a point source, the noise is attenuated an average of 6 dB each time the separating distance is doubled.

Vibration

Ground-borne vibration could be induced by traffic and construction activities, such as earthmoving. The effects of ground-borne vibration could include perceptible movement of building floors, interference with vibration-sensitive instruments, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. The rumbling sounds heard are the noises radiated from the motion of the room surfaces. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance would be well below the damage threshold for normal buildings. Ground-borne vibration is almost never annoying to people who are outdoors; without the effects associated with the shaking of a building, the rumble noise of vibrations is not perceptible. Unlike noise, human response to vibration is not dependent on existing vibration levels. Humans respond to a new source of vibration based on the frequency of such events.

If hard rock is encountered within the planned foundation area of WTGs, blasting could be required to loosen or fracture the rock. Blasting is a short-duration event compared to other rock removal methods such as using track rig drills, jack hammers, rotary percussion drills, etc. Blasting creates a sudden and intense airborne noise potential and local ground vibration. The noise from blasts could reach up to 140 dBA at the blast location, attenuating to approximately 90 dBA at a distance of 500 feet from the blast.

Blasting would be limited to between sunrise and sunset if blasting is necessary during construction. Blasting plans would be required of all contracted blasting specialists, demonstrating compliance with State and local blasting regulations, including the use of properly licensed personnel and obtaining necessary permits and authorizations.

3.10.5 Impacts to Resource

This section describes potential public and worker health and safety risks associated with construction, O&M, and decommissioning of the Project. Impacts to resources that could indirectly lead to health and safety risks, such as geologic hazards (e.g., landslides and seismic activity), air quality and water quality degradation, and changes to traffic patterns, are described in those respective sections.

3.10.5.1 Impact Indicators

For the purposes of this analysis, an impact to public health and safety could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Worker accident or injury rates above the national average.
- Project-related fire risks that would not be controlled or addressed through worker response or through fire response providers; contribution of the Project to wildfires; risks of injury from damaged Project infrastructure or facilities in the event of a wildfire.
- Increased risk of criminal activities that would result in increased safety risks to those parties, workers, or the public.
- Increased demands on emergency providers that would exceed existing capacity or materials or a degradation in emergency response times or service.
- Additional sources of EMFs or corona that would lead to a potential health or safety risk, as defined by existing literature.
- Changes in ambient noise levels (measured in dBA) that exceed allowable noise levels (in dBA) established by Federal, State, or local laws, regulations, or guidelines.
- Noticeable vibration levels at nearby NSAs.

3.10.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to public and worker health and safety:

- Project activities, equipment, materials, and site conditions were qualitatively analyzed to determine any potential risk to the public or workers of accident or injury due to use or exposure. Anticipated worker accident and injury rates from the Project were quantitatively compared to national averages with the consideration of safety standards and regulations to protect worker health and safety.
- Project activities, equipment, materials, and infrastructure were qualitatively evaluated to determine potential fire risks and available on-site and off-site fire response resources. The nearest residents and other populated or industrial areas to the Project Area were gathered to identify any areas at the greatest risks of exposure to fires originating at the Project Area, the distance of identified areas to the Project Area, and the availability of fire response. Wildfire potential in and around the Project Area was evaluated to determine the risk of wildfire occurring within or reaching the Project Area.

- Existing city (Laramie), state (Wyoming), and national crime statistics were gathered and qualitatively evaluated to determine existing and potential safety risks to the public or workers from illegal or criminal activities in the Project Area or at Project facilities.
- Qualitative and quantitative information was gathered for existing emergency response service providers, including law enforcement, fire response, emergency medical services, and emergency responders within and around the Project Area to evaluate response times, existing capacities or future capacity needs, and available resources (e.g., number of trucks, availability of medivac, etc.).
- Project-related and existing sources of EMFs and corona were gathered and evaluated with existing literature to qualitatively determine potential exposure risks.
- Standard acoustic engineering methods that conform to International Organization for Standardization Standard 9613-2 were used in the noise analysis using DataKustik GmbH's CadnaA, the computer-aided noise abatement program. Operational broadband sound pressure levels were calculated assuming that all WTGs are operating continuously and concurrently at the maximum manufacturer-rated sound level. The sound energy was then summed to determine the equivalent continuous A-weighted downwind sound pressure level at a given point of reception. The WTGs' sound power levels and modeling methods are representative of when the wind is blowing from the WTGs to the NSA.
- A noise scenario assessment was performed utilizing a representative layout that incorporated the maximum number of WTGs and the WTG model with the highest sound emission levels as well as the lowest proposed hub height.
- The 285-megavolt-ampere transformers at the proposed substations were included in the CadnaA noise model. Transformer sound power levels were provided based on a 285-megavolt-ampere transformer.

This analysis includes the following assumptions:

- Systems would be put in place for detection and emergency shutdown of systems and safe restoration of service in the event of an emergency, such as a fire or broken blade.
- Turbines could be proactively taken out of service during icing or other extreme weather events.
- Regional electric systems are more likely than a wind energy project to be the target of intentional destructive acts, such as terrorism or sabotage.

3.10.5.3 Proposed Action

Issue Statement #1: Would construction, operations and maintenance, or decommissioning activities lead to, or contribute to, increased risks of accidents or injuries to public and worker health and safety?

Construction, O&M, and decommissioning of the Project would include the use and movement of Project-related vehicles and equipment, and flammable, volatile, and hazardous materials, and would result in exposure to hazardous site conditions and terrains. Increased health and safety risks to the public or workers, if present in the Project Area, could potentially occur in the event of the following:

- Vehicle accident
- Misuse or malfunction of equipment
- Inadvertent spill or unprotected exposure to flammable, volatile, or hazardous materials
- Falling overhead objects

- Trips and falls, including falls into open excavations
- Exposure to blasting, explosion, hot equipment, and welding
- Electrocutation
- Failure of permanent infrastructure, such as blade breakage
- Incidents during weather events, such as ice throw, strong winds, or tornados

Appropriate setbacks have been established as part of the Project design between Project siting corridors and other infrastructure, such as residences and public roads, to minimize potential health and safety risks to the public during construction, O&M, and decommissioning. Setbacks would provide safe distances, as defined by Albany County's Wind Energy Siting Regulations (Albany County 2015), between the siting corridors and areas typically accessed by the public (GEN-1). Existing fences, gates, and other access controls (e.g., cattle guards) would be maintained throughout all stages of the Project, and, if deemed necessary, security guards or access attendants could be employed during construction to prevent unauthorized access (GEN-6). During construction and operations, chain-link fencing would be installed at the substation, switchyard, and outdoor storage area to prevent unauthorized entry (Public Health and Safety [PHS]-9). In areas where public access is available, such as State-owned land that is open to the public, Project personnel would coordinate with the State land office to identify appropriate temporal and spatial access restrictions during construction and operations (PHS-11). All roads constructed for the Project would include signage identifying them as private roads for use only by authorized personnel (PHS-12). As a result, impacts to public health and safety because of exposure to on-site Project-related risks would not be anticipated.

The Project would be constructed and operated in compliance with applicable zoning, siting, and environmental regulations, which include implementation of appropriate measures to protect worker safety (GEN-1). The Project would also implement necessary protections for worker health and safety in accordance with OSHA (PHS-5), in addition to other applicable State, county, and local regulations and permit requirements that establish safety standards. Training would be required for specific Project workers, including appropriate environmental and health and safety procedures, requirements, and site rules (PHS-1); identification, handling, and management of hazardous materials (HAZ-1); first aid and cardiopulmonary resuscitation (CPR) (PHS-4); and job responsibilities and conformance with safety procedures (PHS-5). Project personnel would communicate with local emergency response services to develop response or evacuation plans and procedures in the event of an emergency, and routine coordination would continue throughout the life of the Project (PHS-2). An Emergency Response Plan would be prepared in coordination with Albany County emergency services to ensure the Project's policies and procedures are consistent with those already established for the county (PHS-13). Implementation of all regulatory and permit requirements, training, and emergency and safety plans and practices would minimize risks to worker health and safety.

A Transportation and Traffic Management Plan would be developed and implemented in coordination with Wyoming Department of Transportation (WYDOT) and Albany County to manage turbine component deliveries, traffic, and circulation in and around the Project Area and minimize potential hazards from increased truck traffic and worker traffic (Transportation [TRANS]-1). Project-related travel during construction would be restricted to routes identified in the Project Site Plan (GEN-3), which would allow appropriate traffic control measures to be implemented to minimize the risks of traffic accidents, particularly during transport of large Project components and equipment. Speed limits would be implemented on Project routes during all stages of the Project (GEN-4), and because access restrictions would be implemented on roads constructed for the Project (PHS-12), the potential for unauthorized use on these roads that could contribute to traffic hazards would be minimized. The implementation of traffic controls and planning would reduce the potential for vehicle accidents that could lead to worker injury.

Construction equipment would be outfitted with OSHA-required safety devices, and appropriate personal protective equipment (PPE) would be provided to and required of construction workers or visitors to the Project site (PHS-6). The electrical design of the Project would comply with Wyoming electrical safety codes and standards (Wyoming Department of Fire Prevention and Electrical Safety 2020), which include the enforcement of the National Electric Code to reduce the risk of electrocution or other electrical-related incidents during the use of equipment. Equipment used during construction, O&M, and decommissioning of the Project would be periodically inspected and maintained in good working condition (GEN-5), thereby limiting the potential for equipment malfunction that could lead to injury. In addition to these equipment-related protocols, the use of equipment would be limited to workers trained for their use, and as a result, the potential for misuse or malfunction of equipment that could lead to worker injury would be minimized.

Project-related vehicles would be fueled in accordance with safety procedures to minimize the risk of fires and spills (PHS-3). Appropriate training for the identification, handling, and management of hazardous materials, implementation of emergency response plans and procedures, and use of PPE, as described above, would reduce the potential for inadvertent spills of hazardous materials and avoid unprotected exposure to flammable, volatile, and hazardous materials. In addition, spill containment materials would be present on-site for immediate remediation of accidental spills (HAZ-3). These measures, in addition to limiting the use of equipment to only those trained for their use, would also reduce risks of accidents related to blasting, explosion, hot equipment, and welding.

Incidental accidents could occur in the Project Area, including falling overhead objects or trips and falls, including falls into open excavations. The implementation of safety protocols, training, and communications as described above would reduce the potential for these types of incidents. In addition, plastic mesh fencing would be installed near excavated and trenched areas, material laydown areas, or other areas deemed hazardous to avoid falls. Any open holes or trenches without fencing would be covered or fenced (PHS-10).

Workers present at the Project site during operations would be limited to only those needed for maintenance, inspections, or other operational requirements. The risk of failure of permanent infrastructure, such as blade breakage during operations, has decreased over time. As of 2015, the worldwide rate of blade failure is approximately 3,800 blades a year, or approximately 0.5 percent (Campbell 2015). In addition to the limited potential for blade failure, the risk of a worker being present at the time and in the vicinity of failing infrastructure would be negligible. Ice throw from wind turbines could occur if ice builds up on the turbine blades. The accumulation of ice is dependent on local weather conditions and the operational state of turbines (Wahl and Giguere 2006). Gravity and the mechanical forces of the moving blades could cause ice to be shed from the turbine, and the rotating blades could propel ice fragments from the turbine at a distance no more than approximately 1.5 times the turbine blade tip height. Falling ice could cause damage to nearby structures, personnel, and the public (Wahl and Giguere 2006). During operation of the Project, wind turbines would be operated in conformance with the manufacturer's operational parameters (PHS-7). Staff would perform routine inspections of wind turbines and other Project facilities to identify any potential safety hazards (PHS-8), and if necessary, turbines could be proactively taken out of service during icing or other extreme weather events with strong winds or tornados. A SCADA system would be put in place to monitor power outputs and for managing the system, which would allow for the detection and emergency shutdown of infrastructure in the event of an emergency, such as a fire or a broken blade.

The design of the Project, including the implementation of safety requirements, training, and protocols, as well as development and implementation of safety and emergency response planning, would minimize the risk of worker injury during construction, O&M, and decommissioning. As a result, injury rates associated with the Project would not be expected to exceed national occupational injury and illness rates.

Issue Statement #2: Would construction, operations and maintenance, and decommissioning activities lead to or contribute to increased risks of fires or wildfires that would increase risks of injuries to the public and workers?

Accidental fires could occur during construction, O&M, or decommissioning of the Project because of the use of construction equipment in dry areas; accidental ignition of flammable liquids; mechanical malfunction; or from personnel smoking, particularly if a cigarette or other ignited material is not properly extinguished or if smoking occurs near flammable materials. Lightning strikes to infrastructure or damage to infrastructure from other natural weather events could also result in incidental fires. A fire event would increase risks of injury to the public or workers if present in the Project Area. Additional information on fire and wildfire risks is presented in section 3.16, “Wildland Fire.”

The rate of WTG fires is estimated to be one in 1,700 to 2,000 each year globally and would, therefore, be considered a rare event (Firetrace International 2019). The most commonly identified ignition sources (in decreasing order of importance) are lighting strike, electrical equipment malfunction, hot surface ignition, and hot work maintenance (Uadiale et al. 2014). As described under Issue Statement #1, appropriate setbacks have been established between Project infrastructure and residences and public roads to provide safe distances from areas potentially occupied by members of the public. Public access to the Project Area and specific Project facilities would be restricted through existing fences, gates, or other access controls to prevent unauthorized entry. Where fencing or gates are not present, private property signs would be added to deter unauthorized entry. As a result, impacts to public health and safety because of on-site exposure to Project-related fires, should they occur, would not be anticipated.

The Project would be constructed and operated in compliance with appropriate zoning and siting and environmental regulations (GEN-1), in addition to fire-related safety standards and regulations. Emergency response plans, which would include response procedures for fires, would be prepared in coordination with county emergency services (PHS-13). Additional measures would be implemented prior to construction of the Project and, as necessary, throughout the life of the Project, including worker training in emergency response and health and safety requirements and procedures; fueling of vehicles in accordance with procedures to minimize fire risks; PPE requirements; operation of equipment and infrastructure in accordance with manufacturer’s parameters; and routine inspections on all Project facilities and infrastructure to identify and respond to potential fire risk (as described under Issue Statement #1 and PHS-15). Wind turbines would be outfitted with proper grounding and lightning protection systems to reduce the risk of fires in the event of a lightning strike (PHS-16). The electrical design of the Project would comply with Wyoming electrical safety codes and standards (Wyoming Department of Fire Prevention and Electrical Safety 2020), which include the enforcement of the National Electric Code to reduce the risk of equipment-related fires. All wind turbines and associated electrical equipment would be constructed with nonflammable material around the base of the equipment to reduce the spread of fire should equipment ignite (PHS-17). All construction and maintenance vehicles would be equipped with fire extinguishers to allow timely response to equipment fires, and fire suppression equipment would be maintained in the Project Area during construction and operations (PHS-19). If an on-site fire were to occur, Project personnel would alert the Laramie Fire Department and Tie Siding Volunteer Fire Department (PHS-18), in accordance with implemented emergency response plans. Systems could also be put in place for the detection and emergency shutdown of infrastructure in the event of an emergency, such as a fire.

Fire prevention measures implemented prior to and throughout construction, O&M, and decommissioning of the Project would reduce the risk of a Project-related fire. The risk of a fire from a WTG would be considered rare, and the risk of fire from other Project infrastructure or activities would be minimized through the implementation of EPMs and best practices. Should a fire occur, fire response measures implemented throughout the life of the Project would minimize the risk of a fire that could not be controlled or addressed through worker response (e.g., fire extinguisher) or fire response providers. These measures would also minimize the potential for the Project to contribute to wildfire risks.

Although wildfires could occur in or around the Project Area, the overall risk for their potential is very low to moderate. Wildfire mitigation measures would be developed in coordination with the Laramie Fire Department and Tie Siding Volunteer Fire Department and incorporated in the Project's Emergency Response Plan (PHS-14). The risk of a wildfire would continue to be monitored throughout the life of the Project, and should a wildfire occur with the potential to reach or affect the Project Area, workers would be evacuated in accordance with the Emergency Response Plan. If necessary, infrastructure would be shut down. The risk to infrastructure from wildfires or the risk of infrastructure spreading wildfires would also be minimized through the use of nonflammable materials around the base of equipment. As a result, potential risk on worker health and safety from wildfires would be minimized.

Issue Statement #3: How would Project activities and infrastructure, including access roads, provide increased opportunities for illegal/criminal activities?

Illegal or criminal activities could occur at the Project Area during construction, O&M, or decommissioning. These activities would be similar to criminal activities experienced at other developed sites or infrastructure and could include trespassing and unauthorized access, theft, vandalism, or other destructive acts, which could pose safety risks to those parties, or to landowners and guests or workers, if present in the Project Area.

Setbacks between Project infrastructure and residences and between the Project site and public roads (GEN-1), in addition to the rural setting of the Project Area, would minimize the risk of Project facilities being the target for illegal and criminal activities. Many private properties within the Project Area are signed with no trespassing notices, are fenced off, or include gates or other access controls to prevent or deter unauthorized access. These access controls would be maintained throughout all stages of the Project, and, if deemed necessary, security guards or access attendants could be employed during the construction stages to prevent unauthorized access (GEN-6).

It is assumed that regional electric systems are more likely than wind energy projects to be the target of intentional destructive acts, such as terrorism or sabotage; however, the substations and interconnection switchyard of the Project would be the most critical and vulnerable. During construction and operations, chain-link fencing would be installed at the substation, interconnection switchyard, and outdoor storage areas to prevent unauthorized entry (PHS-9). In areas where public access is available, such as State-owned land that is open to the public, Project personnel would coordinate with the State land office to identify appropriate temporal and spatial access restrictions during construction and operations (PHS-11). Project roads would include signage identifying them as private roads for use only by authorized personnel (PHS-12).

In addition to worker training for identifying and responding to emergency events, including illegal or criminal activities (PHS-1 and PHS-8), workers would perform regularly scheduled inspections of equipment and facilities that would help identify and respond to damage or vulnerability to illegal or criminal activities (GEN-5). As a result, the potential for illegal or criminal activities in the Project Area would be minimized, and risks to workers would be minimized. Because public access to the site would be restricted to the extent possible, and due to the sparsely populated area within and around the Project Area, increased public exposure to risks from illegal or criminal activities are not anticipated.

Issue Statement #4: Does existing law enforcement have the capacity to address criminal activities at the Project Area? Do existing emergency response providers have the capacity and equipment to respond to incidents at the Project Area?

As described in PHS Impact Statements #1 through 3, public and worker safety risks related to Project activities and infrastructure would be avoided or minimized to the extent possible. Because risks related to increased injury or illness from the Project would be reduced through the Project design and

implementation of industry standards and regulatory requirements, Project-related demands on emergency services are not anticipated to result in the exceedance of capacities or materials of existing emergency response providers servicing the Project Area. Local land use planning would continue to monitor the needs of emergency service providers and would plan for and implement expansions as deemed necessary.

Changes to transportation infrastructure, such as roads, from the Project would be limited to access roads with limited or restricted non-Project use. As a result, changes in emergency response routes would be avoided; however, as described in section 3.13, “Transportation and Access,” traffic delays could occur during the transport of large equipment and infrastructure (e.g., turbine components). Traffic controls would be implemented as necessary during the transport of large equipment and infrastructure along public roadways or across at-grade railroad crossings. The Emergency Response Plan would be developed in coordination with local and county emergency services (PHS-2 and PHS-13), and coordination would continue throughout the life of the Project. Prior to the start of construction, a Transportation and Traffic Management Plan will be developed in coordination with WYDOT and Albany County to minimize changes to traffic and circulation patterns and avoid access or delays during the movement of turbine components (TRANS-1). As a result, degradation to emergency response times or services due to Project-related activities would not be anticipated.

Issue Statement #5: What would be the contributions of the Project to EMF and corona and how would these contributions lead to or contribute to worker or public health and safety risks from exposure?

Existing and Project-related transmission lines, electric distribution lines, and other electric devices in and around the Project Area contribute to sources of EMF. EMFs from these sources are categorized as nonionizing and are comparable to computers and less than radios, televisions, and cell phones, which are generally perceived as harmless to humans. Existing and Project-related transmission and distribution lines can produce corona, which, at conductors, could produce small amounts (few parts per million) of ozone.

The intensity of EMF decreases with distance from the source, and ozone that could be created from conductors would not be measurable at any distance from the source (WAPA 2012). As described in literature, EMFs from transmission lines would be similar to typical background levels at a distance of 300 feet (NIEHS 2002). Appropriate setbacks, as described under Issue Statements #1 through 3, have been established between Project infrastructure and residences and public roads to provide safe distances to areas potentially occupied by members of the public. Public access to the Project Area and specific Project facilities would be restricted through existing fences, gates, or other access controls to prevent unauthorized entry. There are no known negative effects to human health from EMFs or ozone at the levels anticipated on the Project site. Very few members of the public would be close enough to Project facilities for any exposure to occur, and then for only brief periods. There would be no impact to the public from EMFs or ozone.

Workers would be in closer proximity to existing and Project-related sources of EMF and corona than the public. Project workers would have more potential exposure than the public, but at the levels expected, they would not be affected. In addition, the Project would be designed, constructed, operated, and maintained following several measures to protect the health and safety of both the public and workers. The Project design would be constructed and operated in compliance with appropriate zoning and siting and environmental regulations (GEN-1). Additional measures would be implemented prior to construction of the Project and, as necessary, throughout the life of the Project, including worker training in health and safety requirements and procedures, PPE requirements, and operation of equipment and infrastructure in accordance with manufacturer’s parameters (as described under Issue Statements #1–2). The Project would include development and implementation of an HSSE Plan that would incorporate all necessary protections for worker health and safety in accordance with OSHA (PHS-5), in addition to other applicable State, county, and local regulations and permit requirements that establish safety standards.

During construction and operations, chain-link fencing would be installed at the substation and switchyard to prevent unauthorized entry (PHS-9), including restricting access to only those workers who are trained and have responsibilities for these facilities, thereby reducing the potential for workers to be near these potential sources of EMFs and corona.

As described above, EMFs from existing and Project-related sources are nonionizing and generally perceived as harmless, and any ozone produced from sources capable of producing corona would not be measurable at any distance. Measures implemented as part of the design of the Project would minimize worker exposure to EMFs and ozone. As a result, potential risk to public health and safety from existing or additional sources of EMFs and corona would be avoided and potential risk to worker health and safety would be minimized.

Issue Statement #6: How would noise generated by construction of the Project affect sensitive receptors, and what impacts could remain after mitigation is applied?

Estimates of noise from the construction of the Project are based on a roster of the maximum amount of construction equipment used at one site in the Project Area during the noisiest stage of construction (road construction). The construction equipment used in the analysis is given in table 3-26.

Table 3-26. Project Construction Equipment Roster Used for Noise Analysis

Equipment Type	Quantity	Maximum Noise Level* at 50 Feet	Maximum Noise Level ¹ at 2,000 Feet
Bulldozer	4	91	59
Hoe and ram hoe	2	88	56
Haul truck	15	96	64
Grader	2	88	56
Compactor	3	85	53
Total maximum noise level	–	98	66

Source: Tetra Tech (2020k).

¹ Measured in dBA.

Maximum estimates of construction equipment noise levels meet or exceed previously recorded existing ambient noise levels of 45 dBA L_{eq} to 53 dBA L_{eq} (WAPA 2012). The nearest NSA is located 1,880 feet from WTG locations and is a participating landowner. The maximum noise level at the nearest sensitive receptor during the noisiest stage of construction would be approximately 66.5 dBA, similar to standing 3 feet from a vacuum cleaner. Construction of the Project would directly and unavoidably impact noise levels, but the impacts would be short term during construction, ceasing with the use of the construction equipment. Because construction noise is exempt from The Albany County Wind Energy Siting Regulations, construction of the Project would not violate any allowable noise levels established by Federal, State, or local laws, regulations, or guidelines.

Vibration from activities associated with Project construction would not be noticeable at the nearest NSA (Tetra Tech 2020k).

If hard rock is encountered within the planned foundation area of WTGs, blasting could be required to loosen or fracture the rock. Blasting would be limited to between sunrise and sunset if blasting is necessary during construction. Blasting plans would be required of all contracted blasting specialists, demonstrating compliance with State and local blasting regulations, including the use of properly licensed personnel and obtaining necessary permits and authorizations.

Issue Statement #7: How would noise generated by operation of the Project affect sensitive receptors, and what impacts could remain after mitigation is applied?

Acoustic modeling was completed for WTG operations during maximum rotation using a conservative layout scenario of 149 turbine locations and the WTG model with the highest sound emission levels as well as the lowest proposed hub height (the GE 3.0-127 WTG model). The calculations also included both substations and associated transformers. The predicted sound level impacts across all 184 NSAs are summarized in table 3-27.

Table 3-27. Project Operations Acoustic Modeling Results Summary

Received Sound Level Ranges (dBA)	Number of NSAs
< 30	36
30 to 35	76
35 to 40	36
40 to 45	32
45 to 50	3
50 to 55	1
> 55	0

Source: Tetra Tech (2020k).

The Albany County Wind Energy Siting Regulations limit noise from commercial wind energy facilities to 55 dBA as measured at a point along the common property lines between a nonparticipating private property and a participating property (Albany County 2015). No NSAs fall within areas that would be expected to experience noise levels above 55 dBA. One NSA falls within an area that would exceed the maximum previously recorded existing ambient noise levels of 53 dBA L_{eq} (WAPA 2012). There are some locations, primarily along the northern and northwestern portions of the Project Area, where modeling of the representative turbine layout shows a small overlap of sound levels slightly above 55 dBA at common property lines between nonparticipating private property and a participating property (Tetra Tech 2020k); however, because the predicted sound level impacts were calculated using the worst-case scenario of turbine numbers, hub heights, and generated noise, it is highly likely the actual noise levels would be less than calculated. In the unlikely case that neither the turbine layout, hub height, nor the WTG model changes from the conservative scenario modeled, and if written landowner permission cannot be obtained at the locations where the sound level slightly exceeds 55 dBA, micrositing of turbines could be necessary to comply with the Albany County Wind Energy Siting Regulations.

3.10.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for public health and safety would continue.

3.10.6 Public Health and Safety Conclusions

The Project would not result in risks to public health and safety. Potential risks to worker health and safety would be unavoidable; however, these risks would be minimized to the extent possible, and injury rates associated with the Project would not be expected to exceed national occupational injury and illness rates. Fire risks and the potential for illegal or criminal activities associated with the Project would be minimized and would not increase the risk of public or worker exposure to health or safety risks. The

Project would not exceed the capacities or materials or existing emergency responders that service the Project Area, nor would Project activities result in traffic delays that would lead to degradation of emergency response times. The Project would not increase the public's exposure to EMFs or corona sources, and workers would not be exposed to Project-related EMFs or corona sources. Based on the analyses of these issues, no significant impacts would be anticipated related to public or worker health and safety.

Construction of the Project would directly and unavoidably impact noise levels at sensitive receptors, but the impacts would be short term, ceasing with the end of construction. Because construction noise is exempt from the Albany County Wind Energy Siting Regulations, construction of the Project would not violate any allowable noise levels established by Federal, State, or local laws, regulations, or guidelines. Vibration from activities associated with Project construction would not be noticeable at the nearest NSA. If any blasting is required during Project construction, it would be limited to the hours between sunrise and sunset and comply with State and local blasting regulations, including the use of properly licensed personnel and obtaining necessary permits and authorizations. Acoustic modeling demonstrated that noise generated by Project operations would not exceed 55 dBA at any sensitive receptors. The acoustic modeling of the worst-case scenario indicated a possibility that there would be some locations of common property lines between nonparticipating private property and a participating property where the sound level might reach slightly above 55 dBA; however, it is highly unlikely that the actual noise levels at these locations would be as high as the worst-case scenario modeled. If the worst-case scenario occurs and if written landowner permission cannot be obtained at the locations where the sound level slightly exceeds 55 dBA, micrositing of turbines could be necessary to comply with the Albany County Wind Energy Siting Regulations. Based on the analyses of these issues, no significant noise impacts would be anticipated.

3.11 Recreation Resources

This section describes recreation resources and opportunities and analyzes potential impacts to these resources from construction, O&M, and decommissioning of the Project.

3.11.1 Regulatory Background

The following State and local regulations establish requirements, standards, and guidelines for the management of recreation resources and are applicable to the Project. There are no Federal recreation regulations applicable to the Project:

- A special-use lease is required by the Wyoming State Lands Office for a ROW on State Trust Lands under the provisions of W.S. 36-5-101 et seq. Special-use leases are authorized under Chapter 5 of the Special Use Leasing of the Board of Land Commissioners Rules and Regulations promulgated under the authority of W.S. 36-2-107 and W.S. 36-5-114 through W.S. 36-5-116. Special Use means any use of State land other than for grazing, agriculture, the extraction of minerals, or uses authorized under easements granted pursuant to Chapter 3 of the Rules and Regulations, or hunting, fishing, and general recreational uses pursuant to Chapter 13 of the Rules and Regulations. Wind energy projects on State Trust Lands require a special-use lease.
- The Albany County Comprehensive Plan, as described in section 3.8, "Land Use," includes the following land use objectives that are also applicable to recreation resources:
 - LU1—Promote development patterns that are growth efficient and logically sequenced to be efficiently served by public services. Direct development to specific areas, facilitating this by phasing infrastructure and service investments.

- LU2—Preserve open spaces, agricultural lands, and environmentally sensitive areas that are not currently suitable for development.
- LU4—Provide recreational opportunities.
- The 2007 Conservation Plan guides the FWS management of the Laramie Plains NWR system, which includes Bamforth NWR, Hutton Lake NWR, and Mortenson Lake NWR (FWS 2007b). The plan outlines important resource components, directs management decisions to maximize unique potential of each refuge, and evaluates wildlife-dependent recreation to determine appropriate public use opportunities. The plan also establishes the following visitor services goal for the Hutton Lake NWR:
 - Provide wildlife-dependent recreational opportunities to a diverse audience when the administration of these programs does not adversely affect habitat management objectives.

Additional information on the recreation regulatory background applicable to the Project is included in the *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.11.2 Data Sources

Data sources used to characterize existing (i.e., baseline) conditions and analyze potential impacts to recreation resources from the Project include the following:

- NWRs (FWS 2019c)
- WYGFD hunter management areas (HMAs) and walk-in areas (WIAs) (WYGFD 2020a, 2020b, 2020c); CPW WIAs (2020a)
- WYGFD Classified Streams and fishing WIAs (WYGFD 2020d); CPW Gold Medal Waters and Fishing Access Areas (CPW 2020b, 2020c)
- KOA Campgrounds (KOA 2020a, 2020b)
- List of Colorado and Wyoming Museums (Macey 2017)
- Personal communication with WYGFD staff on hunting resources within the analysis area (Withroder 2019)

Additional details on these data sources are described in the *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.11.3 Analysis Area

The analysis area for overall recreation resources and opportunities is the Project Area plus a 50-mile buffer around the Project Area to capture the extent of recreation resources that would most likely be utilized by Project workers.

Narrowed analysis areas have been identified for the following topics to capture recreation resources and opportunities within or near the vicinity of the Project Area that could be restricted, precluded, or altered because of the Project:

- Restrictions or closures of recreational opportunities: The analysis area for analyzing changes to recreational opportunities is the Project Area, which captures the extent to which Project activities or infrastructure could result in restrictions or closures of recreational areas and access.

- Quality of hunting opportunities: The analysis area for analyzing changes to hunting opportunities is the Project Area plus a 1-mile buffer around the Project Area to capture the extent of the area that big and small game would avoid due to human presence or noise during construction, O&M, and decommissioning of the Project.

3.11.4 Baseline Description

The following summarizes existing recreation resources and opportunities, including hunting, fishing, camping, hiking, parks, museums, and other local attractions, within the analysis area and, where applicable, within the Project Area. Additional details on these resources are provided in the *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.11.4.1 Hunting

There are numerous public and private hunting opportunities within the analysis area, including the following:

- 12 HMAs: HMAs are parcels of public or private land where WYGFD manages access for hunters. HMAs within the analysis area support hunting of big game species, including elk, antelope, and deer.
- Five WYGFD hunting WIAs: hunting WIAs are tracts of private land or inaccessible public land on which the WYGFD has leased rights for public hunting enjoyment (WYGFD 2020c). Hunting WIAs within the analysis area support hunting of species such as deer and antelope.
- 26 CPW Public Access Program lands. These lands provide hunting access.
- Public areas providing hunting opportunities, including Curt Gowdy State Park, Medicine Bow-Routt National Forest, Arapahoe-Roosevelt National Forest, and Arapahoe NWR.

The Cherokee Park HMA, which comprises 3,166 acres of private and State lands, is in the southern portion of the Project Area and supports big game (elk) hunting. The Cherokee Park HMA is open six times per year to 10 hunters at a time, allowing up to 60 hunters each year (WYGFD 2020a). Because public hunting access is limited in and around the Project Area, the Cherokee Park HMA is regularly used by hunters (Withroder 2019). Hunting areas and opportunities are shown in figure 3-13 and figure 3-14.

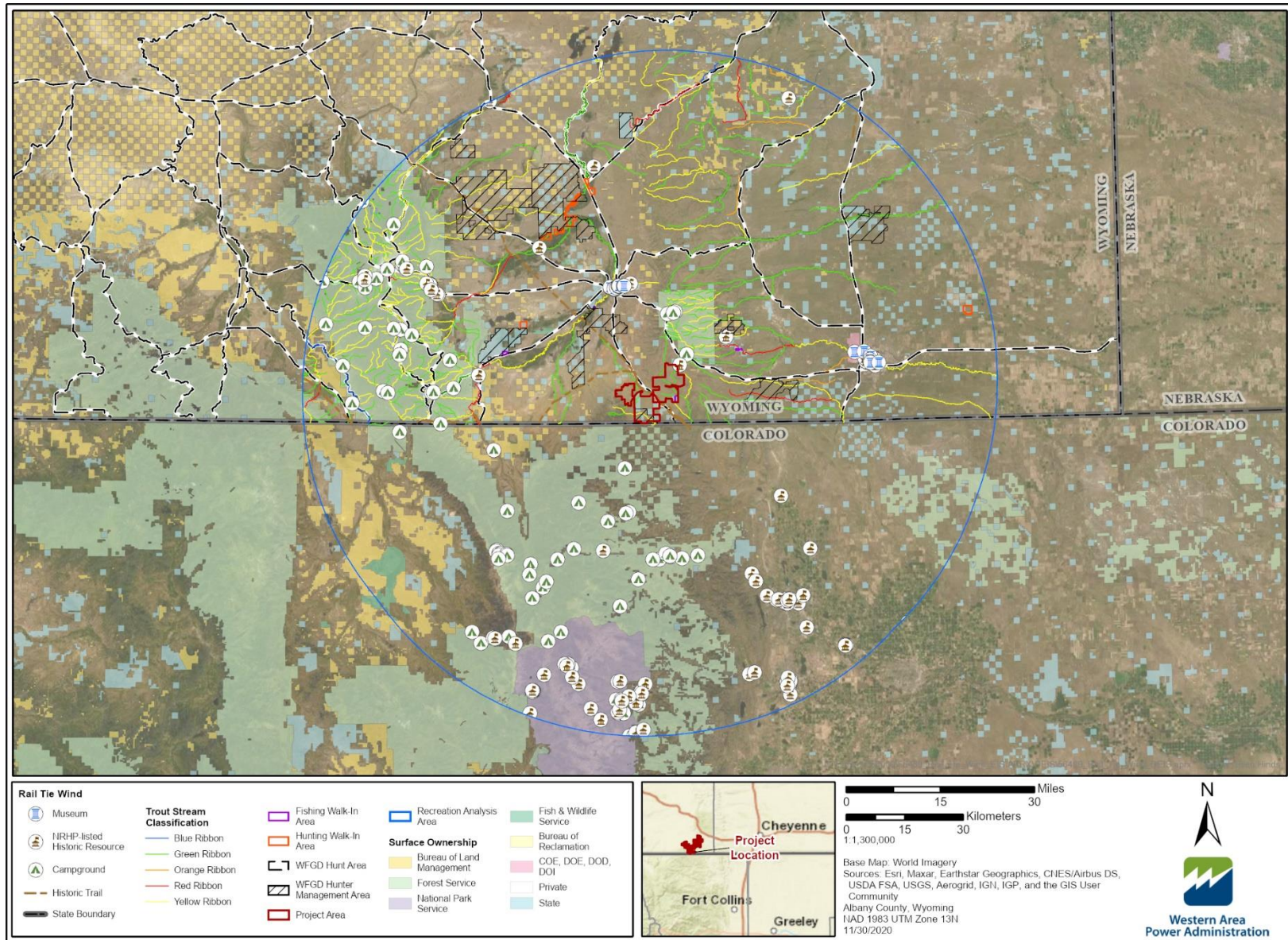


Figure 3-13. Recreational opportunities within the analysis area.

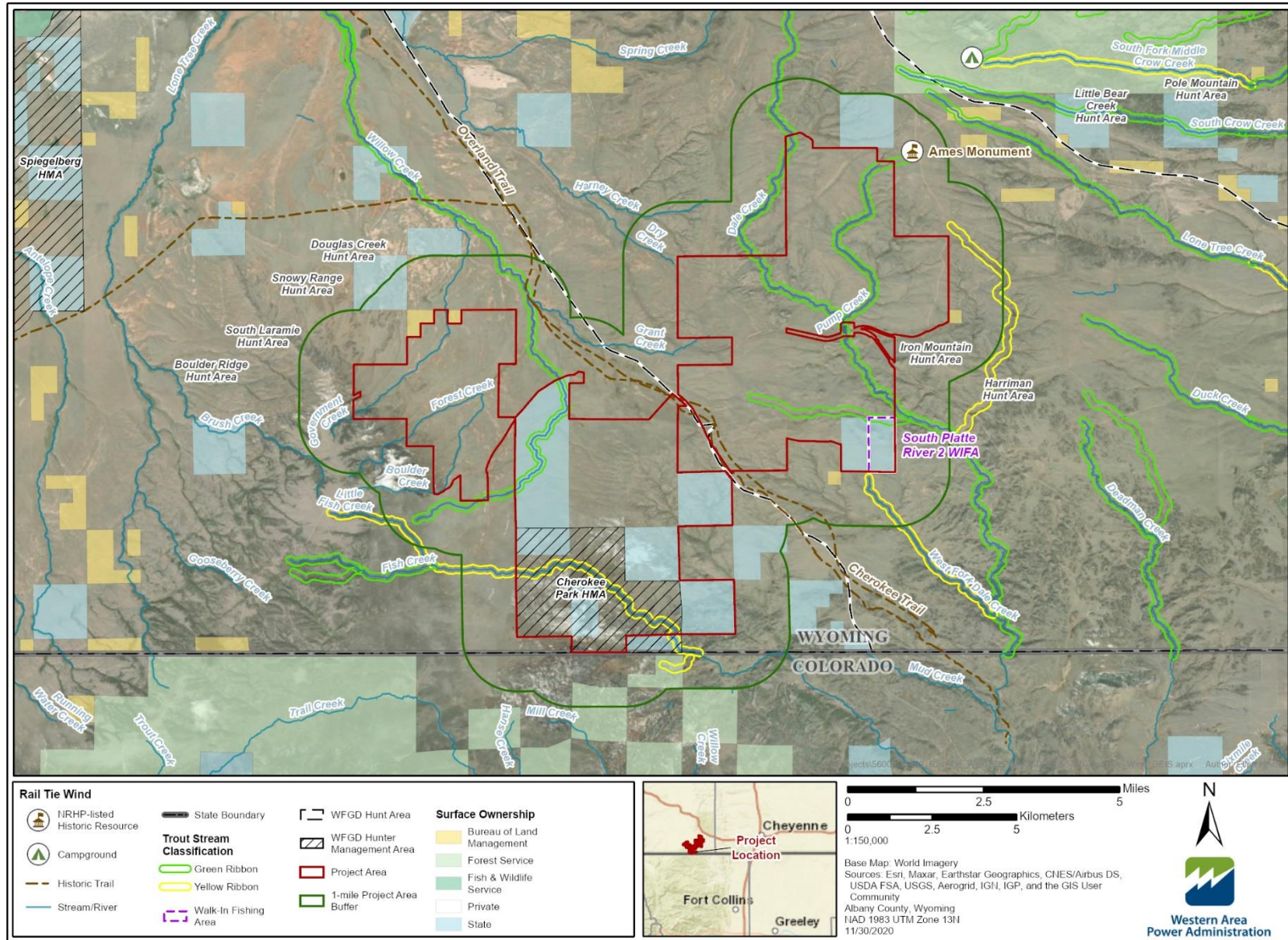


Figure 3-14. Recreational opportunities within the Project Area.

3.11.4.2 Fishing

Recreational fishing opportunities are classified by WYGFD based on the sport fish (trout) density in pounds per mile to demonstrate productivity of the stream resources for fishing purposes (WYGFD 2020a). WYGFD stream classifications include Blue Ribbon streams (national importance; greater than 600 pounds per mile); Red Ribbon streams (statewide importance; 300–600 pounds per mile); Yellow Ribbon streams (regional importance; 50–300 pounds per mile); Green Ribbon streams (local importance, greater than 50 pounds per mile); and Orange Ribbon streams (streams with cool/warm water game fish present).

Numerous WYGFD-classified streams are present throughout the analysis area, as shown in figure 3-13, including Blue Ribbon and Red Ribbon streams. Blue Ribbon streams within the analysis area include a portion of Sybille Creek, located approximately 45 miles north of the Project Area, and a portion of the Platte River, located approximately 40 miles west of the Project Area. Fishing opportunities are also present within the Project Area, as shown in figure 3-14. Within the Project Area, there are eight named streams, four of which are WYGFD-classified streams and are summarized in Table 3-28.

Table 3-28. Wyoming Game and Fish Department–Classified Streams within the Project Area

Stream Name	WYGFD Stream Classification	Length within the Project Area (miles)	Public Access Length within the Project Area (miles)
Fish Creek	Yellow	4.0	0
Dale Creek	Green	5.0	0
Pump Creek	Green	4.0	0
Willow Creek	Green	3.2	3.0

Source: WYGFD (2020a).

Numerous other fishing resources and opportunities are provided throughout the analysis area and the Project Area, including the following:

- **Fishing WIAs:** A fishing WIA is a tract of private land or inaccessible public land on which the WYGFD has leased rights for public fishing enjoyment (WYGFD 2020d). Public access to fishing WIAs is limited to the time period and specific species agreed upon by the landowner and the WYGFD. Public access to any fishing WIA is restricted to foot traffic only. There are three fishing WIAs in the analysis area, as shown in figure 3-13, and one of these—the South Platte River Area 2—is located within the Project Area. This fishing WIA is identified as an area for brook trout fishing.
- **Gold Medal Waters:** CPW designates high-quality resources for fishing as Gold Medal Waters that are defined as those water resources providing the highest quality cold water habitats for trout and having the capability to produce many quality-sized (14 inches or longer) trout (CPW 2020b). The only Gold Medal Water within the analysis area is a portion of the North Platte River, located approximately 40 miles west of the Project Area (CPW 2020b).
- **Fishing opportunities on CPW-managed lands** include State Fish Units, SWAs, and State Trust Land Public Access Program Lands. Three CPW Fishing Access Properties and more than 90 CPW Fishing Access Points are located within the analysis area (CPW 2020c). The closest Fishing Access Point is located within Cherokee SWA along the North Fork Cache La Poudre River, approximately 7 miles south of the Project Area.

3.11.4.3 Camping

There are no campgrounds within the Project Area, although there are more than 90 public and private campgrounds in the vicinity of the Project Area (i.e., within the analysis area). Most of these sites are public campgrounds located within national forest and park lands, with others located within state and county parks and state public access and wildlife areas. These campgrounds offer a variety of sites for tents, recreational vehicle (RV) camping, and dispersed camping; amenities such as restrooms and showers; and recreational opportunities, including hiking, rock climbing, fishing, and boating, among others. The closest campgrounds to the Project Area are the Vedauwoo Campground, which is located approximately 2.5 miles from the Project Area and includes 28 sites; Tie City Campground, which is located approximately 8.0 miles from the Project Area and includes 15 sites; Yellow Pine Campground, which is located approximately 8.3 miles from the Project Area and includes 19 sites; and Curt Gowdy State Park, which is located 8.9 miles from the Project Area and includes 159 sites. Dispersed camping is also available in Colorado within the Cherokee SWA Middle Unit and Upper Unit, which are located 5.5 miles from the Project Area; the number of sites at the Cherokee SWAs is not available.

Private KOA campgrounds are also located in the analysis area but outside the Project Area. The Laramie KOA and Fort Collins KOA are the closest private campgrounds to the Project Area. These campgrounds allow long-term stays and offer RV utility hookups, cabins, tent sites, and other lodging options (KOA 2020a, 2020b).

Campgrounds and camping resources within the analysis area are shown in figure 3-13. The full list of campgrounds within the analysis area is provided in *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.11.4.4 National and State Parks, Forests, and National Wildlife Refuges

There are no national parks, forests, or wildlife refuges or state parks within the Project Area; however, there are a number of Federal parks, forests, and wildlife refuges and state parks located within the analysis area that are open to the public, as shown in figure 3-15. These include the Arapahoe-Roosevelt National Forest (including Pawnee National Grassland), Medicine Bow-Routt National Forest (including Vedauwoo Recreation Area), Rocky Mountain National Park, Hutton Lake NWR, Arapaho NWR, Curt Gowdy State Park, Lory State Park, Boyd Lake State Park, and State Forest State Park. These recreation areas provide a variety of recreation opportunities and attractions, including camping, hiking, biking, off-highway vehicle use, fishing, hunting, sightseeing, photography, horseback riding, birding, and sports, among others. Visitors to these recreation areas range from the thousands to more than 4.5 million.

Additional details for parks, forests, and NWRs in the analysis area are provided in *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

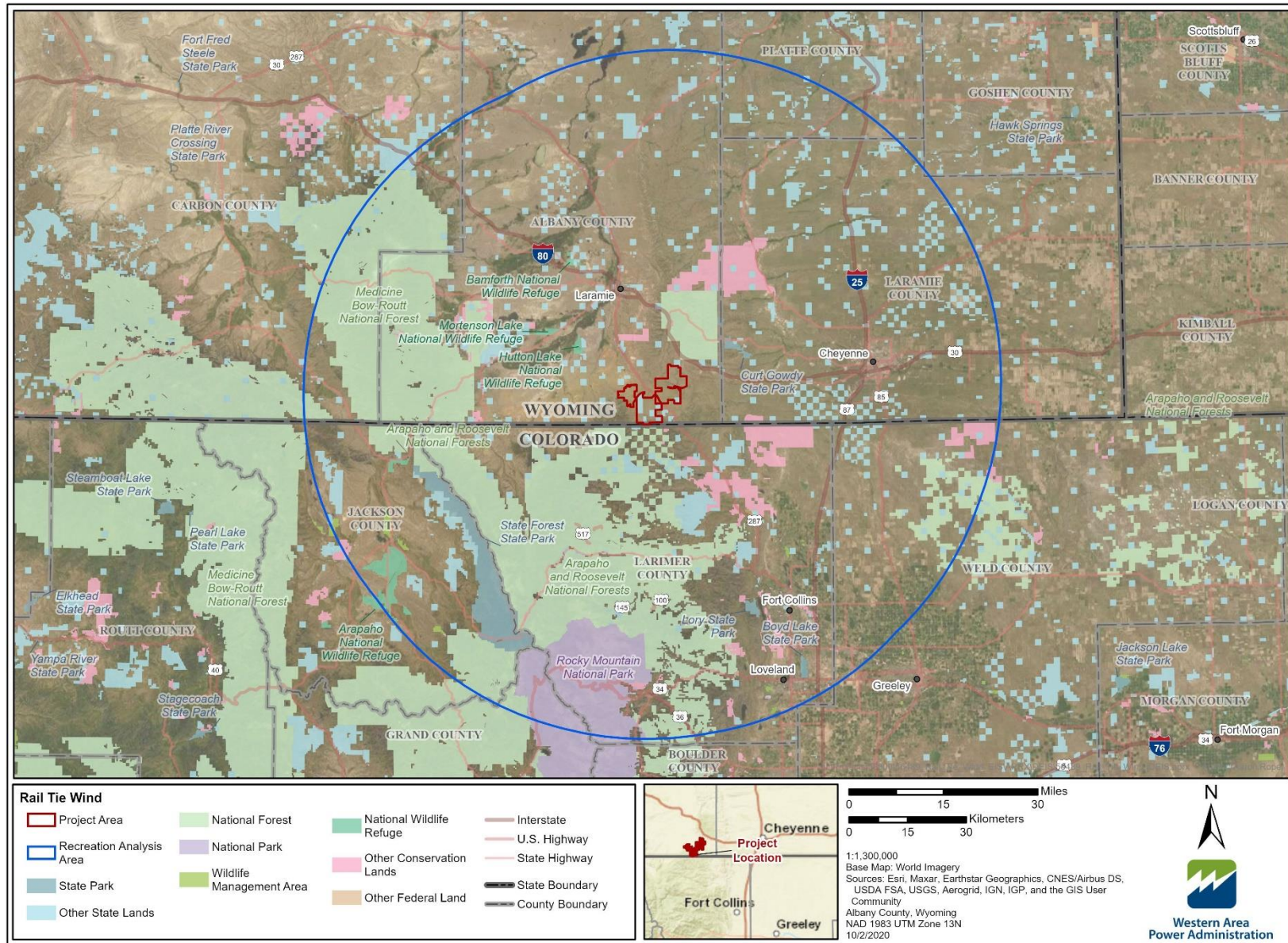


Figure 3-15. Recreation resources.

3.11.4.5 State Wildlife Management Areas and Other Conservation Lands

There are no state WMAs or other conservation lands within the Project Area. Within the analysis area, there are numerous state WMAs and TNC lands that provide a variety of recreational activities, including fishing, hunting, and camping, as described above, as well as wildlife viewing, photography, hiking, picnicking, and guided nature walks.

Wyoming state WMAs within the analysis area include the Laramie River-Jelm Wildlife Habitat Management Area (WHMA), approximately 21 miles west of the Project Area; the Forbes-Sheep Mountain WHMA, approximately 24 miles northwest of the Project Area; the Wick-Beumee WHMA, approximately 48 miles northwest of the Project Area; and the Tom Thorne-Beth Williams WHMA, approximately 43 miles north of the Project Area. There are over 30 Colorado state WMAs within the analysis area, the closest and largest of which is the Cherokee SWA, located approximately 5 miles south of the Project Area. State WMAs are managed to protect wildlife and their associated habitat and provide recreational opportunities for the public, including hiking, fishing, wildlife viewing, and hunting.

TNC has over 20 conservation easements within the analysis area, the closest of which is the Laramie Foothills Easement, located approximately 1.3 miles southeast of the Project Area and encompassing 250 acres in Colorado. The Turtle Rock/Red Buttes Easement is located approximately 6.5 miles north of the Project Area. These easements were developed to protect specific conservation values, such as water quality or migration routes, on private lands and protect these lands from future development. TNC has also identified over 30 Priority Conservation Areas (PCAs) within the analysis area, including two tracts of land near the Project Area: the Laramie Foothills PCA located approximately 0.1 mile southeast of the Project Area and the Turtle Rock PCA located adjacent to the northeastern portion of the Project Area. These areas are not owned or managed by TNC but are areas that have biodiversity significance for conservation priorities. PCAs often provide habitat for threatened and endangered species, sensitive wildlife and plants, and rare plant communities.

State WMAs and other conservation lands are shown in figure 3-15.

3.11.4.6 Museums

There are no museums in the Project Area, although there are over 30 museums located within the analysis area, as shown in figure 3-13. The closest museums to the Project Area are located within Laramie and include the Laramie Plains Museum at the historic Ivinson Mansion, as well as several museums associated with the University of Wyoming. Additional details on museums in the analysis area are provided in *Rail Tie Wind Project Land Use, Agriculture, and Recreation Technical Report* (Tetra Tech 2020i).

3.11.4.7 Historic Sites and Trails

There are over 180 properties listed in the NRHP within the analysis area, as shown in part in figure 3-13. The closest NRHP-listed properties to the Project Area include the Ames Monument, an NHL located approximately 0.3 mile northeast of the Project Area, and Dale Creek Crossing, a historic railroad bridge located adjacent to and just within the northern portion of the Project Area, which are further discussed in Section 3.6.

Multiple historic trails are found within the analysis area. The Overland and Cherokee Trails run parallel to U.S. 287 and traverse through the center of the Project Area. Within the Project Area, the Overland Trail followed the original Cherokee Trail, established in 1849 as a shortcut to the gold fields of California (Weimer 2019). There are no public access points for the Overland Trail within the Project

Area. There are three public access points within the Project Area for the Cherokee Trail. Additional information on historic sites and trails within the cultural resources analysis area are provided in section 3.6, “Cultural Resources and Native American Concerns.”

3.11.4.8 Other Points of Interest

Throughout the analysis area, there are a variety of stores, restaurants, art galleries, movie theaters, events (including Cheyenne Frontier Days and other rodeos), and other points of interest for residents and visitors to the area.

3.11.5 Impacts to Resource

This section describes potential impacts to recreation resources and recreation opportunities from construction, O&M, and decommissioning of the Project.

3.11.5.1 Impact Indicators

For the purposes of this analysis, an impact to recreation could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Temporary or permanent restriction to, degradation of, or conflict with recreational resources or opportunities.
- Project-related human presence or noise in hunting areas at a level that would cause big or small game to avoid the area and thereby lead to a degradation of hunting quality.
- Increase in demand from Project workers on recreational resources that exceeds existing capacities.

3.11.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to recreation:

- Recreation resources and recreation opportunity areas within the Project Area were mapped to determine any overlapping areas where the Project could restrict or prevent the use of recreation resources or restrict access to recreation areas.
- Anticipated noise-producing activities and human presence during construction, O&M, and decommissioning of the Project were evaluated to determine the potential for startle of big and small game in or near the Project Area and avoidance that could degrade hunting opportunities.
- Existing recreational resources were identified in the analysis area. Capacities of recreational resources were qualitatively identified, except for nearby campgrounds. The capacities of campgrounds (i.e., sites) were quantitatively gathered through available sources, such as websites, and through conversations with appropriate agencies and land and business owners. The anticipated number of Project workers was analyzed to estimate the number of nonlocal workers that would relocate to the analysis area and would thereby increase demands on resources. These increased demands were compared to existing capacities of recreation resources to identify any potential for capacities to be exceeded or to prevent their use by non-Project recreationists.

This analysis includes the following assumptions:

- Restrictions or closures to recreation areas during O&M and decommissioning would be avoided unless a temporary restriction or closure is necessary to avoid exposure to safety risks.
- Workers would prefer to temporarily reside close to the Project Area and/or near a population center or make arrangements with private landowners to stay near the Project Area.

3.11.5.3 Proposed Action

Issue Statement #1: Which existing recreation resources would the Project conflict with or preclude?

The Project Area represents the narrowed analysis area for this issue to capture the extent to which Project activities or infrastructure could result in restrictions or closures of recreational areas or access. Construction, O&M, and decommissioning activities would require temporary restrictions to or closures of recreation areas in the Project Area. Access to portions of recreation resources in the Project Area could also be temporarily restricted due to road closures during construction, such as during the use of some portions of roads to transport turbine components to the Project Area. The decision to temporarily restrict or close portions of recreation areas or restrict access to recreation resources would depend on the timing of Project activities (e.g., if the Project activity occurs outside of hunting season, a restriction or closure would be unlikely) and the type of Project activity (e.g., scheduled light maintenance of a turbine, such as a visual check, would not require restrictions or closures, whereas heavy maintenance because of unanticipated events, such as infrastructure damage, would require restrictions or closures to protect the safety of workers and recreational users).

It is anticipated that temporary restrictions or closures could occur in portions of the following publicly accessible recreation areas within the Project Area, although their use would not be entirely precluded:

- Cherokee Park HMA
- Four non-WYGFD-classified streams
- Four WYGFD-classified streams, only one of which allows public access within the Project Area (see table 3-28)
- South Platte River Area 2 fishing WIA
- Dale Creek Crossing NHRP property
- Cherokee Trail

There would be no permanent restrictions to or closures of recreation areas nor permanent changes to access that would affect recreational opportunities.

Ground disturbance during construction of the Project would be limited to the minimum amount necessary to accommodate Project facilities (GEO-1), which would also help reduce restrictions or closures to recreation areas or access, to the extent practicable. In areas where public access is available, such as State-owned land that is open to the public, Project personnel would coordinate with the State land office to identify appropriate temporal and spatial access restrictions during construction and operations (PHS-11). Recreation activities, such as hunting, that would be restricted during construction would be permitted throughout O&M and decommissioning in conformance with the property lease agreements and/or land use regulations (REC-2), unless a localized temporary restriction or closure is necessary to avoid exposure to safety risks, such as during turbine repair.

Measures are incorporated into the Project design to allow continued access to recreation resources to the extent possible throughout construction, O&M, and decommissioning. Project traffic would be limited to minimize disruption of normal land use and recreation activities (REC-3). Before the start of construction, a Transportation and Traffic Management Plan would be developed and implemented in coordination with WYDOT and Albany County to manage turbine component deliveries, traffic, and circulation in and around the Project Area and minimize restrictions or closures to access (TRANS-1). Deliveries of Project components during construction would be scheduled outside of local traffic volume peak times to the extent feasible, thereby minimizing conflicts between Project and non-Project traffic (TRANS-2) and

reducing access restrictions to recreation resources. Temporary road closures could be implemented during construction and decommissioning to allow haul trucks sole access to the road while delivering Project components; closures would be limited to 15 minutes (TRANS-3), which would minimize the disruption to access to recreation resources.

Restrictions to and closures of recreation areas and restrictions to access to recreation resources would be unavoidable throughout construction of the Project; however, these restrictions and closures would be temporary and would only occur in portions of recreation areas, thereby allowing their continued use. Coordination and planning implemented prior to and throughout construction of the Project would reduce the need for restrictions or closures during construction and avoid restrictions or closures during O&M, and decommissioning of the Project, except in cases where restrictions or closures are necessary to protect the safety of recreationists or workers. As a result, degradation of recreational opportunities would be minimized.

Issue Statement #2: Would Project-related human presence or noise cause the avoidance of big game and small game in the Project Area boundary, thereby reducing the quality of hunting opportunities?

The Project Area, plus a 1-mile buffer around the Project Area, represents the analysis area for this issue to represent the extent that the Project could affect the quality of hunting opportunities. Construction, maintenance, and decommissioning of the Project would require activities, such as blasting and the use of heavy equipment, that would produce loud noises. If big or small game are present in or near the Project Area during noise-producing activities, they could be startled and leave the area. The presence of and noise from workers throughout the life of the Project could also startle big or small game.

HMAAs, hunting WIAs, and CPW Public Access Program lands provide public and private hunting opportunities in and around the Project Area. Project-related noise in or near hunting areas could lead to avoidance by big or small game. During construction, O&M, and decommissioning, idling equipment would be turned off when not in use (AQ-5), and blasting or hydraulic hammering during construction would be limited to daylight hours (NOISE-3), thereby limiting the duration of noise. Construction vehicles and equipment would be equipped with manufacturers' standard noise control devices or better (e.g., mufflers and engine enclosures) (NOISE-1 and NOISE-2).

Worker presence would occur most often during construction and decommissioning and would be intermittent throughout O&M. Noise would occur during construction and decommissioning and throughout operation of the WTGs. During operations, infrasound, which is a low-frequency sound below the audible range of humans, could be generated by WTGs. Infrasound could lead to vibration of nearby structures that are detectable by wildlife and could lead to behavioral responses, such as avoidance of areas (Lovich and Ennen 2013), thereby degrading the quality of hunting opportunities. As summarized in section 3.4.5.3, "Proposed Action," past research and observations have demonstrated both avoidance and non-avoidance of operating energy infrastructure. It is therefore unclear if noises, including infrasound, during operations could lead to avoidance of the Project Area by big and small game.

If avoidance does occur and a species leaves a designated hunting area in the vicinity of operational infrastructure, it is anticipated that they would return to the area; therefore, the quality of hunting opportunities within the Project Area would remain similar to existing conditions.

Issue Statement #3: Would the influx of Project workers result in an exceedance of capacity of recreation resources?

The analysis area for this issue is the Project Area plus a 50-mile buffer around the Project Area. Construction of the Project is anticipated to take 20 to 32 months, during which time the average monthly workforce would be 211 to 323 workers, depending on the phasing of construction. It is anticipated that

approximately 80 percent of the construction workforce would not be local and would temporarily relocate to the analysis area (a 50-mile buffer around the Project Area) during construction. Long-term operations of the Project would require 23 workers that could include a portion of nonlocal workers who would relocate to the analysis area. See section 3.12, “Social and Economic Resources (including environmental justice),” for more information on the Project workforce.

The influx of these workers and their families during construction and operations would increase demands on recreation resources within the analysis area (Project Area plus a 50-mile boundary), including the increased use of recreation areas such as those that offer hunting, fishing, and camping opportunities. Demands to recreation resources would be spread out over days and times to reflect workers’ different working schedules. In addition, there are plentiful hunting, fishing, and other recreation opportunities within the analysis area. Because of this, the increased demand by Project workers would not exceed the capacities or availabilities of recreation resources, and worker use of these resources would not prevent their use by existing or future non-Project recreationists.

Although it is assumed that a portion of workers would prefer to reside near population centers or to make arrangements with private landowners to stay near the Project Area, some workers could elect to use campgrounds for housing. There are more than 90 public and private campgrounds located throughout the analysis area. Closer to the Project Area (within approximately 10 miles), there are four campgrounds with a total of more than 200 sites. Dispersed camping is also available throughout the Cherokee SWA Middle Unit and Upper Unit, approximately 5.5 miles from the Project Area. The use of campgrounds by Project workers would be spread throughout the analysis area and would not be anticipated to overburden the capacities of available campsites. In addition, ConnectGen would coordinate with city officials in Laramie, WY, and Fort Collins, CO, and with private campgrounds to identify facilities that are available to construction workers to avoid displacement of public recreational use at private campgrounds (REC-1). Because of this, the increased demand on campgrounds by Project workers would not exceed the capacities or availability of these recreation resources, and worker use of campgrounds would not prevent their use by existing or future non-Project recreationists.

3.11.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.

3.11.6 Recreation Resources Conclusion

The Project could temporarily restrict or close portions of recreation areas in the Project Area; however, the use of recreation areas would not be entirely precluded. Noise during Project construction, O&M, and decommissioning would be unavoidable. Based on existing research, it is not known if Project noise would lead to the avoidance of the area by big and small game. However, if avoidance occurs, once construction and decommissioning activities are complete, it is anticipated that big and small game would return to the area; therefore, the quality of hunting opportunities are anticipated to remain similar to existing conditions. Increased demands on recreation resources from Project workers would not exceed the capacities or availability of existing recreation resources. Based on the analyses of these issues, no significant impacts would be anticipated to recreation resources.

3.12 Social and Economic Resources (including environmental justice)

This section describes social and economic resources, including environmental justice populations, and analyzes potential impacts to these resources from construction, O&M, and decommissioning of the Project.

3.12.1 Regulatory Background

The CEQ and the DOE regulations implementing NEPA require disclosure of the environmental consequences of proposed Federal actions, including the social and economic effects of those actions. EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires Federal agencies taking action to identify and address any disproportionately high and adverse human health or environmental effects of actions on minority and low-income populations. This section of the draft EIS addresses those Federal requirements.

The Wyoming Industrial Development Information and Siting Act requires wind energy projects of the scale of the Project to be reviewed and approved by the State's ISC. Albany County Wind Energy Siting Regulations also require wind energy projects such as the Project to apply for a Wind Energy Conversion System Use Permit. As part of these application processes, the potential socioeconomic impacts must be addressed.

3.12.2 Data Sources

Social and economic data from the following sources were used in this assessment:

- U.S. Census Bureau and U.S. Bureau of Economic Analysis
- The Wyoming Department of Employment, Wyoming Department of Revenue, Wyoming Department of Workforce Services
- The Colorado Department of Labor and Employment, the Colorado State Demographic Office
- Albany County, WY, and Larimer County, CO
- Workforce and Project cost estimates provided by the applicant

Data and analysis to support findings of this socioeconomic analysis are presented in the *Social and Economic Analysis Technical Report: Rail Tie Wind Project, Albany County, Wyoming* (Tetra Tech 2020).

3.12.3 Analysis Area

The analysis area for the social and economic resources assessment is Albany County, WY, and Larimer County, CO.

3.12.4 Baseline Description

Social and economic baseline conditions in the analysis area are described below in terms of population and demographics, employment, housing, property values, and tax revenues.

3.12.4.1 Population and Demographics

Population characteristics of the analysis area counties are summarized in table 3-29. The Project is in Albany County, approximately 16 miles south of the city of Laramie. In 2018, Albany County’s population was 38,601. Laramie is the largest community in Albany County, and the majority (84 percent) of the county’s population resides there. Laramie is the capital of Wyoming and home to the University of Wyoming, which has an enrollment of approximately 12,500 students. This suggests seasonal fluctuations in Albany County’s population and other demographic characteristics as relatively large numbers of students leave during the summer and return in the fall. Albany County’s population increased by 6.3 percent between 2010 and 2018 (Tetra Tech 2020).

Table 3-29. Analysis Area Population

County or State	2018 Population	2020 Forecast	2030 Forecast	2040 Forecast
Albany County	38,601	39,010	41,600	42,600
Wyoming	577,737	579,280	597,260	614,820
Larimer County	350,518	359,838	422,441	480,122
Colorado	5,695,564	5,842,076	6,686,512	7,460,600

Source: Tetra Tech (2020).

Larimer County borders Albany County. Larimer County’s 2018 population was 350,518, with nearly half the county’s population (48 percent) residing in Fort Collins. Larimer County’s population increased by 17 percent between 2010 and 2018 (Tetra Tech 2020).

Population in both Albany and Larimer Counties is forecast to continue growing in the coming decades. Albany County’s population is forecast to be 41,600 by 2030, and Larimer County’s population is forecast to be 597,260 by 2030.

Based on 2010 U.S. Census data and the EPA’s EJSCREEN tool, 17 percent of Albany County’s population is considered minority and 40 percent is low income. Larimer County’s population is 17 percent minority and 27 percent low income. Low-income and minority population data for a 5-mile buffer around the Project, for Albany and Larimer Counties, for the states of Wyoming and Colorado, and for the Census block groups surrounding the Project are presented in table 3-30. High low-income and high minority populations are those that are meaningfully greater than those for a reference jurisdiction (CEQ 1997). Using Albany County as a reference jurisdiction and the 5-mile radius as descriptive of the populations most likely to be affected, U.S. Census data show that the percentages of low-income and minority populations are lower than Albany County and, therefore, do not indicate that there are high minority or high low-income populations in the immediate vicinity of the Project. Similarly, data for the Census block groups surrounding the Project indicate that low income and minority populations are lower than for the counties in which they are located.

Table 3-30. Low-Income and Minority Populations

Demographic Characteristic	5-mile Buffer	Albany County	BG 9639.2	BG 9639.1	Larimer County	BG 24.01.1	BG 25.03.1
Total population	333	37,944	1,103	873	330,976	827	3,191
Minority population ¹	9%	17%	6%	6%	17%	16%	15%
Low-income population ²	21%	40%	18%	35%	27%	28%	23%

Source: Tetra Tech (2020).

Note: BG = Census block group.

¹ Minority population: The percent of individuals in each geographic area who list their racial status as a race other than White alone and/or list their ethnicity as Hispanic or Latino.

² Low-income population: The percent of a geographic area’s population in households where the household income is less than or equal to twice the Federal poverty level.

3.12.4.2 *Employment*

The largest employers in Albany County include the University of Wyoming, Ivinson Memorial Hospital, and Albany County Schools. In 2018, there were an estimated 24,104 people employed in Albany County. Annual unemployment in Albany County in 2018 was 3.3 percent, 0.8 percent lower than the statewide annual unemployment rate for Wyoming. In 2018, employment in Larimer County was an estimated 239,842 jobs, with the county’s largest employers being Colorado State University, University of Colorado Health, the Banner Health McKee Medical Center, and Poudre School District. The annual unemployment rate in Larimer County in 2018 was 2.8 percent, 0.5 percent lower than the unemployment rate for Colorado.

3.12.4.3 *Public Services*

Public services include police and law enforcement, fire prevention and suppression, emergency medical responses, hospitals, and public education. Police, fire, and emergency medical response services are described in section 3.10.4.1, “Emergency Service Providers.”

There is one hospital in Albany County, Ivinson Memorial Hospital in Laramie, which has 24-hour emergency room services and 99 beds. Hospitals in Larimer County include UCHealth Poudre Valley Hospital and Banner Fort Collins Medical Center in Fort Collins, and UCHealth Medical Center of the Rockies and Banner Health McKee Medical Center, both located in the city of Loveland, south of Fort Collins. In addition to major hospitals, there are four smaller healthcare facilities and clinics in Laramie that offer primary or urgent care to the general public and five such facilities in the Fort Collins area (Tetra Tech 2020).

Albany County is served by one school district: Albany County School District #1 with 18 schools and 4,058 students in the 2019–2020 school year. Thirteen of the district’s schools are in the city of Laramie. Larimer County is served by three school districts with a total of 88 schools and 47,773 students in the 2019–2020 school year (National Education Association Research 2021).

3.12.4.4 *Housing and Property Values*

Tables 3-31 and 3-32 present housing characteristics of the analysis area, including rental vacancy rates and units available for rent, which are indicative of housing availability on both a temporary and permanent basis and residential property values. Hotels and motels also provide temporary housing: there are 1,402 rooms in Albany County (all located in Laramie). Vacancy rates for these rooms vary seasonally, with lowest vacancy in the summer months and highest vacancy in the winter. In addition, there are more than 2,400 rooms in the Fort Collins area of Larimer County. Recreational vehicle parks or campgrounds could also serve temporary housing needs in the analysis area; there is one RV park/campground in Laramie and five in the Fort Collins area (Tetra Tech 2020). See section 3.11, “Recreation Resources,” for more information on RV parks and campgrounds.

Table 3-31. Housing Characteristics of Analysis Area

County or State	Total Housing Units	Rental Housing Vacancy Rate	Total Units Available for Rent
Albany County	19,048	8.2	740
Larimer County	142,642	3.0	1,427

Source: U.S. Census Bureau (2019b, 2019c).

The median value of owner-occupied housing in Albany and Larimer Counties and the four Census block groups located within 5 miles of the Project are presented in table 3-32.

Table 3-32. Median Value of Owner-Occupied Housing

--	Albany County	BG 9639.2	BG 9639.1	Larimer County	BG 24.01.1	BG 25.03.1
Median value	226,900	293,200	197,000	336,200	341,300	416,300

Source: U.S. Census Bureau (2020).

Note: BG = Census block group.

3.12.4.5 Tax Revenues

Sales and use taxes generated approximately \$35.1 million in revenues in Albany County in 2019, with sales tax accounting for the larger share (90 percent) of this total. These totals include the state levy of 4 percent and the additional county levy of 2 percent. Sales and use tax revenues are shared between the state (69 percent) and counties (31 percent). In 2019, approximately \$19 million in sales and use tax revenue were distributed to Albany County (\$11.8 million from the 2 percent county tax and \$7.2 million from the county's share of the state sales and use taxes). Property tax revenue in Albany County was \$32.9 million. (Tetra Tech 2020). Sales tax revenues in Larimer County in 2018 were \$29.4 million (Larimer County 2018), and property tax revenues were \$120.1 million (Larimer County 2018).

Wyoming collects an excise tax of \$1 per MW hour of wind energy generated beginning 3 years after a turbine begins generating electricity. Revenue collected from this excise tax is distributed between the State and county where the turbines are located, with 40 percent going to the State general fund and 60 percent going to the county (Tetra Tech 2020).

3.12.5 Impacts to Resource

This section describes potential impacts to social and economic resources (including environmental justice) associated with construction, O&M, and decommissioning of the Project.

3.12.5.1 Impact Indicators

For the purposes of this analysis, an impact to socioeconomic (including environmental justice) could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- An increase in property and other taxes related to the Project would result in an increase to public revenue.
- Noise and visual effects on residential properties in the proximity of the Project would result in a change in residential property values.
- The projected amount of temporary housing for construction workers exceeds the availability of housing units and vacancy rates, exceeding the capacity of public services.
- An increase in local sales tax revenues related to the Project would result in an increase to public revenue.
- There are disproportionately high and adverse environmental or human health effects on high low-income or high-minority populations.

3.12.5.2 Method of Analysis

The following steps were completed to analyze potential impacts to social and economic resources (including environmental justice):

- Demographic data were reviewed to determine if high low-income or high-minority populations are present in the analysis area; potential impacts to these populations were qualitatively assessed.
- Projected construction employment forecasts were compared to available housing and vacancy rates in the analysis area. Existing law enforcement, healthcare, water and sewer utilities, and education services were identified, and local government agencies were consulted. The anticipated number of Project workers were analyzed to estimate the number of nonlocal workers that would relocate to the analysis area and would thereby increase demands on resources. These increased demands were compared to existing capacities of public services to identify any potential for capacities to be exceeded or to prevent of their use by non-Project residents.
- Sales tax revenue from workforce expenditures and material purchases during construction were identified and compared to existing sales tax revenue to qualitatively characterize the difference.
- Current, applicable literature was reviewed to determine how the Project would affect residential property.
- Public revenue from property and other taxes related to the Project were identified and compared to existing public revenue to quantify the difference.
- Current, applicable literature of the cost of wind energy and other energy sources were reviewed to evaluate the cost of wind power compared to other generating sources.

3.12.5.3 Action Alternative

Issue Statement #1: Would the Project's construction and operations result in a substantial short-term or long-term change (increase or decrease) in property values?

Concerns about the potential effects of the Project on surrounding residential property values were raised during scoping. Several detailed, peer-reviewed economic studies have been conducted to address the potential impact of wind projects on residential property values, including recent studies that have addressed impacts in rural settings in the United States (Tetra Tech 2020).

Several studies that have used robust price models and large sample sizes (Hoen et al. 2009; Hoen et al. 2011; Magnusson and Gittel 2012; Hoen et al. 2013) did not find statistical evidence that wind projects had substantial impacts to property values. *The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis* (Hoen et al. 2009) evaluated 7,459 single-family home sales within 10 miles of existing wind facilities with respect to stigmas about wind facilities' effects on property values—specifically related to aesthetics, proximity, and perceived nuisance. The study concluded that “no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities. Although the analysis cannot dismiss the possibility that individual or small numbers of homes have been or could be negatively impacted, if these impacts do exist, they are either too small and/or too infrequent to result in any widespread and consistent statistically observable impact” (Hoen et al. 2009).

A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States (Hoen et al. 2013) used data collected from more than 50,000 home sales from within 10 miles of 67 wind facilities in nine states, and included a substantially larger sample size of homes within 1 mile of facilities than Hoen et al. 2009. Data used in the study were from well before the

announcement of wind facilities to well after their construction to assess how announcement of, as well as construction and operation of, wind facilities affected residential property values. The study found “. . . no statistical evidence that home prices near wind turbines were affected in either the post-construction or post-announcement/pre-construction periods” and that values of homes within a wind facility could be higher or lower than without the presence of the wind facilities (Hoen et al. 2013).

Wind Farm Announcements and Rural Home Prices: Maxwell Ranch and Rural Northern Colorado (Laposa and Mueller 2010) analyzed the effect of the announcement of a large wind energy project on rural housing prices in Larimer County, CO. The Maxwell Ranch project was initially announced in March 2007 at the beginning of substantial national and regional housing price declines. Using data from 2,910 single-family home transactions before and after the wind farm announcement and adjusting for the economic recession, the study concluded that the wind farm announcement had “insignificant and minimal impacts to surrounding home values and sales” (Laposa and Mueller 2010), as well as noting that the wind farm was one of multiple variables affecting home sales prices.

The DOE, citing Hoen et al. (2009), noted “[t]he analysis finds that if property value impacts [from wind energy projects] exist, they are too small and/or too infrequent to result in any widespread, statistically observable impact, although the possibility that individual homes or small numbers of homes have been or could be negatively impacted cannot be dismissed” (DOE 2020).

The Project would not be expected to materially decrease the property values for nearby homes; relevant studies of the effects of wind facilities on residential property values have shown small increases and decreases that are not statistically significant related to the announcement or presence of wind facilities, and that any predicted or observed changes are influenced by other multiple factors.

Issue Statement #2: How much would the Project change (increase or decrease) public revenues from property, excise production, and excise sales taxes?

The Project would generate an estimated \$4.6 million in ad valorem (or property) taxes in its first year of operations. This estimated total would be equivalent to approximately 14 percent of the total property tax revenues generated in Albany County in 2019. Property taxes would decrease over a 20-year depreciation period, after which it would retain 20 percent of its original value. As such, the Project would generate an annual average of approximately \$2 million in property tax revenues, which is approximately 6 percent of annual 2019 Albany County property tax revenues (Tetra Tech 2020). Further, Project operations would yield annual excise tax revenue of approximately \$2 million on electrical generation beginning 3 years after the Project first begins generating electricity; 60 percent of those revenues, or approximately \$1.2 million, would be distributed to Albany County. In summary, combined tax revenues from Project operations would provide a substantial increase in both Albany County and Wyoming tax revenues.

Issue Statement #3: Would population changes during construction (“construction employment”) exceed the capacity of temporary or permanent housing or the capacity of public services available in the analysis area?

Population and Employment

The population in the analysis area would be affected by workers coming to the area during construction. Project construction would take between 20 and 32 months, depending on phasing; the shorter construction period would be if the entire Project is completed in one stage, and the longer time frame would be if it is completed in two stages. Based on Project design and review of similar wind energy projects, the peak monthly workforce under either scenario would be 500 workers; the average monthly workforce would be 323 workers under the one-stage scenario and 211 workers under the two-stage, 32-month scenario (Tetra Tech 2020). The scenario with the larger estimated peak monthly workforce was

used for this assessment. Also, based on similar Wyoming wind energy projects, 80 percent of the construction workforce is assumed to be from outside the analysis area (nonlocal) and would temporarily relocate to the analysis area during construction. Further, assuming 5 percent of the nonlocal workforce (20 workers) move their families temporarily to the area, and based on 3.14 people per family with 0.87 persons per family under the age of 18 (U.S. Census Bureau 2019a), 43 additional people and 17 people under age 18 would temporarily relocate to Albany and Larimer Counties. Based on these assumptions, peak monthly total of population change from nonlocal workers and family members would be 443 people, and the average monthly population change during construction would be 286 people (Tetra Tech 2020).

Assuming that 80 percent of the population during the peak month of construction employment (i.e., 400 people) temporarily locate in Albany County, it would represent approximately 1 percent of estimated 2020 population of the county for the construction period.

Following construction, Project operations would directly employ 23 workers, who could be residents or people who relocate to the area (Tetra Tech 2020).

Public Services

Temporary population increases during construction would represent a very small change in the overall population served by law enforcement and fire and emergency response services and would not adversely impact the provision of those services. Effects of construction and operations of the Project on emergency response services is discussed in section 3.10, “Public Health and Safety.”

Temporary and permanent population changes (described above) are small and would not adversely impact healthcare facilities or services in Albany and Larimer Counties. Similarly, school-aged children would represent a very small portion of temporary and permanent population changes and would not adversely impact public schools in Albany and Larimer Counties. As noted above, based on the assumption that 5 percent of relocating workers moved their families, there would be approximately 17 persons under age 18 that would move to the area.

Housing

During construction, the average monthly workforce of 323 and a peak monthly workforce of 400 nonlocal workers would seek housing or lodging in Albany and Larimer Counties. Hotels, motels, rental housing, RV parks and campgrounds, and other housing or lodging options (such as Airbnb) would serve the housing and lodging needs of the workforce; it is likely that some workers would share units, thus reducing the total number of units needed to house workers. There are more than 2,800 hotel and motel rooms and approximately 2,167 vacant rental units in the analysis area (section 3.12.4.4, “Housing and Property Values”), which would accommodate the temporary housing needs of nonlocal workers. Neither temporary population increase during construction nor population change caused by permanent employment (23 workers) would adversely impact housing availability in the analysis area.

Issue Statement #4: Would temporary tax revenues caused by Project construction substantially change local sales tax revenues during the construction period?

The Project construction would generate sales and use tax revenues from expenditures on construction materials, equipment, and supplies. Purchases made in Wyoming and subject to sales tax are expected to include concrete, rebar, electrical equipment, and cabling. Wyoming and Albany County also impose a use tax on items purchased outside the state, which would include equipment such as wind turbines,

blades, and towers. A total of \$27 million in sales and use taxes are expected to be collected by Wyoming and Albany County during construction of the Project (Tetra Tech 2020). Local Albany County sales tax and the portion of state sales tax revenue distributed to Albany County during construction would be approximately \$14.6 million. Sales and use taxes represent a one-time revenue source during construction but would substantially increase State and local tax revenues during that time.

Sales taxes would be collected on purchases of goods and services during Project operations. Approximately \$300,000 in annual sales tax revenues would be expected to be paid to Albany County during Project operations (Tetra Tech 2020).

Issue Statement #5: Are there low-income or minority populations in the analysis area that would be potentially disproportionately impacted by adverse effects of the Project?

Census data provided through the EPA's EJSCREEN tool indicate that the low-income and minority population characteristics of the 5-mile buffer around the Project, and the Census block groups surrounding the Project, have low-income and minority population percentages below those reported for Albany County as a whole. Construction and operations impacts identified in this EIS do not indicate that the Project is expected to have high and adverse environmental or human health effects that are disproportionately borne by low-income or minority populations.

3.12.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing social and economic conditions and trends would continue. Population, employment, public services, housing, property values, and tax revenues in the analysis area would continue to be influenced by local, regional, national, and, in some aspects, global economic and social influences.

3.12.6 Social and Economic Resources (including environmental justice) Conclusion

The temporary population increase during construction is estimated to be approximately 1 percent of the current population of Albany County, and it would not result in a demand for housing or public services that could not be met by existing housing and capacity of public services. Construction and operations of the Project would provide increases in State and local tax revenues. The Project would not be expected to materially decrease the property values for nearby homes; relevant studies of the effects of wind facilities on residential property values have shown small increases and decreases that are not statistically significant related to the announcement or presence of wind facilities, and that any predicted or observed changes are influenced by other multiple factors.

Analysis of U.S. Census data do not indicate that there are high minority or high low-income populations in the immediate vicinity of the Project. Based on the analysis of these issues, no significant adverse socioeconomic impacts would be anticipated from the Project, including impacts to environmental justice populations.

3.13 Transportation and Access

This section describes existing transportation infrastructure resources and analyzes potential impacts to those resources from construction, O&M, and decommissioning of the Project. Transportation infrastructure resources considered include roadways, railroads, and airports, and radar-dependent transportation operations such as air travel and satellites.

3.13.1 Regulatory Background

The following Federal, State, and local regulations establish requirements, standards, and guidelines for the development, alteration, use, and management of transportation infrastructure resources and are applicable to the Project:

- Manual on Uniform Traffic Control Devices (23 CFR 655.603) establishes standards for traffic control devices, including temporary signage during construction and permanent signage on roadways.
- WYDOT Traffic Studies Manual (WYDOT 2011) provides guidelines for conducting engineering studies on roads under the jurisdiction of WYDOT.

In addition, the following transportation-related approvals or authorizations would be required for the Project:

- A Road Use Agreement is required by WYDOT prior to the use of State roads by Project traffic and requires applicants to be financially responsible for State road repairs and maintenance as determined by WYDOT.
- An Access Permit is required by WYDOT for any widening or building of an approach from land joined to a State highway ROW and requires applicants to be responsible for construction, maintenance, and removal (if necessary) of the approach.
- An Approach License is required by Albany County Road and Bridge Development for building an approach from land joined to a county road ROW and requires applicants to be responsible for construction, maintenance, and removal (if necessary) of the approach.
- A Road Improvement and Maintenance Agreement is required by Albany County Road and Bridge Department for use of county roads by the Project and could include requirements for road improvements and/or maintenance as deemed necessary.

Additional information on the transportation regulatory background applicable to the Project and other general permit requirements are included in the *Rail Tie Wind Project Transportation Analysis Technical Report* (Tetra Tech 2020m).

3.13.2 Data Sources

Data sources used to characterize existing (i.e., baseline) conditions and analyze potential impacts to transportation infrastructure resources from the Project include the following:

- Aerial imagery via Google Earth

A Traffic and Transportation Analysis was completed to evaluate potential impacts to transportation infrastructure resources. This analysis, the methods, assumptions, and results for which are described in the *Rail Tie Wind Project Transportation Analysis Technical Report* (Tetra Tech 2020m), identified existing transportation infrastructure resources that could be affected by the Project and informs the analysis of potential impacts to these resources from the Project. The analysis also summarizes existing local traffic data and provides calculated estimates for Project-related construction, operations, and decommissioning traffic and access routes.

3.13.3 Analysis Areas

The following analysis areas have been identified to evaluate the extent to which potential impacts from the Project could occur on transportation resources and conditions:

- Roadway traffic volumes and conditions, including access: This analysis area includes transportation facilities within and immediately surrounding the Project Area and major State highways connecting to interstates in Albany County, Laramie County, and Larimer County. This analysis area captures all potential routes and roadway networks that could be utilized during construction, O&M, and decommissioning of the Project for delivery of Project components to the Project Area and worker commutes.
- Railroad capacity: This analysis area includes railroads and rail yards within and immediately surrounding the Project Area and railroads near major State highways to capture all potential rail routes and infrastructure that could be used to deliver Project components to the Project Area.
- Traffic patterns: This analysis area includes transportation facilities within and immediately surrounding the Project Area and major interstates and highways in Albany County and Laramie County to capture the extent of Project-related traffic and changes to transportation resources and infrastructure as a result of the Project.
- Aviation and radar-dependent transportation operations: This analysis area includes the Project Area, which captures the extent that Project activities or infrastructure could conflict with existing airport land use plans or interfere with radar-dependent transportation operations.

3.13.4 Baseline Description

The following summarizes existing transportation infrastructure resources and conditions within the analysis area. Transportation resources are shown in figure 3-16. Additional details on these transportation infrastructure resources and conditions are provided in the *Rail Tie Wind Project Transportation Analysis Technical Report* (Tetra Tech 2020m).

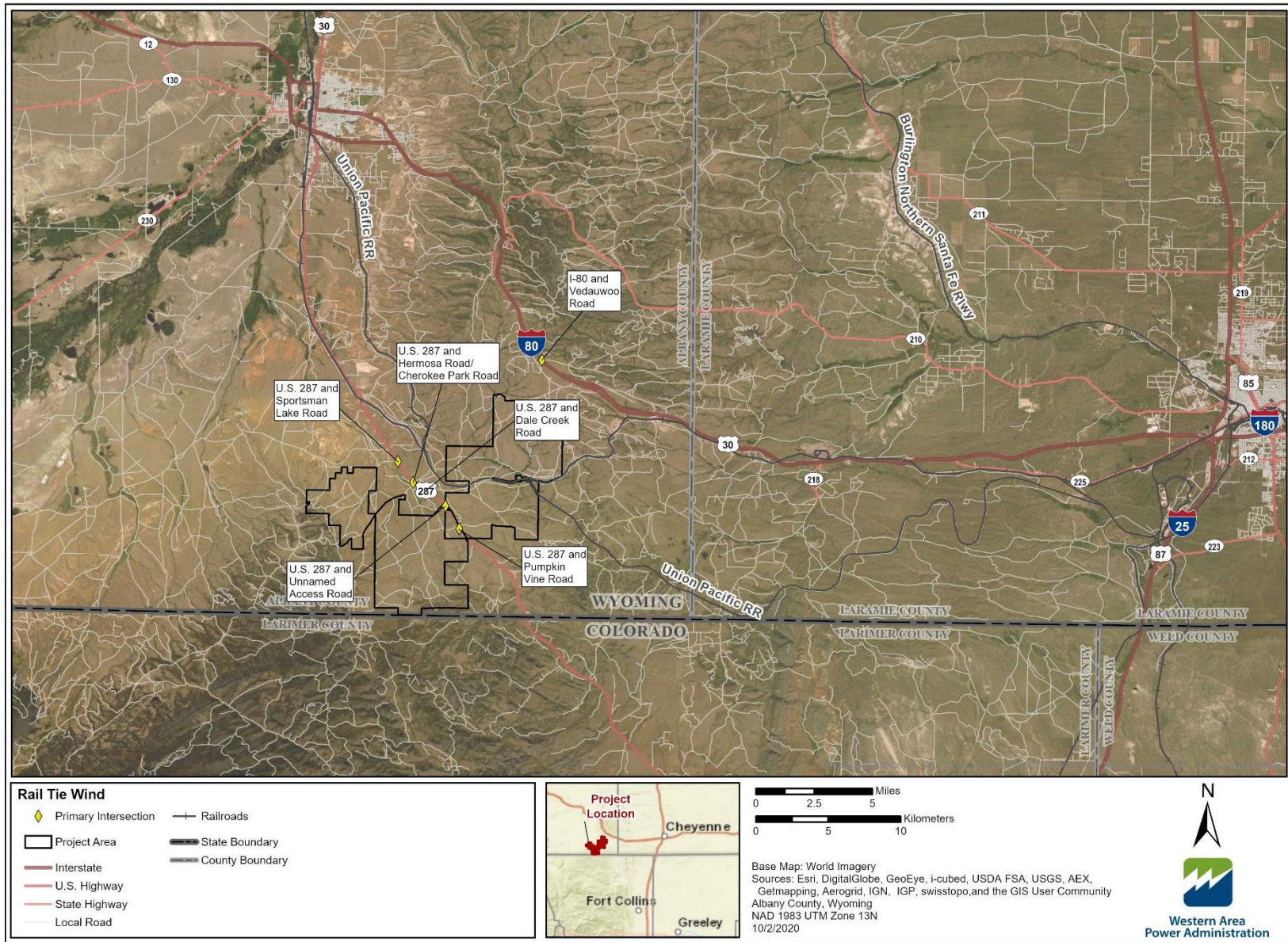


Figure 3-16. Transportation.

3.13.4.1 Roadways

Table 3-33 summarizes interstate highways and State highways within the analysis area.

Table 3-33. Interstate and State Highways within the Project Analysis Area

Interstate (I) Highway/State Highway	Extent	Infrastructure	Planned Upgrades	Speed Limit
I-80	New Jersey to San Francisco, CA, via Cheyenne and Laramie, WY	Four-lane divided freeway with grade-separated interchanges	Full replacement of the I-25/I-80 interchange (WYDOT 2020a); widening and the addition of trucking climbing/passing lanes and truck parking (WYDOT 2018); multiple bridge replacements and infrastructure upgrades and repairs (WYDOT 2020b)	80 mph
I-25	New Mexico to Buffalo, WY	Four-lane divided freeway with grade separated interchanges	Full replacement of the I-25/I-80 interchange and a full replacement of the I-25/Lincolnway Interchange (WYDOT 2020a); multiple bridge replacements and infrastructure upgrades and repairs (WYDOT 2020b); reconstruction of the Colorado portion of the mainline to correct geometric deficiencies and replace aging infrastructure (CDOT 2020)	75 mph (55–65 mph through major cities)
U.S. 287	Laramie, WY, to the north and Fort Collins, CO, to the south	Principal arterial, four-lane divided highway in the Project Area, two-lane highway on other stretches of analysis area	Restriped in 2019; multiple bridge and guard rail replacements and infrastructure upgrades and repairs (WYDOT 2020b)	70 mph

Source: Aerial Imagery on Google Earth, CDOT (2020); Tetra Tech (2020m), WYDOT (2018, 2020a, 2020b).

Local county roadways (CR) within the analysis area include Cherokee Park Road (CR 31), Hermosa Road (CR 222), Monument Road (CR 234), Pumpkin Vine Road (CR 241), Sportsman Lake Road (CR 316), and Boulder Ridge Road (CR 319). Dale Creek Road is a private road (formerly CR 231) located within the analysis area. Various smaller, unpaved public and private roads are also located in the analysis area.

There are no Military Training Routes within the Project Area (Military Aviation and Installation Assurance Siting Clearinghouse 2019). The closet Military Training Route to the Project Area traverses almost 50 miles to the west and east and more than 50 miles to the north of the Project Area.

3.13.4.2 Intersections

Table 3-34 summarizes primary intersections within the analysis area.

Table 3-34. Primary Intersections within the Project Analysis Area

Intersection	Location	Description	Infrastructure
U.S. 287 and Sportsman Lake Road (CR 316)	Approximately 1.1 miles northwest of Tie Siding, WY, near the northwestern portion of the Project Area	Sportsman Lake Road is a gravel road that proceeds west from the intersection at U.S. 287.	Dedicated turn lanes from U.S. 287 onto Sportsman Lake Road; no acceleration lanes for merging vehicles
U.S. 287 and Hermosa Road (CR 222)/ Cherokee Park Road (CR 31)	Center of the Project Area	Hermosa Road is a gravel road that proceeds east from the intersection at U.S. 287 and connects to Monument Road to provide access to I-80 via Vedauwoo Road. Cherokee Park Road is a gravel road that proceeds west from the intersection at U.S. 287 and connects to Boulder Ridge Road.	At-grade railroad crossing on Hermosa Road approximately 1-mile east of U.S. 287; dedicated turn lanes from U.S. 287; no acceleration lanes for merging vehicles

Intersection	Location	Description	Infrastructure
U.S. 287 and Dale Creek Road (formerly CR 231)	Approximately 0.7 mile southeast of Tie Siding, WY	Dale Creek Road is a private, unpaved road that forms a T-intersection with U.S. 287 and generally runs parallel to the UPRR.	Connection to an above-grade railroad crossing; dedicated turn/deceleration lanes for both directions accessing Dale Creek Road
U.S. 287 and Unnamed Access Road	West side of U.S. 287 at the center of the Project Area	Unnamed paved turn-off of U.S. 287 privately owned through a cell tower easement.	Paved turn-off travels approximately 100 feet before transitioning to a two-track road providing access to an existing cell tower; no dedicated turn lanes, although existing pavement width would accommodate turn lane striping
U.S. 287 and Pumpkin Vine Road (CR 241)	Approximately 3.0 miles southeast of Tie Siding, WY	Pumpkin Vine Road is an unpaved road that forms a T intersection with the minor, northeast leg of U.S. 287	Dedicated southbound (left-turning) lane; no dedicated northbound (right-turning) lane
I-80 and Vedauwoo Road (Exit 329)	Approximately 1.0 mile northeast of the Project Area	Vedauwoo Road is Exit 329 off I-80 that intersects Monument Road immediately west of the interchange and thereby provides an interconnection with Dale Creek Road and Hermosa Road.	Low-volume, grade separated exit

Source: Aerial Imagery on Google Earth and Tetra Tech (2020m).

3.13.4.3 Traffic Volumes

Tables 3-35 and 3-36 summarize estimated traffic volumes for 2021, representing commencement of Project construction, and existing traffic conditions (peak hour level of service [LOS]) for interstate highways, State highways, and primary intersections within the analysis area. Traffic data are not collected on county or private roads, but comparative traffic volumes on these roads are typically extremely light.

Table 3-35. Estimated Traffic Volumes and Baseline Level of Service for Highways within the Transportation Analysis Area

Interstate (I) Highway/ State Highway	Traffic Monitoring Location	Percent Trucks	Annual Average Daily Traffic (2021)	Commute Peak Hour	Peak Hour Volume (2021)	Peak Hour Density (peak count per mile per lane)	Peak Hour LOS
I-80	East of Laramie, WY	47%	13,918	10 a.m.–1 p.m.	1,112	5.9	A
I-25	South of Cheyenne, WY	15%	22,682	Unknown	2,268	10.0	A
U.S. 287	Near Tie Siding, WY	17%	4,676	11 a.m.–2 p.m.	368	2.0	A

Sources: WYDOT (2020b) Tetra Tech (2020m).

Table 3-36. Estimated Traffic Volumes and Baseline Level of Service for Primary Intersections within the Transportation Analysis Area

Intersection	Percent Trucks	Annual Average Daily Traffic (2021)	Commute Peak Hour	Peak Hour Volume (2021)	Peak Hour Delay (seconds)	Peak Hour LOS
U.S. 287 and Sportsman Lake Road (CR 316)	15%	4,686	11 a.m.–2 p.m.	376	10.5	B
U.S. 287 and Cherokee Park Road (CR 31)/ Hermosa Road (CR 222)	15%	4,736	11 a.m.–2 p.m.	379	10.4	B

Intersection	Percent Trucks	Annual Average Daily Traffic (2021)	Commute Peak Hour	Peak Hour Volume (2021)	Peak Hour Delay (seconds)	Peak Hour LOS
U.S. 287 and Dale Creek Road	15%	4,686	11 a.m.–2 p.m.	371	9.4	A
U.S. 287 and Unnamed Access Road	15%	4,676	11 a.m.–2 p.m.	368	NA ²	A
U.S. 287 and Pumpkin Vine Road (CR 241)	15%	4,686	11 a.m.–2 p.m.	373	9.4	A
I-80 and Vedauwoo Road exit	NA ¹	40	10 a.m.–1 p.m.	N/A ¹	NA ¹	NA ¹

Sources: Tetra Tech (2020m); WYDOT (2020b)

Note: N/A = no data available.

¹ Vedauwoo Road is a grade-separated intersection at I-80. No data are available, but traffic counts on Vedauwoo Road are expected to be minimal, and traffic utilizing this intersection would not affect traffic on I-80. This intersection could require radii modifications but is not of concern for LOS.

² Peak hour delay for this intersection is not available. It is assumed that vehicle use is currently so seldom that on average 0 vehicles use it during peak hour.

Traffic volumes along I-80, I-25, and U.S. 287 are typically higher on weekends than on weekdays and higher in the summer than in the winter. Traffic along each of these roadways is approximately even between opposite-direction travel lanes. Peak hour times are different for I-80 and U.S. 287, generally occurring between 11 a.m. and 2 p.m. and 10 a.m. and 1 p.m., respectively; peak hour times for intersections are similar. Peak hour times are not available for the I-25 station used for this analysis. Truck traffic volumes are highest along I-80 (47 percent) compared to I-25 (15 percent) and U.S. 287 (17 percent). Annual average daily traffic (AADT), peak hour volume (PHV), and peak hour density are highest along I-25 and lowest along U.S. 287. AADT is similar among the primary intersections, with AADT ranging from 4,676 to 4,736, except for I-80 and the Vedauwoo Road exit, which has an AADT of 40. PHV and peak hour delay are similar among intersections, where data are available. The peak hour LOS for all three highways and three of the intersections is rated A (peak hour delay of 0–10 seconds), with the remaining two intersections rated B (peak hour delay of 10–15 seconds); peak hour data are not available for the I-80 and Vedauwoo Road exit intersection.

3.13.4.4 Rail

The UPRR runs south through the central portion of the analysis area to just east of Tie Siding, WY, where two lines then run northeast and southeast through the eastern portion of the Project Area. In 2015, WYDOT reported an average of 65 to 75 trains per day for the east-west Laramie Subdivision, which is the portion of the UPRR that runs between Cheyenne and Rawlins and includes the portion of the UPRR that runs through the Project Area (WYDOT 2015). WYDOT reported an average of 30 trains per day along this portion of the UPRR in 2009, which is the last year for which data are reported (WYDOT 2015). An approximately 1,200-foot-long siding, located alongside an unnamed dirt road, south of Hermosa Road and north of Hermosa Road, just to the west of the Project Area near Hermosa. This siding is associated with the UPRR. A UPRR rail yard is in Laramie and includes existing infrastructure for delivering and offloading large Project components.

At-grade railroad crossings occur along some of the local roads within the analysis area, including on Hermosa Road approximately 1 mile east of U.S. 287 near Tie Siding and in the north-central portion of the Project Area; Monument Road just north of the intersection with Dale Creek Road in the eastern portion of the portion area; and Stevenson Road approximately 2 miles east of U.S. 287 and northwest of the Project Area.

3.13.4.5 Aviation and Other Radar-Dependent Operations

There are no airports in the analysis area. The Laramie Regional Airport is approximately 12 miles northwest of the Project Area. The airport's master plan does not define the analysis area as part of its planning areas, use areas, or airspace (Laramie Regional Airport 2010). The Rock and Hard Place Ranch Airport is a private airport located approximately 7 miles north of the Project Area. No airport master plan exists for the Rock and Hard Place Ranch Airport.

3.13.5 Impacts to Resource

This section describes potential impacts to transportation and access associated with construction, O&M, and decommissioning of the Project.

3.13.5.1 Impact Indicators

For the purposes of this analysis, an impact to transportation or access could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Traffic delays on roadways that would lead to degradation of LOS; contributions of traffic at primary intersections that would lead to degradation of LOS.
- Damage to transportation resources.
- Changes or restrictions to public access.
- Changes to existing traffic patterns during construction that would result in hazardous conditions.
- Exceedance in the capacity of existing railroads in terms of availability to deliver Project components; exceedance in the capacity of existing railroads in terms of equipment and infrastructure capable of delivering Project components.
- Conflict with aviation operations, airport land use plans, or radar-dependent operations.

3.13.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to transportation and access:

- Roadways within and around the Project Area were identified to determine potential Project routes for the delivery of equipment, components, or materials or for worker travel. Peak construction traffic volumes were used to capture the highest-possible potential volumes for Project-related traffic during construction. The year of projected decommissioning, which would begin following the 35-year operations period, was used to capture the highest-possible potential volumes for Project-related traffic during decommissioning.
- Existing AADT volumes were obtained from measuring locations, and future non-Project-related traffic volumes were estimated using AADT data and changes over time, in addition to information provided in county and local transportation plans. Non-Project and Project-related traffic and transportation routes were analyzed using Highway Capacity Software to determine if existing LOS thresholds would be changed due to Project-related traffic. This information was also used to inform a qualitative evaluation of potential changes to LOS at key intersections.
- Project-related needs for transportation resources or infrastructure were evaluated to qualitatively identify any changes to existing access and traffic patterns.

- Existing railroad corridors and rail yards in and around the Project Area were gathered using available maps. Services and capabilities of railroads were identified through Federal Railroad Administration and WYDOT data. This information was used to determine which railroads and rail services would have the capability and capacity to deliver Project equipment and components.
- Applicable airport land use plans were gathered to identify air space boundaries and restricted areas and determine any overlap with the Project Area. Existing literature and past NEPA documents were reviewed to characterize past coordination on restrictions to wind projects for avoiding interference or conflict with satellite and radar operations.

This analysis includes the following assumptions:

- The 1,200-foot-long UPRR siding near Hermosa would be too small for parking and offloading Project-sized components and would, therefore, not be used or affected by the Project. As a result, this resource is eliminated from further analysis.
- There is no airport master plan for the Rock and Hard Place Ranch Airport. Based on the distance of the Rock and Hard Place Ranch Airport from the Project Area and based on existing land use planning areas of a nearby larger airport, the Laramie Regional Airport, it is assumed the Project Area would be outside of the land use planning areas for the Rock and Hard Place Ranch Airport.
- ConnectGen submitted Form 7460-1 Filings for a preliminary turbine layout to the FAA in October 2019. The FAA issued Determinations of No Hazard for the entire turbine layout in April 2020. The filed turbine layout included 151 turbines that were 679 feet in height, so the final turbine layout will be less in height and number of turbines and can therefore be assumed to also receive No Hazard Determinations.
- Consultations for a wind energy project evaluated in 2012 concluded that although the Project would be visible in the lowest scan angle of the local radar, the impacts would be low and not significant enough to require mitigation (WAPA 2012). Because of the Project's similarities with this wind energy project, it is assumed that the Project's impacts to radar-dependent operations would also not warrant detailed analysis. Therefore, this topic is eliminated from further analysis.

3.13.5.3 Proposed Action

Issue Statement #1: How would the Project affect roadway traffic volumes and conditions?

The analysis area for this issue includes transportation facilities in and immediately surrounding the Project Area and major State highways connecting to interstates in Albany, Laramie, and Larimer Counties (section 3.13.3, "Analysis Areas"). Construction-related vehicles, including trucks carrying equipment and Project components and vehicles used by construction personnel to access the site from lodging/residences, would temporarily contribute to existing traffic volumes. There would be an estimated 250 vehicles per day at peak construction.

The Project would be constructed and operated in compliance with applicable zoning, siting, and environmental regulations (GEN-1), which include implementation of appropriate transportation planning and traffic controls. Project-related travel during construction would be restricted to routes identified in the Project Site Plan (GEN-3). No equipment or vehicles would be parked on roads maintained by Albany County (TRANS-7). A Transportation and Traffic Management Plan would be developed and implemented in coordination with WYDOT and Albany County to manage turbine component deliveries, traffic, and circulation in and around the Project Area and minimize traffic delays (TRANS-1). Deliveries of Project components during construction would be scheduled outside of local traffic volume peak times to the extent feasible, thereby minimizing conflicts between Project and non-Project traffic (TRANS-2). Deliveries would be made by professional transportation companies familiar with the type of equipment,

loads involved, and U.S. Department of Transportation, WYDOT, and Albany County regulations (TRANS-8). Construction deliveries would be coordinated to avoid major traffic-generating events in Laramie, including events held on the University of Wyoming campus, to the extent practicable (TRANS-5). The Project would coordinate with local law enforcement to manage traffic flows and monitor traffic speed during deliveries (TRANS 4 and TRANS-6). If temporary closures are necessary to allow haul trucks sole access to the road while delivering Project components, closures are not expected to exceed 15 minutes during each closure event (TRANS-3). Signage would be placed near construction areas in accordance with the Albany County Zoning Resolution and in coordination with Albany County Road and Bridge Department and WYDOT to notify travelers and local residents about construction and the timing and routes for oversized vehicle movements and deliveries (TRANS-9).

Despite the implementation of transportation planning and traffic controls, the number of vehicle trips to accommodate deliveries and workers to and from the Project Area would contribute to changes in traffic volumes. Haul routes used during construction, including I-80, I-25, and U.S. 287 would see approximately 1.5 percent, 0.5 percent, and 15 percent increases, respectively, in AADT; 4.5 percent, 0.5 percent, and 48 percent increases, respectively, in PHV; and increases of 0.3, 0.1, and 0.2, respectively, in peak hour density (i.e., peak count per mile per lane) (table 3-37). There would be no change due to Project construction in the percent trucks, commute peak hour, or LOS for these routes.

Table 3-37. Estimated Traffic Volumes and Level of Service for Haul Routes used during Peak Construction

Interstate Highway/State Highway	Traffic Monitoring Location	Percent Trucks	AADT (2021)	Commute Peak Hour	PHV (2021)	Peak Hour Density (peak count per mile per lane)	Peak Hour LOS
I-80	East of Laramie, WY	47%	14,120	10 a.m.–1 p.m.	1,162	6.2	A
I-25	South of Cheyenne, WY	15%	22,782	Unknown	2,278	10.1	A
U.S. 287	Near Tie Siding, WY	17%	5,376	11 a.m.–2 p.m.	543	2.2	A

Sources: Tetra Tech (2020m).

Decommissioning would contribute to the same vehicles per day as construction, although over a shorter time period. Because of this, there would be no change because of Project decommissioning in the LOS for haul routes. O&M activities, which would occur over a longer time frame than construction and decommissioning, would contribute to an estimated 20 vehicles per day. Compared to construction and decommissioning, the changes in traffic along haul routes during O&M would be negligible. Because of this, Project-related traffic along haul routes during construction, O&M, and decommissioning would not result in the degradation of LOS.

Primary intersections used to access the Project Area would experience changes in traffic volumes during construction (table 3-38). The U.S. 287 and Sportsman Lake Road (CR 316) intersection would see an approximate increase of 0.2 percent in AADT, a 47 percent increase in PHV, and a decrease of 1.2 seconds in peak hour delay. When considering overall changes to traffic coming from left and right turns at this intersection, there would be an improvement to LOS from B to A; however, this improvement is only applicable to right-turning vehicles (southbound onto U.S. 287) because of a number of factors: multiple turn movements sharing a lane (eastbound left turn and right turn onto U.S. 287); assumption that most Project vehicles would be making a right turn (southbound onto U.S. 287) at this intersection; and right turns having a higher capacity than left turns, therefore, resulting in an increase in average capacity and a decrease in average delay. Left-turning vehicles (i.e., northbound onto U.S. 287) would still experience a delay similar to baseline conditions (LOS B, or a peak hour delay of 10–15 seconds). The other primary intersections, except for I-80 and Vedauwoo Road, which is a grade-separated

intersection and would not be affected by traffic along I-80, would see some increase in PHV and peak hour delay; however, only the LOS of the U.S. 287 and Dale Creek Road and U.S. 287 and Unnamed Access Road would experience a degradation in the LOS from A to B.

Table 3-38. Estimated Traffic Volumes and Level of Service for Primary Intersections used during Peak Construction

Intersection	Percent Trucks	AADT (2021)	Commute Peak Hour	PHV (2021)	Peak Hour Delay (seconds)	Peak Hour LOS
U.S. 287 and Sportsman Lake Road (CR 316)	15%	4,696	11 a.m.–2 p.m.	551	9.3	A
U.S. 287 and Cherokee Park Road (CR 31)/ Hermosa Road (CR 222)	15%	4,736	11 a.m.–2 p.m.	554	11.6	B
U.S. 287 and Dale Creek Road	15%	4,686	11 a.m.–2 p.m.	546	10.8	B
U.S. 287 and Unnamed Access Road	15%	4,676	11 a.m.–2 p.m.	558	11.4	B
U.S. 287 and Pumpkin Vine Road (CR 241)	15%	4,686	11 a.m.–2 p.m.	546	9.9	A
I-80 and Vedauwoo Road exit	NA ¹	215	10 a.m.–1 p.m.	N/A ¹	N/A ¹	N/A ¹

Sources: Tetra Tech (2020m)

Note: N/A = no data available.

¹ Vedauwoo Road is a grade-separated intersection at I-80. No data are available, but traffic counts on Vedauwoo Road are expected to be minimal, and traffic using this intersection would not affect traffic on I-80. This intersection could require radii modifications but is not of concern for LOS.

Primary intersections used to access the Project Area would also experience changes in traffic volumes during decommissioning (table 3-39). As described for construction, the overall LOS improvement shown for U.S. 287 and Sportsman Lake Road (CR 316) is because of the higher capacity right turns (southbound turn onto U.S. 287) experiencing an improvement; left turns (northbound onto U.S. Highway 298) would experience delays during decommissioning similar to existing conditions (LOS B, or a peak hour delay of 10–15 seconds). The other primary intersections, except for I-80 and Vedauwoo Road, would see increases in AADT, PHV, and peak hour delay. The U.S. 287 and Dale Creek Road, U.S. Highway 298 and Unnamed Access Road, and U.S. 287 and Pumpkin Vine Road (CR 241) intersections would experience LOS degradations from A to B. The LOS at U.S. 287 and Cherokee Park Road (CR 31)/Hermosa Road (CR 222) would remain the same as under existing conditions (LOS B). Compared to construction and decommissioning, the changes in traffic at primary intersections during O&M would be negligible. As a result, Project-related traffic at primary intersections during O&M would not result in the degradation of LOS. Construction and decommissioning would result in the degradation of LOS at primary intersections from LOS A to B; however, LOS B would not restrict flows or result in declines in convenience at levels noticeable to drivers and would not exceed an LOS threshold that warrants mitigation.

Table 3-39. Estimated Traffic Volumes and Level of Service for Primary Intersections used during Decommissioning

Intersection	Percent Trucks	AADT (2021)	Commute Peak Hour	PHV (2021)	Peak Hour Delay (seconds)	Peak Hour LOS
U.S. 287 and Sportsman Lake Road (CR 316)	15%	4,686 to 8,836	11 a.m.–2 p.m.	376 to 825	10.5 to 9.8	B to A
U.S. 287 and Cherokee Park Road (CR 31)/ Hermosa Road (CR 222)	15%	4,736 to 8,896	11 a.m.–2 p.m.	379 to 831	10.4 to 13.6	B
U.S. 287 and Dale Creek Road	15%	4,686 to 8,836	11 a.m.–2 p.m.	371 to 825	9.4 to 13.7	A to B

Intersection	Percent Trucks	AADT (2021)	Commute Peak Hour	PHV (2021)	Peak Hour Delay (seconds)	Peak Hour LOS
U.S. 287 and Unnamed Access Road	15%	4,676 to 8,856	11 a.m.–2 p.m.	368 to 825	NA ² to 13.1	A to B
U.S. 287 and Pumpkin Vine Road (CR 241)	15%	4,686 to 8,836	11 a.m.–2 p.m.	373 to 817	9.4 to 11.0	A to B
I-80 and Vedauwoo Road exit	NA ¹	40 to 215	10 a.m.–1 p.m.	N/A ¹	N/A ¹	N/A ¹

Sources: Tetra Tech (2020m).

Note: N/A = no data available.

¹ Vedauwoo Road is a grade-separated intersection at I-80. No data are available, but traffic counts on Vedauwoo Road are expected to be minimal, and traffic using this intersection would not affect traffic on I-80. This intersection could require radii modifications but is not of concern for LOS.

Issue Statement #2: How would the Project affect existing transportation infrastructure and result in changes to access?

Road closures would be required during construction and decommissioning of the Project to allow the transport of large Project infrastructure (e.g., turbine components) and to allow haul trucks sole access to the road while delivering Project components. These road closures would be temporary and, depending on their location, could temporarily restrict public access to certain roads. O&M of the Project would not require road closures or other activities that would restrict access. No upgrades or changes to existing transportation infrastructure would be required as part of construction, O&M, or decommissioning of the Project. Roads used for Project traffic may require repairs or maintenance from the transport of heavy equipment during construction and operations.

A Transportation and Traffic Management Plan would be developed and implemented in coordination with WYDOT and Albany County to manage turbine component deliveries, traffic, and circulation in and around the Project Area and minimize restrictions to access (TRANS-1). Deliveries of Project components during construction would be performed by professional transportation companies (TRANS-8) and would be scheduled outside of local traffic volume peak times to the extent feasible (TRANS-2) and coordinated with local law enforcement to manage traffic flow (TRANS-6), thereby minimizing access restrictions. Temporary road closures would be implemented with construction cones and/or staffed intersections with a traffic-control flagger and would be limited to 15 minutes (TRANS-3). Vehicles and equipment would be parked in the Project Area and not on roads maintained by Albany County (TRANS-7). Where public access is available within the Project Area, such as State-owned land that is open to the public, Project personnel would coordinate with the State land office to identify appropriate temporal and spatial access restrictions during construction and operations (PHS-11). Roads used for the transport of Project equipment would be repaired and maintained in accordance with a Road Use Agreement with WYDOT and a Road Improvement and Maintenance Agreement with the Albany County Road and Bridge Department.

The Project would not require changes to transportation infrastructure and would not result in irretrievable damages to transportation infrastructure from the movement of heavy equipment during construction or operations. Restrictions to access would be unavoidable during construction and decommissioning of the Project; however, these restrictions would be temporary. Coordination and planning implemented prior to and throughout construction and decommissioning of the Project would reduce the duration of access restrictions. As a result, changes to access would be minimized.

Issue Statement #3: How would the Project contribute to changes in traffic patterns?

The Project would not require upgrades or changes to existing transportation that would be available to the public, except for road or bridge repairs if Project-related vehicles result in damage to existing infrastructure. Changes to traffic patterns from the Project would be limited to temporary road closures during construction and decommissioning, as described under Transportation Impact Statement #2, to

allow the transport of large Project infrastructure (e.g., turbine components), to allow haul trucks sole access to the road while delivering Project components, or to accommodate road or bridge repairs. O&M of the Project would not require road closures or other activities that would restrict access.

Road closures during construction and decommissioning could require lane restrictions or detours that would result in changes to traffic patterns. Traffic planning and control measures would be developed and implemented as part of a Transportation and Traffic Management Plan to manage circulation in and around the Project Area (TRANS-1). Signage would be erected to alert drivers about Project construction activities (TRANS-9), and cones and staffed intersections (e.g., traffic-control flagger) would be placed near road closures or Project Area access points to help drivers safely navigate these areas (TRANS-3). The Project would include coordination with local law enforcement to manage traffic flows and monitor traffic speed during deliveries (TRANS-6). Project traffic on access roads constructed for the Project would be restricted to authorized use only (PHS-12). In addition, all staging activities and parking of equipment and vehicles would be restricted to the Project Area and would not be allowed on county-maintained roads (TRANS-7), thereby avoiding unplanned and unmanaged changes in traffic patterns. These measures would reduce the public's exposure to changes in traffic patterns, and when changes to traffic patterns are unavoidable, safety and traffic control measures implemented during construction and decommissioning activities would allow the effective and safe management of changes to traffic patterns, thereby minimizing the creation of hazardous conditions for motorists. Because of the rural nature of the Project Area, pedestrian use of transportation resources would be rare; however, if pedestrians are present during Project construction and decommissioning activities, measures aimed at managing and controlling vehicle traffic and transportation resources would also reduce hazards to pedestrians.

Issue Statement #4: Would the use of railroads to transport Project materials exceed existing railroad capacity or affect existing rail operations?

The UPRR rail yard in Laramie has the existing infrastructure needed to accommodate the delivery and offloading of oversized Project components, such as turbine components, and equipment during construction. Once Project components arrive to the UPRR rail yard, they would either be transported to the Project Area via (1) trucks, (2) the UPRR line that runs through the eastern portion of the Project Area, or (3) a combination of trucks and rail. Use of the UPRR line would require travel through at-grade rail crossings along some of the local roads within the analysis area, including on Hermosa Road approximately 1 mile east of U.S. 287 near Tie Siding and in the north-central portion of the Project Area; Monument Road just north of the intersection with Dale Creek Road and in the eastern portion of the Project Area; and Stevenson Road approximately 2 miles east of U.S. 287 and northwest of the Project Area. If needed, the same rail yard and rail line would be used during decommissioning to transport oversized Project components. Railroads would not be used during O&M.

Project-related uses of the rail yard and rail line would be coordinated with UPRR, WYDOT, and Albany County, as appropriate. As part of a Transportation and Traffic Management Plan developed in coordination with these agencies and implemented prior to construction, steps would be outlined for delivering turbine components (TRANS-1), which would include the identification of the appropriate delivery method (i.e., truck, rail, or a combination) and planning and implementing traffic control measures at at-grade crossings, as appropriate. If needed, an on-site rail yard could be constructed to alleviate demand on existing rail facilities for the delivery and storage of components. Because of this coordination and planning, the increased demand on railroads from the Project would not exceed the capacity of existing railroads. Increased rail traffic would increase the need to use at-grade rail crossings to reach the Project Area; however, increased demands would not disrupt railroad operations at at-grade rail crossings or require burdensome measures to be implemented beyond those already used for at-grade crossings. As a result, the Project would not result in the exceedance of the capacity of existing railroads in terms of availability and capability to deliver Project components and would not disrupt existing and ongoing rail operations.

Issue Statement #5: How would construction of the Project conflict with aviation use and planning areas or airspace?

The Laramie Regional Airport's master plan does not define the analysis area as part of its planning areas, use areas, or airspace (Laramie Regional Airport 2010). The Project Area is approximately 7 miles from the Rock and Hard Place Ranch Airport. Because there is no airport master plan for the Rock and Hard Place Ranch Airport, the airport's use and planning areas are not known. However, based on the size of the use and planning areas for the Laramie Regional Airport, which is a much larger airport, it can be assumed that the Project Area would be outside of the use and planning areas for the Rock and Hard Place Ranch Airport. As a result, the Project would not conflict with airport use or planning areas.

The distance of the Project Area from the Laramie Regional Airport (approximately 12 miles) would prevent interference with height overlay zones, as defined in 14 CFR 77(e)(77). Although no airport master plan exists for the Rock and Hard Place Ranch Airport, the distance of the Project Area from this airport (approximately 7 miles) would be sufficient for avoiding interference with the airport's airspace. ConnectGen submitted Form 7460-1 Filings for a preliminary turbine layout were provided to the FAA in October 2019. The FAA issued Determinations of No Hazard for the entire turbine layout in April 2020. The filed turbine layout included 151 turbines that were 679 feet in height, so the final turbine layout will be less in height and number of turbines and can therefore be assumed to also receive No Hazard Determinations. As a result, the Project would not conflict with aviation.

3.13.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new traffic, traffic patterns, or changes to transportation infrastructure would occur from the Project and the existing conditions and trends for transportation and access to the analysis area would continue.

3.13.6 Transportation and Access Conclusion

The Project would contribute to changes in traffic volumes on roadways; however, there would be no degradation to the LOS for routes used for Project activities. The Project would increase traffic volumes at primary intersections and would result in degradation of LOS at two intersections from A to B during construction and decommissioning. These degradations of LOS would be limited to construction and decommissioning periods and would be expected to return to baseline conditions following completion of these Project phases. In addition, LOS B would not restrict flows or result in declines in convenience at levels noticeable to drivers and would not exceed an LOS threshold that warrants mitigation. The Project would minimize the extent and duration of access restrictions and changes to traffic patterns. The Project would not exceed the capacity of existing railroads and would not disrupt existing and ongoing rail operations. The Project would not conflict with airport use or planning areas or airspace. Based on this analysis, no significant impacts to transportation and access would be anticipated.

3.14 Vegetation

This section describes the existing context and characteristics of the vegetation resources in the Project Area, including land cover types, noxious weeds, and vegetative species of concern, and assesses potential impacts to these biological resources from the construction and operations of the Project.

3.14.1 Regulatory Background

Plants, like animals, are subject to ESA Federal regulations mentioned in section 3.4.1, “Regulatory Background,” and section 3.5.1, “Regulatory Background.” If an action on private lands has a Federal nexus, that Federal agency must include any federally listed plant species in Section 7 consultation to ensure that authorization of that action does not jeopardize the continued existence of that species.

Although the State of Wyoming does not have any statutes establishing protections for native plant species and does not list native plants as SGCN in their SWAP, the State has enacted the Wyoming Weed and Pest Control Act that states: “The district board shall: Implement and pursue an effective program for the control of designated weeds and pests” (W.S. 11-5-105(a)(i)). The Wyoming Department of Agriculture absorbed this responsibility and manages and coordinates weed and pest activities for the State of Wyoming among Wyoming Weed and Pest Control Districts, the Wyoming Weed and Pest Council, Federal agencies, municipalities, trade associations, other states, and other organizations as well as the private sector (Wyoming Department of Agriculture 2020).

The Wyoming Weed and Pest Council, a result of the Wyoming Weed and Pest Control Act, comprises 23 Weed and Pest Districts in the State of Wyoming that correspond with county boundaries. The Albany County Weed and Pest Control District, established in 1973, provides services and information to the public about noxious weeds, determines which species are listed as noxious weeds at the county level, and educates the community about noxious weeds (Albany County Weed and Pest Control District 2020). How plants are designated as noxious weeds depends on the differing regulatory schemes and is described below:

- State-designated weeds and pests are considered of such detriment to the state that each is designated by an Executive Board of Directors and the Wyoming Weed and Pest Council.
- County-declared weeds or pests are considered a detriment to a district.

3.14.2 Data Sources

The information presented in this section comes from various sources, including technical biological survey reports developed for the Project, academic and peer-reviewed literature sources, publicly available GIS data, and State and local resources.

3.14.3 Analysis Area

The analysis area for vegetation resources, excluding noxious weeds, is the siting corridors. This analysis area captures areas of potential new ground disturbance (i.e., access roads, turbine pads, laydown yards) that would affect native vegetation communities if converted to Project-related features, as well as captures overarching changes to the landscape from Project construction and operations.

The analysis area for noxious weeds is the Project Area. This analysis area is appropriate as it considers secondary effects to vegetation communities from the potential spread of noxious weeds during vegetation removal activities associated with the Project.

3.14.4 Baseline Description

Several factors influence the potential for vegetation species to occur within the analysis area, including hydrology, soil types, population connectivity, slope, aspect, and habitat quality. Descriptions of the vegetation communities (or the dominant plant species that characterize the species composition and physical structure of the landscape) that occur within the analysis area and Project Area more generally

are provided in this section. The *Biological Resources Evaluation* technical report prepared for the Project describes the vegetation resources present within the analysis area and evaluates potential impacts to plant species of concern that could result from Project construction and operations (Tetra Tech 2020d). Below is a discussion based on the results of the *Biological Resources Evaluation* technical report.

The Project Area is located within two primary (Level IV) ecoregions: the Laramie Basin and Crystalline Mid-elevation Forests (Chapman et al. 2004). Chapman et al. (2004) describe the Laramie Basin Ecoregion as a wide, intermontane valley dominated by mixed-grass prairie that is generally too dry for Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), except in areas where snow accumulates. Natural vegetation in this ecoregion observed in the analysis area includes needle-and-thread grass (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), Indian ricegrass (*Achnatherum hymenoides*), and various forb and shrub species. The Crystalline Mid-Elevation Forests Ecoregion is described by Chapman et al. (2004) as a mix of lodgepole pine forest, Douglas-fir forest, Ponderosa pine (*Pinus ponderosa*) woodlands, and aspen forest woodlands with understories of grasses, forbs, and shrubs. Natural vegetation in this ecoregion observed in the analysis area includes aspen (*Populus tremuloides*), limber pine (*Pinus flexilis*), mountain mahogany (*Cercocarpus ledifolius*), silver sagebrush (*Artemisia cana*), serviceberry (*Amelanchier* spp.), snowberry (*Symphoricarpos* spp.), and other shrub species. Land uses in these ecoregions include wildlife habitat, livestock grazing, mineral extraction, and recreation; vegetative cover in the analysis area is affected by current grazing and residential settlement land use patterns in the area (section 3.8, “Land Use”). The Project Area more generally is characterized by shrublands, grasslands, rocky outcrops, some forested areas, and a few perennial water features and wetlands.

Elevations within the Project Area range from approximately 7,500 feet to 8,500 feet above mean sea level. Average annual precipitation measured in Laramie, WY (the nearest location to the Project Area with climate data), is approximately 11 inches (U.S. Climate Data 2020). Mean temperature ranges from 27 to 56 degrees Fahrenheit annually (U.S. Climate Data 2020).

3.14.4.1 Land Cover

National Land Cover Database

The NLCD is a publicly available dataset that provides spatial reference and descriptive data for characteristics of the land surface in the United States. The NLCD was developed through a partnership of Federal agencies led by the USGS. Based on a desktop review of the NLCD, land cover for the Project Area consists primarily of shrub/scrub vegetation (64.1 percent) and grassland/herbaceous cover (30.6 percent; figure 3-17) (Tetra Tech 2020d). Land cover within the analysis area reflects land cover in the overall Project Area and is predominantly shrub/scrub (64.0 percent) and grassland/herbaceous (30.4 percent) (Yang et al. 2018). Another seven NLCD land cover types account for approximately 5.6 percent of the analysis area collectively (table 3-40). A description of the primary land cover types mapped in the analysis area is provided below and is based on the NLCD legend.

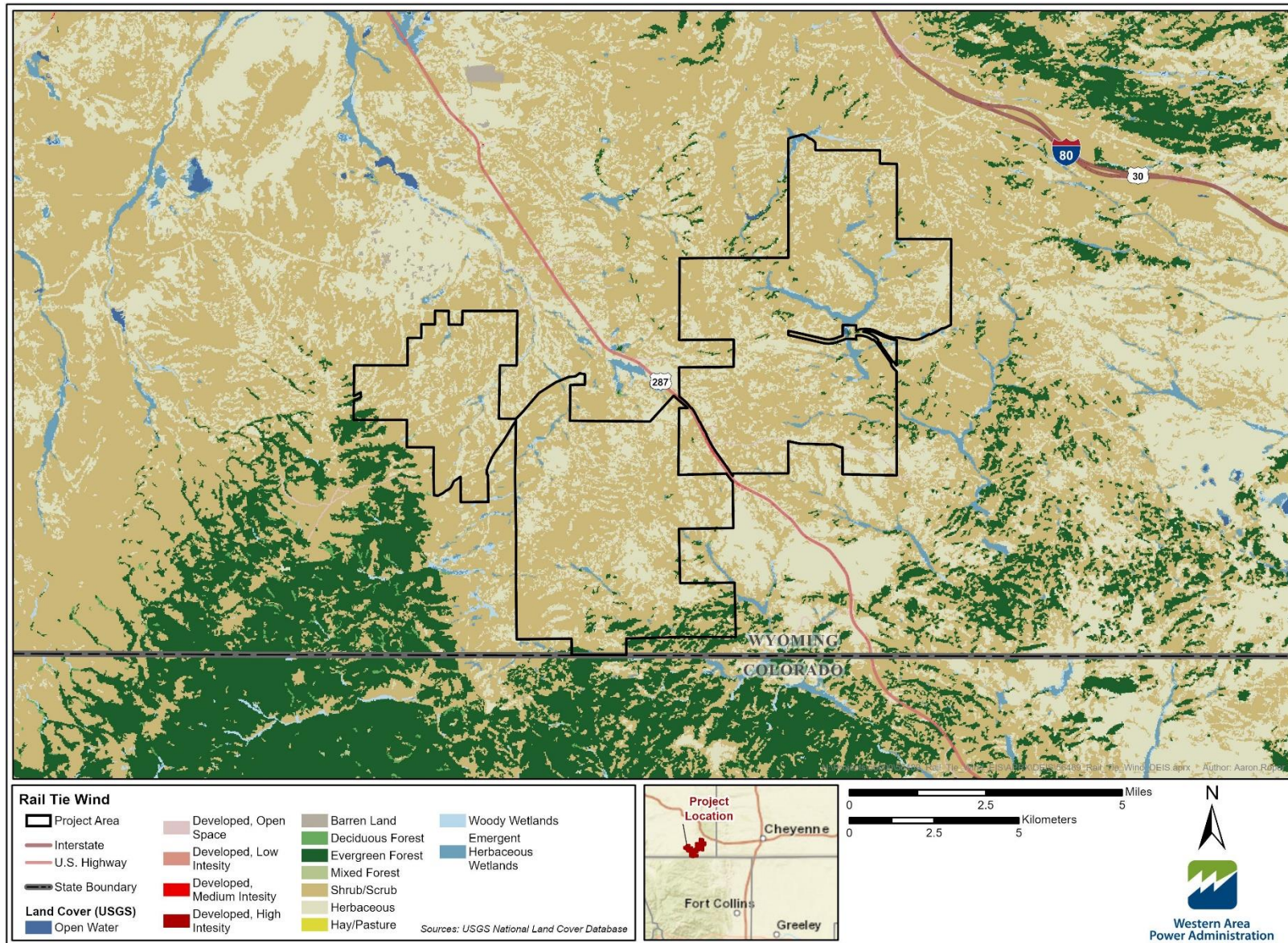


Figure 3-17. National Land Cover Database land cover types within the Project Area.

Table 3-40. National Land Cover Database Land Cover Types within Proposed Siting Corridors

NLCD Cover Class Type	Acres within Siting Corridors	Percentage of Siting Corridors
Shrub/scrub	4,121.8	64.0%
Grassland/herbaceous	1,955.9	30.4%
Evergreen forest	64.8	1.0%
Herbaceous wetland	57.5	0.9%
Woody wetland	15.4	0.2%
Developed, open space	10.5	0.2%
Deciduous forest	2.0	<0.1%
Barren land	1.7	<0.1%
Developed, low intensity	<1	<0.01%
Unclassified	211.7	3.3%
Total¹	6,441.3	100%

Sources: Tetra Tech (2020d); Yang et al. (2018).

¹ Totals may not be exact because of rounding error.

Shrub/Scrub

This land cover type is characterized by areas dominated by shrubs less than 16 feet tall with shrub canopy typically greater than 20 percent of total vegetation. This land cover type includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.

Grassland/Herbaceous

This land cover type is characterized by areas dominated by graminoid or herbaceous vegetation (i.e., annuals, biennials, or perennials that have no persistent woody stem aboveground), generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling but can be used for grazing.

Field-Based Habitat Assessment

Field reconnaissance of the habitat in the analysis area conducted in September 2019 indicates that vegetation and landscape features contain a much higher cover of shrub/scrub vegetation than what was mapped by the NLCD data, accounting for nearly all of the grassland/herbaceous cover mapped by the NLCD (table 3-41). Natural vegetation within the analysis area is mostly shrub/scrub, and more specifically sagebrush steppe (5,821 acres or 94.5 percent), which is composed of low-stature shrubs and grasses. The dominant shrub species observed in the analysis area representative of this ecological system is Wyoming threetip sagebrush (*Artemisia tripartita* ssp. *rupicola*) (Tetra Tech 2020d), which is a low-growing, dwarf form that reaches 15 inches in height (Tilley and Pickett 2019). Foothill shrublands also account for the shrub/scrub land cover in the analysis area and were mapped within the southern and western portions of the Project Area (177 acres within the analysis area). A small area of aspen/deciduous forest (1 acre within the analysis area) was mapped along the westernmost portion of the Project Area, whereas cliffs and rock outcrops were mapped within the northeastern portion of the Project Area (31 acres within the analysis area) (Tetra Tech 2020d). Some lower montane forest (Evergreen Forest) was mapped within the southernmost portion of the Project Area with a few small areas located within the eastern portion of the Project Area (52 acres within the analysis area) (Tetra Tech 2020d).

Table 3-41. Field-Verified National Land Cover Database Land Cover Types within Proposed Siting Corridors

NLCD Cover Class Type	Acres within Siting Corridor	Percentage of Siting Corridor
Shrub/scrub	5,998.6	93.1%
Barren land	92.9	1.4%
Evergreen forest	51.8	0.8%
Herbaceous wetland	50.6	0.8%
Woody wetland	26.9	0.4%
Pasture/hay	4.7	0.1%
Open water	2.0	<0.1%
Deciduous forest	0.8	<0.1%
Unclassified	211.7	3.3%
Total¹	6,441.3	100%

Source: Tetra Tech (2020d).

¹ Totals may not be exact because of rounding error.

3.14.4.2 Noxious Weeds

Noxious weeds are species of non-native plants that can alter habitat structure, exclude native plants, decrease availability of water and forage for both plants and wildlife, and ultimately disrupt the functionality of native plant communities. Invasive plant species and noxious weeds have the potential to negatively impact biological resources, recreation, and wildlife management for said reasons. Managing invasive plant species and noxious weed populations is challenging and the rapidly expanding presence of annual invasive grasses, such as cheatgrass (*Bromus tectorum*) has complicated efforts for restoration of native plant communities. There are currently 30 State-designated noxious weeds in Wyoming (including cheatgrass) and additional weeds designated as declared weeds in every county in Wyoming (Wyoming Weed and Pest Council 2019a). In Albany County, there are three county-listed noxious weeds: locoweed (*Oxytropis nana*), larkspur (*Delphinium* sp.), and cheatgrass (Wyoming Weed and Pest Council 2019b).

Several Wyoming State-listed noxious weeds were identified within the analysis area during the field-based habitat assessment in September 2019 (Tetra Tech 2020d). Most notable among these species were cheatgrass, Canada thistle (*Cirsium arvense*), houndstongue (*Cynoglossum officinale*), and common mullein (*Verbascum thapsus*). Cheatgrass was the only Albany County-listed noxious weed observed in the analysis area.

3.14.4.3 Species of Concern

Special-status species include those listed under the ESA and are discussed in section 3.4.4.5, “Special-Status Species.” Species of concern are those species listed as SOC by the WYESFO because the Wyoming SWAP does not list plants as SGCN. The greatest threat to plant species of concern in Wyoming is habitat loss, invasive plants and noxious weeds, fire suppression, and overgrazing.

There are only two WYESFO SOC plant species listed, the Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*) and Fremont county rockcress (*Boechea pusilla*) (FWS 2020b). Neither of these species are known to occur in Albany County, and, therefore, vegetative species of concern are not further addressed in this EIS.

3.14.5 Impacts to Resource

This section describes the effects on vegetation resources from the construction and operations of the Project.

3.14.5.1 Impact Indicators

For the purposes of this analysis, an impact to vegetation resources could result if any of the following were to occur from construction, O&M, or decommissioning of the Project:

- Acres of new disturbance by habitat type.
- Time needed for habitat types to re-establish.
- Acres of impact to suitable special-status plant species habitat types.
- Effects on vegetation resources are considered at the individual, community, and population levels.

3.14.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to vegetation resources:

- Technical biological survey reports were reviewed to determine vegetative communities present in respective analysis areas, including noxious weeds. Natural histories of vegetative species expected to occur in the analysis area were evaluated to determine their potential for reclamation success.
- Spatial data habitat types and known populations of noxious weeds were compared with Project infrastructure (siting corridors and access roads) to determine potential for spread of noxious weeds and impacts to habitat types.

3.14.5.3 Proposed Action

Issue Statement #1: When would construction and operations involve ground disturbance with the potential to cause the introduction and spread of noxious weeds and other invasive plant species, and how would that introduction affect revegetation success?

Construction activities that remove vegetation and disturb soils would increase the potential for invasive plant species, including noxious weeds, to be introduced or for them to spread. Ground disturbance could result in the mixing of topsoil with subsoil and loss and alteration of seed banks, which could ultimately result in long-term reduction of native plant productivity and introduction of noxious and invasive weeds. The introduction of invasive plant species in disturbed areas could lead to changes in vegetation communities. Noxious and invasive weeds could become widespread within areas of ground disturbance, particularly where there are established nearby populations providing a seed bank. Noxious and invasive weeds can affect revegetation success by outcompeting native plant species for nutrients, space, and available moisture.

Coordination between the weed management contractor and host landowners regarding specific treatment methods on their respective properties would occur (VEG-7), and any herbicide used as part of vegetation management activities would follow label instructions and relevant Federal, State, and local laws (VEG-8). Additionally, a preconstruction survey of the Project footprint would be conducted to identify existing locations of noxious weeds, any locations delineated would be identified in a Weed Management Plan, and appropriate controls would be applied to Project activities in these areas (VEG-5). Upon completion of construction, a postconstruction weed inventory survey would be performed to validate the effectiveness of the weed management program and verify that invasive weed levels have not exceeded preconstruction levels (VEG-6).

Areas of disturbance and areas directly adjacent to disturbance would be the most susceptible to weed infestations (Table 3-42).

Table 3-42. Acres of Disturbance by National Land Cover Database Land Cover Types within Proposed Siting Corridors

NLCD Cover Class Type	Acres of Disturbance within Siting Corridors	Percentage of Siting Corridors
Shrub/scrub	1,071.9	16.6%
Grassland/ herbaceous	559.0	8.7%
Evergreen forest	7.9	0.1%
Herbaceous wetland	9.4	0.1%
Woody wetland	3.2	<0.1%
Developed, open space	2.2	<0.1%
Developed, low intensity	1.2	<0.1%
Barren land	0.4	<0.1%
Developed medium intensity	0.2	<0.01%
Total	1,655	25.7%

Sources: Tetra Tech (2020d); Yang et al. (2018).

Issue Statement #2: How would construction and operations affect vegetation cover? Are all vegetation cover types present in the Project Area reclaimable?

Ground-disturbing construction and operations activities would remove individual plants and replace vegetation cover with human-made structures until Project decommissioning and reclamation.

Areas disturbed during construction would be revegetated as soon as practicable, either through natural revegetation practices or through reseeding with plant species native to the affected ecosystems utilized whenever practicable (VEG-2). Prior to the start of construction, a Reclamation Plan would be developed for the Project that would guide the reclamation and revegetation of disturbed areas during and following construction using locally approved, weed-free, native seed mixes (VEG-3). The Project Reclamation Plan would include implementable measures to properly handle topsoil; re-establish local contours and a suitable seedbed (i.e., respread topsoil); develop and reseed with locally adapted native or desired seed mixes, as coordinated with surface landowners; and ensure the re-establishment of native or desirable, self-propagating vegetation communities that approximate the surrounding landscapes. Reclamation monitoring and adaptive management strategies would be employed as needed to further evaluate reclamation success.

A preconstruction survey of the Project footprint would be performed to identify existing locations of noxious weeds, locations delineated would be identified in a Weed Management Plan, and appropriate controls would be applied to Project activities in these areas to minimize the effects of noxious weeds on plant communities (VEG-5). The Project would coordinate with the weed management contractor and host landowners regarding specific treatment methods on their respective properties (VEG-7). Any herbicide use as part of vegetation management activities would follow label instructions and relevant Federal, State, and local laws (VEG-8). Following construction, a weed inventory survey would be performed to validate the effectiveness of the weed management program and ensure that invasive weed levels have not exceeded preconstruction levels (VEG-6).

Approximately 1,655 acres of vegetation would be removed during the construction and operations of the Project (see table 3-42); of this total, approximately 1,471 acres (89 percent) would be removed during construction activities and would be reclaimed as soon as practicable after construction ceases. Approximately 184.1 acres (11 percent) of vegetation would be removed for Project-related infrastructure and would not be reclaimed until the end of the Project life and after decommissioning. Within the analysis area, shrub/scrub vegetation was dominant (1,072 acres of disturbance within this land cover type [64.8 percent]), and the most common sagebrush species identified was Wyoming threetip sagebrush. Wyoming threetip sagebrush recovers well following extensive disturbances and regenerates relatively

quickly (Monsen 2004; Tilley and Pickett 2019); it is not difficult to establish by direct seeding, rearing, or transplanting growing quickly and attaining a mature stature in 3 to 5 years (Monsen 2004). This is the dominant sagebrush species representative of the ecological system that accounted for approximately 93.1 percent of the analysis area (see table 3-41); therefore, reclamation is expected to be successful and timely in restoring native vegetation cover. The EPMs regarding revegetation mentioned previously will support reclamation success.

Issue Statement #3: Would fugitive dust from construction and operations activities affect plant productivity in the analysis area?

Fugitive dust from vehicle traffic associated with construction and maintenance activities would be a potential effect on nearby plant communities because fugitive dust has the potential to affect photosynthetic rates and decrease plant productivity.

Prior to the start of construction, a Fugitive Dust Plan would be prepared pursuant to Wyoming Air Quality Standards and Regulations (AQ-1). Unpaved access roads and disturbed areas where construction activities are occurring, including temporary laydown areas, would be treated with water or other surfactants as frequently as necessary to further control fugitive dust (AQ-2).

The overall impact to vegetation from fugitive dust would be localized along access roads and would be reduced once construction activities were completed, occurring only occasionally during maintenance activities.

3.14.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the resource would occur from the Project and the existing conditions and trends for the resource would continue.

3.14.6 Vegetation Conclusion

Construction activities would remove vegetation and disturb soils, increasing the potential for noxious and invasive plant species establishment. Measures to monitor (VEG-6) and treat (VEG-7) noxious and invasive species would minimize this risk. Following construction, 88 percent of disturbed vegetation would be reclaimed, and an additional 11 percent of disturbed vegetation would be reclaimed during decommissioning. Reclamation is expected to be successful in restoring native vegetation cover based on the primary vegetation types in the analysis area and through the implementation of best practices such as the Reclamation Plan, Weed Management Plan, and other relevant EPMs. Fugitive dust from vehicles would affect plants growing in localized areas along access roads, and effects would diminish with the end of construction, occurring only occasionally during O&M. Based on this analysis, no significant impacts would be anticipated for vegetation.

3.15 Wetland and Water Resources

Wetland and water resources includes information on surface water resources (including wetlands) that could be potential waters of the U.S. (WOTUS), riparian areas around the surface waters, and groundwater resources. This section does not focus on impacts to aquatic wildlife, which is discussed in section 3.4, "Aquatic and Terrestrial Wildlife and Special-Status Species." This section describes the existing context of the water resources environment and assesses the potential impacts from the construction and operations of the Project.

3.15.1 Regulatory Background

3.15.1.1 Federal Regulations

Clean Water Act

The CWA establishes a structure to regulate pollutant, dredged, or fill material discharges into WOTUS. Section 404 of the CWA provides the Army Corps of Engineers (ACE) jurisdiction to regulate potential WOTUS. Wetlands are defined in 33 CFR 328(e). Jurisdictional wetlands are “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR 328(e)). ACE jurisdiction in nontidal surface WOTUS is determined by the ordinary high water mark (OHWM), which is defined as the “line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 CFR 328(e)).

On January 23, 2020, the EPA and ACE, per EO 13788, finalized the Navigable Waters Protection Rule, which identifies four categories of waters that are federally regulated under the CWA and would be considered jurisdictional WOTUS:

1. Territorial seas and traditional navigable waters.
2. Perennial and intermittent tributaries to territorial seas and navigable waters.
3. Certain lakes, ponds, and impoundments of jurisdictional waters.
4. Wetlands adjacent to other jurisdictional waters.

Under this EO, ephemeral features, groundwater, most farm and roadside ditches, and artificial lakes and ponds are not jurisdictional WOTUS. Implementation timing of this final rule is uncertain because of legal challenges.

Permits under Section 404 of the CWA that address construction impacts to WOTUS include either a nationwide permit or an individual permit. Impacts over 0.5 acre or over 300 linear feet of stream bank require an individual permit.

Consistent with Section 401 of the CWA, applicants for a Clean Water Act Section 404 permit in Wyoming must obtain a Clean Water Act Section 401 Water Quality Certification from the WYDEQ Water Quality Division. The certification and any associated conditions ensure that discharges comply with Wyoming’s Surface Water Quality Standards. WYDEQ may waive, grant, or require an individual certification, depending on the type of permit and surface waterbody associated with the discharge. The permit process timeline is part of the permitting timeline for the Section 404 permit application process to ACE. If an individual Section 401 permit is required, WYDEQ conducts a separate public notice and comment period prior to issuing the Section 401 certification.

Per 10 CFR 1022.24(c), WAPA must follow DOE regulations to coordinate with the relevant Federal agency for proposed actions in wetlands or floodplains to determine if assessments are necessary for WAPA actions. During the environmental review process, they must coordinate with appropriate agencies to establish procedures and responsibilities.

3.15.1.2 State Regulations

Wyoming Department of Environmental Quality

WYDEQ WQD is responsible for administering Sections 305(b) and 303(d) of the CWA in Wyoming. Section 305(b) of the CWA requires states to describe the water quality condition of their waters, including designated use determinations. Section 303(d) of the CWA requires that a state develop a listing of waters that do not fully support existing or designated uses and, therefore, require development of a total maximum daily load to restrict the pollutant of concern from entering the waterbody and help improve its water quality. Wyoming Water Quality Rules and Regulations and the Wyoming Environmental Quality Act provide the WYDEQ primary jurisdiction over the quality of waters of the state. In accordance with Wyoming Water Quality Rules and Regulations, Chapter 1, Section 23(c)(ii), the WQD administrator may authorize temporary increases in turbidity above the numeric criteria. Wyoming Water Quality Rules and Regulations, Chapter 4, also requires that the WQD be notified of any oil or hazardous substances that have been released and that enter, or threaten to enter, waters of the state.

Wyoming has been delegated permit authority for the National Pollutant Discharge Elimination System. The WYDEQ WQD is the State agency responsible for regulating the Pollutant Discharge Elimination System program in the State of Wyoming (WYPDES). Construction activities that disturb between 1 and 5 acres, or less than 1 acre if part of a plan of development, require a WYPDES Small Construction General Permit. Construction activities that disturb 5 or more acres of land require a WYPDES Large Construction General Permit under Section 402 of the CWA. A Large Construction General Permit also requires a complete SWPPP.

Both the WYPDES large and small construction stormwater permits now cover discharges from construction dewatering if those discharges are accumulated stormwater with only minor amounts of groundwater.

Wyoming Wetlands Act

The Wyoming Wetlands Act is a notification program for draining wetlands larger than 5 acres. It applies to any “naturally occurring or man-made wetland, or any series thereof, which has an area comprising five acres or more.” The act requires that a party wishing to drain a wetland submit the appropriate paperwork to WYDEQ. There is no application or approval process. The act also established a mitigation banking program. If a party fails to comply with the notification requirement, he or she may not take advantage of the banking program (W.S. 35-11-301 to 35-11-313).

General Permit for Wetland Mitigation

The WYDEQ WQD is also responsible for isolated wetlands (wetlands not under CWA Section 404 jurisdiction) and could require a general permit if isolated wetlands are disturbed by Project construction. Under the WYPDES program, this general permit for isolated wetlands mitigation authorizes the discharge of fill or dredge material into (1) naturally occurring isolated wetlands or (2) man-made isolated wetlands used to mitigate the loss of naturally occurring wetlands. This permit applies to the loss or destruction of greater than 1 cumulative acre of isolated wetland habitat for a total project. Coverage under this permit would require a mitigation plan to offset the loss of wetland functions and values such that Project activities result in no net loss of wetlands.

Wyoming State Engineer’s Office Water Permits

The Surface Water and Engineering Division of the SEO is responsible for reviewing permit applications for any request for putting surface waters of the State to a beneficial use. In Wyoming, water could be appropriated from an existing right holder, such as a municipal water source, in accordance with a Temporary Water Use Agreement between the water user and water right holder (W.S. 41-3-110). This

contract must identify the source of the water, the amount of the appropriation, and the proposed temporary use, and is subject to approval by the Wyoming SEO. The duration of the temporary water use may not exceed 2 years, at which point a new agreement is required.

Development of new water supply wells requires an applicant to obtain an approved Permit to Appropriate Ground Water from the Groundwater Division of the Wyoming SEO prior to the commencement of any drilling or completion activities (W.S. 41-3-930).

If an applicant for an ISC Permit plans to construct a facility that would use more than 800 acre-feet (260.7 million gallons) of water per year, the applicants must submit a water supply and water yield analysis to the Wyoming SEO. The State Engineer then reviews the analysis to “render a preliminary opinion as to the quantity of water available for the proposed facility.” This preliminary opinion is made available for public comment prior to preparation of a final opinion. The State Engineer’s final opinion is binding on the ISC (W.S. 35-12-108).

In addition to issuance of water permits, the Wyoming SEO is also responsible for review of water-related activities in the Platte River Basin of Wyoming that have a Federal nexus and could be subject to consultation under Section 7 of the ESA. This involves review of the proposed activity and a depletions analysis, if necessary, to determine whether the Project qualifies for coverage under the Wyoming Depletions Plan.

Construction Dewatering Permit

Both the WYPDES large and small construction stormwater permits cover discharges from construction dewatering if those discharges are accumulated stormwater with only minor amounts of groundwater (WYDEQ 2020b). Discharges that have a significant groundwater component and that are pumped or siphoned to a storm drain or could reach a surface water of the state, directly or by overland flow, are considered a process wastewater and must be covered under a separate WYPDES permit for wastewater discharges. In general, most short-term construction dewatering discharges to storm drains or surface waters could be covered under a general permit specifically written for short-term, temporary discharges. If construction site water would be applied to the land surface so that it would not run off to surface waters, the local District Engineer would need to determine if a Land Application Permit is required.

3.15.1.3 Local Regulations

Floodplain Development Permit

The Albany County Flood Damage Prevention Ordinance guides development and protection of property in floodplains within Albany County. The basis for establishing the areas of special flood hazard are the Flood Insurance Rate Maps provided by the Federal Emergency Management Agency (FEMA). The ordinance requires that a Floodplain Development Permit be submitted to the County containing an elevation certificate provided by a licensed engineer stating that the structure’s lowest floor has been elevated to 1 foot above base flood elevation.

This permit is required for Project structures and buildings located within a floodplain zone on privately-owned lands. Wind Energy Conversion Systems siting approval is required prior to submittal of a Floodplain Development Permit.

3.15.2 Data Sources

Data used to characterize the baseline and analyze the impacts to wetlands and water resources from the Project include the following sources:

- EPA ecoregions
- USGS water gauging stations
- WSGS Platte River Basin Water Plan Update
- Wyoming SEO well permit database
- WYGFD scoping response letter to WAPA received January 29, 2020

Further information, research, and data to support findings of the following analysis can be found within the *Rail Tie Wind Project Surface Water and Groundwater Technical Report* (Tetra Tech 2020n).

3.15.3 Analysis Area

The analysis area for wetland and water resources includes the siting corridors plus a 300-foot buffer around surface waterbodies (including wetlands) and areas where groundwater is shallow enough to be reached by the depth of disturbance. Potential Project impacts are not anticipated to affect impaired reaches downstream due to limited and localized Project disturbance, and therefore the analysis area does not include impacts to downstream resources outside of the analysis area other than potential depletions to the Platte River system.

3.15.4 Baseline Description

3.15.4.1 Surface Water

The hydrology of the analysis area is typical of the mountainous high plains of Wyoming (ERM 2010b). Water is stored as snowpack and released throughout the year from mountain headwaters. Snowmelt runoff peaks in May through July. Rainfall comprises a small component of overall streamflow. Many of the streams in the analysis area are ephemeral and intermittent streams, indicating that base flow and rainfall-driven streamflow are low. The average annual precipitation for the area is approximately 11 inches, the wettest months being May and June (NOAA 2020b). Average total snowfall for the area is 4.17 feet (NOAA 2020b).

The Project boundary has two main drainages, one that drains to the North Platte River and one that drains to the South Platte River. The two watersheds in the Project boundary are the Laramie River-Harney Creek watershed (HUC 1018001004) and the Dale Creek watershed (HUC 1019000704) (Tetra Tech 2020n). The Laramie River-Harney Creek subbasin is part of the Upper Laramie River subbasin (HUC 10180010). The Laramie River, the subbasin's major drainage, drains north into Wyoming from its headwaters within the southern Medicine Bow Mountain Range in Colorado, ultimately draining into the North Platte River. The Dale Creek subbasin is part of the Cache la Poudre subbasin (HUC 10190007). Its major drainage, the Cache la Poudre River, drains east across northern Colorado from its headwaters along the Front Range, and ultimately drains to the South Platte River. The North Platte and South Platte Rivers join to form the Platte River, which in turn empties into the Missouri River, the Mississippi River, and, ultimately, the Gulf of Mexico.

Surface Water Quantity and Quality

The Project boundary does not have surface water gauging stations for flow. The nearest USGS gauging station is at the Colorado-Wyoming state border at Sand Creek (No. 06659580), which had flow ranges from 1 cubic feet/second to 127 cubic feet/second. Tetra Tech (2020n) used this gage station in their Surface Water and Groundwater Technical Report as the best representative data for water quantity in the Project Area.

The nearest USGS gage does not measure water quality, and WDEQ has not assessed surface water quality standards attainment in the Project Area as part of its biennial Clean Water Act Section 305(b) and 303(d) Integrated Report. Previous field investigations described in the Surface Waters Assessment Report for the Hermosa West Wind Farm Project (ERM 2010b) noted channel downcutting at portions of Government Creek, Forest Creek, Willow Creek, and Fish Creek.

Wetlands and Surface Waters

Tetra Tech (2020n) performed a desktop analysis and field reconnaissance of wetland and surface water features that could be impacted by the Project, including those that could potentially be considered WOTUS and nonjurisdictional waters. FWS National Wetlands Inventory and USGS National Hydrography Dataset data were used to guide field reconnaissance surveys for potential wetlands and stream features, respectively. Though wetlands were not formally delineated, potential wetlands were mapped following methodology described in the Corps of Engineers Wetlands Delineation Manual (ACE 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0; ACE 2010), and A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-Perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States (ACE 2014). Approximately 67.5 acres of wetlands were mapped within the siting corridors: 30.1 acres of freshwater emergent wetlands, 25.2 acres of freshwater forested/shrub wetlands, and 12.2 acres of palustrine shrub wetlands. The wetlands are mostly associated with stream features and their tributaries.

Stream features and other waterbodies were mapped based on the presence of an OHWM. Centerlines of stream features with an OHWM of less than 10 feet were mapped, and stream features were classified based on flow regime. During the field reconnaissance, 38,382.7 linear feet of streams were mapped within the siting corridor: 2,109.6 linear feet of perennial streams, 4,022.2 linear feet of intermittent streams, and 32,250.9 linear feet of ephemeral streams.

Hydric Soil

Hydric soils are indicative of the presence of a wetland. Hydric soils form under saturated conditions, flooding, or ponding for a long enough period in the growing season to develop anaerobic conditions in the upper portions of the soil. NRCS Web Soil Survey indicates five hydric soil map units are present (Table 3-43) within the siting corridors. Most of these soils are in siting corridors in the northeastern and southwestern portions of the Project Area.

Table 3-43. National Resources Conservation Service Hydric Soil Types within the Siting Corridor

Soil Map Unit Name	Soil Map Unit Symbol	Landform	Acres
Canburn loam, 1 to 4 percent slopes	132	Flood plains	22.1
Dalecreek-Kovich complex, 0 to 9 percent slopes	149	Flood plains, drainageways	31.4
Hapjack-Rogert-Amesmont complex, 3 to 25 percent slopes	172	Mountain slopes	1,720.6

Soil Map Unit Name	Soil Map Unit Symbol	Landform	Acres
Rogert-Lakehelen-Rock outcrop complex, 8 to 40 percent slopes	219	Mountains, mountain slopes	1.6
Silas, gravelly substratum-Vensora loams, 0 to 6 percent slopes	227	Mountain slopes	121.0
Total			1,896.7

Source: NRCS (2019).

Floodplains

Tetra Tech (2020n) reviewed FEMA Flood Insurance Rate Maps to assess floodplains within the Project Area. Approximately 15.8 acres of the siting corridors are in the 100-year floodplain (1 percent annual chance flood hazard) and are in the northeastern portion of the Project Area. These areas are associated with Pump Creek, Dale Creek, and their tributaries in that area. However, no aboveground structures are sited within these floodway areas (Zone AE; FEMA 2011). Wind turbines are generally sited in areas of higher elevation to increase the potential for intercepting strong(er) winds and are not sited within floodplains.

3.15.4.2 Groundwater

Aquifers

The analysis area is located within the Casper groundwater system, which recharges through local precipitation. The direction of groundwater flow is generally from east to west. Within the Project Area, there are three sub-aquifers: the Late-Paleozoic Aquifer and the Quaternary Aquifer in the northwest, and the Precambrian Aquifer system in the southern and eastern portions (Taucher et al. 2013). The Late-Paleozoic Aquifer can reach thicknesses of approximately 1,000 feet in the western portion of the Project Area, whereas the Quaternary Aquifer has a thickness less than 50 feet.

No municipal or community supply wells have been identified in the analysis area. Groundwater wells for domestic use and livestock are common in the analysis area; Tetra Tech (2020n) identified 40 wells with these uses. Twenty-seven of the wells report a static water depth of 10 feet or less, showing shallow groundwater within the analysis area. Wells within the northeastern portion of the analysis area generally report water depths of 0 to 10 feet below ground surface (bgs), wells located in the southern and western portion have water depths between 10 to 20 feet bgs, and there are a few wells with water depths reported from 20 to 50 feet bgs.

Groundwater quality varies within the analysis area but tends to have high total dissolved solids (Taucher et al. 2013). Because the aquifers in the Project Area are relatively shallow, they are categorized as highly sensitive to contaminants (e.g., pesticide, herbicide, spills).

Springs

There are five mapped springs where groundwater discharges to the surface in the Project Area (Tetra Tech 2020n). The springs are in the southern and western portions of the Project Area.

3.15.5 Impacts to Resource

This section describes potential impacts to wetland and water resources associated with construction, O&M, and decommissioning of the Project.

3.15.5.1 Impact Indicators

The following impact indicators were assessed to determine expected impact to wetland and water resources from construction, O&M, or decommissioning of the Project:

- Waterbody crossings, ground disturbance, hydric soils, or highly erodible soils in analysis area that could lead to soil and contaminant transport via wind or stormwater runoff to water resources.
- Foundation excavation for turbine pads deep enough to alter aquifer connectivity.
- Decrease in flow or volume (i.e., depletion) for waterbodies within the analysis area and/or the Platte River Basin.
- Groundwater-contaminating activity distances from water resources within the analysis area.
- Depth of blasting or foundational activities relative to depth to groundwater within the analysis area.

3.15.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to wetland and water resources:

- Temporary and permanent uses of the Project were evaluated to determine the extent to which existing waterbodies (i.e., streams, lakes, wetlands) would be prone to disturbance.
- Depth of confined aquifers were reviewed to determine if subsurface-disturbing activities are deep enough to potentially connect aquifers.
- Temporary and permanent uses of the Project were evaluated to determine the extent to which the flow and/or volume of water in the Platte River Basin would be restricted or reduced.
- Temporary and permanent storage and use of chemicals for the Project were reviewed to determine the potential risk of contamination for existing surface water and groundwater sources within the analysis area.

3.15.5.3 Proposed Action

Issue Statement #1: How would surface-disturbing Project activities associated with the Project lead to increases in sedimentation of a waterbody or degradation of surface water quality?

The analysis area for surface water resources includes the siting corridors plus a 300-foot buffer. Although 3.85 percent of the Project Area is already on disturbed land, surface-disturbing activities associated with the Project could lead to increases in sedimentation of adjacent and downstream waterbodies within the analysis area or degradation of surface water quality from transport of disturbed soils by wind or water. This would be most likely to occur where access roads, crane paths, and buried collector lines cross streams and wetlands because erosion could be exacerbated during construction. Because electrical lines would span streams and wetlands, they are not expected to contribute to increases in sedimentation. Additionally, compaction of soils along roads and turbine pads may reduce infiltration of stormwater to subsurface depths within the Project Area, leading to increased flows across soil surfaces and potentially altering the timing and magnitude of runoff. Disturbed soils could also reach surface water during stormwater events where vegetation has been removed and soils are destabilized and are easily washed into streams and waterbodies. This runoff can increase turbidity and salinity and lead to water quality degradation, which may be further magnified by areas of compacted soils, increased runoff, and therefore greater transport capacity.

ConnectGen has committed to design and construct access roads to minimize disruptions of natural drainage patterns that lead to increased erosion (WQ-7) and to implement a SWPPP (WQ-8) to protect water quality. Stream protection measures would include using open-bottom culverts to avoid altering stream morphology or removing suitable fish habitat, avoiding the disturbance of steep banks, low-water crossings, and crossing streams perpendicularly to reduce potential for erosion (WQ-11). During construction, excavated material would not be stockpiled near stream banks, ponds, or other watercourse perimeters (WQ-12), and erosion-control barriers would be used (WQ-6) to minimize sediment transport to surface waters. Immediately after construction needs, disturbed ground surfaces would be reclaimed and restabilized by native vegetation (VEG-2) as outlined by the Reclamation Plan that will be developed prior to the start of construction (VEG-1).

Special consideration is given to WOTUS protected under the CWA (section 3.15.1.1, “Federal Regulations”). Several of the ephemeral waterbodies within the siting corridors could be considered non-WOTUS by the ACE and jurisdictional status would need to be determined. If WOTUS could be impacted, ConnectGen would complete a formal WOTUS delineation prior to construction and would use these results to further microsite the Project to avoid or minimize potential impacts to jurisdictional WOTUS, to the extent practicable, and support final CWA Section 404 and EO 11990 permitting requirements (WQ-5).

Based on an evaluation of the representative project layout (i.e., representative physical footprint of all Project facilities that may be necessary for the Project) and the results of field reconnaissance (Tetra Tech 2020n), the Project would include 109 stream crossings for collection lines, crane paths, and access roads within the siting corridors, totaling 6,653.6 linear feet of stream crossing. Of these stream crossings, seven are perennial and 102 are ephemeral or intermittent. Of the seven perennial stream crossings, five (247.9 linear feet) would be for crane paths that would be reclaimed following construction, and two (206.7 linear feet) would be for collection lines that would require installation by trenching and would remain in place during operations.

Of the 102 ephemeral/intermittent stream crossings, 12 (1,526.0 linear feet) would be for crane paths and turbine construction disturbance areas that would be reclaimed following construction, and 96 (5,409.1 linear feet) would be for access roads and collection lines that would be installed during construction and would remain in place during operations. One of the 109 stream crossings (0.01 percent) is along an existing access road that could require modifications to ensure that Project safety standards are met and to reduce erosion potential. The distance associated with each stream-type crossing is detailed in table 3-44. Ephemeral and intermittent streams are dry for much of the year because they only flow after precipitation events or during seasons with high runoff and/or groundwater levels.

Erodibility risk analysis indicates high potential for erosion at stream crossings: 96.7 percent of soils (2,786.5 acres) in the analysis area display a moderate erodibility risk and 0.8 percent (22.1 acres) of soils display a severe erodibility risk (2.5 percent [72.6 acres] were not rated) (see figure 3-18). However, only 1.34 percent (22.1 acres) of Project infrastructure is proposed in areas that overlap soils with severe erodibility risk and the Project is anticipated to disturb only a small proportion of the overall watersheds within the Project Area (only 7,924.1 linear feet). Anecdotally, previous field investigations described in the Surface Waters Assessment Report for the Hermosa West Wind Farm Project were conducted for a different project encompassing approximately half of the Project Area, and results noted in the Surface Waters Assessment Report detailed that that project was not expected to contribute marked changes in sediment load (ERM 2010b). Though the EPMS included in the Surface Waters Assessment Report are not applicable to this Project, EPMS proposed for this Project have been shown to reduce sedimentation and erosion (e.g., culverts [Morris et al. 2016]; low-water crossings [Gautam and Bhattarai 2018]; and erosion control barriers [WYDOT 2020c]). Additionally, the Project will implement a SWPPP (WQ-8) and support final CWA Section 404 and EO 11990 permitting requirements (WQ-5), which will ensure

that erosion inspections and monitoring will occur to inform management of potential Project impacts to surface water quality. The overall impact of the Project to surface water quality and sedimentation is low due to minimal overall ground disturbance and surface water crossings within the watersheds and implementation of effective EPMs.

Table 3-44. Surface Water Crossings within the Siting Corridors

National Hydrography Dataset Flowline Type/Infrastructure Type/Crossing Type	Project Phase	Number of Crossing Types	Length of Crossing (linear feet)
Perennial Stream/River		7	454.6
Crane path	Construction only	5	247.9
Collection line	Construction and operations	2	206.7
Ephemeral/Intermittent Stream/River		102	6,198.9
Crane path	Construction only	6	789.8
Turbine construction disturbance area	Construction only	6	736.2
Access road	Construction and operations	64	2,566.7
Collection line	Construction and operations	26	2,106.2
Total		109	6,653.6

Source: Tetra Tech (2020n).

Issue Statement #2: How could belowgrade disturbing activities affect groundwater connectivity and availability?

The analysis area for groundwater resources includes any depth that could reach groundwater resources. Project belowgrade-disturbing activities, such as disturbance for turbine foundations and newly drilled wells, could alter groundwater connectivity. These activities could unintentionally partition groundwater resources or impair groundwater boundaries, thereby decreasing or increasing connectivity among aquifers. Electrical collection would be buried approximately 3 to 6 feet below the ground surface and are not anticipated to intersect groundwater resources except at limited locations, such as stream crossings.

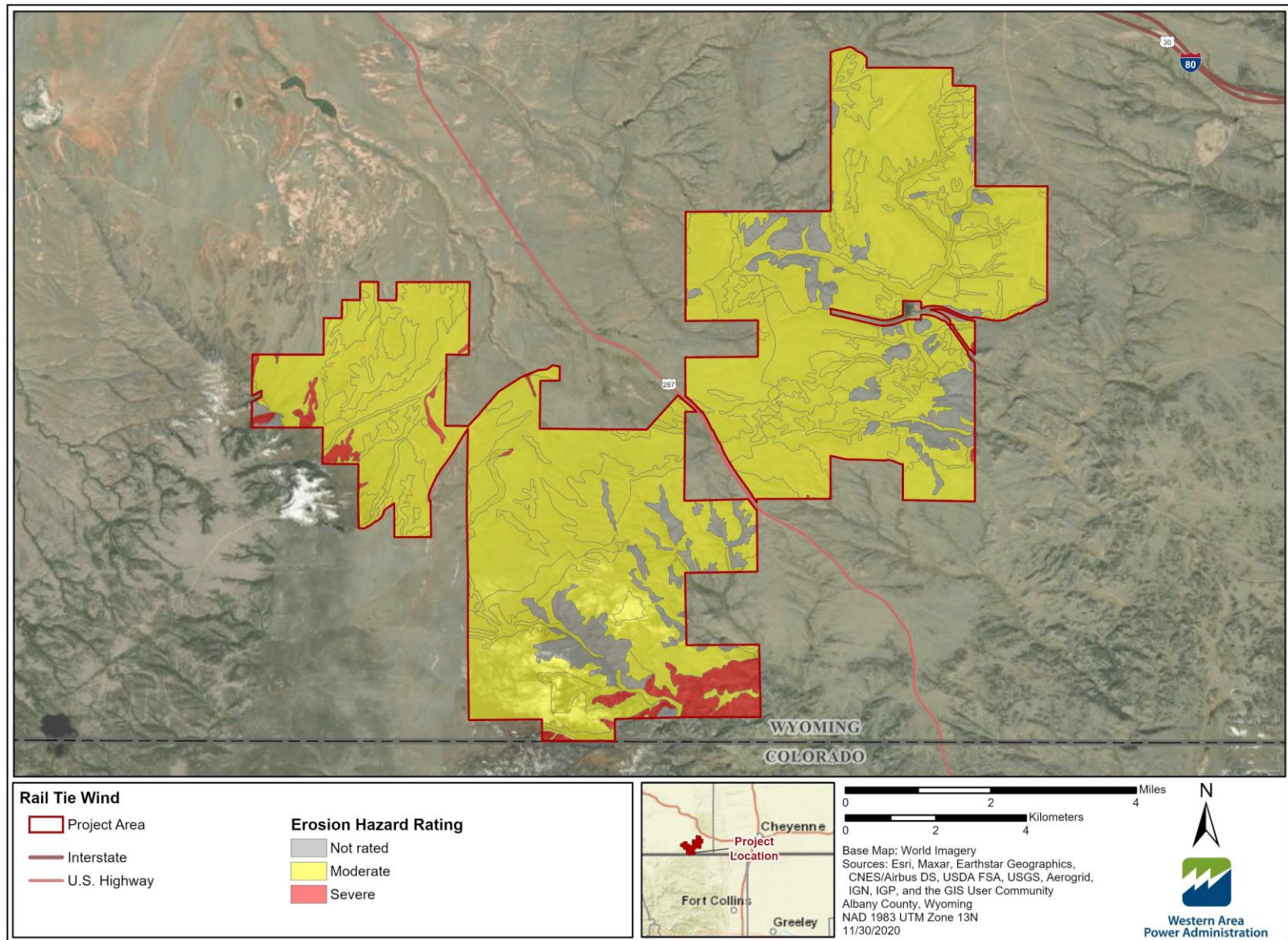


Figure 3-18. Erosion hazard rating.

ConnectGen has not committed to specific EPMs used to avoid disturbances to groundwater connectivity. But Wyoming groundwater data indicate that the aquifers do not overlap in the siting corridors; therefore, the surface-disturbing activities would not connect aquifers. Additionally, well bores are generally small in diameter (0.17–1.0 feet) and would not likely impact groundwater connectivity. Belowgrade-disturbing activities would also not likely impact groundwater availability, such as aquifer recharge or discharge. Aquifers in this area recharge quickly (ERM 2010b) at a rate of about 75 to 150 centimeters per year; therefore, any loss in groundwater availability would likely be inconsequential. If dewatering needs to occur for foundation excavation, activities must adhere to WYDEQ dewatering regulations.

Issue Statement #3: How would surface- and subsurface-disturbing Project activities affect sedimentation or the hydrology of wetlands? What is the net loss of wetland areas?

The analysis area for wetland resources includes the siting corridors plus a 300-foot buffer. Surface- and subsurface-disturbing activities associated with the Project could lead to sedimentation or chemical enrichment of wetlands or alteration of wetland hydrology. This occurs most frequently at wetland crossings where erosion could be exacerbated or wetland connectivity altered and during stormwater events where vegetation has been removed, destabilized, and is easily washed into wetlands. This runoff could increase turbidity, salinity, and lead to wetland water quality degradation. Additionally, chemical enrichment caused by materials introduced during construction (e.g., salts, nitrates, metals, etc.) may occur at wetland crossings or through stormwater transport. Similar impacts may occur in areas of disturbance to shallow groundwater flows, including alluvial flows and/or groundwater-dependent ecosystems and supporting hydrology, such as hydric soils, that may be connected to wetland hydrology within the Project Area.

ConnectGen would design the Project to avoid wetlands to the extent practicable, to utilize existing water crossings when possible, and continues to change Project design to further avoid and minimize impacts to wetlands (WQ-1). ConnectGen has also committed to the conservation of natural woody material associated with wetlands (WQ-2), use of wooden construction matting within disturbed wetlands, establishing erosion-control barriers (WQ-6), signage and flagging to identify wetland boundaries (WQ-4), and restricting the access of vehicles and construction equipment in the disturbed area and wetland buffer (WQ-3). All construction crossings would be removed and immediately reclaimed post-use, minimizing the potential for impacts to wetlands. ConnectGen has also committed to implementing a SWPPP (WQ-8) to minimize stormwater runoff from reaching wetland resources adjacent to or downstream of the Project Area, including stockpiling excavated material away from wetlands (WQ-12) and using erosion-control barriers (WQ-6) to minimize sediment transport to surface waters. If any wetlands are considered WOTUS and a preconstruction notification is needed, ConnectGen would address minimization, restoration, and mitigation in the notification permitting process. ConnectGen would secure the Federal and State permits as needed (WQ-5). EPMs described in Issue Statement #5 below will be implemented to further reduce the potential for chemical enrichment to wetlands and associated hydrology.

The analysis area crosses a total of 9.9 acres of wetlands (table 3-45). Most of these wetland features are associated with the named streams and tributaries in the Project Area. Temporary construction access roads would cross 4.6 wetland acres, electrical connection lines would cross 3.1 wetland acres, crane paths would cross 1.9 wetland acres, and turbine construction footprints would overlap 0.4 wetland acre. Project operations access roads would cross 0.8 wetland acre. The wetlands crossed by the siting corridors are detailed in table 3-45. The Project is located within the Laramie River-Harney Creek and Dale Creek subbasins that are hydrologically connected to the North and South Platte Rivers (Traditional Navigable Water) downstream; therefore, these wetlands could be considered WOTUS and subject to CWA Section 404 regulations. Impacts to wetlands are anticipated to exceed 0.5 acre. If Project impacts result in dredge or fill activities in wetlands or waterbodies, ConnectGen will comply with Section 404 permitting requirements for any potential impacts to wetlands and/or WOTUS.

Potential surface or subsurface impacts to shallow groundwater resources and/or groundwater-dependent ecosystems and supporting hydrology, such as hydric soils, that are connected to wetlands are not anticipated. Non-turbine related Project activities are expected to occur on 599.6 acres with depths to groundwater of 0 to 10 feet. Turbine siting corridors occur on 4,427.7 acres with depths to groundwater of 0 to 10 feet. These are only 2.3 percent and 17 percent of the Project Area, respectively, and are not anticipated to cause measurable disturbances to groundwater, groundwater-connected or -dependent systems, or those connected to wetlands. The majority of turbine siting corridors, which may be associated with the greatest amount of subsurface disturbance, have been sited in high spots away from subsurface water resources with depths to groundwater of 10 to 50 feet, and are therefore not anticipated to impact shallow subsurface flows and/or groundwater dependent ecosystems and supporting hydrology such as wetlands. Additionally, only 2.2 percent (1.9 acres) of the Project Area occurs on hydric soils; 1.4 acres of hydric soil overlap with open water and 0.5 acre overlap with palustrine emergent wetland, both of which are water resources that will be avoided or impacts minimized using EPMs described above. It is unlikely that Project activities will have a measurable impact on wetlands through water resources found in hydric soils.

Table 3-45. Wetland Disturbance by Wetland Type and Project Stage

Wetland Type	Construction Disturbance (acres)	Operations Disturbance (acres)
Freshwater emergent	5.3	0.6
Freshwater forested/shrub	3.0	0.2
Freshwater pond	0.5	0.0
Riverine wetlands	1.1	< 1.0
Total	9.9	0.8

Source: Tetra Tech (2020n).

Fens are peat-forming wetlands that are inundated for most of the year and have soils rich in total organic carbon. They are considered “unique and irreplaceable” and a “Resource Category 1” with a mitigation goal of “no loss of existing habitat value” by the FWS Region 6 (FWS 1999). Wetlands with fen characteristics were identified during field delineation surveys (Tetra Tech 2020n). Approximately 1.7 acres of potential fen wetlands were delineated within the construction disturbance footprint, and 0.2 acre of potential fen wetlands were delineated within the operations disturbance footprint. ConnectGen would identify wetland boundaries, including fen wetlands, on construction plans and flag in the field to avoid and minimize adverse impacts during construction (WQ-1 and WQ-4).

Issue Statement #4: How would water withdrawals for Project use affect water quality and surface water flows (particularly depletions in the Platte River Basin) and availability and/or groundwater volumes or availability?

Project-related water withdrawals could reduce the volume of surface water and, thereby, alter surface water resource flow and velocity. Decreases in surface water volume could impact surface water quality by increasing retention time, temperature, the potential for stagnant water, concentration of dissolved and suspended solids, and eutrophication.

Though the geological source for Project-related water use has not yet been determined, ConnectGen has identified that it would come from existing or new groundwater wells within or proximate to the northwest Project site within the “Green Area” (water resources that do not connect to the South Platte system) or purchased from an off-site source in Albany County to avoid any depletions to the Platte River system (Kuba 2020; Cowley 2020). Water for Project use would be drawn from a permitted source(s) and would not exceed the permitted amount; therefore, no additional depletions associated with the Project to local groundwater resources are anticipated. ConnectGen would consult with the Wyoming SEO prior to

finalizing groundwater use sources, including the drilling of any new groundwater wells (WQ-14). ConnectGen has conservatively estimated that water consumption for the Project will not exceed 200 acre-feet during the 18-month construction period, and 2 acre-feet per year during operations.

Issue Statement #5: What Project activities increase the risk of surface or groundwater contamination from spills, pesticide use, or other chemical storage and use?

Project equipment refueling and storage and use of hazardous materials and pollutants, such as oil, fuel, hydraulic fluid, herbicides, and even metals, pose a risk to surface and groundwater quality. Spills, metal use and corrosion, or herbicide use too close to water resources could flow directly into water resources, and stormwater events could wash contaminants from spills or herbicide application downslope to surface waters or increase vertical flow to groundwater. These events may also affect shallow aquifers, which are sensitive to salts and metals that may be introduced to the water table through infiltration following surface disturbance and construction.

ConnectGen has committed to performing construction activities that would prevent accidental spillage of contaminants to water resources (WQ-9). Equipment would be parked and maintained outside of wetland boundaries (WQ-5) to avoid the potential for direct spills. Water quality BMPs would also be implemented at waterbody crossings to minimize contamination of water resources (WQ-13). A SWPPP would be implemented to further minimize the potential for spills and herbicides to flow into water resources (WQ-8). Herbicides would be applied per label instruction and follow Federal, State, and local laws to avoid impacts to water quality (VEG-8).

For hazardous materials stored on-site, ConnectGen has committed to avoiding storage locations in potentially sensitive areas (HAZ-2) and would use secondary containment (HAZ-3). Prior to construction, a Spill Prevention Control and Countermeasure Plan would be developed, and trained spill containment crews would respond to accidental releases or spills (HAZ-5). Per Wyoming Water Quality Rules and Regulations, Chapter 4, the WQD would be notified of any oil or hazardous substances that have been released and that enter, or threaten to enter, waters of the state.

The surface and groundwater resources within the analysis area that could be impacted by contaminants are described in the Impact Statements 1, 2, and 3 above.

Issue Statement #6: Will groundwater be contaminated from wind turbine generator foundation construction?

Excavation of wind tower foundations could potentially increase groundwater exposure to spills in or near the disturbance area. The siting corridors intersect known aquifer boundaries with water depths of <40 feet bgs; the turbine corridor has approximately 5,000 acres where boring could occur. ConnectGen has committed to performing construction activities that would prevent accidental spillage of contaminants to water resources (WQ-9). Equipment would be parked and maintained away from water resource boundaries (WQ-5) to avoid the potential for direct spills. ConnectGen would implement a SWPPP (WQ-8) to reduce potential contaminants from flowing into (surface and ground) water resources. Potential Project impacts to groundwater are described further in Impact Statements #2 and #4, above.

3.15.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to wetland and water resources would occur from the Project and the existing conditions and trends for the resource would continue.

3.15.6 Wetland and Water Resources Conclusion

Previous field investigations described in the Surface Waters Assessment Report for the Hermosa West Wind Farm Project noted that that project was not expected to contribute marked changes in sediment load (ERM 2010b). The Project would not reduce water availability because Project activities would not connect groundwater aquifers and aquifers in the area have a high recharge rate. Construction would disturb approximately 9.9 acres of wetlands during construction and 0.8 acre of wetlands during operations. The Project would include 109 stream crossings for a total of 6,653.6 linear feet. Of these stream crossings, seven would be perennial and 102 would be ephemeral or intermittent. Several of the ephemeral waterbodies within the siting corridors could be considered non-WOTUS by the ACE and jurisdictional status would need to be determined. If WOTUS could be impacted, ConnectGen would complete a formal WOTUS delineation prior to construction and would use these results to further microsite the Project to avoid or minimize potential impacts to jurisdictional WOTUS, to the extent practicable, and support final CWA Section 404 and EO 11990 permitting requirements (WQ-5). ConnectGen has committed to minimizing and mitigating potential impacts to wetlands and WOTUS through use of EPMS and would comply with Section 404 permitting for any potential impacts to wetlands and/or WOTUS. ConnectGen has committed to spill containment and hazardous materials storage and use measures to minimize potential impacts to surface water and wetlands. Based on the analyses of these issues, no significant impacts would be anticipated to this resource.

3.16 Wildland Fire

This section describes the existing context and characteristics of the wildland fire environment in the Project Area, including fire history, vegetative fuel conditions, potential fire behavior and capacity for fire response, and assesses potential impacts to these resources from the construction and operations of the Project.

3.16.1 Regulatory Background

The following Federal, State, and local regulations establish requirements, standards, and guidelines related to wildland fire and are applicable to the Project:

- The National Fire Protection Association 850 *Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations* (National Fire Protection Association 2020).
- Wyoming currently enforces the National Electrical Code, 2020 Edition (Wyoming Department of Fire Prevention and Electrical Safety 2020). Provisions under this code are regulated by the Wyoming Department of Fire Prevention and Electrical Safety.

Additional information on the health and safety regulatory background applicable to the Project is included in the *Rail Tie Wind Project Health and Safety Technical Report* (Tetra Tech 2020j).

3.16.2 Data Sources

Data sources used to characterize existing (i.e., baseline) conditions and analyze wildfire ignitions include the following:

- Interagency Fuels Treatment Decision Support System web application (Interagency Fuels Treatment Decision Support System 2020)
- Academic and peer-reviewed literature sources
- State and local governmental resources

3.16.3 Analysis Area

The following analysis areas have been identified to evaluate the extent to which potential impacts from the Project could occur on wildland fire resources and conditions:

- Fire history: This analysis area includes the Project Area plus a 20-mile buffer. This extent demonstrates the variation in fire frequency and fire size on adjacent lands relative to fire occurrence in the Project Area.
- Fuels and fire behavior: This analysis area includes the Project Area.

3.16.4 Baseline Description

3.16.4.1 Fire History

Fire frequency and size are influenced by various abiotic and biotic factors, including topography, elevation, seasonal weather patterns, climate, vegetative structure and composition, fuel moisture content, and fuel loading and continuity.

Analysis in the 2019 Wyoming 3 Region Hazard Mitigation Plan (Albany County Emergency Management Agency and Carbon County Emergency Management Agency 2019), suggests that most of the Project Area is at very low, low, and moderate wildland fire potential. According to fire history records, since 2000, three fires have occurred within or on the boundary of the Project Area (table 3-46).

Table 3-46. Previous Fire History

Fire Name	Date	Fire Size (acres)	Cause
Gilbert Lake Fire	2000	150.0	Natural
Boulder Ridge Fire	2004	0.1	Natural
Dale Creek Fire	2007	1.0	Human

Fire occurrence in the Project Area has been sparse relative to adjacent lands in the wider analysis area (SWCA 2020b). Previous fire occurrence and large fire growth have been dictated by fuel composition, with larger fires being associated with timber fuels, located more than 20 miles from the Project Area.

3.16.4.2 Ignitions

In steppe landscapes throughout the Intermountain West, the frequency of lightning ignitions varies spatially and is influenced by geography (i.e., climate and weather patterns), topography, and fuel characteristics. Human-caused ignitions in sagebrush communities are generally associated with increased human activity along roads, in residential areas, or in areas frequented for recreation (Innes and Zouhar 2018).

Although risk of fire associated with wind turbines is not well documented (Uadiale et al. 2014), available data show that after blade failure, fire is the second most common cause of accidental failure in turbines. Since the 1980s, it is estimated that 10 to 30 percent of wind turbine failures are caused by fires (Firetrace International 2019). Fires in wind turbines are most often caused by lightning strike, electrical malfunction, mechanical malfunction, or issues with maintenance. Once the fire is detected, intervention is limited because almost all turbine fires occur in the nacelles and are too high for firefighting action (Hertenberger et al. 2009); firefighters often focus on limiting fire spread by removing fuels adjacent to the turbine.

Although wind turbine fires have occurred in Wyoming and caused wildfires, including the 1,600-acre Cowboy Fire in southwestern Wyoming in 2017 (Green 2017), reportedly, only one in 1,700 to 2,000 wind turbines catch fire each year globally, therefore, the potential for a single turbine to catch fire is relatively rare (less than 1 in 2,000) (Firetrace International 2019). New technology in fire trace systems that automatically detect and suppress fires in wind turbines at their source are continuously developed and improved upon to further reduce this risk (Firetrace International 2019).

3.16.4.3 Fuels and Fire Behavior

Fuels is the term given to both live and dead vegetation that is available for combustion and includes grass, shrubs, and timber. Fire behavior under existing conditions in the analysis area can be estimated based on fuel composition using fire behavior models (FARSITE, FlamMap, BehavePlus, and FireFamily Plus housed within the Interagency Fuel Treatment Decision Support System) (SWCA 2020b).

Most of the Project Area is modelled as exhibiting low fireline intensity (0–5 British thermal units/second/foot) and low to moderate flame lengths (1–8 feet), but high rates of spread (2–50 chains/hour).

3.16.4.4 Fire Response

Fire response resources for the Project Area are described in section 3.10.4.1, “Emergency Service Providers,” and in the *Health and Safety Technical Report* (Tetra Tech 2020j).

3.16.5 Impacts to Resource

This section describes the effects on wildland fire conditions and response resources from the construction and operations of the Project.

3.16.5.1 Impact Indicators

Indicators as to whether a Project-related activity would result in adverse effects on wildland fire resources include:

- increased human-caused or lightning-caused ignitions resulting from construction and operations of the Project.

The primary assumption for analyzing impacts to wildland fire resources is that all design features and EPMs would be implemented (section 2.2.6, “Environmental Protection Measures”) and would effectively minimize or mitigate wildland fire ignitions and wildland fire risk.

3.16.5.2 Methods of Analysis

The following steps were completed to analyze potential impacts to wildland fire:

- Fire history was gathered from various sources to determine previous fire occurrence, frequency of ignitions, and potential for large fire spread.
- Fuels were gathered from the LANDFIRE database and analyzed within the Project Area to provide baseline conditions for potential fire behavior in the event of an ignition.
- Fire response information is presented in section 3.10, “Public Health and Safety.”
- Scientific literature was used to inform the analysis and provide rationale for determining the effects of the Project.

3.16.5.3 Proposed Action

Issue Statement #1: Would equipment used for Project construction increase the risk of wildfire ignition?

The analysis area for fire history and ignitions is a 20-mile buffer around the Project Area. Potential construction-related effects from the Project on wildland fire ignitions include increased incidence of ignitions from vehicle and equipment use, potential ignitions from cigarettes or other ignited materials, use of construction equipment in dry areas that could spark a fire, accidental ignition of flammable liquids, and mechanical malfunction.

Although human activity and equipment use would be elevated in the Project Area, particularly during construction, the application of EPMS to address human-caused ignitions would mitigate the potential for elevated ignitions when compared to baseline conditions. Appropriate setbacks have been established between Project infrastructure and residences and public roads to provide safe distances from areas potentially occupied by members of the public. Public access to the Project Area and specific Project facilities would be restricted through existing fences, gates, or other access controls to prevent unauthorized entry and potential for ignition from the public (PHS-12).

The Project design would be constructed and operated in compliance with appropriate zoning and siting and environmental regulations (GEN-1), in addition to fire-related safety standards and regulations. Prior to the start of construction, an Emergency Response Plan, which would include response procedures for fires, would be prepared in coordination with county emergency services (PHS-13). Wildfire mitigation measures, response, and evacuation would be developed in coordination with Laramie Fire Department and Tie Siding Volunteer Fire Department (PHS-2) and would be incorporated into the Emergency Response Plan (PHS-14).

Additional measures would be implemented prior to construction of the Project and, as necessary, throughout the life of the Project, and would include worker training in emergency response and health and safety requirements and procedures, fueling of vehicles in accordance with procedures to minimize fire risks (PHS-3), PPE, operation of equipment and infrastructure in accordance with manufacturer’s parameters, and routine inspections on all Project facilities and infrastructure to identify and respond to potential fire risk (as described under PHS-15).

The electrical design of the Project would comply with Wyoming electrical safety codes and standards (Wyoming Department of Fire Prevention and Electrical Safety 2020), which include the enforcement of the National Electric Code to reduce the risk of equipment-related fires. All wind turbines and associated electrical equipment would be constructed with nonflammable material around the base of the equipment

to reduce the spread of fire if equipment were to ignite (PHS-17). All construction and maintenance vehicles would be equipped with fire extinguishers to allow timely response to equipment fires, and fire suppression equipment would be maintained in the Project Area during construction and operations (PHS-18 and PHS-19). If an on-site fire were to occur, Project personnel would alert the Laramie Fire Department and Tie Siding Volunteer Fire Department (PHS-18), in accordance with an implemented Emergency Response Plan.

Issue Statement #2 How would the Project affect future potential for and frequency of lightning-ignited wildfires?

The incidence of turbine fires globally is rare (less than 1 in 2,000) and historically, wildfire ignitions (both natural and human) have been relatively low in the Project Area, especially when compared to adjacent lands that are at a higher elevation. The Project is not expected to increase lightning frequency and the incidence of lightning-caused wildfire ignitions due to presence of infrastructure would be mitigated through the use of EPMS and design features, including lightning protection systems that would reduce the chance of fires igniting from lightning strikes (PHS-16). ConnectGen would implement a SCADA system located on-site in the O&M building (section 2.2.1.6, “Supervisory Control and Data Acquisition System”) to monitor operation of the facility. This system would be run remotely but would detect any fire occurrence impacting infrastructure and could be used to shut down operations in the event of an emergency such as a fire.

Fires occurring within the nacelle of a wind turbine would likely not be within the capabilities of the Tie Siding Volunteer Fire Department or the Vedauwoo Volunteer Fire Department; however, local firefighters would be able to keep such a fire from spreading on the ground and could confine the fire to the individual turbine site. Fires occurring within the nacelle are rare, and sensors within the wind turbine would detect interior fires and immediately shut down machinery.

3.16.5.4 No Action Alternative

Under the No Action Alternative, WAPA would not authorize the interconnection request for the Project, and the Project would not be connected to the existing WAPA transmission system. No new disturbance to the wildland fire environment would occur from the Project and the existing conditions and trends for wildfires would continue.

3.16.6 Wildland Fire Conclusion

Construction and operations of the Project would increase the potential risk of wildfire ignitions. The Project would comply with Wyoming electrical safety codes and standards, including the National Electric Code, and would implement setbacks and other measures that would mitigate this risk. Should a fire occur in the Project Area, local fire departments would respond. The incidence of turbine-ignited fires is rare, and wildfire ignitions in the Project Area are infrequent. A SCADA system would detect any fire impacting infrastructure and shut down affected systems. Local fire departments would respond to fires in the Project Area to prevent fire from spreading and extinguish them. Based on this analysis, no significant impacts to wildland fire would be anticipated.

CHAPTER 4. CUMULATIVE IMPACTS

This section considers the impacts from the Project that would overlap with other projects in both time and space.

4.1 Physical and Temporal Boundaries of Cumulative Impacts

There are several extents of physical space considered in the cumulative impacts area that generally coincide with the different analysis areas considered for the direct and indirect Project impacts. These extents are discussed below:

- The Project siting corridors are the smallest extent considered and coincide with the resources that would be affected by direct ground disturbance, such as soils, vegetation, nongame, and small game species.
- The Project Area coincides with resources that would be affected by construction and operation of the Project due to factors such as increased human presence and noise, such as big game species, land use, and public health and safety.
- An area that includes a 10-mile buffer around the Project Area coincides with the cultural resources analysis area. This area includes sites listed or eligible for NRHP Section 106 listing that could be affected through introduction of visual or other intrusions into the setting of a historic property or in alteration of the historic feeling of the property. This area also includes prehistoric, historic, or culturally significant sites identified by Native American tribes that could be affected.
- An area that includes a 30-mile buffer around the Project Area coincides with the visual resources analysis area.
- An area that includes a 50-mile buffer around the Project Area coincides with the recreation resources analysis area.

The temporal aspect of this analysis includes two distinct phases of the Project: the construction phase, which would occur during 2022 and 2023, and the operations phase, which would occur from 2023 into the future until the point in time when the Project would have served its useful life and would be decommissioned, which would be expected to be approximately 35 years.

4.2 Past and Present, and Reasonably Foreseeable Future Actions

Past and present actions in the cumulative impacts area include a diverse array of actions that cannot all be individually listed but that can generally be characterized as rural in nature. These actions consist more specifically of grazing and ranching activities; transportation developments such as county roads, highways, and railroads (and including snow management); utility development such as other wind-energy conversion projects, high-voltage transmission lines, electrical distribution lines, telephone lines, and communication towers; residential and commercial/retail developments; mining operations (kimberlite and gravel operations); and urban development within the city of Laramie.

Possible reasonably foreseeable future actions (RFFAs) were identified in the Determination of Reasonably Foreseeable Actions Considered in Cumulative Impacts Analysis process memo, dated August 17, 2020 (SWCA 2020c). Potential RFFAs were identified through an internet search, including pertinent Federal, State, and local agency and municipality websites and comments received during the public scoping period.

Three criteria are required in order for an RFFA to be included in the cumulative impacts analysis:

- 1) The future action and/or impacts from the action must spatially overlap the corresponding direct and indirect effects analysis area for the Project.
- 2) The future action and/or impacts from the action must temporally overlap the Project and/or the impacts from the Project.
- 3) The future action must be “reasonably foreseeable.” For the purpose of this EIS the interdisciplinary team considered Federal and non-Federal activities that are not yet undertaken but for which there are existing decisions, funding, or identified proposals as RFFAs.

The RFFAs included in the cumulative impacts analysis are provided in table 4-1 below.

Table 4-1. Reasonably Foreseeable Future Actions Included in Cumulative Impacts Analysis

Project	Description	Spatial Overlap	Temporal Overlap
WYDOT Pavement Rehabilitation Project I805179	A 6.23-mile pavement rehabilitation project to take place on Interstate (I) 80 between Laramie to Cheyenne. Vedauwoo West/I-80 Structure No. AXU, AXV, AXW, AXX.	Within 10-mile buffer	2022
Roundhouse Wind Energy Project	300-MW wind project, including 120 wind turbines, two substations, one O&M building, and a 19-mile 230-kV transmission line from the project substation to the Platte River Power Authority Rawhide Substation in Larimer County, CO. Built in two phases. Phase I consists of 82 wind turbines supplying 225 MW of electrical generation. Construction on Phase I of the project was completed and began commercial operation in June 2020. Phase II of the project is currently in the permit phase and is seeking an amendment to the Wyoming Industrial Siting Permit granted by the ISC. The approved permit amendment would allow for the construction of Phase II of the project, which consists of an additional 34 turbines.	Within 10-mile buffer	<u>Construction</u> Phase I: Complete Phase II: June–December 2022 <u>Operation</u> 2020–2052
Corriedale Wind Energy Project	52.5-MW wind project consisting of 21 wind turbines. Located 6 miles east of Cheyenne.	Within 30-mile buffer	<u>Construction</u> 2020 <u>Operation</u> 2021–2051
WYDOT Projects	Road work projects within the city of Laramie. Traffic system work, new roadway construction, sanitary sewer installation, pavement rehabilitation, and safety improvements.	Within 30-mile buffer	2022–2024
I-25/I-80 Interchange Project	I-25/I-80 interchange upgrades and replacement of I-25/Lincolnway interchange. Includes the construction of elevated flyover ramps, bridges, new on- and off-ramps, and realignment work.	Within 30-mile buffer	2021–2030
F.E. Warren Air Force Base Projects	Projects located at the F.E. Warren Air Force Base include the construction of a new industrial building and renovation and construction work at one of the base's entry points (gate 5). In addition, air shows are held at the base in summer.	Within 30-mile buffer	2020–2022

Project	Description	Spatial Overlap	Temporal Overlap
High Plains and McFadden Ridge Wind Energy Project	The project consists of 125 wind turbines and was constructed in three phases. The third phase of the project is expected to be in operation by the end of 2020.	Within 50-mile buffer	<u>Construction</u> 2008–2020 <u>Operation</u> 2010–2035
Two Rivers and Lucky Star Wind Project	The project will be developed in two phases: the Two Rivers Wind Phase and the Lucky Star Wind Phase. The Two Rivers Wind Phase comprises the development of four wind generation facilities (Two Rivers I, II, III, IV). The Two Rivers Phase IV and Lucky Star Wind Phase are located within the 50-mile buffer; the remainder of the project is outside the buffer. Two Rivers Phase IV is a proposed 280-MW facility and would include up to 77 wind turbines. Lucky Star Wind Phase is a proposed 500-MW facility and would include up to 200 wind turbines.	Within 50-mile buffer	<u>Construction</u> 2021–2023 <u>Operation</u> 2022–2053

Source: SWCA (2020c).

4.3 Cumulative Impacts by Resource

4.3.1 Aesthetics and Visual Resources

Although there may be some incremental cumulative impacts to aesthetics and visual resources during the construction phase from the additional equipment and possible fugitive dust generation, the main effect to visual resources would result at areas where multiple new wind developments would be visible. The area where this would be a concern is east of the Project Area toward the other wind developments, including the Roundhouse Wind Project and the Corriedale Wind Project (see figure 4-1). The distance between the nearest edges of this Project and the other two is approximately 10 to 15 miles.

4.3.2 Air Quality and Climate

Emissions of air pollutants would increase during the construction phase when construction on other RFFAs would cause an incremental cumulative impact. But upon completion of the construction phase, operation of the Project would offset emissions from other projects by meeting power demand from a non-carbon-emitting source.

4.3.3 Aquatic and Terrestrial Wildlife and Special-Status Wildlife Species

Past and present actions within the cumulative impacts area for aquatic and terrestrial wildlife were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.4 Avian and Bat Species

Past and present actions within the cumulative impacts area for avian and bat species were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.5 Cultural Resources and Native American Concerns

Cumulative impacts to cultural resources would be similar to those discussed under aesthetics and visual resources because they would be visually based. Sites located in the area that would experience cumulative impact to their setting include the Ames Monument NHL, as well as the linear cultural resources affected by the Project such as the Overland Trail, Historic Lincoln Highway, and Cheyenne Pass Road.

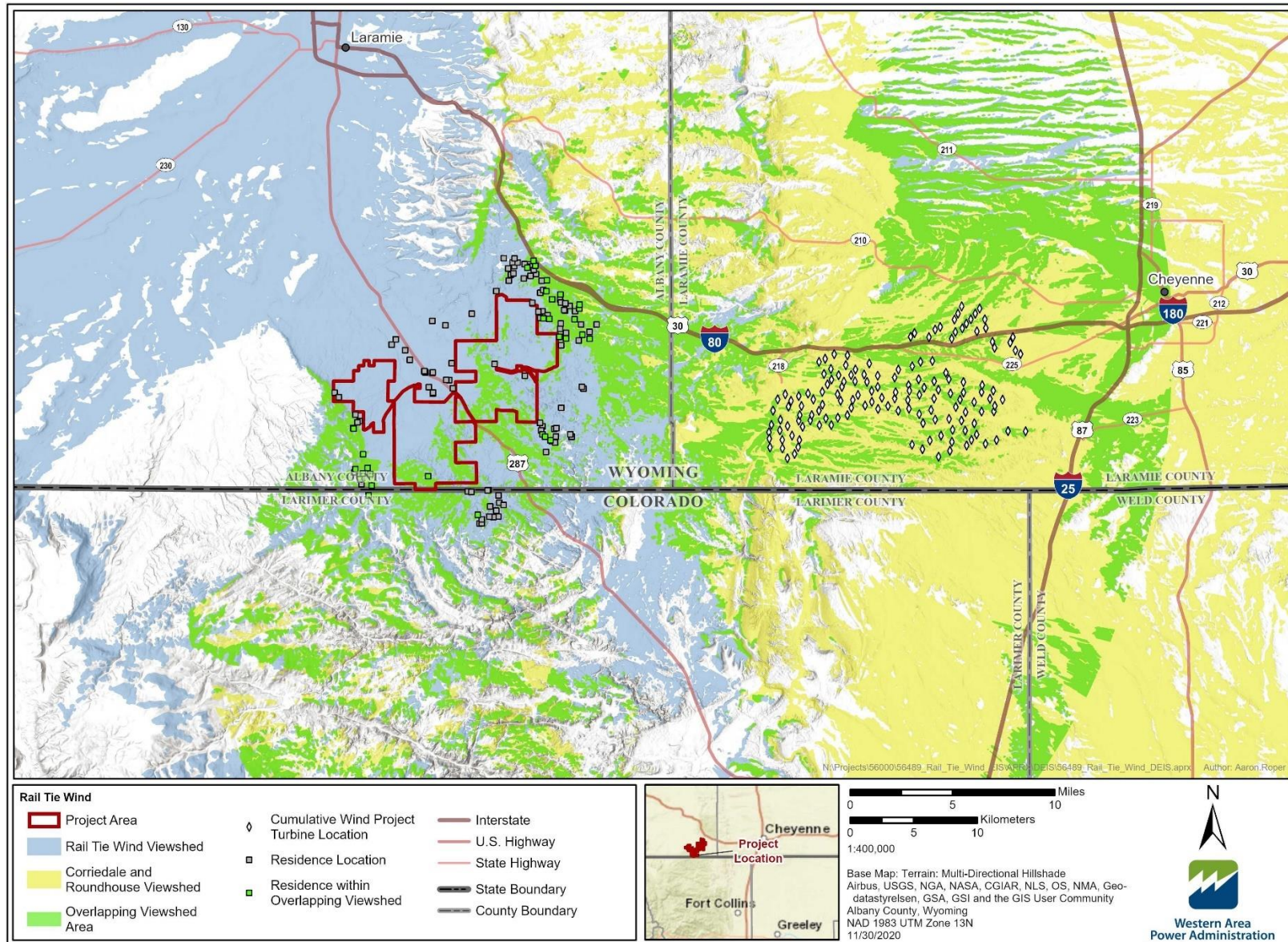


Figure 4-1. Cumulative Wind Project Viewshed Overlap.

4.3.6 Geology, Soils, and Mineral Resources

Past and present actions within the cumulative impacts area for geology, soils, and mineral resources were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.7 Land Use

Past and present actions within the cumulative impacts area for land use were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.8 Paleontological Resources

Past and present actions within the cumulative impacts area for paleontological resources were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.9 Public Health and Safety

Emergency service provider areas would overlap with RFFAs, potentially causing increased level of call outs. Construction industry best practices would minimize the effects of any increases by planning for emergency services well in advance of potential needs and by coordinating with emergency service providers.

4.3.10 Recreation Resources

Although it has been assumed that recreation resources within a 50-mile buffer of the Project may experience increases in demand during Project construction, the distributed nature of those resources offer ample opportunity for personnel from multiple large construction projects to find recreation within the current capacities. In addition, the increases from construction personnel from these projects attending larger, concentrated events such as Cheyenne Frontier Days are only a small fraction of overall attendance numbers.

4.3.11 Social and Economic Resources

Based on the information obtained on RFFAs, it appears that the geography and timing of housing demand for construction crews of these cumulative projects would be spread across a large area (including Cheyenne, Laramie, and smaller towns in western Albany County). It is also likely that the specialized construction crews would move from one project to the next because the RFFAs are not timed simultaneously, which could promote continued residency by these workers.

Local tax revenue would increase because of these projects individually and cumulatively. Sales tax would fluctuate with construction; when more equipment and materials are purchased sales tax revenue would increase. Property tax revenues would increase with the completion of each project, and slowly decline with the depreciation rate of each project. The list of RFFAs indicates that the maximum property taxes collected would likely occur in 2023; however, additional actions that are not reasonably foreseeable today would affect that projection as they are brought forward.

4.3.12 Transportation and Access

The local routes proposed for transporting materials, equipment, and crews to the Project do not have other RFFAs affecting them. The planned upgrades to the Interstate (I) 25/I-80 interchange in Cheyenne could have complicating implications and cumulative impacts when considered with the transportation needs of this Project. If highway transport were required through this interchange, requirements for oversized loads would be coordinated with WYDOT and construction contractors. The I-80 resurfacing would be expected to maintain one-lane traffic in each direction, along with the ability of the interstate highway to accommodate oversize loads, thus avoiding cumulative impacts. Other WYDOT projects in Laramie would not overlap in location with Project impacts to transportation.

4.3.13 Vegetation

Past and present actions within the cumulative impacts area for vegetation were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.14 Wetland and Water Resources

Past and present actions within the cumulative impacts area for wetland and water resources were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

4.3.15 Wildland Fire

Past and present actions within the cumulative impacts area for wildland fire were accounted for in the affected environment. No RFFAs fall within this cumulative impacts area.

CHAPTER 5. CONSULTATION AND COORDINATION

5.1 Public Involvement and Scoping

5.1.1 Public Involvement

In its outreach to the public, WAPA emphasizes four principles. First, the public involvement process should make it clear to the public how WAPA will listen to input. Second, the process should provide information about the methods and mechanisms available for the public to comment on the Project. Third, the process should describe for the public how input will be used and incorporated into decision making. Fourth, the process should summarize for the public the input that WAPA heard and how it affected the Project.

Using these principles as guidance, WAPA is completing the activities necessary for meaningful Project communications and public participation. These activities have included the public scoping period and scoping meetings as noted below; currently include the collection and analysis of public comments on the draft EIS, and holding the draft EIS public hearings; and will include preparation of the final EIS and record of decision.

WAPA is maintaining a Project website that contains relevant information for this NEPA process, including the publicly released EIS as well as information provided by ConnectGen used in the development of the EIS analyses. This website can be found here:
<https://www.wapa.gov/transmission/EnvironmentalReviewNEPA/Pages/rail-tie-wind-project.aspx>.

In addition, ConnectGen is also maintaining a separate website. This website can be found here:
<https://www.railtiwind.com/>.

5.1.2 Scoping Period

The notice of intent to prepare an EIS was published in the Federal Register on December 30, 2019. This notice presented the Project, announced the 32-day public scoping period, solicited public comment, and announced scheduled scoping meetings.

The scoping process used for this Project was initiated on December 30, 2019, by mailing a description of the Project and invitation to the scoping meetings to a mailing list comprised of names and addresses obtained from the Larimer and Albany County Assessors' websites encompassing a 3-mile radius from the Project Area boundary.

WAPA hosted two public meetings in January 2020 at the Hilton Garden Inn Laramie, 2229 Grand Avenue, Laramie, WY, 82070; approximately 80 individuals attended each meeting. The scoping meetings were advertised in a variety of formats, including publication in the Federal Register as well as newspapers with local circulation, mailed invitations to the Project mailing list, publication on WAPA's website, and news releases (SWCA 2020d). In each format, the advertisements provided logistics, explained the purpose of the public meetings, gave the schedule for the public comment (scoping) period, outlined additional ways to comment, and provided methods for obtaining additional information.

The 32-day period for submitting scoping comments was from December 30, 2019, to January 31, 2020. In total, 142 submittals containing 753 substantive comments were collected during the public scoping period. The Project's scoping report (SWCA 2020d) summarizes the input received on the scope of the EIS during that period. Although the period for scoping comments ended on January 31, 2020, WAPA has continued and will continue to accept comments on the Project throughout the NEPA process.

5.2 Agency Participation and Coordination

5.2.1 Federal, State, and Local Agencies

WAPA has contacted key Federal, State, county, and local agencies, as well as Native American tribes, to initiate coordination throughout the NEPA review process. Table 5-1 lists the agencies that WAPA has contacted during preparation of this EIS. Cooperating Agencies for this NEPA process are discussed in section 1.4, “Cooperating Agencies.”

Table 5-1. Agencies Contacted to Initiate Coordination

Federal	State	Local
FS	Colorado Air National Guard	Albany County Commissioners
FWS	Colorado Department of Natural Resources	Albany County Planning and Zoning
EPA	CDOT	Albany County Road and Bridge Department
ACE	CPW	Larimer County Commissioners
U.S. Department of Agriculture	Colorado Geological Survey	Larimer County Department of Health and Environment
U.S. Department of the Interior	Colorado Governor’s Energy Office	Larimer County Department of Natural Resources
U.S. General Services Administration	Colorado Public Utilities Commission	Larimer County Department of Planning and Building Services
U.S. Department of the Interior	Colorado SHPO	Larimer County Department of Engineering
FAA	State of Colorado Governor’s Office	Larimer County Road and Bridge Department
ACHP	University of Wyoming	City of Laramie Mayor
Bureau of Indian Affairs/Rocky Mountain Regional Office	Wyoming Business Council	Laramie Chamber Business Alliance
BLM Wyoming State Office	Wyoming Department of Agriculture	Tie Siding Volunteer Fire Department
FEMA Region VIII	Wyoming Department of Education	–
FERC	WYDEQ	–
Federal Highway Administration	Wyoming Department of Health	–
NPS	Wyoming Department of Revenue	–
National Weather Service, Cheyenne, Wyoming	Wyoming Department of State Parks and Cultural Resources	–
Wyoming U.S. House of Representatives	Wyoming Environmental Quality Council	–
Wyoming U.S. Senators	Wyoming Infrastructure Authority	–
–	Wyoming Public Service Commission	–
–	Wyoming State Climate Office	–
–	Wyoming State Engineer’s Office	–
–	WSGS	–
–	Wyoming Wildlife and Natural Resources Trust	–
–	Wyoming SHPO	–
–	WYDOT	–
–	WYGFD	–

Federal	State	Local
–	Wyoming Office of State Lands and Investments	–
–	Wyoming Office of Homeland Security	–
–	State of Wyoming Governor’s Office	–

Source: SWCA (2020d).

5.2.2 Government-to-Government and Section 106 Consultation

WAPA is conducting formal consultation with interested tribes on a government-to-government level, according to Section 106 of the NHPA. WAPA has invited 16 federally recognized tribes to participate in the Section 106 consultation process (table 5-2). WAPA began informal coordination with tribes through letter outreach prior to the public scoping meetings. Letters of invitation were sent on February 27 and September 8, 2020. Tribes that have accepted WAPA’s invitation are the Northern Cheyenne Tribe, Northern Arapaho Tribe, Standing Rock Sioux, Yankton Sioux Tribe, Rosebud Sioux Tribe and the Ute Tribe of Uintah and Ouray Reservation. Ten tribes have yet to respond, but consultation remains open to any tribe that wishes to participate, and consultation will be ongoing throughout the NEPA process.

Table 5-2. Tribes Invited to be Consulting Parties under National Historic Preservation Act Section 106

Tribe
Cheyenne River Sioux Tribe
Crow Creek Sioux Tribe
Crow Tribe
Eastern Shoshone Tribe of the Wind River Reservation
Fort Peck Assiniboine and Sioux Tribes
Lower Brule Sioux Tribe
Northern Arapaho Tribe
Northern Cheyenne Tribe of the Northern Cheyenne Indian Reservation
Oglala Sioux Tribe
Rosebud Sioux Tribe
Santee Sioux Nation of Nebraska
Shoshone-Bannock Tribes of the Fort Hall Reservation
Sisseton Wahpeton Oyate Tribes
Standing Rock Sioux Tribe
Ute Tribe of the Uintah and Ouray Reservation
Yankton Sioux Tribe

Source: SWCA (2020a).

5.2.3 Biological Coordination and Consultation

Section 7(a)(2) of the ESA requires any Federal agency that carries out, permits, licenses, funds, or otherwise authorizes an activity must consult with the FWS to ensure that the authorized activity is not likely to jeopardize the continued existence of any ESA-listed species or result in the adverse modification or destruction of designated critical habitat. Preliminary studies are near completion and a biological determination will soon be made whether the Project may affect ESA-protected species. If so, a consultation will be conducted with the FWS and the results of that consultation will be published with the final EIS. If not, the biological determination of no effect and its rationale will be published with the final EIS.

5.3 Preparers and Reviewers

5.3.1 Western Area Power Administration

WAPA staff who have been involved in the preparation of this EIS are listed in table 5-3.

Table 5-3. Western Area Power Administration Environmental Impact Statement Team

WAPA Staff	Role
Calvin Jennings, Ph.D.	Federal Preservation Officer/Tribal Liaison
Eric Weisbender	GIS Lead
Lisa Meyer	Archaeologist
Mark Wieringa	WAPA Document Manager
Timothy Langer, Ph.D.	Biology and Regulatory Specialist

5.3.2 SWCA Environmental Consultants

SWCA staff who have been involved in the preparation of this EIS are listed in table 5-4. To the best of SWCA's knowledge and belief, no facts exist relevant to any past, present, or currently planned interest or activity (financial, contractual, personal, organizational, or otherwise) that relate to the proposed project development; and bear on whether SWCA has a possible conflict of interest with respect to being able to render impartial, technically sound, and objective assistance or advice.

Table 5-4. SWCA Environmental Consultants Environmental Impact Statement Team

SWCA Staff	Role
Aaron Roper	GIS Lead
Alyssa Bell	Paleontological Resources
Brad Sohm	Air Quality and Noise Lead
Cara Bellavia	Principal in Charge
Chris Bockey	Visual Resources Analysis
Christa McCabe	Project Controller
David Fetter	Project Manager
Debbi Smith	Desktop Publishing and Section 508 Accessibility Compliance
Doug Faulkner	Natural Resources Lead
Haley Monahan	Natural Resources Support, Administrative Record
James Gregory	Socioeconomic Analysis
Jenny McCarty	Water Resources Support
Jill Grams	Visual Resources and Aesthetics
Joanna Guest	Air Quality and Noise Support
Kayla Bradshaw	Cultural Resources Support
Kerri Linehan	Technical Editor and Production Co-Lead
Krista Perry	Deputy Project Manager
Kristina Stelter	Document Formatter
Laura Klewicki	Land Use, Recreation, Public Health and Safety, Transportation
Linda Burfitt	Technical Editor and Production Co-lead
Mac Fuller	Geology and Soils Support

SWCA Staff	Role
Mary Huisenga	Water Resources Lead
Matt Petersen	Senior NEPA Advisor
Nate Wojcik	Geology and Soils Lead
Ron Salvo	Project Controls Lead
Sarah Lupis	Project Coordinator and Public Involvement
Scott Phillips	Cultural Resources Lead
Susan Munroe	Technical Editor
Vicky Amato	Wildland Fire

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APPENDIX A

Rail Tie Wind Project Description

Project Description

Rail Tie Wind Project

ConnectGen Albany County LLC

March 2020

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1.0 Introduction

The Rail Tie Wind Project (Project), is a proposed utility-scale wind energy facility under development by ConnectGen Albany County LLC (ConnectGen). The Project is located in southeastern Albany County, Wyoming, and encompasses approximately 26,000 acres of ranchland on private and Wyoming State Lands located near Tie Siding, Wyoming (Project Area). No federally-managed lands are located within the Project Area (Figure 1).

ConnectGen has applied to interconnect the Project to the existing Craig to Ault 345 kilovolt (kV) transmission line that intersects the Project Area, under the Western Area Power Administration's (WAPA) Large Generator Interconnection Process (LGIP). The Craig to Ault line is jointly owned by WAPA, Tri-State Generation and Transmission Association, and Platte River Power Authority. In accordance with its Open Access Transmission Service Tariff, WAPA's consideration to grant an interconnection request is a federal action subject to environmental review pursuant to the National Environmental Policy Act of 1969 (NEPA), U.S. Department of Energy (DOE), and the Council on Environmental Quality (CEQ) NEPA implementing regulations.

1.1 Project Overview

ConnectGen has prepared this Project Description to provide WAPA with information on the scope of the Project, including the features that would comprise the Project as well as associated construction, operation, and maintenance activities. The intention is to provide relevant Project information to support the preparation of WAPA's NEPA document.

The Project would have a generating capacity of up to 504 megawatts (MW) of renewable energy. For construction planning and site optimization, the Project consists of two separate Phases, each approximately 252 MW. Construction of the Project is expected to begin in 2021, and both phases could be fully operational by the end of 2022. As is common with large wind projects, the Project may require two years to fully construct. If additional time is required for construction, it is anticipated that the first 252 MW phase would be completed and fully operational by the end of 2022, with the second phase operational in 2023.

To support analysis of potential resource impacts from the Project, various studies and associated field work will be conducted. These studies will include review of resources such as visual, noise, land use, air quality, wildlife, and other environmental resources.

1.2 Project Components

The Project would include the following components and equipment:

1.2.1 Wind Turbine Generators

The wind turbines would be arranged in collinear strings located within 1,000-foot wide wind turbine siting corridors (Figure 2, Project Siting Corridors). This corridor design approach provides flexibility in turbine placement during the design phase to avoid and minimize impacts wetlands, waterbodies, cultural sites,

and other environmentally sensitive areas, to the extent practicable. Access roads and electrical collection lines will also be located within these corridors where feasible to minimize the Project's overall footprint. For the portions of the Project where it is not feasible to locate the access roads and electrical collection lines within the turbine string corridors, 100-foot and 50-foot wide siting corridors respectively will be used in these areas (Figure 2, Project Siting Corridors). The precise locations of each turbine within the corridor would be based on the wind turbine model selected, various siting criteria such as optimal wind speed, geotechnical conditions, environmental considerations, and landowner requested setbacks. For reference, Figures 3 depicts a Representative Project Layout for a 3 MW turbine model, and Figure 4 depicts a Representative Project Layout for a 6 MW turbine model.

Between 84 and 149 turbines would be included in the Project. The total number of wind turbines will depend on the turbine model selected and final design. ConnectGen is currently considering several turbine models with capacities between 3 MW and 6 MW each. Each turbine, with associated foundations and equipment, would have a permanent physical footprint of approximately 0.1 acre and a vertical height up to 675 feet, depending on the turbine type selected.

Of the several turbine models being considered by ConnectGen, the smallest model would be the General Electric Company (GE) 3.0 MW, and the largest would be the Siemens Gamesa 6.0 MW or the Vestas 5.6 MW. The turbine specifications for each of these models are provided in Table 1-1, Potential Turbine Specifications. As shown in the table, the specifications of the turbine models are similar, and thus many of the potential resource impacts associated with each turbine model would be anticipated to be similar. It is also expected that the specifications associated with a selected turbine model with a capacity between 3.0 MW and 6.0 MW would fall within the range of dimensions outlined in in Table 1-1, Potential Turbine Specifications. Regardless of the turbine model selected, all turbines would be sited within the 1000' siting corridors depicted in Figure 1-2, Project Site Plan.

TABLE 1-1: Potential Turbine Specifications

Turbines	GE 3.0 MW	Vestas 5.6 MW	Siemens Gamesa 6.0 MW
Tower Type	Tubular	Tubular	Tubular
Blade (Rotor) Diameter	127 m	162 m	170 m
Hub Height	89 m	125 m	115 m
Total Turbine Height	152.5 m	206 m	200 m

1.2.2 Access Roads

Temporary and permanent access roads including new, improved, or existing access roads, may be necessary for both construction and operation of the Project. New, permanent all-weather access roads would be needed to access each wind turbine location during operations, and existing or improved public roadways may be used as well. Based on initial estimates, approximately 60 miles of new all-weather access roads would be needed for the Project.

1.2.3 Crane Paths

A crane path, which is compacted ground that is used to “walk” the cranes to each turbine pad site during construction, will generally be co-located with the access roads. In addition, there will be several dedicated crane paths that are located cross country in an area away from any permanent access road. Crane paths are temporary and will be decompacted and reclaimed once construction of the Project is complete.

1.2.4 Electrical Collection System

Underground collection lines are proposed to connect wind turbines and deliver power from each turbine to the Project substations. If necessary due to the geology or topography, overhead collection lines may be used in some areas. Underground collection typically entails 34.5kV electric cable buried to a depth of approximately 48 inches, while overhead collection consists of 34.5kV electric lines strung from vertical wooden monopoles typically 50-80 feet tall. The total length of collection would be determined based on the final design and siting of turbine arrays and substations but could include up to 80 miles of collection facilities.

1.2.5 Electrical Substation and Switching Station

The Project would include two 345kV substations, one for each phase of the Project. Each substation site would encompass a fenced area of up to 5 acres, containing one to two main power transformers depending on the phase.

A 345kV switchyard would be required to connect both phases of the Project to the existing Craig to Ault 345kV transmission line. The switchyard would be designed based on the findings of WAPA’s facilities studies; however, a typical 345kV switching station encompasses a fenced area of up to 8 acres of land.

1.2.6 345kV Electric Transmission Line

Approximately 4 miles of new single circuit, 345kV overhead transmission lines would connect the two Project substations to the WAPA switchyard. The transmission line structures would likely be wood H-frame or steel monopoles, as determined based on final engineering and design of the transmission line. Structure height would typically be 100 to 125 feet but may vary depending on terrain.

1.2.7 Operations and Maintenance Facility

A single operations and maintenance (O&M) building is proposed for the Project. The proposed O&M facilities would include an approximately 7,000-square foot building, complete with sanitary and electrical services, located within an approximately 5-acre security fenced area. A permanent water well may be used to supply the O&M building.

1.2.8 **Meteorological Equipment**

At least three 105-meter tall meteorological towers would be constructed for the Project. Meteorological towers would likely be self-supported, lattice-mast style towers. ConnectGen has identified 12 potential met tower locations but will select the final locations upon selection of a turbine type and finalization of Project Design.

1.2.9 **Construction Laydown Yards**

Two temporary laydown yards of approximately 15 acres each would be prepared during the construction period for each phase of the Project. If necessary, additional smaller laydown yards of 2 acres each may be used through the Project Area. The laydown areas would consist of graveled storage and parking areas, which would be reclaimed following completion of construction. Concrete batch plants, as needed would be located within the construction laydown yards. If required, water for the batch plants could be acquired from temporary water wells or hauled from available water sources located nearby. All water use would comply with county and state permitting requirements.

1.2.10 **Project Component Dimensions and Disturbance**

Table 1-2 below provides the typical facility dimensions and anticipated temporary and permanent ground disturbance from construction of the Project.

TABLE 1-2: Project Component Dimensions and Ground Disturbance

Project Component	Construction Dimensions	Operation Dimensions	Number of Units	Estimate Acres of Temporary Disturbance	Estimate Acres of Permanent Disturbance
Wind Turbine Generators	250 ft x 350 ft	30 ft radius	149	299	10
Access Roads	Up to 100 ft width	20 ft width	58 miles	698	140
Underground Collection System	50 ft width	N/A	77 miles	431	0
Electrical Substation	7 acres	5 acres	2	14	10
Interconnection Switchyard	10 acres	8 acres	1	10	8
345kv Electric Transmission Line	100 ft width	20 ft width	4.4 miles	53	11
Operations and Maintenance Facility	7 acres	5 acres	1	7	5
Meteorological Equipment	200 ft x 200 ft	20 ft x 20 ft	3	3	0.03
Construction Laydown Yards	15 acres	0 acres	2	30	0
Crane Paths	100 ft width	0 acres	14.5 miles	179	0

1.3 ConnectGen’s Purpose and Need

ConnectGen proposes to construct and operate a wind power generation facility in Albany County, Wyoming. The Project would interconnect with the Western Area Power Administration transmission system with a new interconnection to the 345 kV Craig to Ault transmission line near the town of Tie Siding, WY. ConnectGen has made interconnection requests and transmission service requests in accordance with Western’s Open Access Transmission Service Tariff (Tariff) and the Federal Power Act, as amended (FPA).

The Project is a renewable energy project that would result in no carbon, sulfur, nitrogen, or mercury air emissions. In addition, the Project would not consume water resources in the process of generating wind energy, nor would it produce substantial quantities of solid waste.

ConnectGen’s purpose for the proposed Project is to generate clean, renewable energy in response to increasing market demand. Thirty-seven states now have a renewable portfolio standard (RPS) or goal for the amount of electricity produced by renewable energy sources, such as wind, solar, biomass, and geothermal sources. In addition to the demand driven by state RPS mandates and clean energy goals, there is increased demand from western load-serving entities as a result of the low cost of wind energy and planned retirements of thermal generation plants. Many western utilities have announced ambitious plans to add large amounts of renewable energy to their portfolios in the coming years. These drivers of demand create a dynamic marketplace in which wind energy can be generated in one location and transmitted to another location in response to market conditions and power purchase agreements between the wind energy developer and the utility or large-scale consumer purchasing the electricity. The proposed Project is complementary to ConnectGen’s renewable energy generation strategy and will contribute to the generation resource pool needed to meet future load and regional RPS requirements.

1.4 Agency Actions and Permits

The ConnectGen Project will require actions from a variety of local, state, and federal agencies. These actions include Project approvals and issuance of permits, as detailed below and in Table 1-3. This is a preliminary list, as additional requirements may be identified as the Project design is finalized.

TABLE 1-3: Environmental Permits, Approvals, and Consultations

Permit/Clearance	Lead Agency	Description
Federal		
National Environmental Policy Act (NEPA)	WAPA	Preparation of an environmental impact statement under NEPA
Clean Water Act, Section 401 and Clean Air Act Coordination	U.S. Environmental Protection Agency (EPA)	Coordination with EPA during the NEPA process to address any concerns with protecting water and air quality. EPA is charged with reviewing and commenting on EIS’s in the NEPA process.
Clean Water Act Section 404	U.S. Army Corps of Engineers (USACE) - Wyoming Regulatory Office	Required when dredging or filling waters of the U.S. and wetlands. Project activities may qualify for coverage under an applicable Nationwide Permit if Section 404 authorization is needed.

Permit/Clearance	Lead Agency	Description
Endangered Species Act, Section 7 Consultation, and Migratory Bird Treaty Act	USFWS - Wyoming Field Office	Consultation with USFWS regarding threatened and endangered species and discussions regarding migratory birds.
Bald and Golden Eagle Protection Act	USFWS – Wyoming Field Office	Coordination with USFWS regarding potential impacts to bald eagles and golden eagles. Coordination on the implementation of USFWS’s Eagle Conservation Plan Guidance.
National Historic Preservation Act (NHPA), Section 106 Consultation	Advisory Council on Historic Preservation (ACHP)	Comment on the proposed project’s impacts on historic properties; ACHP typically delegates this consultation requirement to the appropriate State agency.
Obstruction Evaluation/Airport Airspace Analysis Notice of Proposed Construction or Alteration Determination of Hazard or No Hazard	Federal Aviation Administration (FAA) - Northwest Mountain Region	An Obstruction Evaluation/Airport Airspace Analysis filing must be made online. Following review, a Notice of Proposed Construction or Alteration form (FAA 7460-1) must be submitted prior to construction to ensure wind turbines will not interfere with aviation. Siting near a military or civilian airfield may trigger an analysis of possible impact of turbine towers on radar from airfields. FAA will provide a Hazard/No Hazard Determination and may require lighting on turbines to address potential hazards.
State		
Industrial Siting Permit	Wyoming Industrial Siting Council	The Industrial Siting Council is tasked with reviewing the socio-economic and environmental impacts of industrial facilities prior to issuing a construction permit. The Council requires a permit if the project cost is greater than 178.9 million dollars, based on the potential build out for the site. The Project would require an Industrial Siting Permit.
New Source Construction (Air Quality) Permit	Wyoming Department of Environmental Quality (DEQ) - Air Quality Program	This air emissions permit is required prior to the construction of a concrete batch plant.
Construction Storm Water Permit Section 401 Water Quality Certification	Wyoming DEQ – Water Quality Division	The Project will need to obtain a permit for authorization of storm water discharges associated with construction activities. Wyoming DEQ is responsible for issuing water quality certification for permits authorized under Section 402 and 404 of the Clean Water Act.
State-Designated Species Consultation	WGFD	Coordination with WGFD regarding state-designated Species of Greatest Conservation Need (SGCNs).
NHPA Section 106 Consultation	Wyoming State Historical Preservation Office (SHPO)	Consultation with SHPO regarding Project impacts to historic properties.

Permit/Clearance	Lead Agency	Description
Water Rights Permit	Wyoming State Engineer's Office	Permit will be necessary for certain water withdrawals.
Native American		
Section 106 Consultation	Tribal Historic Preservation Office	WAPA will initiate tribal consultation during the NEPA process.
Local		
Land Use Change Permit, Wind Energy Conversion System (WECS) Permit, Road Access Permit, Utility Crossing Permit	Albany County	Permits may be required from Albany County for road use, utility crossings, zoning changes, and the installation of a wind farm larger than 25kW. Consultation has already started.

1.5 Environmental Monitoring

ConnectGen will develop an environmental monitoring program that describes all necessary actions required by the various permits issued for the project. ConnectGen will be responsible for meeting conditions of any permits and assuring that necessary environmental monitoring activities are being performed. The environmental monitoring program will incorporate monitoring observations and additional mitigation measures as needed into construction practices and standard operating procedures for the Project. The environmental monitoring program would be developed to meet the standards or regulatory requirements of permitting agencies or governing bodies.

2.0 Construction

This section describes typical construction practices for a utility-scale wind energy project. Information is based on ConnectGen and industry knowledge, and input from third party engineering firms. Construction practices could vary depending on final engineering, design, and site-specific conditions.

2.1 General Construction Description

In developing the Project design, ConnectGen intends to minimize environmental impacts resulting from the Project and maintain industry safety standards, while managing cost and schedule. This approach would be realized by completing environmental resource studies to identify potential sensitivities and constraints to be considered during the siting and design stage and developing environmental protection measures to avoid, minimize, and mitigate impacts during the construction, operation, and decommissioning phases of the project. ConnectGen will adopt certain construction best practices to reduce ground disturbing activities, such as minimizing the cut and fill required for roads and foundations, and the use of as much excavated native soil and rock as possible. ConnectGen will also apply the concept of adaptive planning and design that when applied to the Project, would minimize significant adverse impacts to the natural characteristics of the site.

Before construction begins, each area of proposed ground disturbance will be inspected to evaluate existing conditions. To the extent possible, upon completion of construction activities, revegetation and reclamation would be conducted within disturbed areas in order to return the site to near pre-construction conditions. This effort would include activities such as conservation and reapplication of topsoil, seeding areas of bare soil, applying weed control measures, and returning land contours and drainage to pre-construction conditions.

ConnectGen will limit public access to the site during construction activities in order to assure public and worker safety. Public access would be limited during activities such as wind turbine erection, foundation excavation, electrical collection system trenching, and substation construction and interconnection. Access would be limited on roads in these areas by narrowing down the road to one lane of public traffic with flaggers used to direct the flow of traffic or suspending traffic for safe movement of large equipment. The intention would be to keep road closures to a minimum to the extent feasible.

2.1.1 Equipment

Table 2-1 lists the types of equipment needed for Project construction, the purpose of each equipment type, and their anticipated numbers.

TABLE 2-1: Anticipated Construction Equipment

Purpose or Phase of Construction	Equipment Type	Anticipated Amount of Equipment
Road Construction (2 crews)	Bulldozer	4
	Hoe and Ram Hoe	2
	Haul Truck	15
	Grader	2
	Compactor	3
Foundation Excavation (5 crews)	Hoe and Ram Hoe	4
	Air Drill	2
	Bulldozer	2
	Compactor	2
Rebar (2 crews)	Picker	3
	Telehandler	2
Concrete Placement (1 crew)	Belt Truck	2
	Telehandler	2
	Concrete truck	12-18
Foundation Backfill (3 crews)	Bulldozer	4
	Compactor	2
Wind Turbine Unloading (1 crew)	Crane	1
	Picker	2
	Telehandler	3

Purpose or Phase of Construction	Equipment Type	Anticipated Amount of Equipment
Wind Turbine Base Installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6
Wind Turbine Tower Installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6
Wind Turbine Nacelle/Rotor Installation (1 crew)	Crane	2
	Picker	2
	Telehandler	6
	Dozer	2
	Haul Trucks	6
	Manlift	2
Collection System (1 crew)	Trencher	2
	Bulldozer	2
	Hoe	4
	Haul Truck	2
	Cable Truck/Trailer	2
Substation (1 crew)	Drill Truck	1
	Bulldozer	1
	Picker	1
	Hoe	2
	Bucket Truck	2
	Pole Truck	1
Miscellaneous (1 crew)	Picker	2
	Telehandler	4
	Water Trucks	3-4
	Grader	1
	Fuel/Lube Truck	1

Heavy vehicle traffic is expected on the Project site during construction. Dump trucks, for example, would be needed to move soil and aggregate. Concrete trucks would be needed for wind turbine foundations and other facilities. Water tankers would be needed to wet down roadways for dust control. The crane needed for wind turbine installation would be assembled at the first wind turbine site and then would be “walked” to subsequent wind turbine sites along the Project access roads. Where the road cannot be built within the tolerances required for walking the crane, the crane would be disassembled, moved to the next wind turbine site, and reassembled.

2.1.2 Roads and Turbine Pads

For construction crews and equipment to reach each wind turbine location, roads will need to be constructed, extended and/or improved throughout the Project site. Existing roads will be used to the extent possible; however, new access roads will need to be constructed to turbine sites, the O&M building, and the Project’s substations. Access roads will be sited to reduce ground disturbance, minimize adverse impacts to sensitive resources (e.g., wetlands, cultural resource sites, sensitive habitat, etc.) and optimize transportation safety and efficiency during construction and maintenance activities. In general, access roads will likely be sited within the 1,000-foot turbine corridors. For the portions of the Project where it is not possible to locate the access roads and electrical collection lines within the turbine string corridors, 100-ft-wide access road and 50-ft-wide collection line corridors will be used for purposes of adaptive planning and design. Depending on the turbines selected, approximately 60 miles of new access roads would be required.

Access roads would be needed during construction and operation to access the following permanent Project facilities: turbines, met towers, substations, and the O&M building.

A crane path, which is compacted ground that is used to “walk” the cranes to each turbine pad site, will generally be co-located with the access roads. In addition, there will be several dedicated crane paths that are located cross country in an area away from any permanent access road. Crane paths are temporary and will be decompacted and reclaimed once construction of the Project is complete.

Trucks bringing wind turbine components to the site will likely be extra-long (for blade transport) and heavy-load (for wind turbine nacelles). For these trucks to reach the site, some road improvements may need to be completed on existing county, state and private roads. Specifically, turns in existing roads, such as Cherokee Park Road/County Road (CR) 31, may need to be widened to allow access for the extra-long trucks.

The design of the roads will consider the flow of the natural contours; however, modifications may be made in order to maintain safety during construction and maintenance activities. Table 2-2 provides general road specifications.

TABLE 2-2: General Road Specifications

Characteristic	Specification
Maximum slope	8%-14% for access roads
Maximum width (construction)	Up to 100 feet, including crane path
Maximum width (post construction)	20 feet
Minimum turn radius	200 feet
Road surface	All-weather gravel
Speed limit	25 miles per hour on access roads and 15 miles per hour on wind turbine string roads

Construction zones of 250 feet by 300 feet will be established around each wind turbine site. This area would need to be clear and level enough to allow for the wind turbine components to be delivered and for a crane to be set up. Construction would be designed to minimize the amount of workspace required at

each turbine site. To the extent practicable, a minimal amount of vegetation would be removed to allow for turbine component delivery. Typically, the pad constructed for the crane requires the same amount of work as the roads, although these pads would be reclaimed to as near as practicable to preexisting conditions once construction of the turbine is complete.

Once the construction of the Project is complete, reclamation would be performed in areas disturbed by construction activities. The cut material accumulated during road construction will likely be used to return contours to pre-construction conditions, as practicable. Any remaining fill material will be distributed across the Project site in a manner that will not adversely affect dust and erosion, change drainage conditions, or impact any sensitive vegetative communities. Any exposed areas that are not covered by road materials will likely be revegetated using an approved native seed mixture or landowner-preferred mixture. Noxious weed control would continue onsite during the revegetation process and during the Project's operation.

2.1.3 Electrical Collection System

Each wind turbine will be connected to underground electrical collection lines to allow the generated energy to be sent to the Project substations. These collection lines are anticipated to be direct-buried (rather than placed in conduit) using cable specifically designed for this application. The voltage of this system will likely be 34.5 kV. Typically, the cables would be buried directly into native soil onsite. However, if the native soil does not provide enough thermal conductivity (i.e., to allow heat to dissipate from the cables), engineered backfill may be used. This engineered backfill will be a soil type capable of efficiently dissipating heat from the cables. The engineered backfill will only be used in the cable trenches, and only in amounts needed to achieve heat dissipation from the cables. The engineered backfill will be weed and seed free. The remaining depth of the trenches would then be backfilled with native materials, and re-contoured to pre-construction conditions and revegetated with native seed, or landowner-approved seed mixture. ConnectGen may need to use blasting techniques if rock strength exceeds typical excavation limits. If underground electrical lines are not technically or economically feasible in some areas, overhead electrical lines will be used. The overhead collection line structures will be wooden or steel monopole and would be 50 to 80 feet in height. Depending on the turbine selected, approximately 80 miles of collection lines will be required.

To the extent possible, the electrical collection system will be collocated with access roads in areas likely already disturbed by the road construction. For areas near the substations where several runs of cable may be required, cable trenches may be placed on both sides of the road. In some areas, a collection line will be installed cross country in an area not located next to existing or planned access roads. In these situations, the collection line would be installed in a manner as described above, and then re-contoured to pre-construction conditions and revegetated with native seed, or landowner-approved seed mixture.

2.1.4 Wind Turbine Foundations

The wind turbine foundation anchors the wind turbine structure securely to the ground. Typically, the construction of the wind turbine foundations constitutes the largest volume of earth excavation associated with a wind power project, although some foundation designs allow for much of the excavated material to be backfilled in and around the foundation itself. Depending on the turbine type selected, the Project will contain 84 to 149 turbine pads.

Two foundation designs are typically used for wind turbine installations in the U.S.; the specific foundation used for individual turbine locations would be determined by the soil conditions and wind turbine

requirements. The first foundation type is a “mat” foundation. The second foundation type is a “pier” foundation. Mat foundations are wide and shallow, and pier foundations are narrow and deep. Mat foundations are typically 60- to 80-foot diameter octagons with an approximate depth of 10 to 12 feet. Pier foundations are typically 15 to 18 feet in diameter with an approximate depth of 30 to 40 feet. There are variations on these foundations, and the exact foundation type to be used cannot be determined until a final turbine type is chosen and a detailed geotechnical investigation is completed. Due to the expected soil conditions in the Project Area, the Project will most likely use the “mat” foundation type.

The turbine base consists of a metal ring and series of anchor bolt connections to fasten the wind turbine tower to the foundation. The turbine base is cast into the concrete reinforced structure that makes up the remainder of the foundation. An electrical grounding mat is typically cast in place when the concrete for the foundation is poured. The casting and the subsequent backfilling of the foundation is usually done prior to the delivery of the wind turbine components to allow the lowest sections of the wind turbine tower to be directly placed upon delivery.

2.1.5 Wind Turbine Installation

Installation of wind turbines requires specialized equipment and crews, and careful planning. During construction, turbine components will be delivered directly to each installation location as they arrive at the Project. Lower tower sections will be set in place immediately on the foundation, with the remaining components placed around the tower site in planned laydown arrangements. Crane crews will erect the turbines once all components arrive at the turbine location to minimize the amount of time the equipment is on the ground. Exceptions may occur if components arrive before the turbine location is available (e.g., due to snow on the site or other temporal constraints that prevent construction from occurring at that time). In this instance, some components may be placed at a temporary laydown area until turbine site access and crews are available to move and erect the turbine.

2.1.6 Met Tower Installation

ConnectGen will install at least three permanent met towers within the Project site to collect accurate meteorological data used to track the performance of the wind turbines. Such data will include wind speed and direction, barometric pressure, humidity, and ambient temperature. Each tower would be assembled onsite. Meteorological towers would likely be self-supported, lattice-mast style towers.

2.1.7 Substation

The electrical collection system will deliver the power to one of the two Project substations. The Project substations would each be up to 5 acres in size. At the substation, the voltage of the energy will be stepped up from the collection system voltage of 34.5 kV to the transmission voltage of 345 kV. Capacitor banks and other equipment would be installed at each substation to provide the voltage support necessary to meet the interconnection requirements for the Project as determined by WAPA. A small control building would be built within each substation yard to house electrical metering equipment and the SCADA system for the wind turbines.

2.1.8 Transmission Line

Approximately 4 miles of new single circuit, 345 kV overhead generation tie (gen tie) line would connect the two Project substations to the WAPA switchyard. The transmission line structures would likely be wood H-frame or steel monopoles, as determined by final engineering and design of the gen tie line. Structure height would typically be 100 to 125 feet but may vary depending on terrain. The gen tie line will be designed in consideration of Avian Power Line Interaction Committee guidance to avoid and minimize impacts to avian species.

2.1.9 O&M Building

ConnectGen will construct an O&M building in the Project Area. This building will house storage for spare parts, offices for wind farm staff, conference rooms, computers, telecommunications and control equipment for the wind turbines, SCADA equipment, emergency lodging quarters, and shop facilities. There will also be a parking lot and temporary laydown area. This building will likely be pre-engineered and assembled and finished onsite. The O&M building will be painted in an earth-tone color (such as light tan) conducive to the local site conditions. The O&M building will also have offices, break room and bathrooms, and if connection to a sewer system is not feasible at the building site, a septic system will be installed. A supply of potable water for the O&M building will be provided through a connection to a nearby existing well or installation of a new well, as feasible.

2.1.10 Laydown Yard

ConnectGen will develop two construction laydown yards of approximately 15 acres each that would be developed in the Project Area where most general construction materials would be offloaded and stored. Additional smaller laydown yards of approximately 2 acres each may be developed within the 1000' turbine siting corridors as necessary. The intent is for wind turbine components to be delivered directly to the pad site where they will be installed; although deliveries received before the turbine pads are available (either due to weather, road construction, or crew availability) would be off-loaded in the nearest laydown yard. Materials needed for the potential concrete batch plant, substation construction, or electrical collection system construction would be offloaded near the location of their intended use.

2.1.11 Construction Schedule

The exact schedule of construction has not yet been developed, and is dependent on completion of WAPA's NEPA review and acquisition of all necessary permits for the Project. Other factors that may impact the construction schedule include weather-related construction constraints, the type and number of wind turbines ConnectGen elects to use, the required in-service date for the Project as determined by WAPA, and supplier delivery dates for turbines and components. The outdoor construction season is weather-dependent, but generally is from March to November, with demobilization of outdoor work in November. Any interior work, such as commissioning of the wind turbines and finishing work on the O&M building and substation, could continue during the winter months. In general, a typical schedule for the construction of wind energy projects of this scale is shown in Table 2-3, Typical Construction Schedule of Wind Energy Projects.

TABLE 2-3: Typical Construction Schedule of Wind Energy Projects

Activity	Duration (months)
Mobilization	1
Access Roads and Laydown Areas Completed	2-6
Substation Construction	4-6
O&M Building Construction	3-6
Transmission Construction	3-6
Foundations	4-6
Wind Turbine Erection	4-6
Commissioning	2-3
Acceptance Testing	2-3

Many of these activities will take place concurrently. Schedule would vary with the number of turbines to be installed.

2.2 Construction Preparation Activities

2.2.1 Housekeeping

Good housekeeping can drastically increase occupational health and safety and minimize the environmental impacts of the Project. At the end of each work shift, debris will be removed from active construction areas and taken to designated trash collection areas for proper disposal. Materials still needed at the turbine site will likely be assembled and secured at the site, and materials no longer needed will likely be returned to the construction laydown areas.

An area located near the potential concrete batch plant will be designated for “washing out” concrete trucks. The location would be determined through coordination with applicable agencies, and the wash out area would be cleaned and returned to a natural state at the end of construction.

2.2.2 Truck Deliveries

Heavy vehicle traffic is expected to access the site during most of the construction phase of this Project. Many of these vehicles will be specialized vehicles for turbine component delivery (such as the blade trucks). Normal heavy-duty truck traffic on site will include concrete trucks used for delivering concrete for the construction of the turbine bases, dump trucks to move soil and rock from base excavations, and water tankers to wet down the site roads and graded areas for dust control. Signs on the public roads utilized by heavy trucks would be erected warning the public of the increased heavy construction traffic on these roads. When possible, delivery times would be coordinated with the use patterns of the roads to avoid traffic congestion and increase safety. It is anticipated that trucks would be dispatched from Laramie and/or Cheyenne, Wyoming, depending on where rail deliveries are made, or where other materials are supplied from. All deliveries made to the Project Area will be required to conform to all WYDOT and United States Department of Transportation (USDOT) regulations.

2.2.3 Transmission Line Crossings (Vehicle Traffic)

The need for vehicles to cross under the existing WAPA transmission infrastructure that transects the Project Area will require careful marking and/or lighting plans to protect WAPA's transmission infrastructure and ensure crew and equipment safety.

2.2.4 Fencing

ConnectGen plans to install fencing around those areas where public safety risks exist and site personnel are not available to control public access (such as excavated foundation holes, electrical collection system trenches, and laydown areas). At the end of work shifts, open pits, trenches, and holes will be covered or fenced to deter wildlife from becoming trapped or injured. Other areas deemed hazardous, or where issues with security or theft are of concern, may also be fenced. The Project substations will be permanently fenced for safety.

If temporary fencing is needed for laydown areas, the fencing will likely be of chain-link design. Temporary fencing around unfinished turbine bases are normally designed to warn people of the potential danger more than to bar access, and therefore this fencing is typically a high visibility plastic mesh. In instances where livestock have access to the turbine site, excavations will potentially be fenced with chain-link or other livestock fencing. Permanent fencing around the substation will be of a sturdy design.

2.2.5 Surveying and Staking

Construction staking will be one of the first construction activities associated with the Project during which turbine micro-siting will occur. Field crews will use survey equipment and GIS data to locate points in the field that correspond to the locations of project components identified on the engineering layout for the Project. When a critical point is found, it is marked with a survey stake (usually a wooden stake with a colored plastic flag, driven into the ground one to two feet). The point location is usually accessed by a pick-up truck or similar vehicle, and teams of two or more walk across the site to perform the surveying and staking.

Once staking is completed, a walkthrough would be completed by the construction manager, design engineer and project manager to confirm that existing conditions have not changed from when the detail design was completed. Typically, the biologist and archaeologist are also present to identify any potential issues that may be present. During the walkthrough, if constraints are noted, the construction manager and design engineer will consider whether the use of adaptive planning is appropriate.

2.2.6 Geotechnical Sampling

The geotechnical investigation will characterize the depth and strength of the subsurface soil structures to determine dynamic properties for the individual turbine foundation designs, and to understand the soil characteristics for heat dissipation where electrical collection infrastructure will be placed. This work will be in addition to any previous borings and test pits that may have been completed in the Project Area. The investigation will consist of coring specific locations along the turbine strings and collection line routes. Coring would be completed using geotechnical drilling equipment mounted to either a truck or

tracked vehicle. The coring process will provide samples that will be logged, and discrete samples will be collected for laboratory strength testing. The coring process leaves holes at the test site approximately three inches in diameter and up to 40 feet deep. Upon completion, borings will be backfilled in accordance with State and local requirements. Test pits dug with a backhoe or similar equipment may also be used to evaluate whether the bedrock can be excavated.

2.3 Civil Construction Activities

2.3.1 Clearing and Grubbing

Where necessary, clearing work will include clearing and removing trees, cutting and removing all brush, shrubs, debris, and vegetation to approximately flush with the ground surface; and disposal of all cuttings and debris. Cuttings and debris will likely be mulched or chipped on site and used for ground stabilization or disposed of in an approved facility designed to handle such waste.

Grubbing work will include the complete removal and disposal of all stumps and roots larger than approximately two inches in diameter, including matted roots, regardless of size. Grubbing will extend to a minimum depth of approximately four inches below the natural surrounding ground surface.

All excavations made by clearing and grubbing activities will be backfilled with compacted earth/aggregate available onsite.

Typically, clearing and grubbing activities will be needed for all site development activities. However, because the site lacks significant forested vegetation and cover, these activities are expected to be minimal.

2.3.2 Site Grading

ConnectGen plans to prepare a detailed grading plan that will describe the methods that will be employed during Project construction. The plan will describe the stepwise activities required for the project. Complete road grading would be carried out first to allow access to other Project features. The roads will be installed based on the lines and grades indicated on the detail design drawings and confirmed during survey and staking. Rough grading of the laydown areas, turbine pads, substation pads, and O&M building pad will begin at the same time or shortly after roads are graded. The completed facilities will be done after construction is complete. The final grading would provide a smooth uniform surface and minimize the impact to existing drainage patterns. The overall goal of the detail design and grading plan is to achieve balanced cut and fill, which will reduce the amount of fill material that will be transported in or out of the Project Area.

2.3.3 Rock Removal/Blasting

Geotechnical investigations will be performed to support the final engineering and design of the Project, and will be used to inform the excavation requirements, such as whether blasting and rock removal will be necessary. If blasting and excavation is needed, all activities would be conducted in accordance with applicable regulations and modern industry practice, using methods and techniques that will minimize

overbreak beyond the limits indicated on the drawings and would attempt to preserve the rock beyond these limits in the soundest possible condition.

Before beginning any blasting operations, ConnectGen will prepare a blasting plan. The blasting plan will include specific detailed information on all procedures, materials, and equipment to be used, in accordance with applicable regulations. The blasting plan will describe procedures and precautions to be taken with regard to the worker and public safety and protection of existing structures. The plan will describe specific drilling, blasting, mucking, and hauling operations. All blasting would be performed in accordance with the approved blasting plan.

If blasting is required, controlled blasting techniques such as pre-splitting or line drilling would likely be used. Pre-blast surveys and blast monitoring may be required for blasting within 500 feet of any existing structures. Additional monitoring may also be required for blasting near identified springs or other environmentally sensitive areas.

2.3.4 Road Base Construction

Based on preliminary design, road base (aggregate) would be placed on graded areas in six-inch to 12-inch (maximum) deep compacted layers, to the desired finished grade. The depth of each compacted layer will be based on the detail design and ConnectGen's construction contractor's ability to achieve the required compaction. The use of a geotextile is not anticipated at this time. If the engineers determine that it is needed, it will be installed prior to laying down any road base material.

To the extent possible, aggregate will be made from crushing the rock excavated from the turbine foundation locations, eliminating the need to bring in aggregate from offsite. However, some roads would need to be built before any foundations are excavated, so some aggregate will likely be imported from a nearby source. The construction contractor will determine where the aggregate is sourced from.

2.3.5 Excavation

Excavation involves the removal of earth to allow for the construction of roads and foundations. Excavation for structures will be completed to the specifications indicated on the detail design drawings and confirmed during micrositing. Adaptive design and planning will be used to avoid excavations in environmentally sensitive features or wildlife areas. Machine excavation will be controlled to prevent undercutting the determined subgrade elevations. Excavated materials that meet the specified requirements may be used for fill, embankments, and backfill. Vertical faces of excavations will likely not be undercut to provide for extended footings.

Material excavated below the bottom of concrete structures to be supported on the subgrade will be replaced with concrete placed monolithically with the concrete above. Rock fill or lean concrete may be used, if acceptable to the design engineer.

Depending on the foundation design, of which there may be several, much of the excavated materials can be put back into the foundation excavations. Excess rock material will be crushed and used as road aggregate as appropriate. Remaining excess excavated materials will be disposed of in the Project Area

in coordination with host landowners and would not be taken offsite for disposal unless necessary. If excess materials are spread onsite, it will be done in a manner that will minimize impacts to environmental sensitivities on the site (e.g. wetlands or waterbodies).

2.3.6 Compaction

During construction of roads and foundations, the earth under and around these civil structures must be properly compacted to assure that the earthen foundations for the facilities are solid. Compaction associated with the Project will meet the following standards; rock fill will likely be compacted in eight-inch uncompacted thickness to 70 percent relative density as determined by American Society for Testing and Materials (ASTM) D4253 and D4254.

2.3.7 Trenching

ConnectGen plans to use open trenching and in some circumstances directional drilling, to install the electrical collection system cables and fiber optic lines. During open trenching, the extent of trench open at any given time will be limited to those distances necessary to expedite work. Trenches that are not backfilled by the end of the day will be covered or fenced. Covers will be secured in place and will be sufficient to keep livestock and wildlife from falling into the trench or hole. In areas where trenching will take place in waterbodies, best management practices will be developed and implemented to minimize impacts to water quality, sensitive habitat, and sensitive species, and any required permits will be obtained. Waterbodies will be restored to their preexisting contours and riparian areas will be allowed to revegetate.

2.3.8 Stormwater Pollution Prevention

There are several perennial and intermittent streams present in the Project Area. In order to protect water resources, ConnectGen will prepare a Project-specific Stormwater Pollution Prevention Plan (SWPPP), which will include erosion control measures to be used across the Project Area. The SWPPP will be prepared per the U.S. Environmental Protection Agency (EPA) document entitled "Storm Water Management for Construction Activities-Developing Pollution Prevention Plans and Best Management Practices," and in conformance with local and state permit requirements.

Given the dry and windy nature of the area, dust control measures will be proposed as part of the SWPPP to protect water quality, minimize impacts to residents, and minimize impacts to vehicles traveling along local roads. Examples of best management practices that can be included in the SWPPP are the use of water or other dust control measures on or near heavily used public roads, holding onsite traffic speeds to appropriate levels to minimize dust generation, using rock to cover disturbed soil, and revegetating or otherwise covering soils as soon as possible following soil disturbance.

2.4 Structural Construction Activities

2.4.1 Concrete Supply

ConnectGen may bring all concrete from a nearby concrete batch plant near Laramie, Wyoming, which would result in increased truck trips to the site during construction. However, the amount of concrete

needed for many of the Project components makes this a challenging undertaking. Consequently, the need for an onsite temporary concrete batch plant located in the Project Area offers a more efficient and cost-effective alternative.

A significant amount of concrete would be needed for construction of the wind turbine foundations, substation foundations, and operation and maintenance building foundation, an onsite batch plant could be used to supply the required concrete. An onsite batch plant would be in one of the proposed laydown areas. The plant would have the capacity to produce 1,500 yards of concrete daily. The plant would include a generator, a cement storage facility, sand, aggregate, and water storage. The batch plant would occupy approximately two to three acres of the laydown area and use approximately 30,000 gallons of water daily during peak production of concrete

2.4.2 Steel Placement

The construction of the turbine foundations will require a large volume of steel reinforcement rebar that will need to be stored onsite in the laydown yards. ConnectGen assumes that some level of prefabrication will occur offsite prior to delivery to the Project Area.

2.4.3 Formwork

The construction of turbine foundations may require formwork. Formwork is usually timber or steel used to form the foundation shape into which rebar is placed and then concrete is poured. The formwork is removed when the concrete has cured. Steel formwork will be reused. However, if timber formwork is used, it may need to be disposed of after several uses. ConnectGen would apply appropriate disposal methods to discard this material when it is no longer useable.

2.5 Electrical Construction Activities

2.5.1 Buried Cable Placement

ConnectGen will likely use two methods for the placement of the electrical collection system cable. These include open trenching and horizontal directional drilling. Open trenching uses a trenching machine or trackhoe to open the trench so the cable can be placed at the proper depth. Depending on the results of the geotechnical study, offsite fill material may be required if the local soil does not provide for acceptable heat transference. The offsite material would be placed around the cable to facilitate heat transfer, and then native soil would be used to backfill the trench. As discussed in Section 2.1.2, excess materials excavated from trenches that are not put back into the trenches will likely either be used for road aggregate or spread across the site.

The electrical collection system cable will be buried at least 3 feet below the ground surface, with fiber optic cables placed shallower, at a minimum of 18 inches. The final depths would be determined by the geotechnical conditions of the Project Area, and the method used to install the cable.

ConnectGen may elect to use horizontal directional drilling for cable installation under streams or other waterbodies in the Project Area to reduce potential impacts to waters and wetlands and to minimize impacts to other sensitive habitats.

2.5.2 Grounding

When the turbine foundation is constructed it will include a grounding mat that surrounds the foundation and is connected to the foundation. The grounding mat is typically made of a bare copper cable mat that helps discharge electricity into the earth should the turbine build up an electrical charge from a lightning strike or equipment malfunction. The Project substations will also have a grounding grid laid in trenches below the ground surface around each substation site to protect equipment and personnel in the case of electrical malfunction or lightning strike.

Transmission poles also typically require grounding. During construction of the gen tie line, a grounding crew will follow behind the pole assembly and erection crew to install the structure grounding rods. This crew would install the proper number of ground rods based upon resistance measurements they take at each pole location.

2.5.3 Buswork And Electrical Line Connections

The Project will require some overhead electrical line and buswork (i.e., rigid overhead metal conductors) connections to be made at the Project substations. The electrical collection system would likely come into each Project substation underground, then transition overhead into the buswork. The buswork connects the turbine collector lines on different feeder lines to a common bus. Any necessary voltage regulation devices would also connect to this buswork, which then connects to the low-voltage side of the substation transformer. On the high-voltage side of the transformer, an overhead connection would be made to the Project's gen tie line using a riser. Electrical equipment will be designed in accordance with Avian Power Line Interaction guidance to avoid and minimize potential impacts to avian species.

Small overhead cranes, scissor lifts and other equipment will be used to construct the buswork as appropriate. These components would be bolted together onsite and placed on foundations for each component. The Project substations will be fenced.

2.5.4 Communications Systems Installation

Communication between the wind turbines and the Project substations will use underground fiber optic cables or similar material. In most cases, these cables will be buried above or adjacent to the electrical collection system cables using the same trenches and minimizing the impact to the environment. There will also be a communication line that goes to the O&M building.

2.5.5 Aviation Lighting on Wind Turbines

The Federal Aviation Administration (FAA) regulations require aircraft warning markings on all structures taller than 200 feet. The two wind turbine designs being considered for this Project are taller than 200 feet, so lighted marking is required. Once the Project layout is finalized, ConnectGen will prepare a Project lighting plan using the guidance from FAA Advisory Circular AC No. 70/7460-1L, 2018. Typical aspects of aviation warning for a wind energy project include flashing red lights placed on the nacelles of the turbines. Depending on the height of the turbines, some or all turbines will require a light. All turbines greater than 500 feet in height will required to be lit. Once the final turbine type is selected a detailed marking plan will be developed in coordination with the FAA.

2.6 Wind Turbine / Met Tower Erection

2.6.1 Turbine Component Delivery and Storage

The delivery route for Project components will be dependent on the location of the turbine manufacturer. The Project components may be delivered via trucking along Interstate 80 and/or U.S. Highway 287, or may be shipped by railroad to Laramie, Wyoming and transferred to trucks for delivery to the Project.

As the wind turbine components arrive at the Project Area, they will typically be routed to the turbine pad where they are to be installed. When trucks arrive at each location, a crane will remove the turbine components from the truck. Each turbine pad will have a plan for the arrangement of major components before erection can begin. These components include tower sections, nacelle, rotor hub, and blades. Ideally, the wind turbine foundation will be ready so that the lowest tower section can be offloaded and set directly onto the foundation.

While most of the major components will arrive assembled, the rotor (consisting of the hub and blades) will be assembled onsite. Typically, the rotor would be placed with the nose up, and a crane would be used to lift blades so they can be attached to the rotor. Once these blades are attached, and any hydraulic or electrical connections are made between the hub and blades, the completed rotor package will be ready to be lifted into place.

2.6.2 Crane Movement or Assembly

When a large crane first arrives in the Project Area, it will be set up near the location of its first turbine installation and assembled there. Once the turbine at a site is erected, the crane would be left assembled and “walked” to the next turbine site in the string. The requirements for walking the cranes would set many of the design requirements for the turbine access road design, including road width and grade. In instances where the crane cannot be walked to the next turbine pad, it will be disassembled and moved to the next site, where it will be reassembled. ConnectGen may elect to use several cranes to erect turbines concurrently.

2.6.3 Wind Turbine Component Lifts

Wind turbines are installed in large, pre-assembled components that are pieced together in the field. The tower usually consists of three or four sections and is installed first. The tower sections are lifted one at a time and bolted together in place. Once the last tower section is in place, the nacelle is secured to the top of the tower. Finally, the rotor (hub and blades) is lifted into place and secured to the nacelle. While typically the rotor can be lifted into position as a complete unit, in some instances the hub is fitted onto the nacelle, and then the blades are lifted into position and fixed to the hub. The rotor lift requires the use of a helper crane.

Lifting and assembling large turbine components can only be done with good visibility and low winds. Typically, once the crane and all wind turbine components have arrived at a site, the assembly of the major components takes only a few days per turbine. ConnectGen may choose to have two or more large cranes simultaneously installing turbines.

2.6.4 Met Tower Installation

The met towers will arrive on site as individual structural components. The structural components will be assembled on the ground into tower sections and the tower sections will be lifted into place on the tower foundations using a crane. Alternatively, the individual structural members could be erected on the foundations, with the entire assembly being built member by member in the air.

3.0 Operation & Maintenance

3.1 Operation Activities

The following sections describe the activities required to operate and maintain the Project.

3.1.1 Project Administration

Project administration includes the business aspects of running a utility scale wind farm. Such activities include staffing the Project, training staff, scheduling and facilitating maintenance, monitoring the performance of the Project, and preparing necessary documentation that is required by local, state and federal agencies. Several of these activities are discussed in more detail below.

The O&M facility will be staffed during normal business hours, and staff will include a supervisor and approximately 20 Project maintenance staff.

3.1.2 Orientation and Training

ConnectGen will develop site-specific training materials that all employees on the Project will complete. It is assumed that ConnectGen will employ experienced operators and maintenance staff per specific job requirements. Training materials may address safe work procedures on wind turbines and the specific tasks necessary to provide scheduled and unscheduled wind turbine maintenance. In addition, all site personnel will be trained on the environmental management and monitoring requirements of the Project.

ConnectGen will also develop a safety orientation program that site visitors must complete prior to going out on the Project. This orientation will address those aspects of environmental management they may impact during their onsite activities. Topics may include general site procedures for:

- Avoidance of wildlife
- Threatened and endangered species identification and avoidance
- Cultural resources and fossil protection and reporting
- Requirements for control of livestock
- Noxious weed control
- Excessive dust avoidance
- Noise requirements
- Motorized access limited to site access roads
- Hunting awareness
- Worker health and safety
- Other procedures as appropriate for their onsite activities

3.1.3 Wind Farm Performance Monitoring

Wind turbines generally operate automatically without the need for centralized plant operators. The role of the site manager and staff will be to monitor the performance of the turbines, but initiate manual control only as needed for maintenance and troubleshooting.

Site management will analyze the performance trends of the wind turbines and associated facilities to evaluate the overall efficiency of Project operations. This analysis will use data collected from the wind turbines and the permanent met towers. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the Project based on the results of these analyses.

At times, wind turbines may need to draw power from the WAPA transmission line and/or local utility company in order to optimize the direction of the nacelle. Supporting infrastructure would be necessary to ensure that each turbine can both generate and draw power from either the WAPA transmission line or local utility distribution lines.

3.2 Maintenance Activities

As with any machinery, regularly scheduled preventive maintenance would help to ensure the safe and efficient long-term operation of the wind turbines. ConnectGen will develop the Project's Operation and Maintenance Plan that will describe the scheduled minor and major maintenance activities and inspection requirements anticipated during the calendar year.

Staff periodically will analyze meteorological data and performance trends for the wind turbines and associated facilities to determine the overall efficiency of the operation. It is possible some scheduled maintenance activities would be added or adjusted to improve the performance of the operation. Staff will have specific training regarding safe work on wind turbines, and the specific tasks necessary to provide both scheduled and unscheduled wind turbine maintenance.

Road maintenance will be performed on an as-needed basis. Regular snow removal will occur during the winter months to maintain access to the wind turbines, substation, and operation and maintenance building. Care will be taken in siting the operation and maintenance building to avoid contributing to snow drifting on Boulder Ridge Road. Grading and blading will be performed as required in the spring to remove vehicle ruts. Similar surface work may be needed after heavy rainfall or unusually heavy maintenance traffic. Culverts, drains, and other water management features will be kept clear to allow for natural water flows.

There may be times during the year when portions of the Project site could not easily be accessed due to high winds, or heavy rain or snow storms. A Health, Safety, Security, and Environment (HSSE) Plan will be developed for the Project to guide staff's activities during these weather conditions.

3.2.1 Project Drive-By Inspections

Staff will drive the Project site frequently to conduct a visual inspection of the operation, including wind turbines, road conditions, fencing, other infrastructure, and any incidences of waste disposal or

vandalism. The purpose of the inspections will be to identify obvious problems requiring maintenance or attention. Visual inspections are a redundant check on the wind turbines. Each wind turbine will have internal sensors to monitor its operating condition. Wind turbines requiring maintenance will be stopped remotely to allow the condition to be fixed.

3.2.2 Scheduled Wind Turbine Maintenance

Individual project components, including the Project substations, will be inspected on a daily, weekly, monthly, or annual basis, as required by that equipment. The schedule will be part of the Operation and Maintenance Plan. Inspection results would be logged and used to plan future maintenance activities. Minor oil leaks, for example, will be promptly addressed to prevent a developing problem. Wind turbine maintenance events will be scheduled based on the manufacturer's specifications. They likely would be planned for the spring and summer each year. Blade washing when required, will be conducted by a contractor who will supply the necessary water. Maintenance of the substation's transformers, switchgear, and buswork likely will require that the substation be de-energized. Most scheduled substation maintenance activities could be performed during a single day each year.

3.2.3 Unscheduled Wind Turbine Maintenance

Unscheduled repair work may be either minor or major. Replacing faulty internal components on the wind turbines, for example, will be considered a minor repair done with small tools and the wind turbine's integrated winch system. Only a pickup or small truck will be need to access the wind turbine using the existing Project access roads. Similarly, minor repairs are listed below:

- Replacing wind turbine sensors
- Replacing small motors (e.g., for the yaw drive or fans)
- Replacing small pumps (e.g., for the hydraulic system or cooling system)
- Replacing gear oil
- Replacing coolant
- Replacing hydraulic fluid
- Replacing seals (e.g., on generators or gearboxes)

Major repairs are far less common and may require a crane and heavy trucks. If the crane pad used during construction was no longer available, a pad consisting of aggregate will be installed. The repair activity will be planned to minimize the crane's time on-site and the overall effects of the repair. Major repairs are listed below:

- Replacing wind turbine blades
- Replacing a wind turbine generator
- Replacing a wind turbine gearbox
- Replacing a wind turbine transformer

The need to replace an entire wind turbine prior to decommissioning is extremely unlikely. If a wind turbine tower or foundation failed, replacement of the wind turbine would require that the wind turbine be removed in the reverse order in which it was installed. Components not used for the replacement wind

turbine would be loaded onto trucks and removed from the site. The new wind turbine would be installed using the appropriate combination of original and replacement parts with the construction methods described previously.

4.0 Decommissioning

ConnectGen estimates the Project will have an estimated 35-year life based on the useful life of the wind turbines. After that time, ConnectGen will evaluate the continued operation of the Project and either upgrade and re-power the facility with renegotiated leases or decommission it.

If the Project was decommissioned, the goal of decommissioning would be to remove the power generation equipment and return the site to a condition as close to its pre-construction state as possible. Major activities required for decommissioning would typically occur in reverse order to construction and are listed below:

- Wind turbine, wind turbine foundation, and meteorological tower removal down to depth of at least 36 inches below grade. Concrete and steel would be hauled off site and recycled as appropriate. Foundations would be filled with native weed-free aggregate and soils.
- Electrical collection system removal for above-ground structures and decommissioning in place for below-ground cables. Raw material costs could facilitate removal of below ground cables.
- Substation and switchyard removal. Fencing and fence posts would be removed. Non-native aggregate would be removed. Native aggregate would be scattered on site.
- Sale or demolition of the O&M building. The on-site septic system would be abandoned consistent with state and local requirements, unless needed for a future use of the site.
- Transmission line removal down to 36 inches below grade. Foundation holes would be filled with native weed-free soil.
- Road removal (as required by permit and/or site control agreements by landowners). Road disturbances would be re-graded to original contours where cut and fill made recontouring feasible. Any roads left in place would become the responsibility of the landowner.
- Grading.
- Revegetation and revegetation monitoring to ensure establishment of vegetation.

The specific requirements and approach for each activity are estimates, since the technologies and construction techniques available when the Project is decommissioned are expected to have changed from their current state.

4.1 Wind Turbine / Met Tower Removal

The decommissioning activity most notable to the general public will likely be the removal of the wind turbines and met towers. The disassembly and removal of this equipment would essentially be the same as their installation, but in reverse order.

4.1.1 Crane Movement and Assembly

When a large crane first arrives onto the Project site, it will be taken to the location for its first turbine removal. The crane will be assembled on that site, and then used to disassemble the wind turbine. Once the turbine at that site is disassembled, the crane will be walked to the next turbine site. If the requirements for walking the cranes cannot be met with the Project's roads, road improvements may be required. At locations where the road cannot be improved to within the tolerances for walking the crane, the crane will be disassembled, moved to the next site, and reassembled.

If the crane pads built for the construction of the Project were subsequently removed, or no longer meet the requirements for the crane, then crane pads will need to be installed or improved.

4.1.2 Wind Turbine / Met Tower Disassembly

The large components that make up a wind turbine will be disassembled in the reverse order they were assembled. The rotor (hub and blades) are removed from the nacelle and, with the help of a smaller crane, turned horizontally and set on the ground. Once the turbine rotor has been removed, a crew and small crane will disassemble it into the hub and three loose turbine blades. Next, the nacelle will be removed from the top of the tower, followed by each portion of the tower. The met tower will similarly be disassembled by a crane, starting with the upper tower sections and moving downward. The met tower sections will be disassembled on the ground into individual structural members for removal from the site. The met tower foundations will be removed to below grade as required in the lease agreements with the land owners.

4.1.3 Component Removal

The most efficient manner for component removal will be for each large component (other than the rotor) to be placed directly onto a truck's bed when it is removed from the turbine. These trucks could then immediately take the component off the site. This approach will limit the need for clearing an area around the turbine base to just enough area to set down the rotor.

When the rotor is disassembled, the blades will be placed into a carrying frame. The blades in the frame can then be loaded onto a truck for removal from the site. The hub can also be removed once it is disassembled from the blades.

4.2 Electrical System Removal

4.2.1 Buried Cable Removal

Between each of the turbine locations, there will be a buried electrical cable and fiber optic cable. ConnectGen will discuss with WAPA and landowners whether to remove these cables or leave them in place at the time of decommissioning. Removing the cables will cause some environmental impact that may need to be mitigated but leaving them in place could impact future uses of the site.

If the cables are to be removed, a trench will be opened, and the cables pulled out. The cables will be cut into manageable sections and removed from the site. The trenches will then be filled with native soil and compacted. The disturbed area will be revegetated with native plants, or landowner-approved seed mixtures.

4.2.2 Substation Disassembly and Equipment Removal

Once the Project and transmission line is decommissioned, the substations will likely be disassembled. Major components will be removed from their foundations and placed onto trucks using a crane. The steel structures and control buildings will be disassembled and removed from the site. The fence will be taken down, and fence posts removed. The gravel placed in the substation yards will be removed if it was not native rock. Native rock would be scattered onsite.

ConnectGen will discuss with WAPA and the landowner whether the substation foundation and grounding grid will be removed or left in place.

4.2.3 Transmission Line Removal

Assuming the transmission line no longer serves a purpose for the site, it will be disassembled and removed. Initially, the wires will be removed from the tower hangers and collected for recycling. The tower structures will then be disassembled and removed, including grounding rods to six inches below grade. The areas around the poles, along with any access roads that were necessary, will be removed if it was not native rock. Native rock would be scattered and spread onsite.

4.3 Operations and Maintenance Building Removal

The O&M building will either need to be demolished and removed or sold. All equipment and furniture within the building if demolished will likely be removed. All debris from the demolition will likely be removed from the Project site. Any installed septic system will also be abandoned in a manner consistent with State and local health regulations unless retained by any new owner of the O&M building.

4.4 Structural Foundation Removal

When the wind turbines, met towers, and substation components are removed from their foundations, the foundations need to be removed per the requirements of the lease agreement. The concrete and steel in the foundations will be broken-up and removed to a depth of at least 36 inches below grade. All concrete and steel debris will be removed from the site.

4.5 Civil Decommissioning Activities

4.5.1 Road Removal

The landowners will have the choice when the Project is decommissioned as to whether the Project access roads are to be removed. If the roads are left, maintenance of the roads will become the responsibility of the landowner.

Once all the necessary equipment and materials have been removed from an area and the road to that area is no longer needed, it can be removed. The road surface and bed materials will be removed down to grade. Any materials native to the Project area will be scattered across the site, and foreign materials removed.

4.5.2 Re-Grading and Re-Vegetation

For areas where equipment or materials are removed, those areas will be re-graded back to pre-construction contours, to the extent possible. Holes where foundations have been removed to 36 inches below grade will be refilled with native soils. Removed roads will be re-graded to original contours if cuts and fills make such re-grading practical. Crane pads will also be re-graded.

All areas of disturbed ground will be re-vegetated using native seed mixtures or those approved by the landowner.

5.0 Environmental Protection Measures

ConnectGen will plan, coordinate, and conduct each of the Project phases in a manner that protects the quality of the environment. ConnectGen will comply with applicable federal, state, and local laws, regulations, permits, and ordinances related to environmental protection.

5.1 Project Plans

ConnectGen will develop and implement the following environmental-related plans to avoid or minimize adverse effects to environmental resources from construction, operations and maintenance, and decommissioning:

- **Transportation and Traffic Management Plan.** This plan will describe measures designed to avoid or minimize adverse effects to the existing transportation system.
- **Blasting Plan.** This plan will describe measures designed to minimize adverse effects due to blasting.
- **Weed Management Plan.** This plan will describe the practices to manage noxious weeds during construction and operations activities.
- **Reclamation Plan.** This plan will describe post-construction activities to reclaim disturbed areas.
- **Lighting Plan.** This plan will follow the guidance from FAA Advisory Circular AC No. 70/7460-1L, 2018 to identify required aviation warning lights for nacelles.
- **Spill Prevention, Control and Countermeasures (SPCC) Plan.** This plan will describe the measures designed to prevent, control, and clean up spills of hazardous materials.
- **Storm Water Pollution Prevention Plan (SWPPP).** This plan, consistent with federal and state regulations, will describe the practices, measures, and monitoring programs to control sedimentation, erosion, and runoff from disturbed areas.
- **Bird and Bat Conservation Strategy (BBCS).** This plan will describe a program of specific and comprehensive actions that, when implemented, reduce risk of avian and bat mortality.
- **Health, Safety, Security, and Environment (HSSE) Plan.** This plan will describe measures designed to avoid and/or minimize adverse effects associated with breaches in Project security during

construction including terrorism, sabotage, vandalism, and theft. The plan will include provisions describing how the Project construction team will coordinate with state and local law enforcement agencies during construction to improve Project security and facilitate security incident response, if required. In addition, the plan will guide staff activities during adverse weather conditions, including high winds, heavy rain, or snow storms.

- **Fugitive Dust Plan:** This Plan, to be prepared pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f), will describe the measures to minimize fugitive dust emissions.
- **Erosion Control Plan:** This plan will identify areas of potentially higher erodibility due to excavation, grading or ground disturbance, and will define appropriate erosion control measures that may be implemented during or after construction.
- **Unanticipated Discoveries Plan:** This plan will describe procedures for responding to the discovery of archaeological, cultural resources or paleontological resources during construction.

5.2 Measures

ConnectGen will develop and implement Environmental Protection Measures (EPMs) to avoid or minimize adverse effects to environmental resources from construction, operations and maintenance, and decommissioning of the Project. ConnectGen will designate certain areas as “environmentally sensitive” and take actions to avoid or minimize effects on these areas. Environmentally sensitive areas may include, for example, wetlands, certain water bodies, cultural resources, or wildlife habitat.

ConnectGen will implement the EPMs listed in Table 5-1 during the Project phases (construction, operations and maintenance, and decommissioning) as noted in the table. EPMs are an integral part of the Project. Project activities described in this Project Description document would incorporate and be subject to the EPMs and requirements imposed as part of federal, state, or local permits and authorizations.

TABLE 5-1: Environmental Protection Measures

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
General					
GEN-1	The Project will be designed, constructed, and operated in compliance with Albany County Zoning Resolution (as amended; Albany County 2015) and Albany County Wind Energy Siting Regulations. Construction and operations activities will comply with all Federal, State, and county environmental regulations, as applicable.	X	X	X	X
GEN-2	The Project will delineate environmentally sensitive areas (e.g. wetlands, waters, habitats) located within or adjacent to the Project Area and seek to avoid or minimize impacts to these areas during design and final siting. Environmentally sensitive areas will be identified in construction planning documents. Construction and operations personnel will be informed of the appropriate practices that may be applicable to avoid or minimize impacts when working in the vicinity of these areas.	X	X	X	X
GEN-3	Construction travel will be restricted to existing roads and permanent or temporary access roads identified in the final Project Site Plan.		X		
GEN-4	The Project will implement speed limits on construction and permanent access roads to minimize potential for fugitive dust, impacts to wildlife, and for safety purposes. Speed limit signs will be posted as appropriate.		X	X	X
GEN-5	Construction and operations equipment will be inspected periodically per the manufacturer's specifications and maintained in good working condition.		X	X	X
GEN-6	Fences, gates and other access controls (e.g. cattle guards) will be maintained in good working order during construction and operation activities. Damaged access controls will be repaired or replaced as soon as possible. Security guards or access attendants may be employed during the construction phase if needed.		X	X	X
GEN-7	Routine operation and maintenance activities will be scheduled and performed during daylight hours.			X	
GEN-8	Temporary sanitary facilities will be located in convenient locations throughout the site. Facilities will be located greater than 100 feet from any waterbody or wetland and will be regularly serviced and maintained.		X		X
Air Quality					
AQ-1	A Fugitive Dust Control Plan will be prepared pursuant to Wyoming Air Quality Standards and Regulations Chapter 3, Section 2(f).	X	X		X
AQ-2	All unpaved roads and disturbed areas where construction activities are occurring, including temporary laydown areas, will be treated with water or other surfactants as frequently as necessary to control fugitive dust. Wind erosion control techniques such as windbreaks, water, WY DEQ-approved chemical dust suppressants, and/or vegetation will be applied to soil disturbance areas that could potentially result in wind-blown soils.		X		X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
AQ-3	All construction equipment vehicle tires will be cleaned via track pad entrances as necessary to limit tracking of soil onto public roadways prior to leaving the construction site.		X		
AQ-4	All vehicles that are used to transport solid bulk material on public roadways and have the potential to cause visible dust emissions on public roadways either will be covered or the materials sufficiently wetted in a manner to minimize fugitive dust emissions.		X		X
AQ-5	Idling equipment will be turned off when not in use.		X	X	X
AQ-6	Any stationary sources associated with construction or operations activities requiring WDEQ-AQD permits or waivers will be controlled in accordance with relevant regulations and permit conditions.		X	X	X
Cultural Resources					
CR-1	An Unanticipated Discoveries Plan will be developed that describes procedures for responding to the discovery of archaeological or other cultural resources, including unmarked graves, during construction.	X	X		
CR-2	Conduct appropriate worker education concerning the recognition and protection of cultural resources for all on-site personnel.	X	X	X	X
CR-3	Conduct a new Class I records search for the Project and Class III cultural resources inventory for all work areas where ground disturbance may occur to comply with Section 106 of the NHPA. The Class III inventory should be performed subsequent to the Draft EIS and after the Project design is finalized. The survey results will be shared with the Wyoming SHPO to identify and avoid resources eligible for the National Historic Register.	X			
CR-4	To the extent practicable, construction activities will avoid impacts to cultural resource sites that may be identified within the Project Area. Cultural resource sites and appropriate buffers will be delineated on construction drawings as restricted areas and will be flagged in the field with signage and/or temporary fencing to prevent unauthorized entry.		X		X
CR-5	Conduct a systematic architectural inventory of the Project Area and use setbacks to reduce impacts to historic architectural resources to the extent practicable.	X			
Hazardous Materials					
HAZ-1	Prior to commencing construction, a Hazard Communication Program will be developed to comply with OSHA requirements under the Hazard Communication Standard. Elements of the Hazard Communication Program include a hazard determination process, approval process, materials inventory system, and training for site personnel. At a minimum, hazardous materials will be properly labeled and stored and material safety data sheets will be available at the site.	X	X	X	X
HAZ-2	Care will be taken when selecting the location of hazardous materials storage areas within the site to avoid potentially sensitive areas.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
HAZ-3	In compliance with the EPA's Spill Prevention, Control and Countermeasure Regulation, secondary containment for hazardous materials that are stored onsite will be provided to minimize potential effects to the surrounding environment. Examples of secondary containment are concrete bermed areas and manufactured containment pallets.		X	X	X
HAZ-4	Concrete washout would only be disposed of in properly designed concrete washout facilities.		X		
HAZ-5	A Spill Prevention Control and Countermeasure Plan (SPCC Plan) will be prepared per local, State and Federal regulations and will be on site during construction, operation, and maintenance that defines procedures for storage, clean up and disposal of petroleum-based products. The SPCC will identify the types of equipment and materials that will be maintained on-site to facilitate a cleanup in the event of a spill. Construction and operations personnel will be trained to recognize and respond to accidental releases or spills in compliance with the SPCC. Regularly scheduled training modules will be provided to ensure prevention and preparedness throughout the life of the Project.		X	X	X
HAZ-6	All refuse, wastes, or hazardous materials will be handled, processed, treated, stored, and properly disposed of in accordance with Federal, State, and local regulations.		X	X	X
HAZ-7	Should previously unknown hazardous materials such as contaminated soils be encountered within the site during construction, operations and maintenance, or decommissioning, the materials will be characterized and the appropriate agency will be informed.		X	X	X
Public Health and Safety					
PHS-1	All site personnel, regardless of job responsibilities, will receive Project orientation including environmental and health and safety Project procedures, requirements and site rules.		X	X	X
PHS-2	Rail Tie will coordinate with local emergency services, including the Tie Siding Volunteer Fire Department personnel and Laramie Fire Department in development of response or evacuation plans and procedures. Rail Tie personnel will continue routine coordination with local emergency services throughout the life of the Project.	X	X	X	X
PHS-3	Fueling of vehicles will be conducted in accordance with procedures that will minimize the risk of fires and spills.		X	X	X
PHS-4	Selected Rail Tie personnel and construction crew leads will be trained in first aid, automated external defibrillator operation, and CPR. Adequate materials and resources for onsite treatment, first aid, and stabilization will be available onsite at all times.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
PHS-5	A Health, Safety, Security and Environment (HSSE) Plan will be prepared for worker protection, as required by OSHA, with emphasis on safety and health regulations for construction and operations and maintenance. All employees would be required to conform to safety procedures and to receive appropriate training for their job responsibilities. The HSSE Plan will include requirements for first aid and other emergency medical material to be stored on site and in maintenance vehicles.		X	X	
PHS-6	Construction equipment will be outfitted with OSHA-required safety devices. Hard hats, safety boots, ear and eye protective equipment, and other safety equipment will be used on the construction site.		X		
PHS-7	Wind turbines will be operated in conformance with the manufacturer's operational parameters.			X	
PHS-8	Staff will perform routine inspections of the Project facilities, including wind turbines, roads, fencing, and other infrastructure, and will identify any incidences of waste disposal, theft, or vandalism.			X	
PHS-9	Chain-link security fencing will be installed at the substation and switchyard, and at the outdoor storage area adjacent to the operations and maintenance building to prevent unauthorized entry.		X	X	
PHS-10	During construction, temporary plastic mesh fencing will be installed to protect public and worker safety near excavated wind turbine foundations, electrical collection system trenches, material laydown areas, or any other areas deemed hazardous. Open holes and trenches without fencing will be covered or fenced to deter wildlife and livestock from becoming trapped or injured.		X		
PHS-11	The general public will not be permitted access to the Project facilities. Most private property within the Project area is fenced off. If trespassers are identified on privately-owned land, they will be escorted off of the property. Some of the property that the Project will be constructed on is State-owned land that is open to the public. The Project will coordinate with the state land office to identify appropriate temporal or spatial access restrictions during construction and operation periods.		X	X	X
PHS-12	The Project will post any roads it constructs as being private roads only for use by authorized personnel in connection with Project operations.		X	X	X
PHS-13	An Emergency Response Plan will be prepared in coordination with Albany County emergency services to ensure that policies and procedures are consistent with those already established for the county.	X			
PHS-14	Wildfire Mitigation Measures will be developed in coordination with the Laramie Fire Department and Tie Siding Volunteer Fire Department and will be incorporated in the Project's Emergency Response Plan.	X			
PHS-15	Onsite personnel will routinely inspect the wind Project facilities for fire hazards.			X	
PHS-16	Wind turbines will be outfitted with lightning protection systems that will reduce the chance of fires igniting from lightning strikes.		X	X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
PHS-17	The base of each turbine will be surrounded by a non-flammable, aggregate-based turbine pad. The turbine pad will be regularly inspected, maintained, and treated to prevent vegetative growth that could result in a fire hazard.			X	
PHS-18	All construction and maintenance vehicles will be equipped with fire extinguishers in the event of an equipment fire. Should an onsite fire occur, Project personnel will call 911 to alert the Laramie Fire Department and Tie Siding Volunteer Fire Department.		X	X	X
PHS-19	Fire suppression equipment, including a trailer-mounted tank of 500 gallons or more capacity with a gasoline powered pump, shall be maintained in the Project Area at all times during construction and operations.		X	X	X
Noise					
NOISE-1	Construction vehicles and equipment will be maintained in proper operating condition and will be equipped with manufacturers' standard noise control devices or better (e.g., mufflers, engine enclosures).		X		X
NOISE-2	Construction and hauling equipment will be maintained adequately and equipped with appropriate mufflers.		X		X
NOISE-3	Blasting or hydraulic hammering will be limited to daylight hours.		X		X
Geology and Soils					
GEO-1	Temporary ground disturbance activities will be limited to the minimum amount necessary in order to safely construct project facilities.		X		
GEO-2	Ground disturbance activities in areas of highly erodible soils and steep slopes will be avoided to the extent practicable.		X		
GEO-3	Roads will be designed to follow existing contours and to avoid steep slopes that would require extensive cut-and-fill construction.	X			
GEO-4	Soils excavated from the turbine pads will be segregated into separate stockpiles for topsoil and subsoil. Subsoil will be used primarily as backfill while topsoil will be spread as the topmost layer of soil to support revegetation. Any unused soils or excavated rock will be removed from the site or disposed of in coordination with the landowner.		X		
GEO-5	An Erosion Control Plan (ECP) will be developed to identify areas of potentially higher erodibility due to excavation, grading, or ground disturbance. The ECP will define appropriate erosion control measures that may be implemented during and after construction.		X		
GEO-6	Erosion control measures will be periodically inspected, and as required after precipitation events. Erosion control measures will be repaired or replaced as necessary.		X	X	X
GEO-7	As soon as practicable following completion of ground disturbance activities, areas of temporary ground disturbance will be regraded and recontoured to blend with the natural terrain while maintaining existing drainage patterns.		X	X	X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
GEO-8	All private landowner's existing drainage and erosion control structures such as diversions, irrigation ditches and tile lines shall be avoided by the Project, or in the alternative, appropriate measures are to be taken to maintain the design and effectiveness of the existing structures. Any structures disturbed during construction shall be repaired to as close to original condition as possible, as soon as possible.		X		
Paleontological Resources					
PALEO-1	Prior to construction, a pedestrian survey will be conducted by a qualified professional paleontologist in areas of high potential for fossil occurrence where ground disturbance activities are proposed to occur.	X			
PALEO-2	A Paleontological Unanticipated Discoveries and Mitigation Plan will be prepared that outlines appropriate actions in the event of an unanticipated discovery of fossils, including sampling investigation and reporting, and if needed, museum storage coordination for any specimen or data recovered.	X	X		
PALEO-3	Construction personnel involved with earth-moving activities will be informed of the possibility of encountering fossils, how to recognize fossils, and proper notification procedures. This worker training will be prepared by a qualified paleontologist and will be presented to all construction personnel during orientation.	X	X		
PALEO-4	If fossils are discovered in an active construction area, work would be stopped at that location and the construction project manager would be immediately notified.		X		
Recreation					
REC-1	City officials in Laramie and Fort Collins and private campgrounds or mobile home park owners will be coordinated with to identify facilities that are available to construction workers in order to avoid displacement of public recreational use at private campgrounds.	X	X		
REC-2	Recreational activities, such as hunting, may be restricted temporarily during construction for the safety of workers and recreationists; however, following construction recreational activities may continue in conformance with the property lease agreements and/or land use regulations.		X	X	X
REC-3	To the extent practicable, construction and maintenance traffic will be limited to minimize disruption of normal land use and recreation activities.		X	X	X
Transportation					
TRANS-1	Rail Tie will coordinate with WYDOT and Albany County to implement a Transportation and Traffic Management Plan that minimizes risks and inconvenience to the public, while ensuring safe and efficient construction of the Project. The plan will focus on turbine component deliveries, traffic and circulation primarily within and in the vicinity of the Project area. It will be designed to minimize potential hazards from increased truck traffic and worker traffic and to minimize impacts to traffic flow in the vicinity of the Project.	X	X		

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
TRANS-2	To minimize conflicts between Project traffic and background traffic, deliveries of project components will be scheduled around local volume peaks to the extent feasible.		X		
TRANS-3	Road clearances may include temporarily blocking road intersections via construction cones and/or staffing blocked intersections with a traffic-control flagger to allow haul trucks sole access to the road while delivering Project components. If required, public road closures are not expected to exceed 15 minutes during each/any road closure event.		X		X
TRANS-4	The Project will coordinate with WY DOT to determine whether temporary speed limit reductions during construction are applicable where Project access points intersect with State Highway 287.	X	X		
TRANS-5	Construction deliveries would be coordinated to avoid major traffic-generating events in Laramie including on the University of Wyoming campus, to the extent practicable.		X		
TRANS-6	The Project would coordinate with local law enforcement, to manage traffic flows and monitor traffic speed during deliveries.		X		X
TRANS-7	All staging activities and parking of equipment and vehicles would occur within the Project Area and would not occur on maintained Albany County roads.		X		
TRANS-8	Equipment and material deliveries to the site would be performed by professional transportation companies familiar with the type of equipment, loads involved, and U.S. DOT, WYDOT, and Albany County regulations.		X		X
TRANS-9	Road signs would be erected to notify travelers and local residents that construction is occurring in the area and provide information regarding the timing and route for oversized vehicle movements and deliveries. The erection/placement of road signs and the Project construction activities would be performed in accordance with the Albany County Zoning Resolution (as amended; Albany County 2015) and coordinated with the Albany County Road and Bridge Department and WYDOT.		X		
Vegetation					
VEG-1	A Reclamation Plan will be prepared prior to the onset of construction that will guide the revegetation of disturbed areas during and following the construction process.	X	X		
VEG-2	Revegetation will be implemented for all areas temporarily disturbed by construction or decommissioning of the facility in conformance with landowner agreements and in compliance with State and/or Federal permitting requirements. Temporarily disturbed areas will be revegetated as soon as practicable, either through natural revegetation practices or through the use of reseeding. If reseeding is required, plant species native to the affected ecosystems will be utilized .		X		X

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
VEG-3	The Reclamation Plan will identify locally-approved, weed free, seed mixtures that prioritize plant species native to the ecosystems affected by site construction.	X	X		
VEG-4	The Project will develop and implement an Integrated Weed Management Plan that identifies appropriate controls to avoid, minimize, or treat the spread of noxious weeds directly resulting from construction, operations, and decommissioning.	X	X	X	X
VEG-5	The Project will perform a preconstruction survey of the project footprint to identify existing locations of noxious weeds. Any locations delineated will be identified in the Weed Management Plan, and appropriate controls will be applied to Project activities in these areas.	X			
VEG-6	Upon completion of construction, a post-construction weed inventory survey will be performed to validate the effectiveness of the weed management program and ensure that invasive weed levels have not exceeded preconstruction levels.		X	X	
VEG-7	The Project will coordinate with the weed management contractor and host landowners regarding specific treatment methods on their respective properties.	X			
VEG-8	Any herbicide use as part of vegetation management activities will follow label instructions and relevant Federal, State, and local laws.		X	X	X
Visual Resources					
VIS-1	Collection lines will be buried and co-located with access roads to the extent practicable.	X	X		
VIS-2	The operations and maintenance building will be designed with rural and agricultural architectural elements to minimize contrast with existing structures. The building will be painted with earth-tone colors identified in the Bureau of Land Management (BLM) Standard Environmental Colors palette or as required by Albany County to reduce visual contrasts from color.	X	X	X	
VIS-3	Outdoor facility lighting will be designed with light caps and/or directed downward to minimize offsite glare.	X	X	X	
VIS-4	Turbine components will be painted with a light, non-reflective white color in accordance with the Albany County Wind Siting Regulations (Albany County 2011).	X	X	X	
VIS-5	The Project will follow Federal Aviation Administration (FAA) Obstruction Marking and Lighting requirements as defined by Advisory Circular No 70/7460-1L and will coordinate with the FAA on the feasibility of Aircraft Detection Lighting System (ADLS) to reduce the potential impact of nighttime lighting.	X	X	X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
Water Quality					
WQ-1	The Project will identify, avoid, and/or minimize adverse effects to wetlands and waterbodies.	X	X	X	X
WQ-2	Woody vegetation in potentially disturbed wetlands will be cut at ground level to leave the root systems intact and encourage sprouting of the existing species following construction.		X		
WQ-3	Equipment operation in or directly adjacent to wetlands or waterbodies will be kept to the minimum necessary to safely perform the work. Prefabricated equipment matting will be used to avoid rutting, soil compaction, and other ground disturbance where temporary work areas occur in wetlands or waterbodies.		X		X
WQ-4	Wetland and aquatic resource boundaries will be clearly identified on all construction plans and will be posted with signs and flagging in the field.		X		X
WQ-5	Appropriate permits will be secured should any fill or dredge activities in wetlands or other waters of the United States (WOTUS) be required.	X	X	X	X
WQ-5	No parking or servicing of construction-related vehicles will occur within any wetland boundary.		X	X	X
WQ-6	Erosion control barriers and other measures, such as silt fencing, fiber logs, and/or hay bales will be placed immediately upgradient of wetlands and waterbodies to minimize sediment transport and deposition.		X		X
WQ-7	Access roads will be designed and constructed to minimize disruption of natural drainage patterns including perennial, intermittent, and ephemeral streams.	X	X		
WQ-8	A Stormwater Pollution Prevention Plan (SWPPP) outlining specific erosion control measures will be prepared, and its requirements will be implemented onsite for the proposed Project. The SWPPP will comply with USEPA and WYDEQ requirements.	X	X		
WQ-9	Construction activities shall be performed using methods that prevent entrance or accidental spillage of solid matter, contaminant debris, and other objectionable pollutants and wastes into flowing streams or dry watercourses, lakes, and underground water sources.		X		
WQ-10	Borrow pits, if required, shall be excavated so that the water will not collect and stand therein. Upon completion of construction, the sides of borrow pits will be brought to stable slopes, with slope intersections shaped to carry the natural contour of adjacent, undisturbed terrain into the pit or borrow area, giving a natural appearance.		X		
WQ-11	Waterbody crossings would incorporate WGFD design specifications and professional engineering standards, as applicable. Open-bottom culverts will be used where appropriate to avoid changing stream morphology or removing suitable fish habitat. In addition, such waterbody crossings and culverts would be constructed in a manner that prevents sediment erosion, deposition of sediment, and minimizes impacts to any environmentally sensitive areas.	X	X	X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
WQ-12	Excavated material or other construction materials will not be stockpiled or deposited on or near stream banks, pond shorelines, or other watercourse perimeters where they can be washed away by storm runoff or can, in any way, encroach upon the actual water body itself.		X		
WQ-13	Water quality BMPs would be implemented at waterbody crossings to minimize any unforeseen impacts to the Platte River System's watershed and associated vegetation communities.		X		X
WQ-14	If new groundwater wells are required for construction or operation, the Project will coordinate with the WY State Engineer's Office to ensure withdrawal volumes will not adversely affect supplies for other uses.	X	X	X	
Wildlife					
WL-1	Initial vegetation clearing would be performed during the non-breeding season for birds (September 1 through April 15) if feasible. If vegetation clearing cannot occur during the non-breeding season, surveys will be performed in breeding bird habitat to identify avian nesting activity within the Project Area. Nest sites would be avoided until determined to be inactive.	X	X		
WL-2	The Project will develop and implement a Bird and Bat Conservation Strategy to avoid and reduce potential impacts to non-listed bird and bat species that may result from the operations of the Project.	X	X	X	
WL-3	The Project will develop and implement eagle conservation practices and seek to avoid the unintentional take of eagles at wind energy facilities.	X	X	X	
WL-4	In consideration of the USFWS' Land Based Wind Energy Guidelines (2012), the Project will perform post-construction mortality surveys to calculate the fatality rate of birds and bats.			X	
WL-5	All trash and refuse will be disposed of in designated, covered waste receptacles and regularly removed from the site in order to avoid attracting scavengers.		X	X	X
WL-6	The overhead power to ground wire (OPGW) wires associated with the Project 345-kV gen-tie line will be marked with bird flight diverters consistent with methods suggested in the Avian Power Line Interaction Committee's Reducing Avian Collisions with Power Lines (2012).		X		
WL-7	If overhead collection lines are included in the Project's final design, the electric lines will be designed to incorporate appropriate spacing of energized parts to avoid or reduce the potential for electrocution risk to large birds, specifically raptors. The Project's design would consider the Avian Power Line Interaction Committee's Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 and Reducing Avian Collisions with Power Lines: The State of the Art in 2012.	X			
WL-8	The Project will notify the USFWS within 24 hours of federally listed species or eagle mortality documented on the Project site.		X	X	

Resource Category	Measure	Implementation			
		Preconstruction	Construction	Operations	Decommissioning
WL-9	The Project established a 1-mile spatial buffer around known, occupied eagle nests identified during the 2019 and 2020 raptor nest surveys. The area within the 1-mile buffers was excluded from the Project Siting Corridor, therefore wind turbine generators would be setback a minimum 1-mile from the identified eagle nests. If future nest surveys identify additional occupied eagle nests, the Project will coordinate with the USFWS to identify appropriate nest-specific avoidance or minimization measures.	X			
WL-10	To the extent practicable, herptile habitats for Species of Greatest Conservation Need, such as fallen trees, prairie dog colonies, and potential basking rocks, will be left intact.		X	X	X
WL-11	Construction activities will be avoided between Nov 15 – April 30 in areas of Mule Deer Crucial Winter Range ¹ .		X		X

¹ WGFD. 2020. Wyoming Game and Fish Open Data. Available online at: <https://wyoming-wgfd.opendata.arcgis.com/>. Accessed December 2019 and February 2021.

6.0 References

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American Wind Energy Association (AWEA). 2018. U.S. Wind Energy Projects. Accessed on October 23, 2019. <http://www.awea.org/projects/projects.aspx?s=Wyoming>

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DRAFT

FIGURES

Figure 1: Project Area

Figure 2: Project Siting Corridors

Figure 3: Representative Project Layout (3 MW turbine)

Figure 4: Representative Project Layout (6 MW turbine)

DRAFT

Figure 1: Project Area

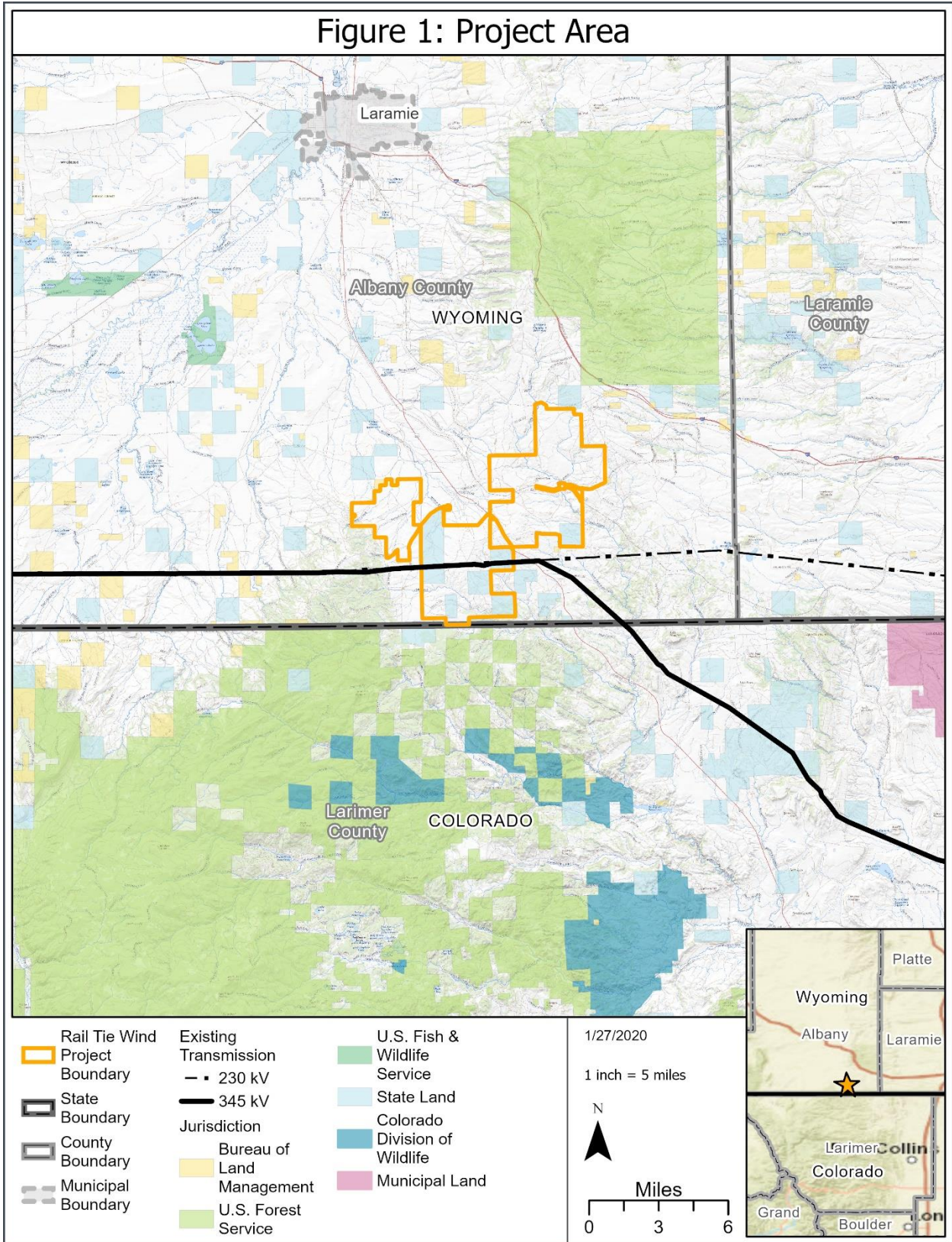


Figure 2: Project Siting Corridors

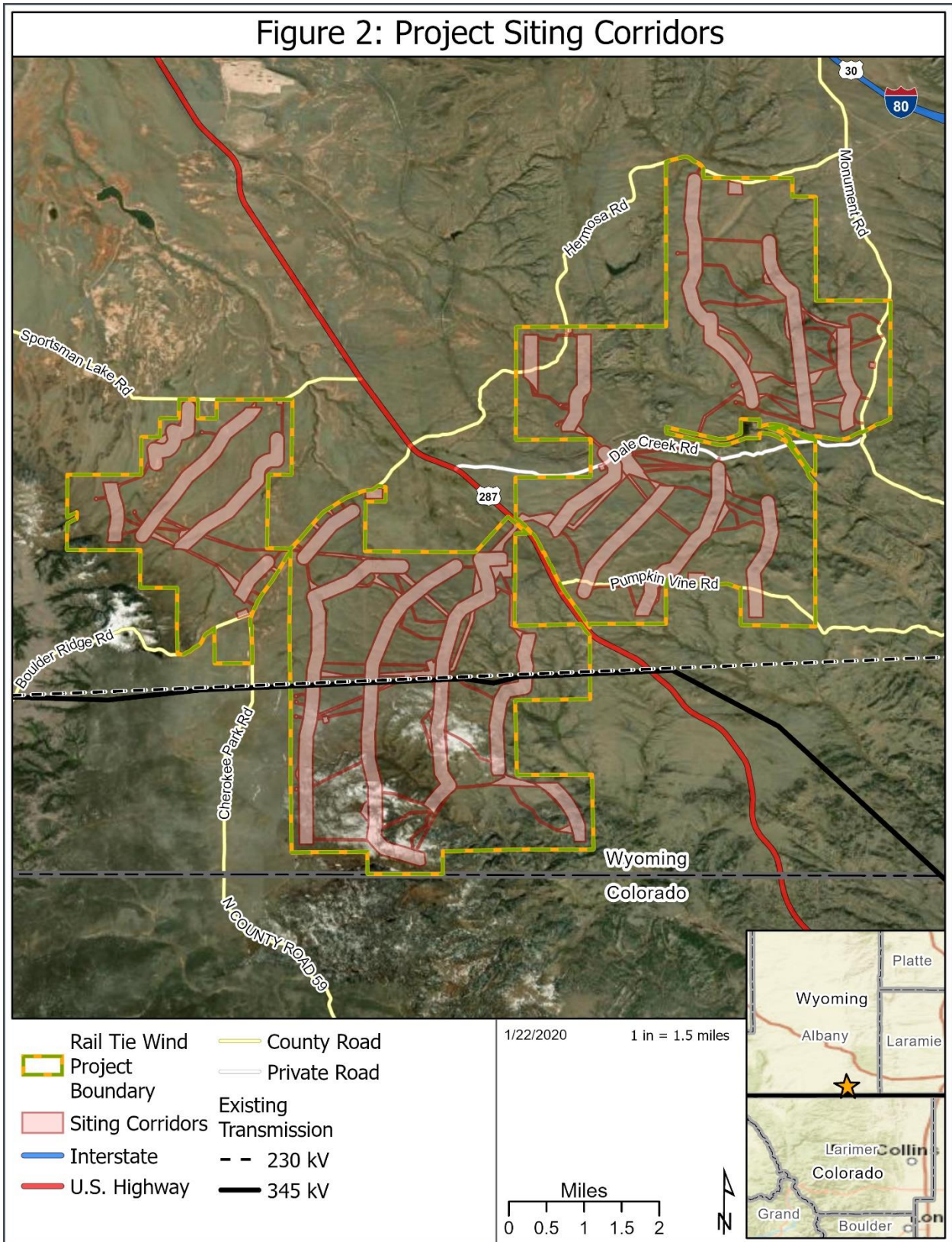
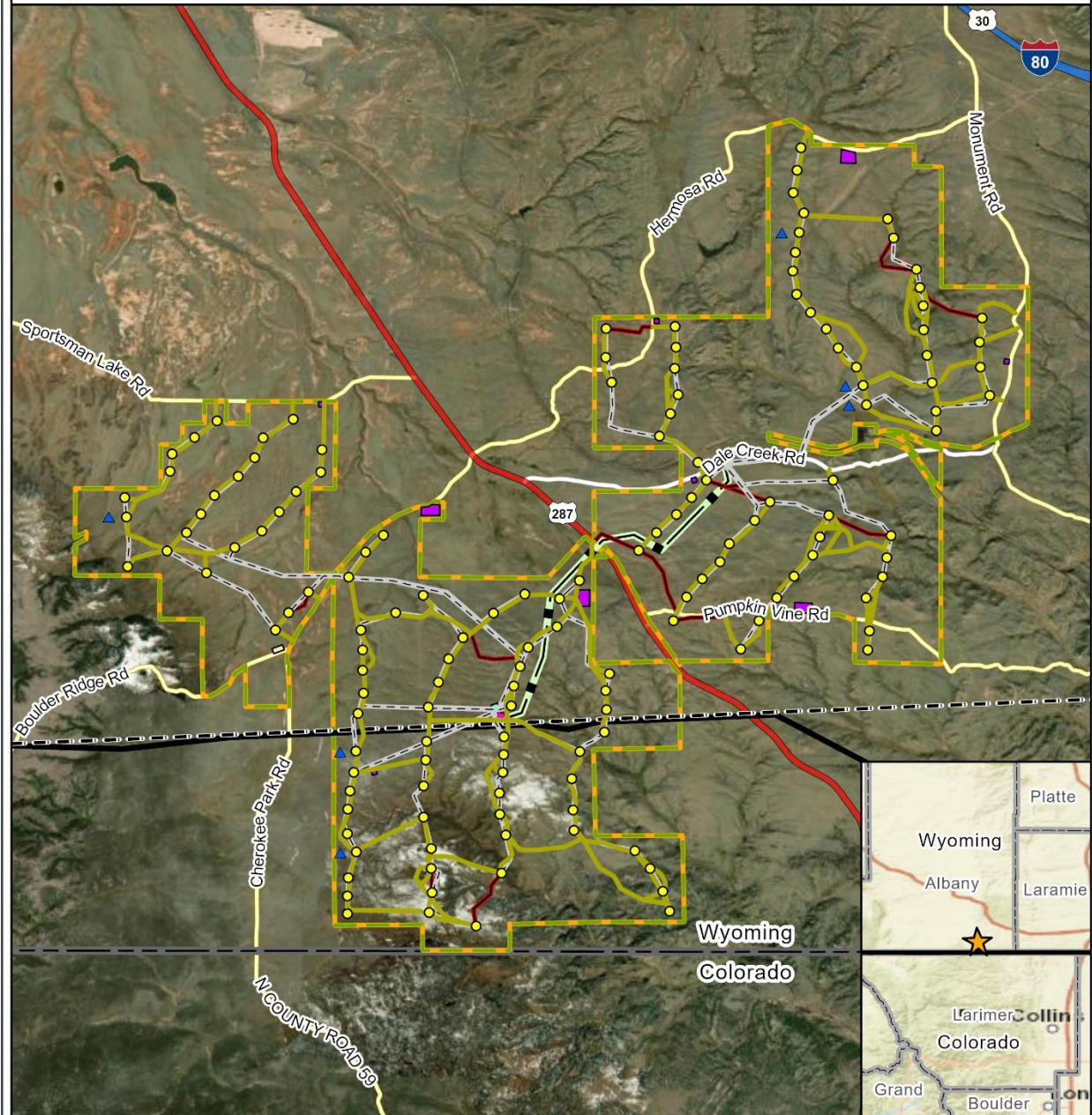


Figure 3: Representative Project Layout (3 MW Turbine)



Rail Tie Wind Project Boundary	Existing Transmission 230 kV	Met Tower Locations	Phase I Project Substation
Interstate	Existing Transmission 345 kV	Access Roads	Phase II Project Substation
U.S. Highway	<u>Representative Project Features</u>	Collection Lines	Interconnection Switchyard
County Road	Representative Project Features	Crane Paths	Laydown Yards
Private Road		Transmission Line	O&M Site

PRELIMINARY: Final locations of features shown pend additional engineering, environmental surveys, and other siting considerations.

2/25/2020 1 in = 1.5 miles

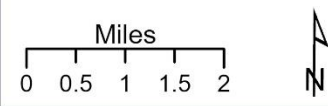
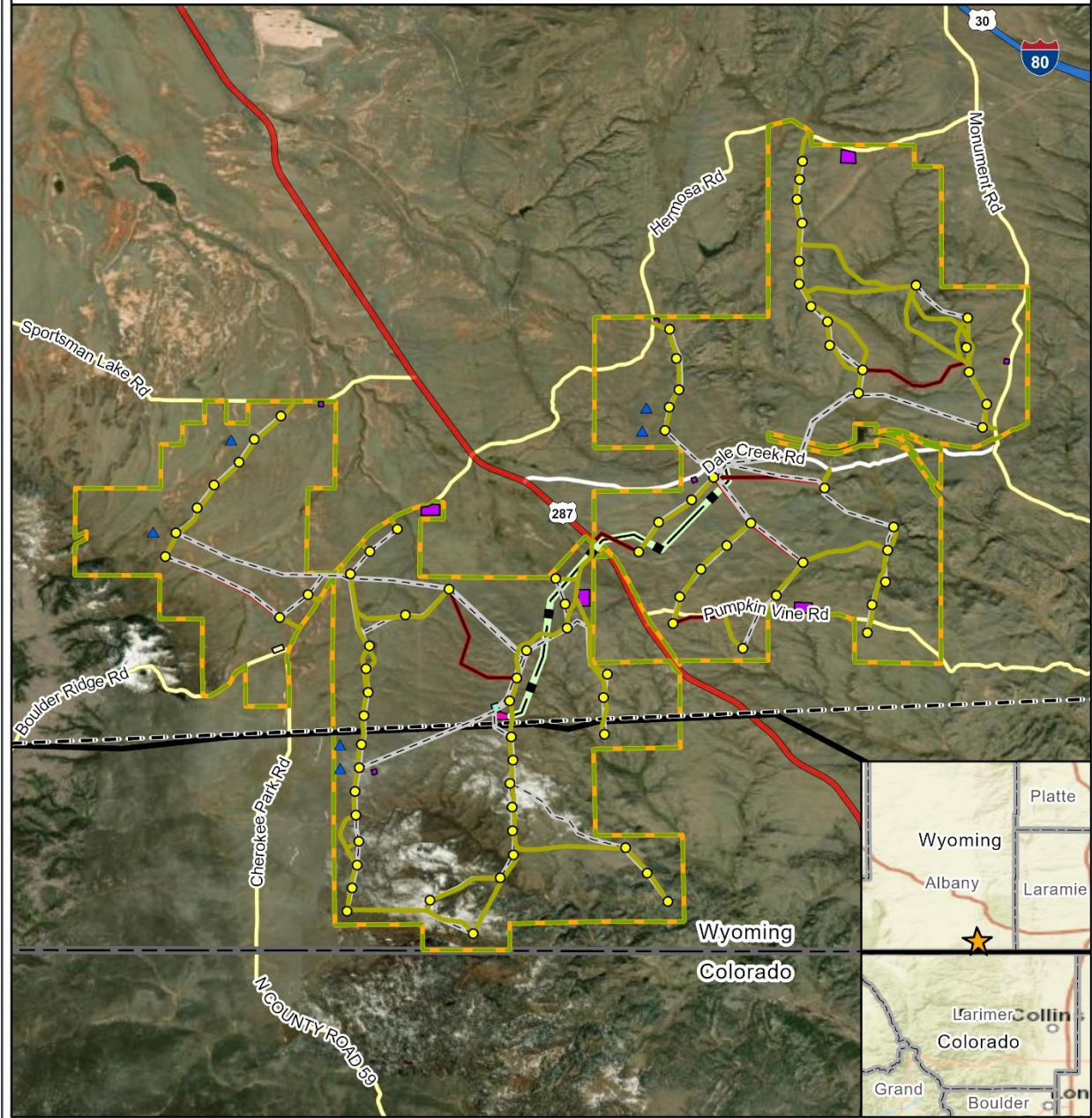


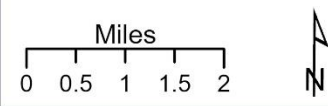
Figure 4: Representative Project Layout (6 MW Turbine)



<ul style="list-style-type: none"> Rail Tie Wind Project Boundary Interstate U.S. Highway County Road Private Road 	<ul style="list-style-type: none"> <u>Existing Transmission</u> <ul style="list-style-type: none"> 230 kV 345 kV <u>Representative Project Features</u> <ul style="list-style-type: none"> Representative Project Features 	<ul style="list-style-type: none"> Met Tower Locations Access Roads Collection Lines Crane Paths Transmission Line 	<ul style="list-style-type: none"> Phase I Project Substation Phase II Project Substation Interconnection Switchyard Laydown Yards O&M Site
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PRELIMINARY: Final locations of features shown pend additional engineering, environmental surveys, and other siting considerations.

1/27/2020 1 in = 1.5 miles



APPENDIX B

DRAFT Programmatic Agreement

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DRAFT 2/4/2021
PROGRAMMATIC AGREEMENT

AMONG
THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,
COLORADO STATE HISTORIC PRESERVATION OFFICER,
WYOMING STATE HISTORIC PRESERVATION OFFICER,
AND
ADVISORY COUNCIL ON HISTORIC PRESERVATION

REGARDING
THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,
WYOMING

1. **WHEREAS**, the U.S. Department of the Energy, Western Area Power Administration (WAPA), received a request from ConnectGen Albany County LLC (Applicant) for the proposed Rail Tie Wind Project (Project), to interconnect with WAPA’s Ault-Craig 345-kilovolt (kV) transmission line in Albany County, Wyoming (WY); and
2. **WHEREAS**, Applicant’s proposed Project would consist of 84 to 149 wind turbines with a generating capability of 3 to 6 megawatts (MW) each, for a combined total generating capacity of up to 504 MW, within an approximate 26,000-acre Project area roughly 15 miles southeast of Laramie, near Tie Siding and bisected in the south by U.S. Highway 287; and in addition to turbines, the proposed facility would include access roads, collection lines, a substation, switchyards, control buildings, three or more meteorological towers, and other related infrastructure, on private and state lands; and
3. **WHEREAS**, pursuant to Section 106 of the National Historic Preservation Act, as amended (NHPA: Public Law 89-665; 54 U.S.C. 300101 et seq. and 54 U.S.C. § 306108), WAPA is required to take into account the effects of its undertakings on historic properties; and with regard to this proposed Project, WAPA defines its “undertaking” as the interconnection — to which the proposed Project is a connected action under the National Environmental Policy Act (NEPA) —, and which WAPA is required to consider the request in accordance with its Open Access Transmission Service Tariff and the Federal Power Act, as amended; and
4. **WHEREAS**, WAPA lacks authority over Applicant’s proposed Project, including electrical generation methods, selection and siting of equipment, and construction and operation of the proposed Project; and
5. **WHEREAS**, WAPA, in consultation with the WY State Historic Preservation Officer (WYSHPO) and the Colorado SHPO (COSHPO), defined the area of potential effects (APE) for the undertaking as the area within which historic properties [as defined at 36 CFR § 800.16(1)(1)] may sustain loss of integrity (as defined in 36 CFR § 60.4) by alteration or destruction caused by the proposed Project, and it includes 1) horizontally, the proposed Project footprint, which entails the physical footprint of all Project facilities within an approximately 26,000-acre area where Project facilities

1 could be built; and vertically a maximum depth of 15 feet for the construction of the wind turbine
2 foundations and a maximum height of 675 feet for construction of wind turbines, and 3) a 10-mile
3 APE from the proposed Project area boundary within which historic properties, where “setting”
4 and/or “feeling” are determined critical to a property’s National Register of Historic Places (NRHP)
5 eligibility may be present (Appendix A, herein incorporated by reference); and
6

- 7 6. **WHEREAS**, WAPA, as the lead Federal agency and in consultation with the CO and WY SHPOs,
8 determined that the proposed undertaking requires the development of a programmatic agreement
9 (PA), because identification efforts and effects on historic properties may not be fully determined
10 prior to approval of the undertaking (36 CFR § 800.14(b)(1)(ii)); and
11
- 12 7. **WHEREAS**, WAPA consulted with the CO and WY SHPOs, pursuant to 36 CFR Part 800, the
13 regulation implementing Section 106 of the NHPA (54 U.S.C. § 306108), regarding the
14 development of this PA and the APE per § 800.14(b)(ii), and both SHPOs are participating as a
15 Signatories to this PA; and
16
- 17 8. **WHEREAS**, WAPA sought input from the SHPOs about the presence of historic properties during
18 the development and early siting of the undertaking, and the SHPOs reviewed the selection of Key
19 Observation Points (KOP) determined relevant to visual analysis with regard to potential adverse
20 visual effects that may occur as a result of the proposed undertaking; and
21
- 22 9. **WHEREAS**, WAPA notified and requested the Advisory Council on Historic Preservation’s
23 (ACHP) participation in the development of this PA, and the ACHP is participating as a Signatory;
24 and
25
- 26 10. **WHEREAS**, to date, identification efforts revealed 478 previously identified recorded cultural
27 resources within the overall APE [6 National Register of Historic Places (NRHP) listed, 75 NRHP
28 eligible, 87 NRHP unevaluated, and 310 NRHP not eligible]; of which nine are within the proposed
29 Project area and 469 are within the 10-mile zone, including historic and prehistoric archaeological
30 sites, the Ames Monument National Historic Landmark (NHL), and segments of 12 linear resources
31 such as emigrant trails (Cherokee and Overland), and an intercontinental railroad (Union Pacific)
32 and highway (Lincoln Highway); and of which 390 are located in Wyoming and 88 in Colorado;
33 and
34
- 35 11. **WHEREAS**, the Ames Monument NHL, so designated by the Secretary of the Interior on October
36 31, 206, constructed between 1880 and 1882, is a memorial to the Ames Brothers of Massachusetts,
37 designed by the prominent American architect, H. H. Richardson, and built by Norcross Brothers of
38 Worcester, Massachusetts; and
39
- 40 12. **WHEREAS**, WAPA invited Wyoming State Parks and Cultural Resources to participate in the
41 development of this PA as a Concurring Party, because they own and manage the Ames Monument
42 NHL located within the 10-mile APE within which visual effects would be assessed and 1.09 miles
43 from the Applicant’s proposed Project footprint, and it is both a State Historic Site and a NHL; and
44
45

- 1 13. **WHEREAS**, WAPA, pursuant to 36 CFR § 800.10, invited the National Park Service (NPS) due to
2 potential adverse effects to the Ames Monument NHL and possibly National Historic trails near the
3 Applicant’s proposed Project footprint, and the NPS is participating as an Invited Signatory; and
4
- 5 14. **WHEREAS**, WAPA invited the Wyoming Office of State Lands and Investments to participate in
6 the development of this PA as an Invited Signatory, because approximately 4,800 acres of State
7 Trust Lands are within the proposed Rail Tie Wind project boundary; and
8
- 9 15. **WHEREAS**, WAPA as per 36 CFR § 800.14(b)(2)(i), invited the Albany County Historic
10 Preservation Board, Alliance for Historic Wyoming, Cheyenne Depot Association, Laramie
11 Railroad Depot Association, Lincoln Highway Association, Anna Lee Ames Frohlich, and Mitchell
12 Edwards, to participate in the Section 106 consultation process for this undertaking, as these
13 organizations, special interest groups or persons have demonstrated their interest or standing in the
14 undertaking, and are participating in the development of this PA under 36 CFR § 800.2(c)(5), and
15 each may sign as a Concurring Party; and
16
- 17 16. **WHEREAS**, WAPA, as per 36 CFR § 800.14(b)(2)(ii), invited the following federally-recognized
18 tribes to participate in the Section 106 consultation process and in the development of this PA as
19 Concurring Parties: the Cheyenne River Sioux Tribe, Crow Tribe, Crow Creek Sioux Tribe, Eastern
20 Shoshone Tribe of the Wind River Reservation, Fort Peck Assiniboine and Sioux Tribes, Lower
21 Brule Sioux Tribe, Northern Arapaho Tribe, Northern Cheyenne Tribe of the Northern Cheyenne
22 Indian Reservation, Oglala Sioux Tribe, Rosebud Sioux Tribe, Santee Sioux Nation of Nebraska,
23 Shoshone-Bannock Tribes of the Fort Hall Reservation, Sisseton Wahpeton Oyate Tribes, Standing
24 Rock Sioux Tribe, Yankton Sioux Tribe, and Ute Tribe of the Uintah and Ouray Reservation; and
25
- 26 17. **WHEREAS**, of those tribes listed in Whereas #16, the Northern Arapaho Tribe, Northern
27 Cheyenne Tribe of the Northern Cheyenne Indian Reservation, Standing Rock Sioux Tribe,
28 Yankton Sioux Tribe, and the Ute Tribe of the Uintah and Ouray Reservation are participating in
29 the Section 106 consultation process for the development of this PA, and may sign as a Concurring
30 Party to the PA; and
31
- 32 18. **WHEREAS**, WAPA agrees that for the life of the PA the agency will consider requests for Section
33 106 consultation as per 36 CFR § 800.14(b)(2)(i) from any agency, organization, special interest
34 group, person or federally recognized Indian tribes to participate in the consultation process at any
35 point in time about this undertaking; and
36
- 37 19. **WHEREAS**, WAPA sought and considered public input about cultural resources and the presence
38 of and effects to historic properties through its NEPA scoping process and comments were
39 considered and addressed, and WAPA will consider all NEPA comments regarding cultural
40 resources and historic properties up to the signing of this document; and
41
- 42 20. **WHEREAS**, ConnectGen Albany County, LLC (and/or by extension its successor) is participating
43 as an Invited Signatory to this PA, and will fund all cultural resource identification, documentation
44 and treatment and mitigation efforts, which may include, but are not limited to, cultural resources
45 literature reviews, surveys, historic building surveys, traditional cultural property surveys, visual
46 analysis of the proposed undertaking’s viewshed, noise analysis, reports, site records, a monitoring

1 and discovery plan, historic property treatment plan(s) (HPTP), or other measures agreed upon
2 through consultation, to avoid, minimize or mitigate potential adverse effects to historic properties;
3 and
4

5 21. **WHEREAS**, Applicant is committed to implementing environmental protection measures to reduce
6 direct and indirect impacts to cultural resources, such as, reducing visual impacts when designing
7 the layout of structures, buildings and infrastructure, using setbacks to avoid direct disturbance, and
8 seeking approval from the Federal Aviation Administration to use a sensor-based Aircraft Detection
9 Lighting System to reduce nighttime lighting; and
10

11 22. **WHEREAS**, definitions in Appendix B (herein incorporated by reference) are applicable to this
12 PA;
13

14 **NOW, THEREFORE**, WAPA, Applicant, SHPOs, NPS and ACHP agree WAPA's undertaking and
15 Applicant's connected action shall be administered in accordance with the following stipulations to satisfy
16 WAPA's Section 106 responsibility.
17

18 **STIPULATIONS**

19
20 The following stipulations will be carried out as follows:
21

22 **I. CULTURAL RESOURCES SERVICES AND PROFESSIONAL STANDARDS**

23
24 A. Applicant shall contract for all cultural resource identification and treatment/mitigation efforts.
25 The cultural resources contractor shall be qualified to conduct cultural resources literature
26 reviews, surveys, historic building surveys, traditional cultural property surveys, visual analysis
27 of the proposed undertaking's viewshed, reports, site records, a monitoring and discovery plan,
28 and historic property treatment plan(s) to minimize or mitigate adverse effects to historic
29 properties. Applicant will ensure that all work conducted under the terms of this PA meets the
30 Secretary of the Interior's Standards for Archeology and Historic Preservation (48 FR 44716)
31 (*Federal Register*, September 29, 1983) and is consistent with the ACHP's guidance on
32 archaeology and all applicable National Park Service guidance for evaluating cultural resources
33 for eligibility to the NRHP. WAPA defines conventions or standards for inventory and survey
34 intensity to adequately identify historic properties within the APE. All inventory/survey
35 activities will meet WAPA and SHPOs reporting/documentation standards, which are available
36 on the CO and WY SHPO websites. All formal Section 106 consultation with the WY SHPO
37 will be submitted in WyoTrack. In CO the Applicant shall obtain appropriate permits to
38 conduct archaeological field work and be in good standing, complying with the reporting
39 standards.
40

41 B. Applicant shall ensure that all cultural resources services will be carried out by or under the
42 direct supervision of a person or persons meeting, at a minimum, the applicable professional
43 qualifications standards set forth in the Secretary of the Interior's (Secretary) *Standards for*
44 *Archeology and Historic Preservation* (48 FR 44716) (*Federal Register*, September 29, 1983)
45 in the appropriate discipline. WAPA must review the cultural resources contractor's
46 professional qualifications, and any permits obtained, to determine that the contractor meets the

1 Secretary's qualifications prior to cultural resources work being conducted.
2

- 3 C. WAPA shall consult with federally recognized Indian tribes who wish to participate in the
4 consultation process about the presence of historic properties and properties of traditional
5 religious and cultural significance within the APE. WAPA will consult with tribes at any point
6 in time about this undertaking.
7
- 8 D. Applicant shall provide WAPA with full documentation of all their efforts to coordinate with
9 tribes including, but not limited to, copies of all correspondence, telephone logs, meeting
10 agendas, notes, and contact information.
11

12 **II. PROTECTION OF CONFIDENTIAL INFORMATION**

13 To the extent consistent with NHPA (Section 304), the Archaeological Resources Protection Act, Section
14 9(a), regulations or statutes, cultural resource data from this proposed undertaking will be treated as
15 confidential by all consulting parties and will not be disseminated to any person, organization or agency that
16 is not a consulting party to this PA. All archeological locational information is confidential. WAPA may
17 redact locational or tribally sensitive information from cultural resources survey reports or other
18 documentation prior to sharing the information, unless such information is already available on an
19 unrestricted basis in a state cultural resources database or information center, or the tribe whose information
20 is of concern agrees in writing that the information may be shared. Applicant and WAPA will respect
21 confidentiality concerns expressed by tribes for properties of traditional religious and cultural significance
22 (NHPA 101(d)(6)(A)).
23

24 **III. INVENTORY, NRHP EVALUATIONS, EFFECTS AND CONSULTATION**

25 A. Historic Property Identification:

26 Identification of historic properties will occur by 1) performing a Class I or literature review to
27 identify known cultural resources within the APE, 2) consulting with parties to this PA, and 3)
28 performing a Class III inventory of areas within the Project footprint, as agreed to between
29 WAPA, SHPO and Applicant, which shall be completed prior to construction. Additional
30 literature reviews or Class III surveys may be necessary for substantial scope or APE changes.
31 To ensure no trespassing issues arise, Applicant shall obtain right-of-entries for the lands in the
32 proposed APE prior to initiation of the Class III inventory.
33
34

35 B. NRHP Evaluations and Effects:

- 36 1. Applicant's cultural resources contractor will make recommendations to WAPA about
37 NRHP evaluations of all cultural resources documented within the proposed Project
38 footprint APE. Cultural resources will be evaluated under all four NRHP Criteria and all
39 seven aspects of integrity. Evaluations by the contractor may include limited shovel testing
40 at archaeological sites during surveys to assess eligibility under Criterion D only. Shovel
41 tests may be conducted to assess deposition, integrity and the presence of data needed to
42 address research questions that are considered locally or regionally important. Any artifacts
43 found on private land in a shovel test will be replaced in the shovel test unit after being
44 properly documented, unless otherwise requested by the landowner. Any artifacts found on
45 State land in a shovel test will be collected, analyzed and curated at the University of
46 Wyoming at the Applicant's expense.

- 1
2 2. Effects from the undertaking will be assessed for all historic properties documented within
3 the APE, except only visual effects will be assessed for historic properties that are eligible
4 under NRHP Criteria A and/or C, where setting and/or feeling are integral to the integrity of
5 the resource, and are located within the viewshed of the 10-mile APE.
6

7 C. Consultation: WAPA will consult on NRHP eligibility determinations and effects to cultural
8 resources within the proposed Project footprint, including those properties identified within the
9 APE where “setting” and “feeling” are integral to their eligibility, and which may be affected as
10 a result of the proposed undertaking:

- 11 1. WAPA will review the contractor’s literature review and Class III reports and submit them
12 to consulting parties (except SHPOs) for a **30-calendar day** review period. If additional
13 reports are needed, the same process outlined in this stipulation will be followed.
14 Comments shall focus on the adequacy of documentation, NRHP eligibility
15 recommendations and potential effects to historic properties. WAPA will consider all
16 comments and the contractor shall revise the report(s) if necessary. If comments are not
17 received within the **30-calendar day** review period, WAPA will move forward per
18 Stipulation II.C.2.
19

- 20 2. Class III inventory is only anticipated to occur in WY within the proposed Project footprint.
21 WAPA will submit the Class III inventory report(s), associated site forms and any
22 comments received from consulting parties per Stipulation II.C.1 to the WY SHPO with
23 WAPA’s determinations of eligibility and effect for a **30-calendar day** review period. The
24 WY SHPO will comment on WAPA’s NRHP eligibility and effect determinations. WAPA
25 will seek consensus on determinations of eligibility. However, if WAPA and the WY
26 SHPO do not agree on eligibility within **30 calendar days**, WAPA will continue to consult
27 with the WY SHPO or request a determination of eligibility from the Keeper of the
28 National Register (The Keeper) pursuant to 36 CFR § 800.4(c)(2) and 36 CFR Part 63. The
29 Keeper’s determination is final. For cultural resources that WAPA and the WY SHPO
30 agree are not eligible for listing in the NRHP, no further review or consideration is required
31 under this PA. If comments are not received within the **30-calendar day** review period,
32 WAPA will consider its eligibility and effect determinations as final for the purposes of the
33 proposed undertaking. If changes in the APE require Class III survey in CO, consultation
34 with COSHPO will occur, and the parties follow the same review process as described in
35 this stipulation.
36

- 37 3. WAPA will make a reasonable and good faith effort to engage federally recognized Indian
38 tribes to identify properties of traditional religious and cultural significance and determine
39 if historic properties exist within the APE. Should properties of traditional religious and
40 cultural significance be identified, at Applicant’s expense, such resources may be
41 documented or discussed in a separate report.
42

43 D. If WAPA agrees to the interconnection and construction begins, variances may be needed, and
44 additional survey may be necessary in areas not previously surveyed. Recognizing the potential
45 for high costs associated with construction delays, Applicant, WY SHPO, and consulting parties
46 agree to the process stated below for cultural resources survey, reporting and consultation:

- 1 1. For **Negative** site reports, WAPA shall be notified by the Applicant by email of the negative
2 results and construction will continue. WAPA will send the draft report to the WY SHPO for a
3 30-calendar day review and comments will be considered for the final report.
4
- 5 2. For **Positive** site reports, where **sites will be avoided**, WAPA shall be notified by the Applicant
6 by email of the positive results, their commitment to avoid the sites, and construction will
7 continue with archaeological monitors present to ensure avoidance. WAPA will send the
8 survey and monitoring report to the WY SHPO for a 30-calendar day review and comments will
9 be considered for the final report.
10
- 11 3. For **Positive** site reports, where **sites cannot be avoided**, WAPA shall be notified by the
12 Applicant by email of the positive results and their inability to avoid any site. No construction
13 will occur in that surveyed area until WAPA has completed consultation as stipulated under
14 Stipulation III.C and potentially under Stipulation IV.
15

16 **IV. HPTP DEVELOPMENT AND RESOLUTION OF ADVERSE EFFECTS**

- 17 A. If WAPA determines that the undertaking will have adverse effects on historic properties,
18 WAPA shall consult with SHPOs, consulting parties and Indian tribes to develop and evaluate
19 adjustments or modifications to the undertaking that could avoid, minimize, or mitigate adverse
20 effects to those properties.
- 21 B. WAPA will advise the Applicant, to the maximum extent possible, on planning and actions that
22 may be appropriate to minimize adverse effects to the Ames NHL that may be caused by the
23 undertaking (36 CFR § 800.10).
- 24 C. WAPA, through the Applicant, will resolve adverse effects on historic properties through the
25 development and implementation of one or more HPTP, as described below. The HPTP will
26 provide specific avoidance, minimization, or mitigation measures, commensurate with the
27 adverse effects, including cumulative effects, that may be caused by the undertaking.
 - 28 1. HPTPs will be prepared in consultation with SHPO, consulting parties and Indian tribes,
29 and will be consistent with, the Secretary's Standards; the Advisory Council on Historic
30 Preservation's Section 106 Archaeology Guidance (2009); the Historic American Buildings
31 Survey (HABS), Historic American Engineering Record (HAER), and Historic American
32 Landscapes Surveys (HALS) guidance (<http://www.nps.gov/hdp/>); and appropriate state
33 guidelines. WAPA will hold consultation meetings or video conference calls to discuss
34 development of the HPTP.
 - 35 2. HPTP Development, Review and Acceptance:
 - 36 a. WAPA with the Applicant will develop a HPTP outline and consult with the consulting
37 parties to determine HPTP content and specific treatment or mitigation proposed for the
38 historic properties or groups of historic properties adversely affected.
 - 39 b. Once an HPTP is completed and accepted by WAPA, the WAPA will provide the
40 HPTP to the consulting parties for a 30-day review.

1 c. WAPA will take all comments into account and request of the Applicant to revise the
2 HPTP, as appropriate. The Applicant will revise the HPTP and provide it to WAPA
3 within 10 days. WAPA will submit the final HPTP to the consulting parties and the
4 appropriate SHPO for a 30-day review and concurrence. WAPA will endeavor to reach
5 consensus on the HPTP, but if the consulting parties fail to resolve adverse effects in a
6 reasonable timeframe, WAPA will comply with 36 CFR § 800.7 and seek ACHP
7 comment and move forward accordingly. The final HPTP will be appended to
8 Appendix C (herein incorporated by reference) of this PA.

9 3. The introductory content of the HPTP will include the undertaking overview, a list or table
10 of all identified historic properties within the APE, including those determined visually or
11 indirectly affected within the 10-mile APE, maps, and monitoring procedures and discovery
12 protocols, as detailed in Section 4 of this Stipulation.

13 a. The HPTP list or table of historic properties will include state, land ownership,
14 township, range, and section and Smithsonian number. The list or table will also include
15 a field for archaeological properties indicating the probability of buried subsurface
16 deposits, treatment to address the direct and cumulative effects of the undertaking for
17 historic properties and specific groups of historic properties (e.g., archaeological sites,
18 trails, etc.), and identify whether treatment or mitigation must be implemented prior to
19 construction activities occurring in an area (e.g., archaeological data recovery, landscape
20 photography), or will be implemented during or post ground-disturbing activities (e.g.,
21 historical research, installation of an interpretive kiosk, public education materials, etc.).

22 b. Subsequent sections or chapters of the HPTP will identify each specific historic property
23 or group of historic properties that will be adversely affected and cannot be avoided and
24 will include the following:

25 i. A distinctive name or number (Smithsonian number);

26 ii. A brief description of the historic property;

27 iii. Its location in terms of distance and direction from a project-defined milepost(s) or
28 similar established markers;

29 iv. The type of disturbance that will affect the historic property;

30 v. The nature or kind of each required treatment measure (avoidance, minimization,
31 mitigation) pertaining to each historic property (e.g., landscape photography,
32 archaeological data recovery, etc.);

33 vi. The identification of treatment measures, if any, which must be completed prior to
34 construction activities and/or those measures which may be completed after
35 construction;

36 vii. The documentation and reporting procedures for each proposed treatment measure;

37 viii. Each subsection of the HPTP that concerns an archaeological historic property will
38 incorporate a research design as needed to guide data recovery and other treatment
39 efforts. Existing research designs may be used within acceptable historic context
40 documents when the consulting parties agree that they are appropriate to a specific
41 historic property or group of properties;

42 ix. WAPA released the Draft Environmental Impact Statement to cooperating agencies
43 on January 7, 2021, and discussions began between cooperating agencies about ideas

1 on possible treatment measures for potential adverse visual effects on the Ames
2 Monument NHL and other potential historic properties within the APE that may
3 include one or a combination of the following, but are not limited to:
4 (a) Completion of NRHP nomination forms.
5 (b) Conservation easements.
6 (c) Completion of all technical aspects of HABS, HAER, and HALS
7 documentation such that submittal can be filed with the Library of Congress.
8 (d) Documentation of local or regional resources to be submitted to the
9 appropriate SHPO or State Archives.
10 (e) Purchase of land containing historic properties for transfer to protective
11 management/ownership with willing consent of landowner.
12 (f) Partnerships and funding for public archaeology projects or volunteer public
13 outreach.
14 (g) Print publication (brochure/book)
15 (h) Digital media productions (website/podcast/video/narrated drone footage).
16 (i) Access to historic properties otherwise unavailable to the public.
17 (j) Interpretation of historic properties and development of signage.
18 (k) Ames Monument NHL Preservation.
19 (l) Hiking trail system to connect to the Ames Monument NHL.(m) Physical
20 repairs to Ames NHL.
21 (n) Partnering with WY SHPO on site stewardship for Ames and surrounding
22 historic properties.
23

24 4. Included in the HPTP will be the procedures for archaeological monitoring, and tribal
25 monitoring, if appropriate, and handling and reporting of discoveries of previously
26 unidentified cultural resources or human remains, and NRHP evaluation, and HPTP
27 treatment implementation, if appropriate.

- 28 a. Archaeological monitoring will, as appropriate, include archaeological inspection of
29 construction activities by personnel under the direct supervision of a person meeting
30 the Secretary of the Interior’s Professional Qualifications standards.
- 31 b. Monitoring may include tribal monitors within construction areas near historic
32 properties or site types previously identified as significant to tribes or at testing or
33 excavation locations, should it be appropriate and permitted by the landowner.
- 34 c. Any cultural resource discovered during pre-construction, construction, and/or
35 construction monitoring, will be treated in accordance with the inadvertent discovery
36 protocols in the PA or if human remains or funerary objects be discovered at any time
37 within WY, the Applicant shall comply with the Wyoming Statute 7-4-106. All costs
38 to treat, mitigate, remove and curate any archaeological materials or human remains
39 shall be borne by the Applicant.
- 40 d. The HPTP will discuss curation of human remains and funerary objects which shall
41 comply with WY state protocol until such time repatriation occurs. Archaeological
42 materials collected during data recovery excavations on state lands shall be curated at

1 the University of Wyoming. Archaeological materials collected during data recovery
2 excavations on private land will be either turned over to the landowner after
3 appropriate analysis is completed. The landowner may donate the materials to a
4 museum or a curation facility.

5 e. After the completion of treatment measures, a preliminary summary report will be
6 prepared and distributed to the appropriate consulting parties.

7 f. The Applicant shall ensure that the final results of such treatment efforts are reported to
8 WAPA in a final report, which WAPA will provide to the SHPO.
9

10 V. DISCOVERIES

11
12 A. WAPA and Applicant agree that during the lifetime of this PA if archaeological materials are
13 discovered as a result of the undertaking's construction activity, the discovery will be protected
14 from further disturbance, all earth disturbing activities will cease within 30 meters (100 feet) of
15 the discovery, and heavy equipment will be removed from the area until the discovery is
16 assessed and documented. WAPA will be notified immediately about the discovery. If the
17 discovery is an isolated find and determined by the cultural resources' contractor in consultation
18 with WAPA as not eligible for NRHP listing, it will be documented, and the activity will
19 proceed with no further consultation. For all other discoveries, WAPA may assume the
20 discovery as eligible for NRHP listing pursuant to 36 CFR § 800.13(c) or consult with the tribes
21 and SHPO regarding its eligibility. WAPA will notify the SHPO and tribes by phone within 24
22 hours of the discovery. As required by 36 CFR 800.13, WAPA will also consult with the
23 ACHP if the discovery was, or will be, adversely affected by the construction activity.
24

25 B. WAPA and Applicant agree that at any time if human remains are discovered, work shall cease
26 within 30 meters (100 feet) of the discovery. If the PA is still in effect, discoverer shall
27 immediately notify Applicant and WAPA by telephone and in writing within 24 hours of the
28 discovery (email is acceptable). If human remains are encountered after this PA expires, the
29 discoverer shall immediately notify the Applicant who shall contact the SHPO and follow the
30 procedures set forth in Wyoming Statute 7-4-106.
31

32 VI. PA ANNUAL REPORTING AND REVIEW

33
34 Applicant shall prepare an annual letter report to WAPA for the duration of this PA regarding how it has
35 carried out the stipulations of this PA and activities associated with the HPTP. The annual letter report
36 should include Project status and schedule, and if appropriate any APE expansions/modifications, variances
37 or changes in scope, cultural resources monitoring or mitigation activities, HPTP activities, discovery
38 situations, and outstanding tasks to be completed under this PA. The implementation and operation of this
39 PA shall be evaluated on an annual basis by WAPA and the SHPOs. For the first two years from the
40 execution of this PA, WAPA shall hold either a face-to-face meeting or video conference meeting to discuss
41 the status of the project and PA. After the first two years, annual meetings may be held at the request of any
42 Signatory or Invited Signatory. Any Signatory or Invited Signatory may request additional information
43 from Applicant, which they will share with all consulting parties. WAPA shall inform the Signatories and
44 Invited Signatories when all stipulations of this PA have been carried out.

1
2 **VII. DISPUTE RESOLUTION**
3

- 4 A. If any Signatory or Invited Signatory to this PA objects at any time to any actions proposed or
5 to the manner in which the terms of this PA are implemented, WAPA shall notify the SHPO
6 and other Signatories and Invited Signatories about the objection by email and will consult with
7 the objecting party to resolve the matter. If WAPA determines that such objection cannot be
8 resolved, WAPA will forward the objection to the ACHP for its advisory comments.
9
- 10 B. If the ACHP does not provide its advisory comments regarding the dispute within **30 calendar**
11 **days**, WAPA may make a final decision on the dispute and proceed accordingly. Prior to
12 reaching such a final decision, WAPA shall prepare a written response that takes into account
13 any timely comments regarding the dispute from the Signatories and Invited Signatories to the
14 PA and provide them and the ACHP with a copy of such written response.
15
- 16 C. The Signatories' responsibilities to carry out all other actions subject to the terms of this PA that
17 are not the subject of the dispute remain unchanged.
18

19 **VIII. AMENDMENT**
20

21 This PA may be amended in counterparts when such an amendment is agreed to in writing by all Signatories
22 and Invited Signatories who have signed this PA. WAPA will distribute copies of any amendments to the
23 Signatories, Invited Signatories and Concurring Parties. An amendment will be effective after it is signed
24 by all Signatories and filed with the ACHP.
25

26 **IX. TERMINATION**
27

28 If any Signatory or Invited Signatory to this PA determines that its terms will not or cannot be carried out,
29 that Signatory or Invited Signatory shall immediately consult with the other Signatories and Invited
30 Signatories to attempt to develop an amendment. If, within thirty **30 calendar days** (or another time period
31 agreed to by all Signatories and Invited Signatories), an amendment cannot be reached, the Signatory or
32 Invited Signatory who has signed this PA may withdraw their participation in the PA or request that the PA
33 terminated upon written notification to the other Signatories and Invited signatories. All Signatories and
34 Invited Signatories must agree that the terms of this PA will not or cannot be carried out to terminate
35 this PA. If the PA is terminated before the proposed undertaking has started or finished, WAPA shall
36 notify the Signatories and Invited Signatories on the course of action it will pursue, that is either:

- 37 A. follow the procedures outlined in 36 CFR §§ 800.4 - 800.6 for WAPA's undertaking and
38 connected action, or
39 B. execute a new PA pursuant to 36 CFR § 800.14(b), or
40 C. request, take into account, and respond to the comments of the ACHP under 36 CFR § 800.7.
41

42 **X. DURATION OF THIS PA**
43

44 This PA will be in effect for the life of the project (i.e. construction, operation, and decommissioning) from
45 the date of its execution, unless the PA is amended pursuant to Stipulation VII with a new expiration date
46 prior to such time or terminated pursuant to Stipulation IX.

1
2 **XI. WYOMING GENERAL PROVISIONS**
3

- 4 A. Entirety of Agreement. This PA, consisting of thirty (30) pages, Appendix A consisting of one
5 (1) page, Appendix B consisting of one (1) page, and Appendix C (number of pages yet to be
6 determined), represents the entire agreement between the Parties and supersedes all prior
7 negotiations, representations and agreements, whether written or oral, regarding compliance
8 with Section 106 of the NHPA.
9
- 10 B. Prior Approval. This PA shall not be binding upon any Signatory or Invited Signatory who has
11 signed this PA unless this PA has been reduced to writing before performance begins as
12 described under the terms of this PA, and unless the PA is approved as to form by the Wyoming
13 Attorney General or his or her representative.
14
- 15 C. Severability. Should any portion of this PA be judicially determined to be illegal or
16 unenforceable, the remainder of the PA shall continue in full force and effect, and any
17 Signatory or Invited Signatory who has signed this PA may renegotiate the terms affected by
18 the severance.
19
- 20 D. Sovereign Immunity. The State of Wyoming and the WY SHPO expressly reserve their
21 sovereign or governmental immunity by entering into this PA, and the tribes do not waive their
22 sovereign immunity by concurring with this PA, and each fully retains all immunities and
23 defenses provided by law with respect to any action based on or occurring as a result of this PA.
24
- 25 E. Indemnification. Each Signatory to this PA shall assume the risk of any liability arising from
26 its own conduct. Each Signatory agrees they are not obligated to insure, defend or indemnify
27 the other Signatories to this PA.
28

29 EXECUTION of this PA by the Signatories and implementation of its terms are evidence that WAPA has
30 taken into account the effects of its undertaking and connected action on historic properties and afforded the
31 ACHP an opportunity to comment on it in compliance with Section 106. Effective date of the PA is the date
32 the PA is signed by the ACHP and filed with their office.
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1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

13
14
15
16 **SIGNATORY**

17
18 **WESTERN AREA POWER ADMINISTRATION**

19
20
21 By: _____ Date: _____
22 James Wood, Senior Vice President and Rocky Mountain Regional Manager

1 **PROGRAMMATIC AGREEMENT**

2 **AMONG**

3 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
4 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
5 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
6 **AND**
7 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

8 **REGARDING**

9 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
10 **WYOMING**

11 **SIGNATORY**

12 **COLORADO STATE HISTORIC PRESERVATION OFFICE**

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20 By: _____ Date: _____
21 Steve Turner, AIA
22 Executive Director & State Historic Preservation Officer
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4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

13
14
15 **SIGNATORY**

16
17 **WYOMING STATE HISTORIC PRESERVATION OFFICE**

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19
20 By: _____ Date: _____
21 Sara Needles, State Historic Preservation Officer

22
23
24 Approval as to Form:
25 Wyoming Attorney General's Office

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28 By: _____ Date: _____
29 Tyler Renner, Assistant Attorney General

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1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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14
15
16 **SIGNATORY**

17
18 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

19
20
21 By: _____ Date: _____
22 John M. Fowler, Executive Director

1 **PROGRAMMATIC AGREEMENT**

2 **AMONG**

3 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
4 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
5 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
6 **AND**
7 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

8 **REGARDING**

9 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
10 **WYOMING**

11 **INVITED SIGNATORY**

12 **CONNECTGEN ALBANY COUNTY LLC – RAIL TIE WIND PROJECT**

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20
21 By: _____ Date: _____
22 Caton Fenz, Chief Executive Officer

1 **PROGRAMMATIC AGREEMENT**

2 **AMONG**

3 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
4 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
5 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
6 **AND**
7 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

8 **REGARDING**

9 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
10 **WYOMING**

11 **INVITED SIGNATORY**

12 **WYOMING OFFICE OF STATE LANDS AND INVESTMENTS**

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19
20 By: _____ Date: _____
21 Jenifer E. Scoggin, Director

1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

13
14
15 **CONCURRING PARTY**

16
17 **ALBANY COUNTY HISTORIC PRESERVATION BOARD**

18
19
20 By: _____ Date: _____
21 Karen C. Bard, Chair

1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

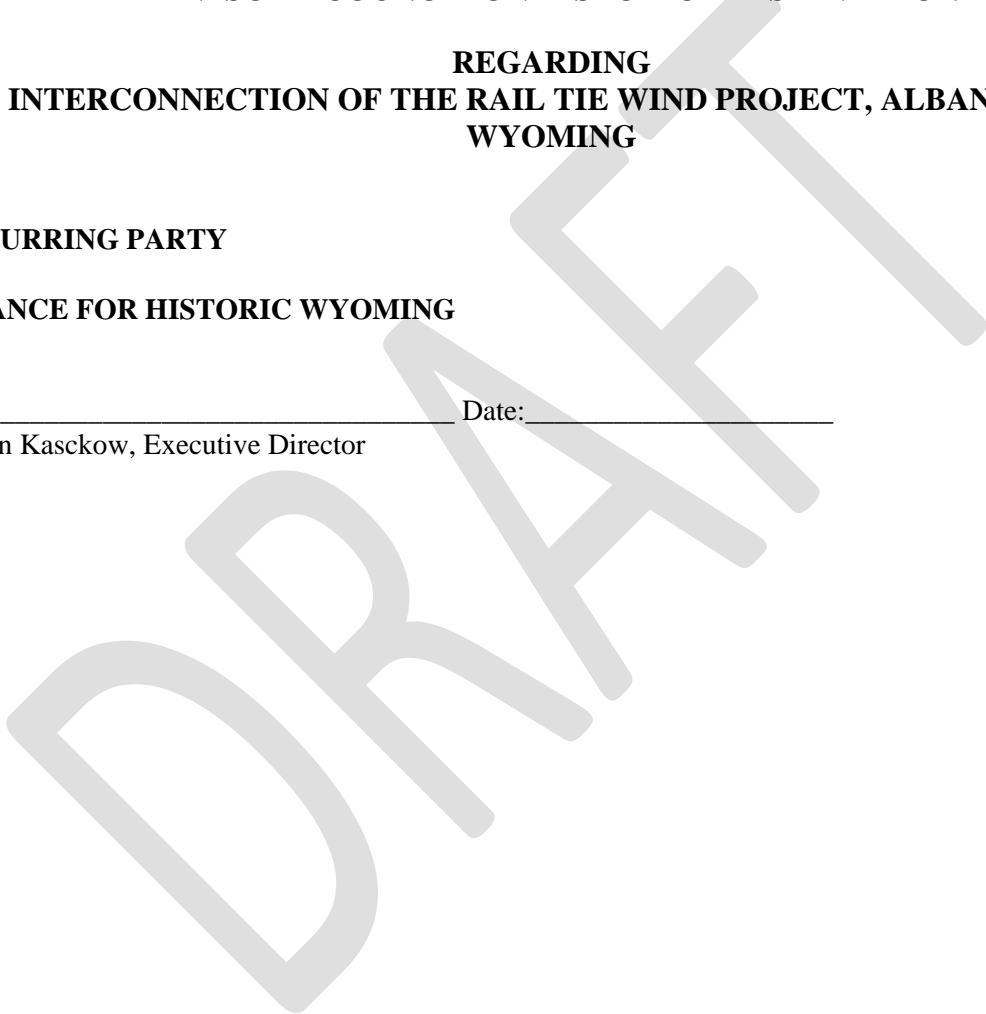
9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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14
15 **CONCURRING PARTY**

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17 **ALLIANCE FOR HISTORIC WYOMING**

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19
20 By: _____ Date: _____
21 Rin Kasckow, Executive Director



1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

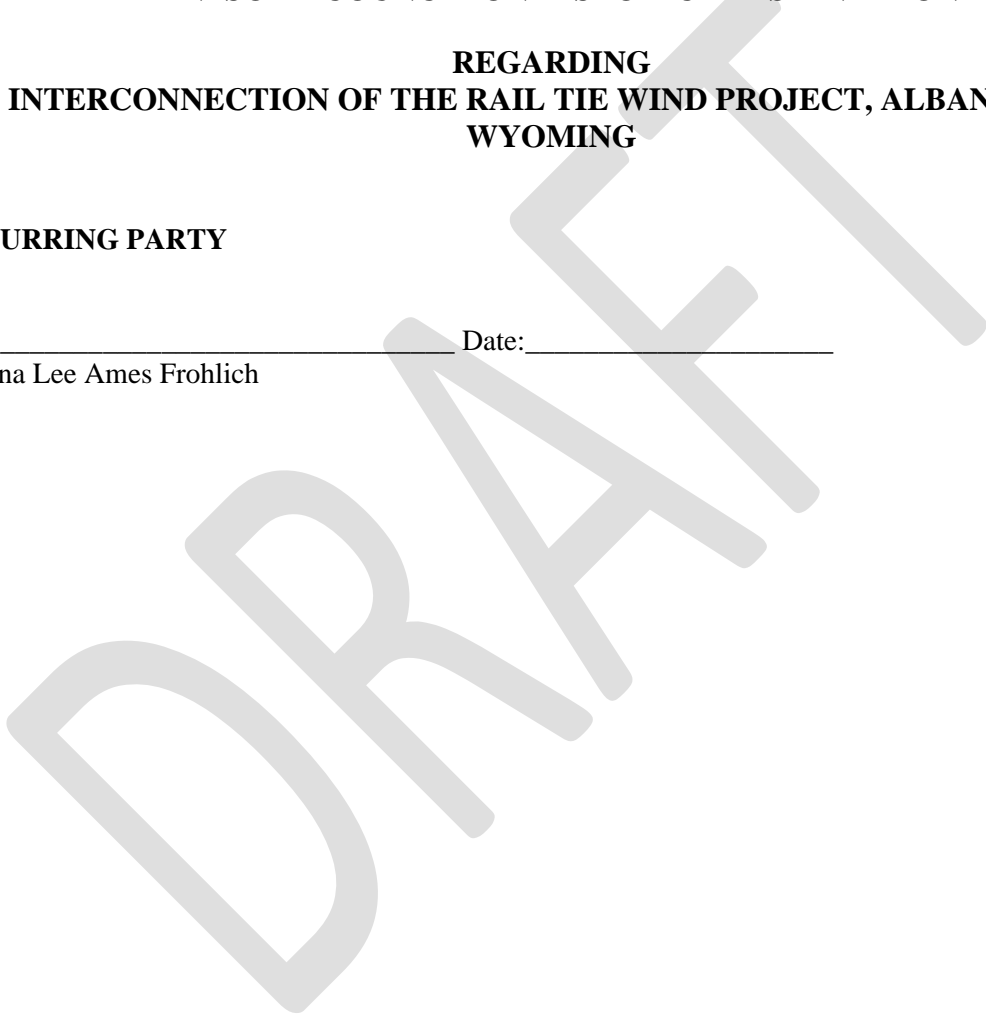
4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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15 **CONCURRING PARTY**

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17
18 By: _____ Date: _____
19 Anna Lee Ames Frohlich



1 **PROGRAMMATIC AGREEMENT**

2 **AMONG**

3 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
4 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
5 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
6 **AND**
7 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

8 **REGARDING**

9 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
10 **WYOMING**

11 **CONCURRING PARTY**

12 **LINCOLN HIGHWAY ASSOCIATION**

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21 By: _____ Date: _____
22 James Davis, Wyoming Member

1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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16 **CONCURRING PARTY**

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18 **NORTHERN ARAPAHO TRIBE OF THE WIND RIVER INDIAN RESERVATION**

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20
21 By: _____ Date: _____
22 Ben Ridgley, Tribal Historic Preservation Officer

1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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15 **CONCURRING PARTY**

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17 **ROSEBUD SIOUX TRIBE**

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19
20 By: _____ Date: _____
21 Ione Quigley, Tribal Historic Preservation Officer
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1 **PROGRAMMATIC AGREEMENT**

2
3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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15 **CONCURRING PARTY**

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17 **STANDING ROCK SIOUX TRIBE**

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19
20 By: _____ Date: _____
21 Jon Eagle, Tribal Historic Preservation Officer

1 **PROGRAMMATIC AGREEMENT**

2 **AMONG**

3 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
4 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
5 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
6 **AND**
7 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

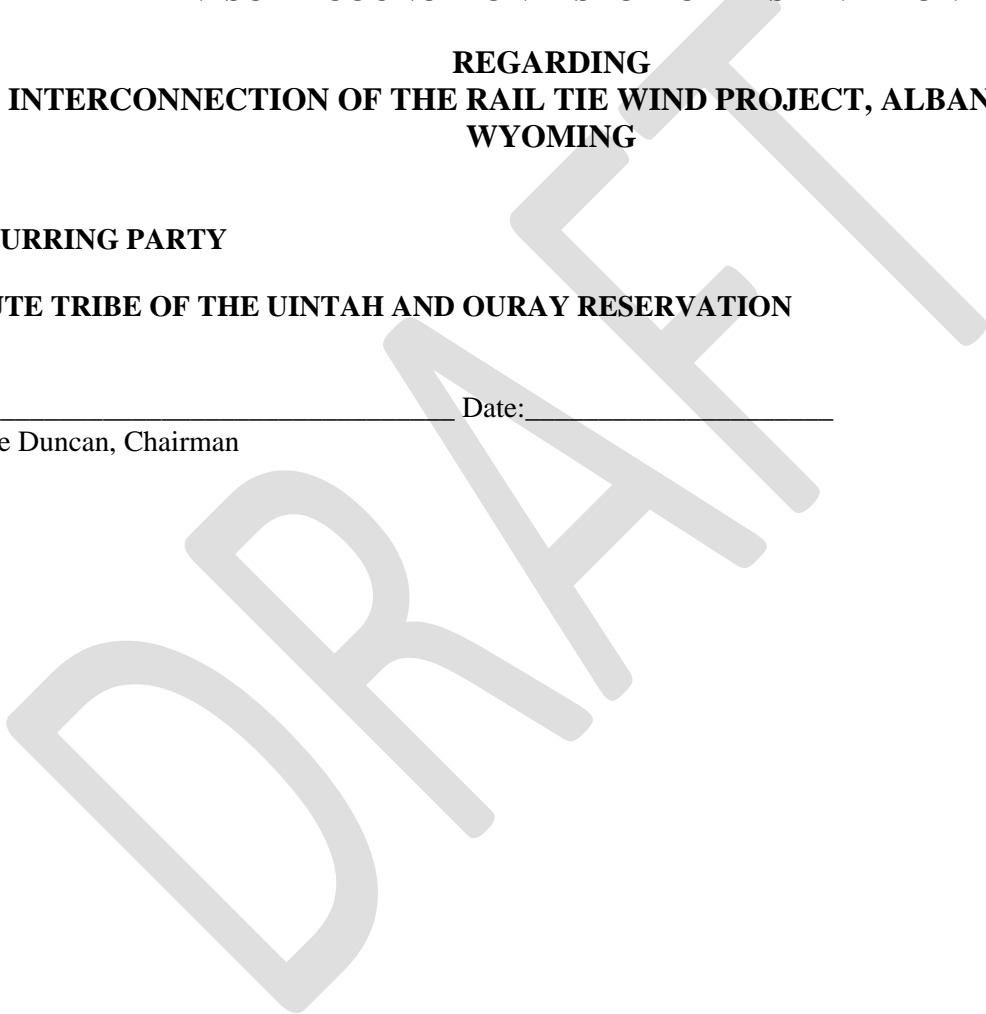
8 **REGARDING**

9 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
10 **WYOMING**

11 **CONCURRING PARTY**

12 **THE UTE TRIBE OF THE UINTAH AND OURAY RESERVATION**

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20 By: _____ Date: _____
21 Luke Duncan, Chairman



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1 **PROGRAMMATIC AGREEMENT**

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3 **AMONG**

4 **THE U.S. DEPARTMENT OF ENERGY-WESTERN AREA POWER ADMINISTRATION,**
5 **COLORADO STATE HISTORIC PRESERVATION OFFICER,**
6 **WYOMING STATE HISTORIC PRESERVATION OFFICER,**
7 **AND**
8 **ADVISORY COUNCIL ON HISTORIC PRESERVATION**

9
10 **REGARDING**

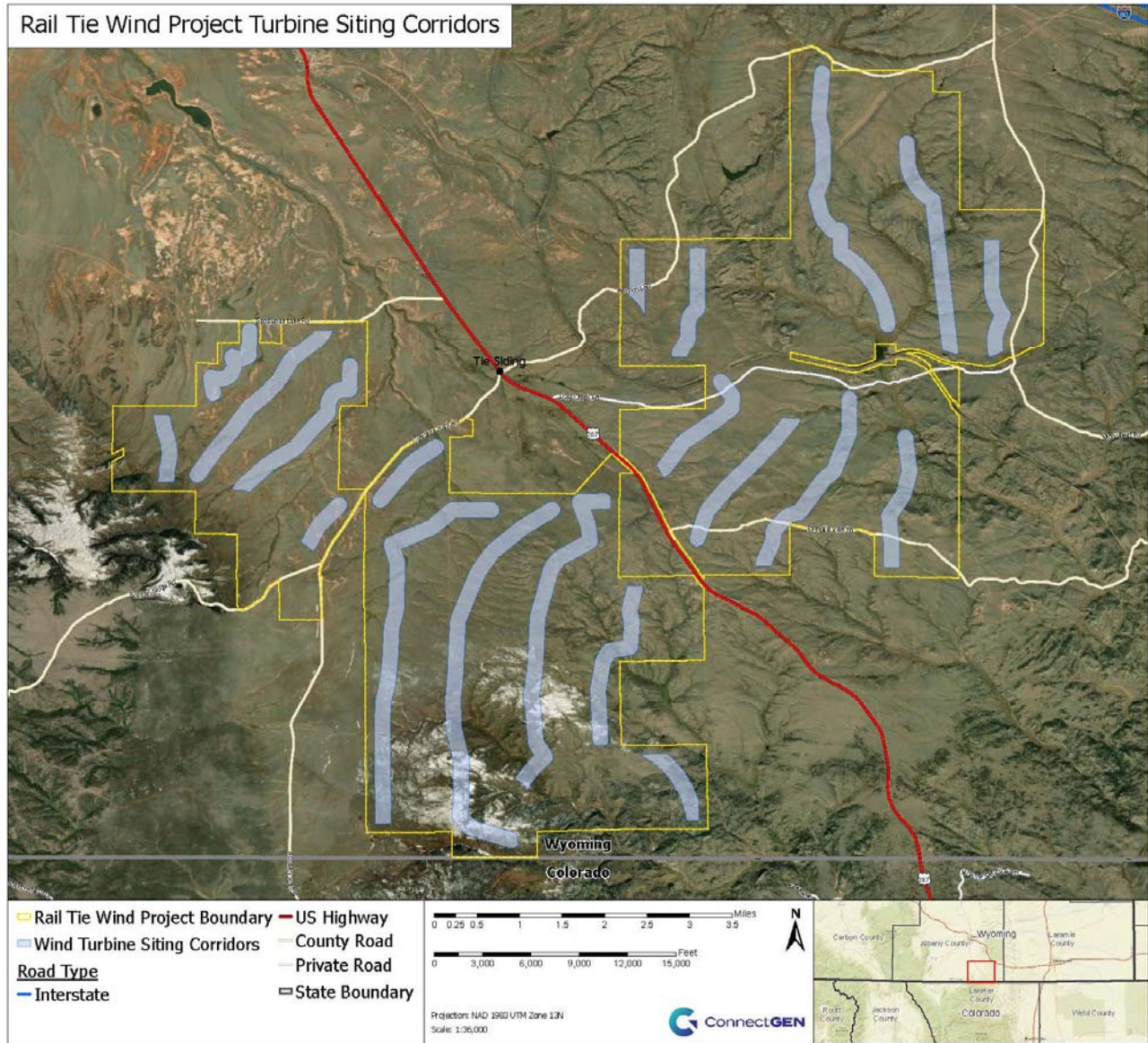
11 **THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,**
12 **WYOMING**

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15 **CONCURRING PARTY**

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17 **YANKTON SIOUX TRIBE**

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19
20 By: _____ Date: _____
21 Kip Spotted Eagle, Tribal Historic Preservation Officer
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APPENDIX A APE Map



APPENDIX B

Definitions

Archaeological resources/materials – any material remains of past human life or activities which are of archaeological interest at least 50 years of age.

Area of potential effects (APE) – the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Class I – see Literature review

Class III survey – a professionally conducted intensive pedestrian survey of the APE or portions of the APE as agreed to by the SHPO and lead federal agency.

Concurring Party – consulting party that does not have a particular responsibility under the PA and has been invited to concur with the stipulations of the PA. A Concurring Party can sign at any time. The refusal of any party invited to concur in the PA does not invalidate the PA.

Consulting party – a consulting party includes SHPO/THPOs, Indian tribes and Native Hawaiian organizations, other organizations and individuals who may be concerned with the possible effects of an agency's action on historic properties and who is invited to participate in the Section 106 consultation process.

Historic property – any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

Historic Properties Treatment Plan (HPTP) – a document that identifies specific treatment or mitigation strategies for individual historic properties and/or specific groups of historic properties, include data recovery, avoidance (e.g., fencing, flagging) and/or monitoring for avoidance.

Invited Signatory – a party with a Section 106 responsibility under the terms of the PA with the authority to amend or terminate the PA. The refusal of any Invited Signatory to sign the PA does not invalidate the PA.

Literature review (aka Class I) – a literature and records search of existing archaeological and historic site records.

Project area – the approximate 26,000-acre proposed Project site boundary.

Project footprint – the physical footprint of all Project facilities, including wind turbines, access roads, temporary crane paths, electrical collection lines, transmission line, Project substations, interconnection switchyard, operations and maintenance building, temporary laydown yards, meteorological towers, and any other areas within the Project area that would be disturbed by the Project.

Signatory – a consulting party that has a Section 106 responsibility under the terms of the PA and has the sole authority to execute, and amend or terminate the PA.

Undertaking – a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval (36 CFR § 800.16(y))

APPENDIX C
Historic Properties Treatment Plan
(To be determined)

C-1 of (TBD)

PROGRAMMATIC AGREEMENT REGARDING THE INTERCONNECTION OF THE RAIL TIE WIND PROJECT, ALBANY COUNTY,
WYOMING