

S E C T I O N 2

# Proposed Action and Alternatives

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This section describes the transmission line alternatives that have been identified for detailed analysis in this Draft EIS. NEPA regulations require that an EIS include a range of reasonable alternatives that would meet the purpose and need of the proposed project, including the Proposed Action and a No Action Alternative. By including a range of alternatives in the EIS, the lead agency can explore alternative ways of meeting the stated purpose and need of the proposed project. The EIS must also describe any alternatives that were considered, but eliminated from detailed analysis, with an explanation of why the alternatives were eliminated from further consideration (40 CFR 1502.14). For actions proposed by a private entity, the range of alternatives typically includes denying the request (i.e. No Action); approving the request as proposed; or approving the request with changes or stipulations. The No Action Alternative provides a useful baseline for comparing the environmental effects associated with the action alternatives. It also demonstrates the consequences of denying approval of a proposed project or action.

In addition to the No Action alternative (Alternative A), this Draft EIS analyzes two transmission line action alternatives: Alternative B – West Route (Proposed Action) and Alternative C - North Route (Figure 1.0-1). Alternative B would follow the transmission line route identified in the preliminary right-of-way (ROW) application submitted to BLM in December 2008 and to USFWS in December 2009. For this Draft EIS, Alternative B has been modified to include two route options (South Diamond Lane and Hog Wallow) that would follow different alignments at the western ends of Alternative B and connect at different locations to the existing HEC 115-kV transmission line west of Diamond Junction. The second action alternative, Alternative C, would follow a north-south route that would completely avoid the Malheur National Wildlife Refuge (MNWR), and connect to a different HEC 115-kV transmission line located near the community of Crane, Oregon. Both action alternatives (including the Alternative B route options) include an additional option that would be a reduced capacity transmission line configured to accommodate a maximum of 115-kV. Once commissioned, the transmission line would be deeded to HEC for long-term operation and maintenance and the line would be incorporated into the HEC electric transmission and distribution system serving southeast Oregon and northern Nevada. Once the line is deeded to HEC, it is proposed that the associated ROW would also be assigned to HEC or their successors.

Because development of the Echanis Wind Energy Project involves a Federal action to approve, deny, or approve with stipulations, the application for ROW for the transmission line, this EIS must analyze the indirect environmental effects of the Echanis Project at the same level of detail as the direct and indirect environmental effects of the proposed transmission line. In other words, because the transmission line cannot be built without crossing Federal lands, a grant of ROW would be a Federal Action that would enable the Echanis Project to move forward. Analysis of both the transmission line proposal and the Echanis Project is accomplished by incorporating the Echanis Project into the two action alternatives analyzed in this Draft EIS. The following section provides a detailed description of the No Action Alternative (Alternative A) and the two action alternatives (Alternatives B and C).

## 2.1 ALTERNATIVE A – NO ACTION

The No Action Alternative represents the reasonably foreseeable outcome that would result from denying the request for a ROW grant to Echanis, LLC to construct the proposed 230-kV transmission line to transport electrical power from the Echanis Project to the regional transmission grid. Because the Echanis Project is a

connected action to a ROW grant, denial of the ROW grant would preclude development of the Echanis Project.

The No Action Alternative is intended to portray the current and future state of the environment in the absence of the Proposed Action. It provides a useful baseline for comparison of environmental effects and demonstrates the consequences of not granting the ROW request.

## 2.2 ALTERNATIVE B – WEST ROUTE (PROPOSED ACTION)

Alternative B would involve the construction and operation of an overhead double-circuit 230-kV transmission line that would transport electrical power from the Echanis Wind Energy Project to the regional electric grid. This alternative represents the Project Applicant's "Proposed Action" (i.e. the proposed project described in the project Applicant's preliminary ROW application submitted to BLM in December 2008 and to USFWS in December 2009). In addition to the proposed route for the transmission line, this alternative includes two optional routes at the western end of the proposed alignment that would also meet the Project's stated purpose and need. A reduced capacity 115-kV design configuration is also included as an option that could apply to all of the route options being considered under Alternative B. Because of the interdependence between the Echanis Project and the transmission line, Alternative B includes the development of the Echanis Project as part of the Proposed Action. The various Project components comprising Alternative B are described below.

### 2.2.1 Transmission Components

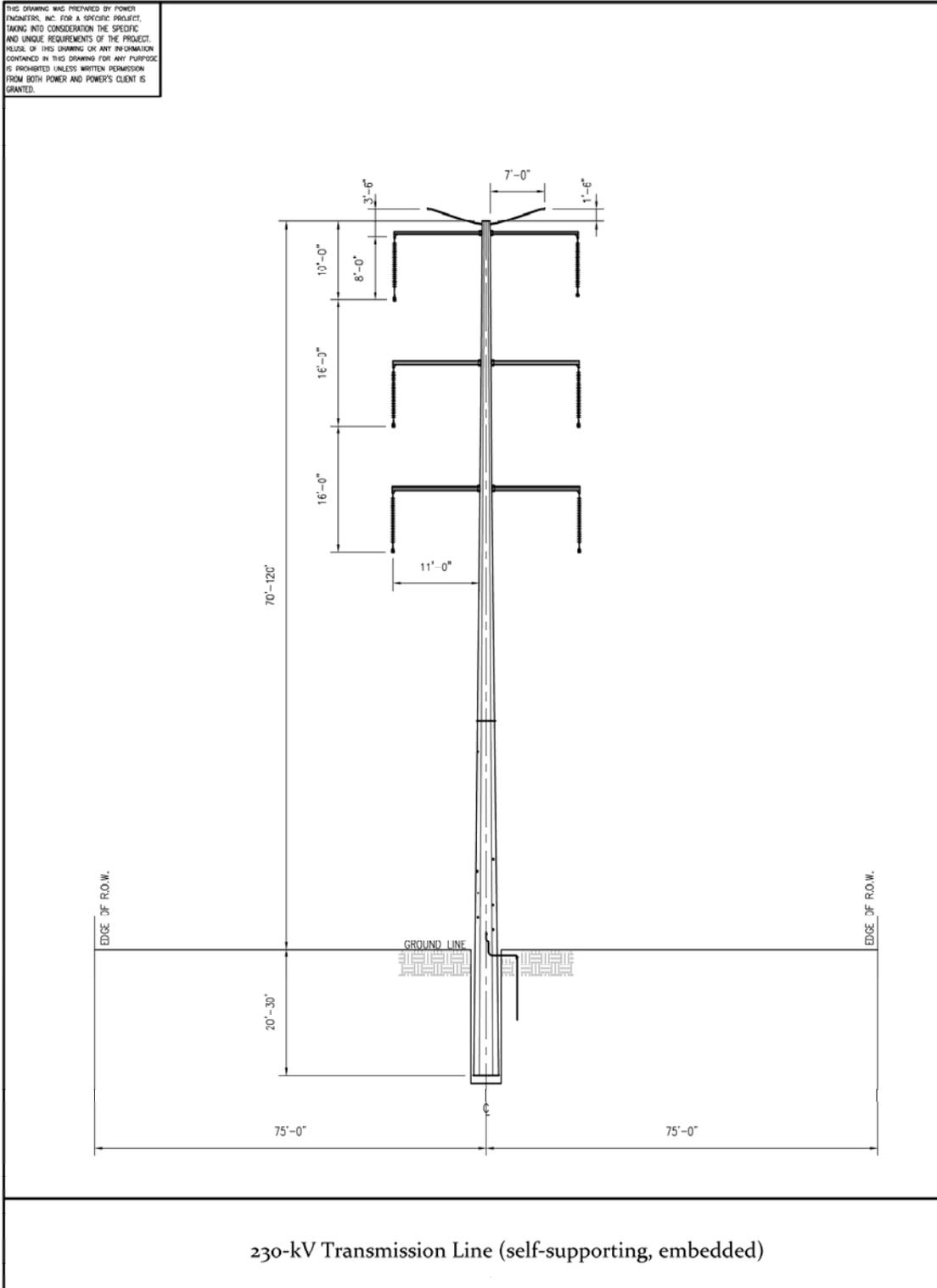
Alternative B would include construction of a new double-circuit 230-kV transmission line, an interconnection with an existing HEC 115-kV transmission line, new and improved access roads, and the relocation of an existing HEC distribution line located along South Diamond Lane. Details on these transmission components are described below.

#### 2.2.1.1 Right of Way Location

The proposed 230-kV transmission line would begin at a new Substation located on the Echanis Project site and end at a new interconnection station constructed adjacent to the existing HEC 115-kV transmission line west of Diamond Junction (Figure 1.0-1). The length of the transmission line would be approximately 28.87 miles, with approximately 18.70 miles crossing private land, 8.85 miles crossing land administered by the BLM, and approximately 1.32 miles crossing land within the MNWR administered by the USFWS. The transmission line would be located within a permanent 150-foot wide ROW along the entire route.

#### 2.2.1.2 Transmission Line

In most areas the transmission line would be supported by steel poles 70 to 80 feet tall directly embedded into the ground. A typical configuration for the double-circuit 230-kV transmission line is shown in Figure 2.0-1. A photograph of a similar transmission line mounted on weathering steel poles is shown in Figure 2.0-2. Taller poles would be erected on either side of the Blitzen Valley where the transmission line would cross the MNWR (Figure 2.0-3). At this location, poles up to 130 feet tall would be secured to concrete footings embedded in rim rock on land administered by the BLM. The distance between the two poles would be more than 1,400 feet allowing the line to completely span the MNWR. In other areas along the transmission line route the distance between poles would range from 600 to 1,000 feet, depending on site conditions and topography.



**Figure 2.0-1 230-kV Transmission Line (self-supporting, embedded)**



Figure 2.0-2 230-kV Transmission Line (with weathering steel pole)

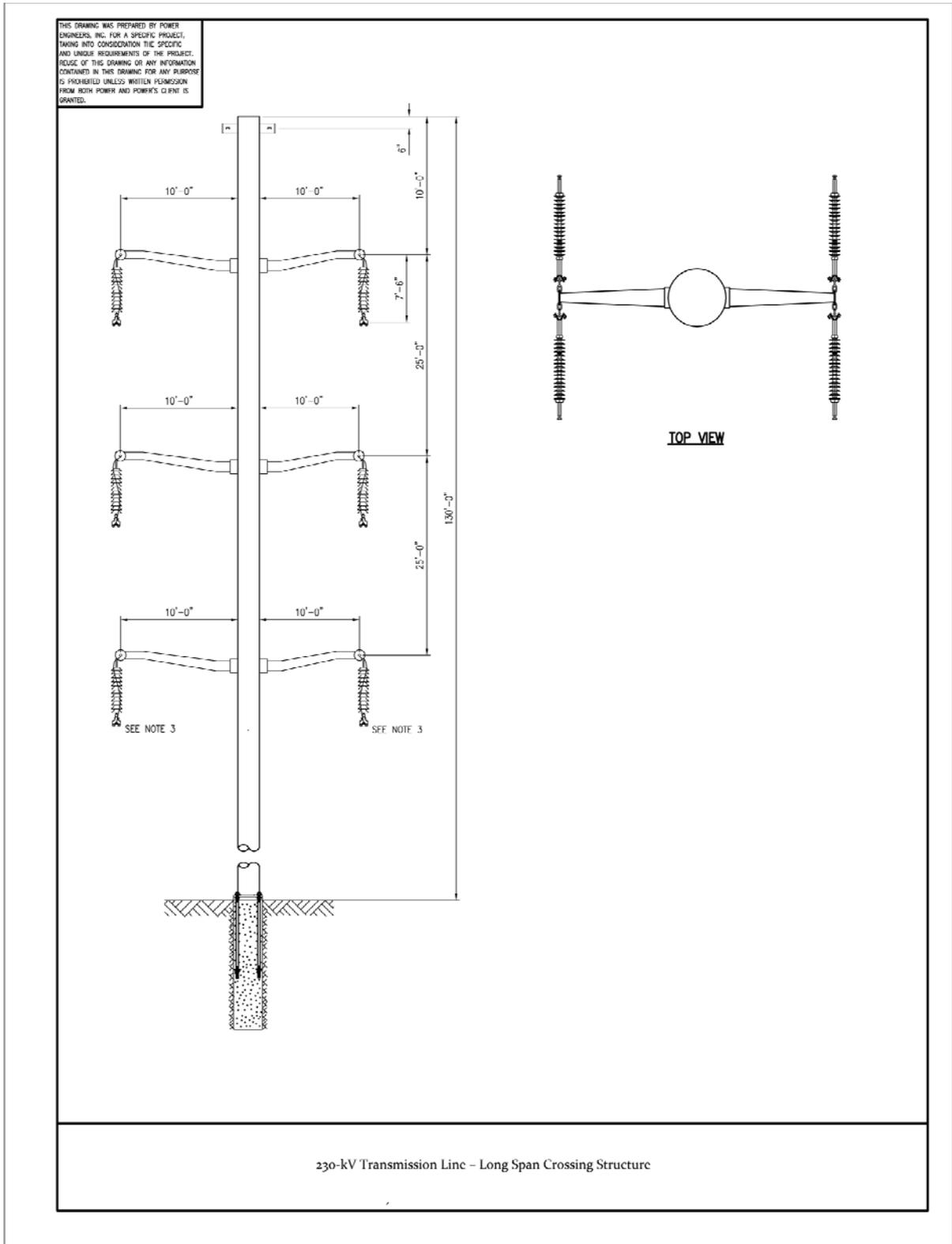


Figure 2.0-3 230-kV Transmission Line – Long Span Crossing Structure

At each pole location, a hole approximately 30 inches in diameter would be excavated to a depth of 20 to 30 feet using power augers and/or excavators (depending upon soil conditions). In rocky areas, excavation by controlled blasting may be required. A crane would be used to place the pole in the hole and the hole would be backfilled with native or imported fill material. Any remaining spoils would either be spread evenly on the ground within the transmission line ROW or removed and disposed of at an approved disposal site.

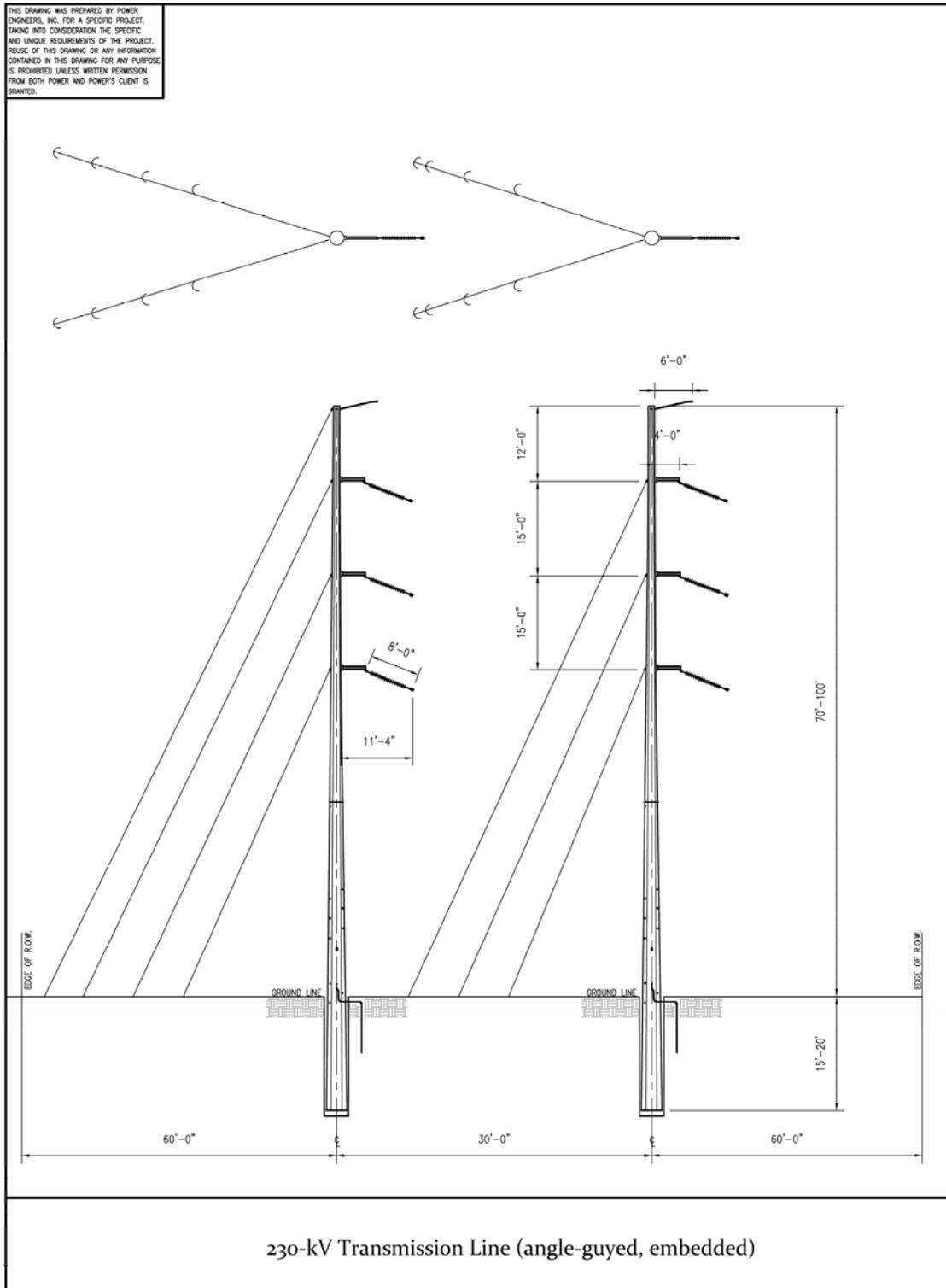
At full build out, each pole would carry six conductors (wires), each connected to insulators, attached to davit arms, mounted on each pole. Each set of three conductors would comprise a single three-phase circuit. The bottom conductors would be at least 22 feet above the ground at their lowest point of sag. In addition, a single optical ground wire (OPGW) would be strung between the poles for the sole purpose of operating the line and interconnected transmission grid.

At certain locations, where the route changes direction at a sharp angle, the transmission line wires would be placed on separate single poles (Figure 2.0-4). Guy wires and soil anchors would be installed where the transmission line would change direction to provide additional support. Self-supporting steel angle poles on concrete foundations would be installed at locations where anchors could not be installed (i.e. near roadways). Along the southern portion of the route, a three-wire HEC distribution line would be added to the transmission line below the primary conductors as an “underbuild” to provide a source of “station service” power to the Substation and other facilities on the Echanis site (Figure 2.0-5).

The construction and powering of the transmission line would occur in three phases:

- Phase I would involve the installation of transmission line poles, construction of access roads, and the stringing of a single circuit (three conductors) along one side of the transmission line poles. This single circuit would be designed and built to 230-kV standards, but initially would only be energized at 115 kV.
- Phase II would be a second construction phase that would involve installation of a 230-kV capacity line on the opposite side of the transmission line poles installed during Phase I. Phase II would occur at an undetermined future date and would not require construction of additional access roads or installation of additional poles. The same laydown areas, tensioning sites, and access routes used during Phase I construction would be used during Phase II.
- Phase III would involve increasing the power being transmitted through the initial circuit installed during Phase I from 115-kV to 230-kV. Because the line would have already been built to a 230-kV standard during Phase I, no additional construction or ground disturbing activities would be required during Phase III.

Poles and associated hardware would be transported to each pole location by flatbed truck. Assembly and mounting of associated line hardware would take place at each pole location. The assembled structures would then be raised by a crane and placed in the pre-dug holes. A pilot line would then be pulled (or strung) from pole to pole by a vehicle and/or helicopter and threaded through stringing sheaves on each pole. A larger diameter, stronger line (the pulling line) would then be attached to the pilot line and strung. This process would be repeated until the conductor is pulled through all sheaves. The conductors would be strung using power pulling equipment at one end and power braking or tensioning equipment at the other end. Sites for tensioning equipment and pulling equipment would be located approximately 10,000 to 20,000 feet apart.



**Figure 2.0-4 230-kV Transmission Line (angle-guyed, embedded)**

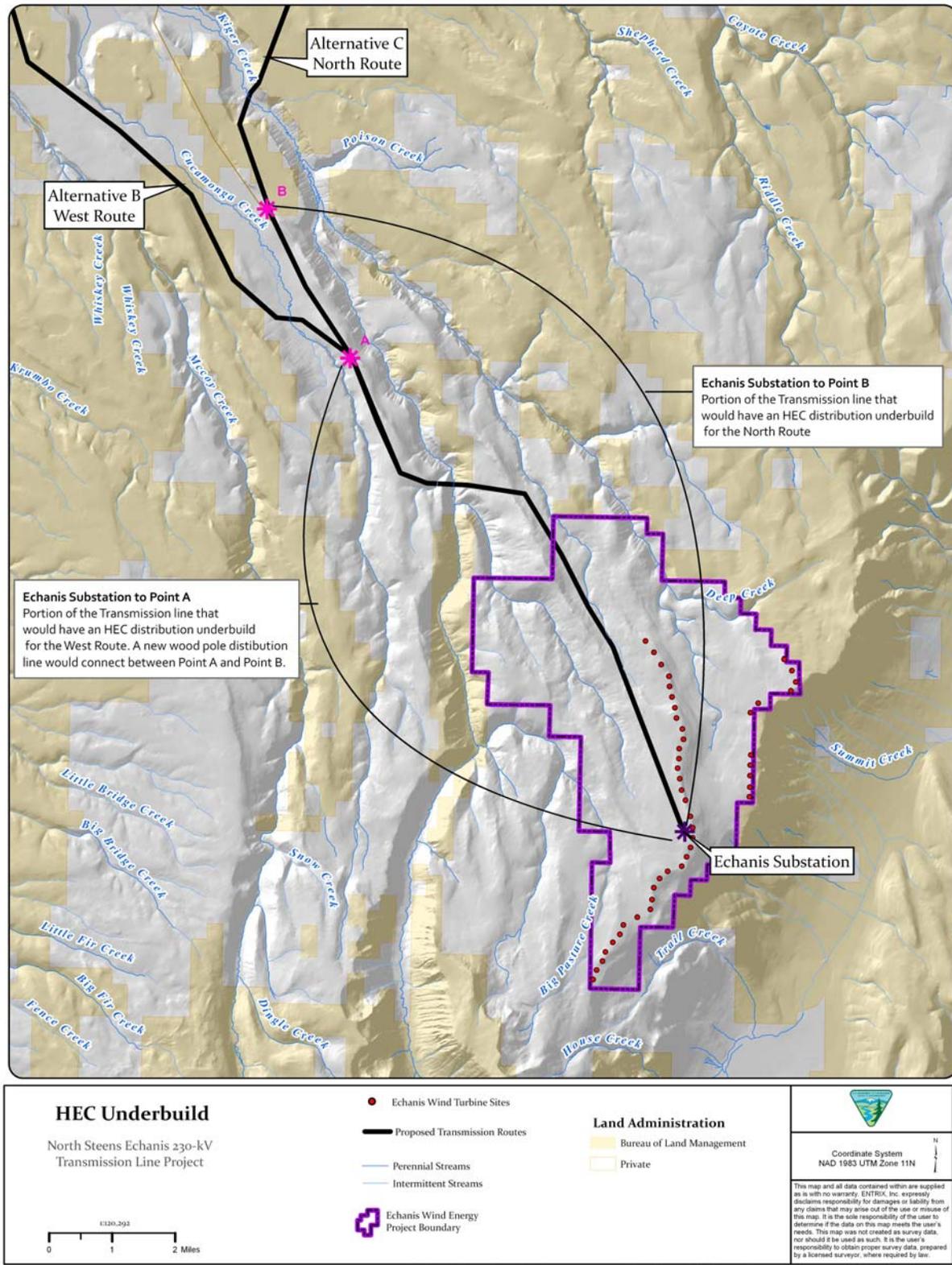


Figure 2.0-5 HEC Underbuild

During conductor installation, guard structures would be erected over natural or manmade obstacles. Guard structures consist of temporary H-frame poles placed on either side of the obstacle. These structures prevent ground wire, conductors, or other equipment from falling on an obstacle. Equipment for erecting guard structures includes augers, line trucks, pole trailers, and cranes. At minor road crossings other safety measures would be used, such as barriers, flaggers, or other traffic control.

At each pole location, sufficient area would be needed to allow safe operation of construction equipment. At each pole location a temporary construction easement extending 10 feet beyond the edge of the 150-foot permanent right-of-way would be required. In locations where downguys would be installed (i.e., where the line changes direction), an additional 100 feet of temporary workspace would be required in two directions from the pole location to accommodate installation of structural supports. Each pole would occupy an area of approximately 400 square feet (a 10-foot radius around each pole). Vegetation within this area would be controlled to reduce fire danger. Other existing vegetation within the ROW (and temporary construction easements) could be disturbed during construction, but would not be permanently cleared. Following construction, disturbed areas would be restored to original condition using salvaged native vegetation and seed mixes approved by BLM and USFWS (for areas within the MNWR).

### **2.2.1.3 Interconnection Station and Connection to the Regional Grid**

The proposed transmission line would interconnect with the existing HEC 115-kV transmission line at a new interconnection station located on a 0.69 acre site adjacent to the existing line (Figure 2.0-6). The interconnection station would contain circuit breakers to disconnect the Echanis Project from the existing HEC line. The interconnection station site would be enclosed by cyclone fencing and topped with a 3-strand barbed wire climb barrier. All vegetation within the fenced area would be removed and replaced with gravel. Construction would involve grading the site to a level surface, installing concrete foundations for electrical equipment, applying gravel, installing security fencing, and connecting equipment to the existing HEC 115-kV transmission line. Approximately 2.0 miles of the existing access road from Highway 205 to the interconnection station site would be improved by grading and widening. Approximately 0.59 miles of access road improvements would occur within the boundaries of the MNWR, west of Highway 205. Approximately 1,000 feet of new access road would be built from the existing access road to the interconnection station site.

HEC has a service area of approximately 20,000 square miles, covering southeastern Oregon and northwestern Nevada, and its headquarters are located in Burns, Oregon. It is a member owned non-profit cooperative, which means that it does not pay state or federal income taxes based on profits from operations. Because of this, any profits that HEC may make during the year are allocated back to its members in the form of patronage capital. HEC purchases all of its power from BPA under a long-term contract; even though some that of that BPA power is transmitted and received through Sierra Pacific Power Company's (SPPC) system in Nevada. (HEC 2010)

The process of electrically interconnecting the 104 MW Echanis, LLC wind project to the HEC and the BPA grids has progressed through the Feasibility and System Impact Study reports to the Facility Study report stage from January 2008 to date. BPA is currently finalizing the Facility Study report and an official cost and schedule for the 104 MW plan of service. It is estimated that the final Facility Study report, associated phased plan of service, and official cost and schedule would be completed in June 2010. Subsequent to that date, BPA would begin ordering long-lead items at Columbia Energy Partners LLC's (CEP) request, per BPA's Large Generator Interconnection Procedures (LGIP). A Large Generator Interconnection Agreement (LGIA) and Balancing Authority Agreement (BAA) would be signed upon final completion and issuance of the BLM EIS and permit for the Echanis generation-tie line right-of-way, based upon the selected transmission line route alternative. (Blood, 2010)

The preliminary plan of service, as produced in the BPA Facility Study report, calls for acceptable mitigation of problems on the 115-kV systems of HEC, BPA, and the Idaho Power Company to interconnect the full 104

MW. In the near-term, CEP, HEC, and BPA would work together to, first, bring on-line an initial 40 MW of the Echanis project requiring minimal upgrades. Then, an incremental 64 MW would be brought on-line in concert with certain long-lead items coordinated with BPA and Idaho Power. To allow interconnecting of the full 104 MW, the following system upgrades would be required to the HEC, BPA, and Idaho Power electrical and communications systems (Blood, 2010):

#### HEC Upgrades

- **Line Section:** If the Alternative B - West Route is selected, no line upgrades are foreseen on the HEC system. However, the 30-MVA regulator at the HEC Hanley Substation would either have to be replaced or moved south of the Echanis project's interconnection point on the HEC Hanley-Catlow 115-kV transmission line.
- **Line Section:** If the Alternative C - North Route is selected, HEC would have to replace approximately 20 miles of the existing "3/0" 115-kV transmission line conductor with a higher rated 115-kV conductor. The 20-mile line section originates from CEP's gen-tie line interconnection point at HEC's Crane Substation to the east of the HEC Hanley Substation 30-MVA regulator and the BPA Harney Substation. The Hanley 30-MVA regulator would not be affected.
- **Communications:** Communications media, voice, metering and data, monitoring, and control equipment to coordinate the transmission of the Echanis-generated power between the HEC and BPA networks, to comply with Western Electric Coordinating Council (WECC) reliability standards.

#### BPA Upgrades

- **Harney Substation:** Static VAR Compensator (SVC, @ +20/-12 Mvar) and flow-based Remedial Action Schemes (RAS).
- **Communications:** Communications media, voice, metering and data, monitoring, and control equipment and RAS to coordinate the transmission of Echanis-generated power, and one other project on the Harney-Redmond line, with BPA's network to comply with WECC reliability standards.
- **Harney-Redmond 115-kV Transmission Line:** Upgrade an approximately 20-mile section of transmission line between Brasada and Redmond from a Maximum Operating Temperature (MOT) of 80 degrees Celsius to 100 degrees Celsius by re-sagging /re-tensioning that line section.

#### Idaho Power Company Upgrade

- **Hines Substation:** Replace the 50-MVA Hines Substation transformer with a 100-MVA unit to allow for single-line outage contingencies between BPA-Harney and Idaho Power Company systems.

In addition to the above equipment upgrades, HEC would have to make operational changes. HEC does not generate any of its own power or have any other power generators located in its service area. Thus, its electrical distribution system is only designed to deliver power to its members. Some of the related operational changes that would be required so that HEC could transmit the power from the Echanis Project to the regional electrical grid system include:

- Taking on the new role would require HEC to formally change its status from a "local service provider" to a "transmission owner and provider," and require it to coordinate the new power transmission with WECC.

- New operational procedures and training would have to be implemented to manage generation from several sources.
- Current service interruptions that occur about twice a year, to complete minor system maintenance, would have to change so that the Echanis Project could deliver the contracted power reliably. (Whitaker 2010)

It is estimated that it would take at least 6 to 12 months to implement the above changes to the HEC electrical distribution and operational system.

#### **2.2.1.4 Laydown Areas and Tensioning Sites**

Approximately eight laydown areas (i.e. temporary storage yards) would be needed for unloading, storage, and distribution of construction materials and transmission components, including poles, davit arms, insulators, and the conductor on reels. In addition, approximately 19 pulling/tensioning sites would be needed for the temporary placement of reel trailers and/or tensioning truck/trailers during the installation of conductors. The preliminary locations of proposed laydown areas and tensioning sites are shown in Figure 2.0-7. With the exception of the laydown area at the interconnection site (described above) all laydown areas would be located on private land. Most pulling/tensioning sites would be located on private land. Exceptions include five sites on BLM land. No surface preparation would be required at the proposed laydown areas or tensioning sites. Any resulting temporary surface disturbance would be restored following construction.

#### **2.2.1.5 Access Roads**

New and improved access roads (approximately 2.19 miles) and unimproved overland access routes (approximately 26.07 miles) would be needed to move workers, vehicles, and equipment to the transmission line corridor during initial construction, and during inspection, maintenance, and repair of poles, insulators, and conductors (Figure 2.0-8). Existing unpaved access roads would be widened and new access roads would be constructed across BLM and USFWS administered lands. These roads would be widened or constructed to a width of approximately 20 to 22 feet within a permanent 40-foot wide ROW. The additional ROW beyond the 20- to 22-foot wide travel surface would be needed to accommodate construction, reconstruction, drainage improvements, snowplowing, and shoulder work. Overland access routes would be required on private land, BLM administered land, and land administered by the USFWS. Access roads constructed on federal land would be located on terrain requiring minimal, if any, cut and fill. In those few areas requiring cut and fill, appropriate erosion control measures would be implemented. Access roads would be maintained during construction and dust would be controlled using water or dust suppression chemicals. Any roads needed for continued transmission line operations and maintenance would be stabilized and use of overland roads would be monitored to avoid rutting. Those roads not needed for transmission line maintenance, or public or administrative access would be reclaimed by recontouring, scarifying, reseeding, and barricading.

#### **2.2.1.6 Distribution Line Relocation**

The Project Applicant also proposes to relocate approximately 1.35 miles of an existing 24.9-kV distribution line that presently crosses the MNWR along the south side of South Diamond Lane. The relocated line would be buried in a narrow trench backfilled with native soils, except where the line would cross the Donner und Blitzen River and the Buena Vista Canal. At those locations the line would be installed underneath the river and canal using the directional boring construction method to avoid disturbing the waterway and damaging the channelized river banks. Transmission poles would be placed at each end of the buried distribution line and underground vaults would be installed to accommodate any required splices or connections. Construction activities would be confined within the existing easement for the distribution line, except for minor access improvements along South Diamond Lane. The additional option of placing the distribution line within the existing ROW of South Diamond Lane could be evaluated at a later date.

### 2.2.1.7 Construction Period

Construction of the access roads would begin in spring 2011. Construction of the poles and installation of the first circuit of the 230-kV transmission line would occur in the spring, summer, and fall, as dictated by ground conditions and weather, and would last approximately five months. The timing for installation of the second circuit has not yet been determined.

### 2.2.1.8 Operation and Maintenance

Operation and maintenance activities would include aerial and ground patrol of the lines, climbing inspections, pole and conductor maintenance, and repair of access roads. Selective clearing of vegetation, primarily juniper trees, would be performed when necessary to provide for surveying, electrical clearance, line reliability, and construction and maintenance operations. The ROW would not be chemically treated to control vegetation unless necessary to comply with requirements of a permitting agency.

The following maintenance activities would be conducted on a regular basis:

- Routine air patrols from a helicopter to inspect for structural and conductor defects, conductor clearance problems, and hazard tree identification.
- Routine ground patrols to inspect structural and conductor components.
- Pole and conductor maintenance, including davit and insulator replacement.
- Cathodic protection surveys.
- Routine vegetation clearing, including trimming or removing tall shrubs and trees, to ensure adequate ground-to-conductor clearances.
- Road maintenance, including blading to improve surface conditions and removal of large rocks and debris; maintenance and repair of erosion control and water drainage systems; and road repairs after damage from washouts or slumping.
- Vegetation removal on access roads to allow the necessary clearance for access and provide for worker safety.
- Reduction of fuel loads (e.g. vegetation removal) around poles in fire-prone areas.
- Installation of bird protection devices, bird perch discouragers, and relocation or removal of bird nests.
- Follow-up restoration activities, such as seeding, noxious weed control, and erosion control.
- Miscellaneous damage repair due to failure of conductor splices, lightning strikes, wildfires, high winds, ice, or vandalism.

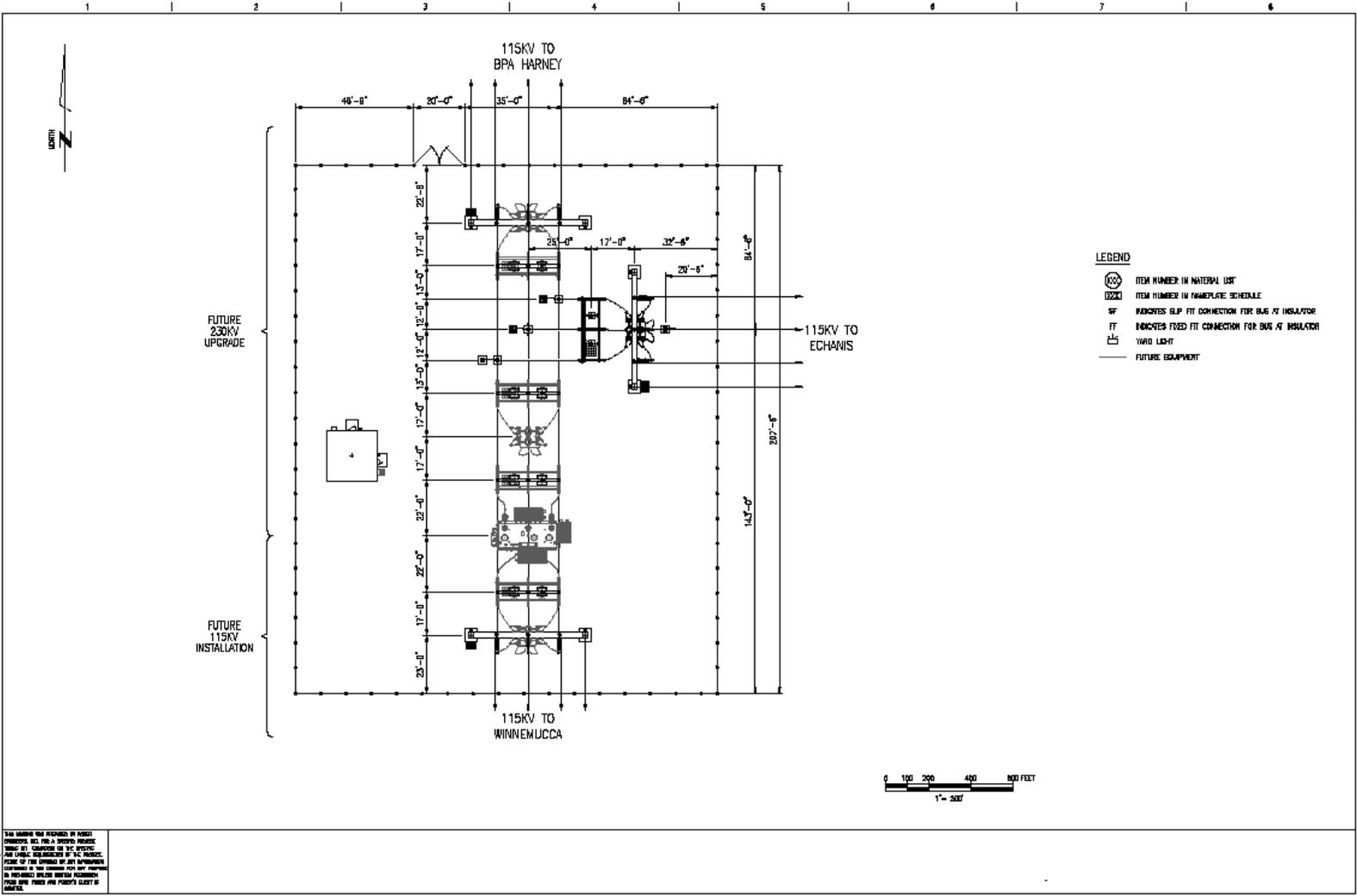


Figure 2.0-6 Interconnection Station

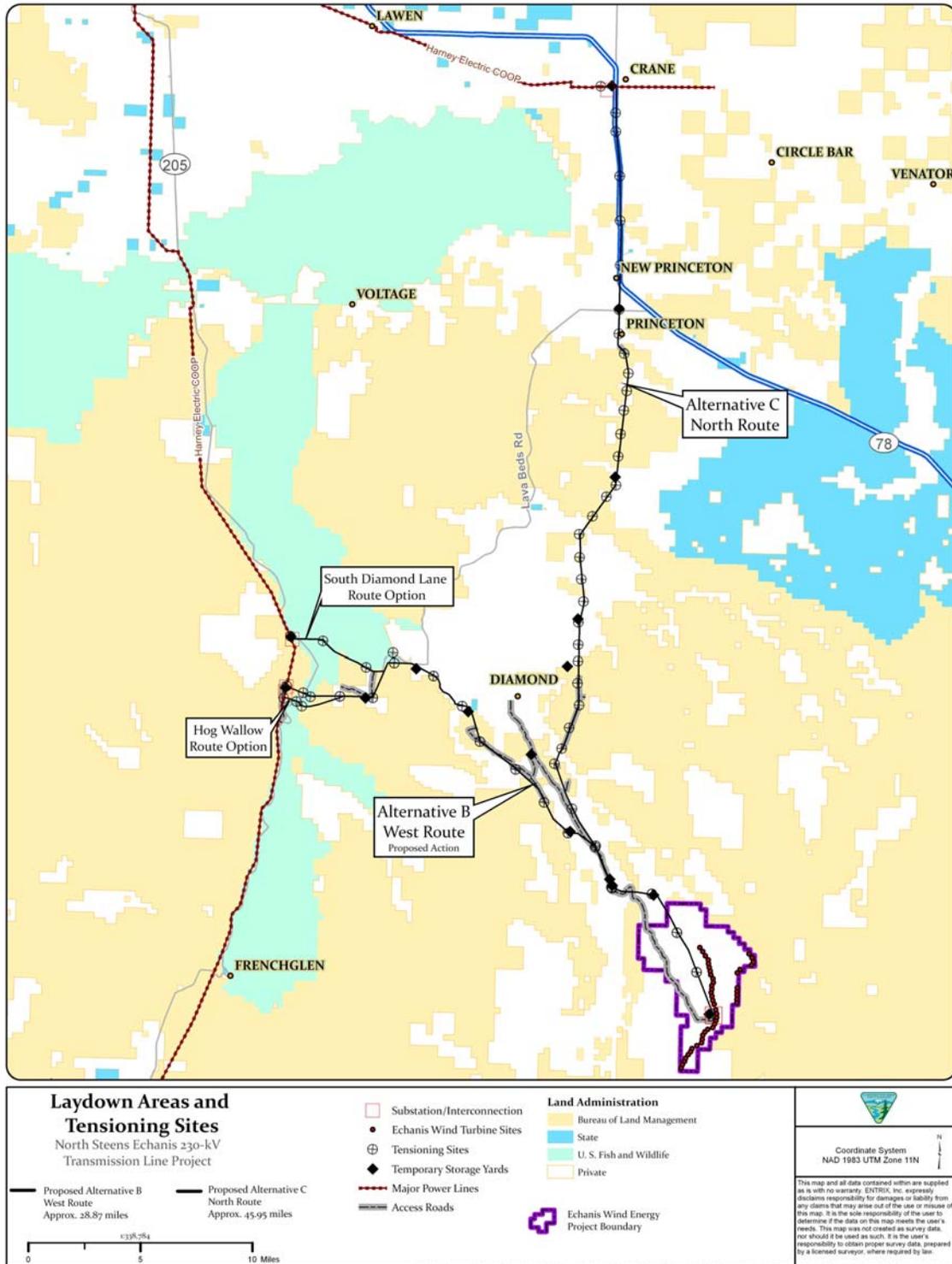


Figure 2.0-7 Laydown Areas and Tensioning Sites

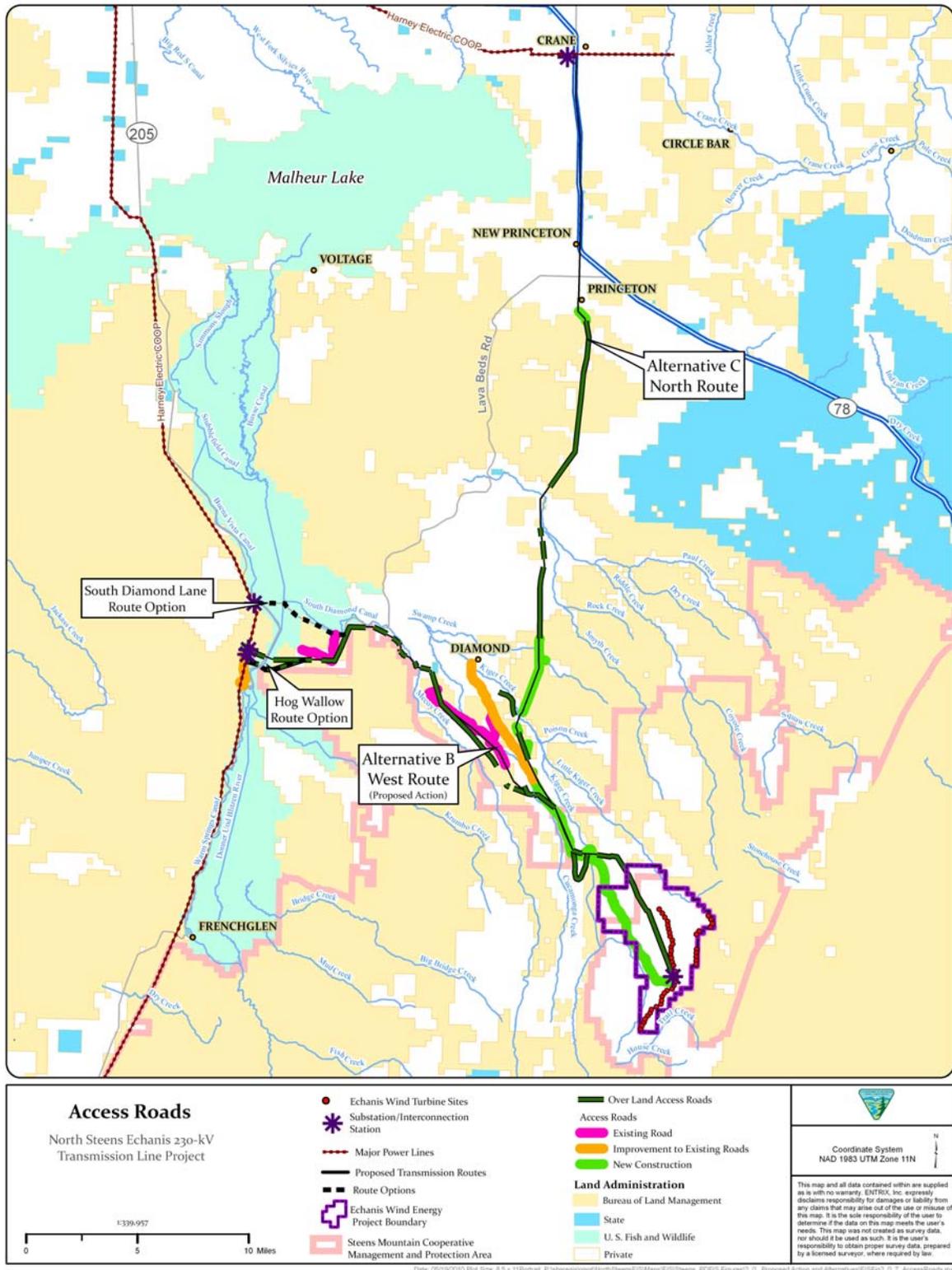


Figure 2.0-8 Access Roads

### 2.2.2 South Diamond Lane Route Option

The South Diamond Lane Route Option is a variation of Alternative B that would deviate from the West Route alignment approximately 4.59 miles east of the existing HEC 115-kV transmission line (Figure 1.0-1). Heading west from the point where the route would deviate from the Alternative B alignment, the route would parallel the south side of South Diamond Lane, cross over Highway 205, and follow a primitive road (and a short cross-country segment) to a new interconnection station that would be located adjacent to the existing HEC 115-kV transmission line. Approximately 4.10 miles of this route would cross land (in four different locations) within the MNWR, approximately 6.09 miles would cross BLM land, and approximately 18.08 miles would cross private land. The overall length of the South Diamond Lane Route Option, from the Echanis Substation to the HEC transmission line, would be 28.26 miles. As with Alternative B, along the southern portion of the route, a three-wire HEC distribution line would be added to the transmission line as an “underbuild” to provide a source of “station service” power to the Substation and other facilities on the Echanis site.

The ROW width, transmission line components, interconnection station design, need for laydown areas and tensioning sites, access roads, and construction methods would be similar to those described for Alternative B. Approximately seven temporary laydown areas and 18 pulling/tensioning sites would be required for the South Diamond Lane Route Option. Six laydown areas would be on private land and one on BLM administered land. Ten pulling/tensioning sites would be on private land, six on land within the MNWR administered by the USFWS, and two on land administered by the BLM. The interconnection station to the HEC 115-kV transmission line would be approximately 2.5 miles further north than Alternative B, the access road to the interconnection site from Highway 205 would be only 1/8 as long, and several laydown areas and tensioning sites would be required along South Diamond Lane. The same 1.35 miles of the existing 24.9-kV distribution system located along South Diamond Lane would be placed underground with this route option, using the same existing distribution line easement and construction methods described in Section 2.2.1.6.

### 2.2.3 Hog Wallow Route Option

The Hog Wallow Route Option is a second variation of Alternative B that would deviate from the West Route alignment approximately 2.84 miles east of the existing HEC 115-kV transmission line (Figure 1.0-1). This route would cross approximately 8.43 miles of land administered by the BLM, approximately 1.90 mile of land within the MNWR, and approximately 18.73 miles of private land. The route would cross the Blitzen Valley and the MNWR approximately 0.5 mile south of where Alternative B would cross the same two features. Unlike Alternative B, this route option would require placement of several poles on land within the MNWR. The overall length of the Hog Wallow Route Option, from the Echanis Substation to the HEC transmission line, would be 29.06 miles. As with Alternative B, a three-wire HEC distribution line would be added as an “underbuild” to the transmission line along southern portion of the route to provide a source of “station service” power to the Substation and other facilities on the Echanis site.

As with the South Diamond Lane Route Option, the ROW width, transmission line components, interconnection station design, need for laydown areas and tensioning sites, access roads, and construction methods, would be similar to Alternative B. Approximately nine temporary laydown areas and 18 pulling/tensioning sites would be required for the Hog Wallow Route Option. Eight laydown areas would be on private land and one would be on BLM administered land. Twelve of the pulling/tensioning sites would be on private land, three on land within the MNWR administered by the USFWS, and three on land administered by the BLM. The interconnection station to the HEC 115-kV transmission line would be 0.5 mile further south than Alternative B, the access road to the site from Highway 205 (the same road used for Alternative B) would be about 0.5 mile shorter, and several additional laydown areas and tensioning sites would be needed. The same 1.35 miles of the existing 24.9-kV distribution system located along South

Diamond Lane would be placed underground with this route option, using the same existing distribution line easement and construction methods described in Section 2.2.1.6.

#### **2.2.4 Alternative B – 115-kV Transmission Line Option**

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments described above for Alternative B – West Route and the South Diamond Lane and Hog Wallow Route Options. The 115-kV Transmission Line Option would include a single three-phase (i.e. three conductors) 115-kV circuit. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods, interconnection points, and access requirements would be the same as described for Alternative B. The primary difference between this option and the others described above is that the 115-kV Transmission Line Option would not involve a second future construction phase.

#### **2.2.5 Echanis Wind Energy Project**

As described at the beginning of this section, the Echanis Project has been incorporated into all transmission line action alternatives analyzed in this Draft EIS; including the two route options and 115-kV design configuration described for Alternative B. The Echanis Project would involve the deployment and operation of 40 to 69 wind turbines on a 10,500 acre privately-owned parcel in rural Harney County. The Project would have a peak generating capacity of up to 104 megawatts (MW) of electrical power and would include multiple project components, including wind turbines, a power collection system, a new Substation, access roads, and an operations and maintenance building. Each major component of the Echanis Project is described below.

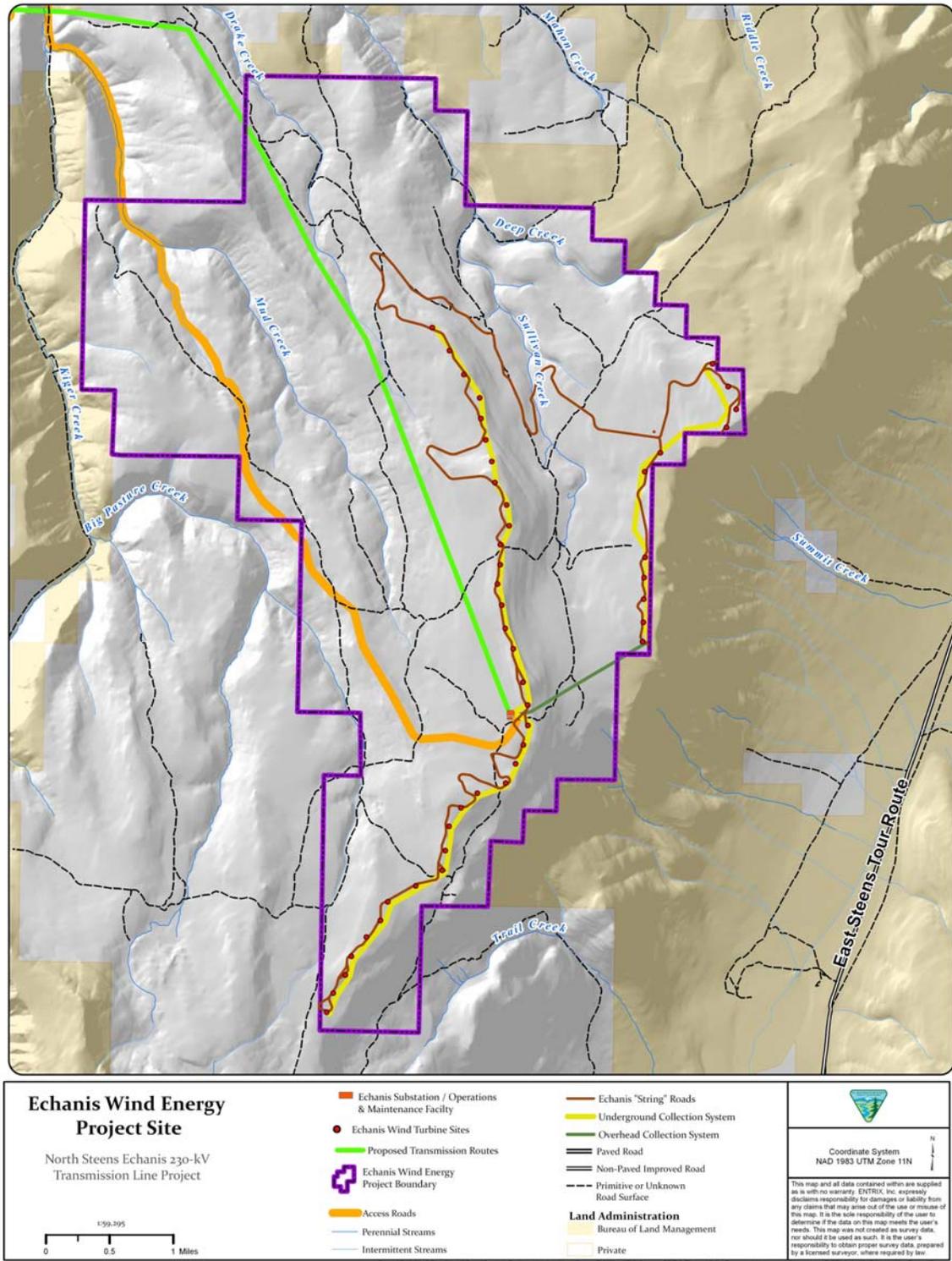
##### **2.2.5.1 Wind Turbines**

The proposed Project would deploy 40 to 69 wind turbines in multiple “strings” across the Echanis site (Figure 2.0-9). Each turbine would have a 3-bladed up-wind rotor connected to a nacelle that houses a generator, gearing, and internal controls. Each nacelle would be mounted on steel tubular towers, varying in height from 213 to 263 feet tall. Each tower would be anchored to a steel and concrete foundation. The towers, including the rotor blades (at 12:00 o’clock position) would be approximately 415 feet tall. The normal maximum generation capacity of each turbine would range from 1.5 MW to 2.5 MW of electricity, depending on the final number of turbines developed on the site. A photograph of a wind turbine similar to the type that would be deployed on the Echanis site is shown in Figure 2.0-10.

Each tower would be comprised of three to four tapered segments that would be fabricated offsite, transported to the Project site, placed in position by crane, and bolted in place. The towers would be approximately 12 feet in diameter at the base, tapering to 9 feet at the top. When fully assembled, each tower would weigh approximately 100 tons. The exterior of the tower would have a smooth surface and be painted a neutral color to blend with a sky background (such as blueish-white). The tubular towers would sit atop steel and concrete foundations designed for the specific subsurface conditions at the individual turbine sites.

The tower foundation would be one of two industry-standard designs. One type of foundation would be an inverted “T” type foundation, which consists of a relatively shallow concrete base with a relatively large diameter. The maximum depth of the base would be about 8 feet below the ground surface, while the diameter would be approximately 42 feet. The turbine tower would be anchored to the foundation base by a baseplate ring consisting of long, steel bolts extending nearly to the bottom of the concrete base. The other foundation type would be a pile foundation that uses a cylindrical culvert instead of a concrete foundation to anchor the tower base. Inner and outer sections of culvert pipe of slightly different diameter would be sunk into an excavation that would range from 25 to 35 feet in depth, depending on specific subsurface conditions, and backfilled with compacted soil. Two parallel rings of full-length steel anchor bolts would then extend





**Figure 2.0-9 Echanis Site**



Figure 2.0-10 Example Wind Turbine

from the tower base plate through the culvert section, which would be filled with concrete after installation of the bolts.

The nacelle mounted on top of each turbine tower would be approximately 29 feet long, 12 feet wide, and 13 feet high. The exterior surface would be constructed of fiberglass lined with sound-absorbing foam. The generator, gear box, and associated control equipment for the turbine would be housed inside the shell of the nacelle. The nacelle would be accessed internally through the tower, and most servicing of machinery would be conducted within the nacelle.

The 3-bladed rotor assembly would be attached to the rotor hub at the front of the nacelle. The turbine blades would have a smooth outer surface and be composed of laminated fiberglass or a fiberglass composite. Each blade would be fabricated offsite in one piece and transported to the Project site. At the site, the assembly would be bolted to the rotor hub, raised into position by crane, and connected to the nacelle.

### **2.2.5.2 Power Collection System**

Electricity generated in the nacelle of each turbine would be carried through the tower to a transformer mounted on a concrete pad adjacent to the base of each tower. The transformers would increase the voltage from 575 volts to 34.5 kilovolts (kV). Electricity would be carried underground from the transformers to the Echanis Substation via an 8.99 mile network of 34.5-kV power cables installed approximately 4 feet below the ground surface. One 1.18 mile overhead collection link would be needed to transfer electricity from the easternmost turbine string to the Echanis Substation. Junction boxes to facilitate the splicing of cables would be installed at various locations within the Project Area. Figure 2.0-9 illustrates the expected layout of the power collection and transmission systems on the Echanis site.

### **2.2.5.3 Substation**

A new Substation would be constructed near the center of the Echanis site. The Substation would serve as a collection point for the underground cable system that would convey the generated power from each turbine location. The Substation would contain circuit breakers, power conditioning equipment, and a transformer that would increase the 34.5-kV collection voltage to 115-kV for transmission via the overhead transmission line. The Substation site would be approximately 200 feet long and 400 feet wide (1.84 acres), enclosed with cyclone fencing and topped with a 3-strand barbed wire climb barrier. All vegetation within the fenced area would be removed and replaced with gravel. Construction would involve grading the site to a level surface, installing concrete foundations for electrical equipment, applying gravel, installing security fencing, and connecting equipment to the new transmission line.

### **2.2.5.4 Operation and Maintenance Building**

A 24-foot by 48-foot single-story operations and maintenance building would be located adjacent to the Substation. The building would be designed to accommodate computer equipment that would provide supervisory control of the Substation and the wind turbines. The building would also serve as an emergency shelter for crews during lightning storms and other severe weather. The building would have an on-site septic system and water would be obtained from an on-site well. Electricity would be obtained from the nearest available HEC service line. A small amount of supplies, including lubricants, would be stored in the building to support daily maintenance activities.

### 2.2.5.5 Access Roads

An existing access road, currently providing access to a privately-owned ranch, would be widened, improved, and extended to connect the Echanis Project site to Ham Brown Lane and South Diamond Lane. The access road surface would be graded and widened to a width of between 20 to 22 feet and topped with sub-course and top-course aggregates. The completed access road would be approximately 18.95 miles long. Approximately 17.47 miles of the access road would be on private property and 1.48 miles would be on public land administered by the BLM (Figure 2.0-8). The access road would be located within a 40-foot wide easement on private land and a 40-foot wide ROW on land administered by BLM. The additional ROW beyond the 20- to 22-foot wide travel surface would be needed to accommodate construction, reconstruction, drainage improvements, snowplowing, and shoulder work. The portion of the access road crossing BLM administered land would be outside of the boundary of the Steens Mountain CMPA. Approximately 17.11 miles of additional 16-foot wide service roads (i.e. string roads) would be developed on the Echanis site to provide access between the operations and maintenance building, wind turbines, and other wind energy related facilities on the site. Access and service roads would be maintained and dust control measures would be used during construction and operation of the Echanis Wind Energy Project.

### 2.2.5.6 Construction Period

Construction of the Echanis Project would begin in 2011 and last approximately 9 to 12 months, depending on weather and site conditions.

### 2.2.5.7 Operation and Maintenance

The Echanis Project would operate 24 hours a day, 365 days per year. The Project would be equipped with a central Supervisory Control and Data Acquisition (SCADA) system that would be continuously online to monitor and control operation of the of the wind turbines and Substation. Maintenance activities at the site would include aerial and ground inspections, tower maintenance, and repair of access roads. Selective clearing of vegetation, primarily juniper trees, would be performed only when necessary for maintenance operations.

The following maintenance activities would be conducted on a regular basis:

- External and internal tower cleaning.
- Wind turbine blade cleaning.
- Gearbox inspection and oil changes.
- Load testing, installation, and certification of anchor/eyebolts.
- Tower painting and surface inspection/recoating.
- Composite blade inspection and repair.
- Lightning conductor/protection testing, installation, and repair.

## 2.3 ALTERNATIVE C – NORTH ROUTE

Alternative C would involve construction and operation of an overhead double-circuit 230-kV transmission line that would transport electrical power from the Echanis Wind Energy Project to the regional electric grid by connecting to an existing HEC 115-kV transmission line located near Crane, Oregon (Figure 1.0-1). A reduced capacity 115-kV design configuration is included as an option under Alternative C. Because of the interdependence between the Echanis Project and the transmission line, Alternative C includes the

development of the Echanis Project as part of the Proposed Action. The various Project components comprising Alternative C are described below.

## **2.3.1 Transmission Components**

### **2.3.1.1 Right of Way Location**

The proposed 230-kV transmission line would begin at a new Substation located on the Echanis Wind Energy Project site and end at a new interconnection station constructed adjacent to the existing HEC 115-kV transmission line near Crane, Oregon (Figure 1.0-1). The transmission line would be approximately 45.95 miles long, with approximately 33.66 miles crossing private land, approximately 12.10 miles crossing land administered by the BLM, and approximately 0.19 mile crossing state land. The transmission line would be located within a permanent 150-foot wide ROW along the entire route.

### **2.3.1.2 Transmission Line**

The design, materials, and construction techniques for the proposed transmission line would be the same as described for Alternative B. The six aluminum conductors comprising the double circuit 230-kV line would be strung on 70- to 80-foot tall steel poles, which would be embedded directly into the ground. The span length between poles would range from 600 to 1,000 feet, depending on site conditions and topography. At certain locations, where the route changes direction at a sharp angle, the transmission line conductors would be placed on separate single poles.

At each pole location, a hole approximately 30 inches in diameter would be excavated to a depth of 20 to 30 feet using power augers and/or excavators (depending upon soil conditions). In rocky areas, excavation by controlled blasting may be required. A crane would be used to place the pole in the hole and the hole would be backfilled with native or imported fill material. Any remaining spoils would either be spread evenly on the ground within the transmission line ROW or removed and disposed of at an approved disposal site. As with Alternative B, a three-wire HEC distribution line would be added as an “underbuild” to the transmission line along southern portion of the route to provide a source of “station service” power to the Substation and other facilities on the Echanis site.

As described for Alternative B, build out of the Project would occur in phases. During Phase I, a single circuit designed and built to a 230-kV standard would be installed on one side of each pole, but it initially would be operated at 115-kV. During Phase II, a second circuit would be installed on the other side of each pole and operated at 230 kV. During Phase III, the operational voltage of the Phase I 115-kV line would be increased to 230-kV. The second circuit would be added in the future, if needed, to serve other wind energy projects developed in the area.

### **2.3.1.3 Interconnection Station and Connection to the Regional Grid**

The proposed transmission line would interconnect with an existing HEC 115-kV transmission line at a new interconnection station similar to the facility described for Alternative B. The interconnection station would contain circuit breakers to disconnect the Project from the existing line and would be fenced with cyclone fencing topped with a barbed wire climb barrier. All vegetation within the fenced area would be removed and replaced with gravel. Construction would involve grading the site to a level surface, installing concrete foundations for electrical equipment, applying gravel, installing security fencing, and connecting equipment to the existing 115-kV transmission line.

If the Alternative C - North Route is selected, HEC would have to replace approximately 20 miles of the existing "3/0" 115-kV transmission line conductor with a higher rated 115-kV conductor. The 20-mile line section originates from CEP's gen-tie line interconnection point at HEC's Crane Substation to the east of the HEC Hanley Substation 30-MVA regulator and the BPA Harney Substation. In this case, the Hanley 30-MVA regulator would not be affected. (Blood, 2010)

#### 2.3.1.4 Laydown Areas and Tensioning Sites

Approximately nine laydown areas would be used for the temporary unloading, storage, and distribution of construction materials and transmission components, including poles, davit arms, insulators, and conductor on reels. In addition, approximately 36 pulling/tensioning sites would be required along the transmission line route for the temporary placement of reel trailers and/or tensioning truck/trailers during the installation of conductors. All nine lay-down areas and 25 of the pulling/tensioning sites would be located on private land. Eleven pulling/tensioning sites would be on land administered by BLM. The preliminary proposed locations for laydown areas and tensioning site are shown on Figure 2.0-7. No surface preparation would be required for either the laydown areas or the tensioning sites. Any resulting surface disturbance would be restored following construction.

#### 2.3.1.5 Access Roads

New access roads and overland access roads (approximately 5.03 and 25.05 miles, respectively) would be required for vehicle and equipment access to the transmission line corridor during initial construction, and for inspections, maintenance, and repair of poles, insulators, and conductors during long-term operation (Figure 2.0-8). New access roads would be constructed across private lands and BLM-administered lands. Overland access roads would be located on both private land and BLM-administered land. Overland access routes would have a single 8-foot wide travel lane and would traverse the landscape over open ground; no roadbed improvements would be required. Access roads constructed on federal land would be located on terrain requiring minimal, if any, cut and fill. In those few areas requiring cut and fill, appropriate erosion control measures would be implemented. Access roads would be maintained during construction and dust would be controlled using water or dust suppression chemicals. Any roads needed for continued transmission line operations and maintenance would be stabilized and use of overland roads would be monitored to avoid rutting. Those roads not needed for transmission line maintenance or public or administrative access would be reclaimed by recontouring, scarifying, reseeding, and barricading.

#### 2.3.1.6 Construction Period

Construction of the access roads would begin in spring 2011. Construction of the poles and installation of the first circuit of the 230-kV transmission line would occur in the spring, summer, and fall, as dictated by ground conditions and weather, and would last approximately five months. The timing for installation of the second circuit has not yet been determined.

#### 2.3.1.7 Operation and Maintenance

Operation and maintenance activities for Alternative C would be the same as for Alternative B and would include aerial and ground patrol of the lines, climbing inspections, tower and wire maintenance, and repair of access roads. Selective clearing of vegetation, primarily juniper trees, would be performed only when necessary to provide for surveying, electrical clearance, line reliability, and construction and maintenance operations. The ROW would not be chemically treated to control vegetation unless necessary to comply with requirements of a permitting agency.

### 2.3.2 Alternative C - 115-kV Transmission Line Option

The 115-kV Transmission Line Option would be a reduced capacity design configuration constructed along the same transmission line alignments described above for Alternative C. The 115-kV Transmission Line Option would include a single three-phase (i.e. three conductors) 115-kV circuit. The alignment of the transmission line, pole heights and spacing, ROW width, construction methods, interconnection points, and access requirements would be the same as described for Alternative C.

### 2.3.3 Echanis Wind Energy Project

As described at the beginning of this section, for the purposes of this DEIS, the Echanis Project has been incorporated into all of the action alternatives, including Alternative C, as a connected non-Federal action. The site layout for the Echanis Project under Alternative C, including wind turbines, power collection system, Substation design, main access road, on-site string roads, and O&M building would be the same as described for Alternative B. The construction schedule would be the same, beginning in 2011 and lasting approximately 9 to 12 months, depending on weather and site conditions. Operation and maintenance activities at the Echanis site would be identical to those described for Alternative B.

## 2.4 **ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS**

The CEQ NEPA regulations (40 C.F.R. 1502.14) state that an EIS must “Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.” The BLM NEPA Handbook (Handbook H-1790-1) further states that an action alternative can be eliminated from detailed analysis if the action alternative meets any of the following conditions:

- The alternative is ineffective (i.e. it would not respond to the purpose and need).
- The alternative is technically or economically infeasible given past and current practice and technology (this does not require cost-benefit analysis or speculation about an applicant’s costs and profits).
- The alternative is inconsistent with the basic policy objectives for the management of the area.
- Implementation of the alternative is remote or speculative.
- The alternative is substantially similar in design to another alternative that is already being analyzed.
- The alternative has substantially similar effects to another alternative that is being analyzed.

This section complies with this guidance by reviewing a number of alternatives that were originally considered by the Project Applicant, but were eliminated from further consideration.

### 2.4.1 Route Selection Process

The Project Applicant identified several potential transmission line routes during the initial route selection process. Discussions were held with private landowners, federal and state land managers, and local officials to obtain information on potential opportunities and constraints. The route selection process was based on the consideration of the following factors:

- Property ownership
- Land use compatibility
- Topography

- Environmental constraints
- Construction and operation costs
- Electrical loss due to long transmission distances
- Location and capacity of existing energy infrastructure

The alternative routes considered but rejected, along with the reasons for eliminating the alternatives from further consideration, are described below.

## 2.4.2 Alternatives Considered but Rejected

All of the transmission line routes evaluated during the route selection process had two Project features in common: 1) the location and configuration of the wind turbines strings, and 2) the location of the Echanis Substation. The location of the wind turbines was based on analysis of several years of meteorological data that was used to determine the placement of each turbine tower to maximize energy production at the site. The arrangement of the wind turbines in turn dictated the location of the underground power collection system and the Echanis Substation. Four route alternatives were identified to transport power from the Echanis Substation to the regional electric grid. Each route alternative is described below along with the reasons the alternative was eliminated from further consideration.

### 2.4.2.1 Steens Mountain CMPA Route Alternative

The CMPA Route Alternative would have extended 25 miles from the Echanis Substation to the new interconnection station adjacent to HEC's existing 115-kV transmission line near Diamond Junction (Figure 2.0-11). The transmission line would cross public and private land within the Steens Mountain CMPA as well as land within the MNWR between these two points. The CMPA route would have been the shortest and most direct route of all the alternatives considered. However, this alternative was eliminated from further consideration because Section 113(f) of the Steens Mountain Cooperative Management and Protection Act prohibits construction of facilities of the magnitude of the proposed transmission line on Federal lands within the boundaries of the CMPA.

Sec. 113(f) states:

**PROHIBITION ON CONSTRUCTION OF FACILITIES.**—No new facilities may be constructed on Federal lands included in the Cooperative Management and Protection Area unless the Secretary determines that the structure—

- (1) will be minimal in nature;
- (2) is consistent with the purposes of this Act; and
- (3) is necessary:
  - (a) for enhancing botanical, fish, wildlife, or watershed conditions;
  - (b) for public information, health, or safety;
  - (c) for the management of livestock; or
  - (d) for the management of recreation, but not for the promotion of recreation.

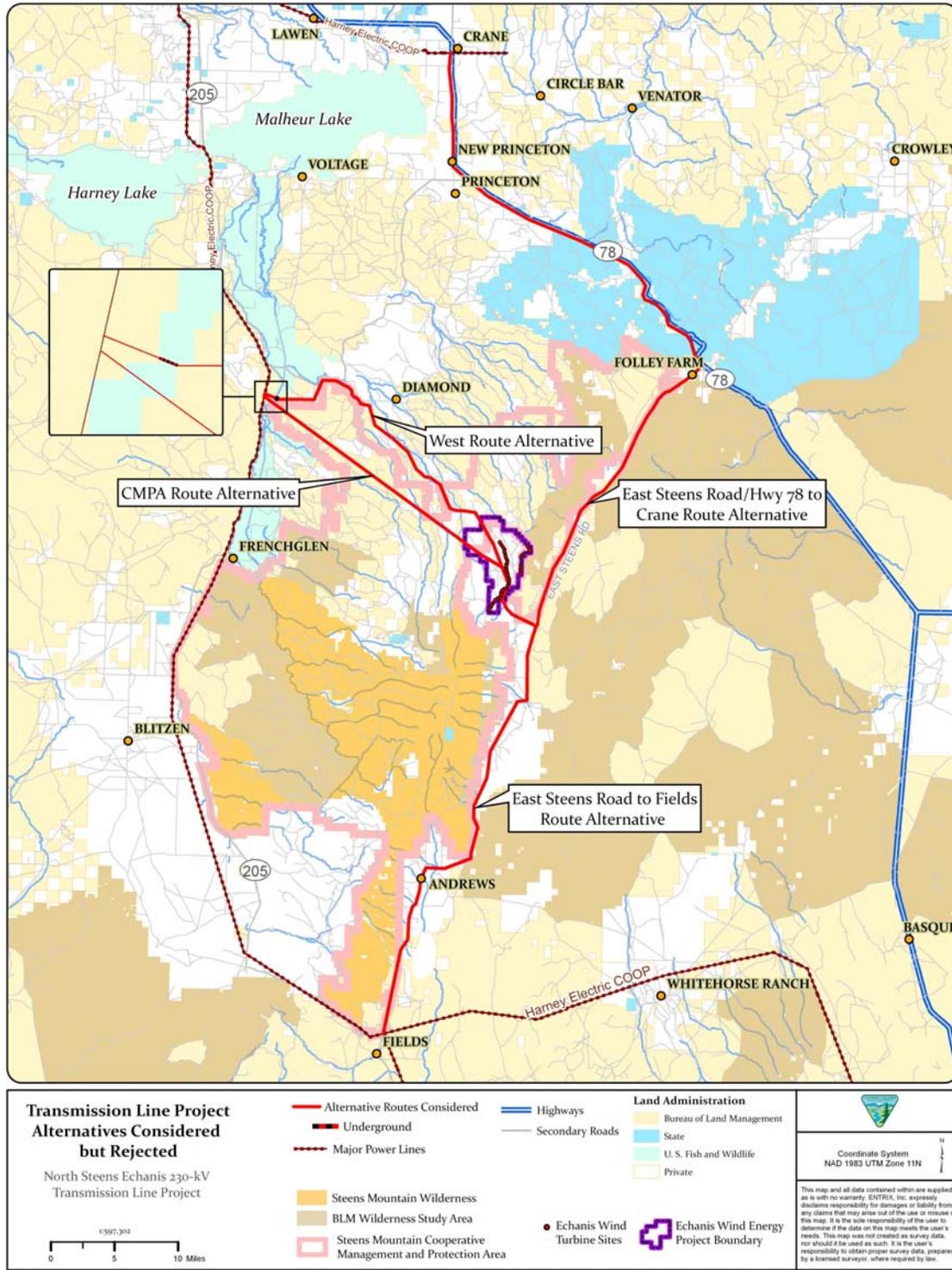
BLM determined that the proposed transmission line would be prohibited on Federal lands by Section 113(f) because it would not be minimal in nature, may be inconsistent with the purposes of the Act, and is not necessary for the purposes expressed in (A) through (D) above. Therefore, this route option was eliminated from further consideration.

### 2.4.2.2 East Steens Road/Hwy 78 to Crane Route Alternative

The East Steens Road/Hwy 78 to Crane Route Alternative would have been the longest route of all the alternatives considered. The transmission line would have extended 70 miles from the Echanis Substation, along East Steens Mountain Road and Highway 78 to Crane, OR where the transmission line would tie into an existing HEC 115-kV transmission line (Figure 2.0-11). Along East Steens Road, the transmission line would have been placed within the ROW of an existing distribution line that crosses BLM land. Depending on the exact placement of facilities under this alternative, the CMPA prohibitions described in Section 2.4.2.1 as well as the Interim Management Policy for Lands under Wilderness Review (IMP, H-8550-1,1995) restrictions (IMP at page 29 and 30) would have barred further consideration of this alternative. Placement of the proposed new transmission line within a valid existing ROW would not circumvent these prohibitions and restrictions. Existing ROWs on Federal lands authorize specific uses and do not convey rights to construct new facilities not within the scope of the original grant. For this reason any new use would have required a new authorization (even if it was within a pre-existing ROW) and be subject to the land management authorities, restrictions, and prohibitions in effect at the time of the new proposal. In addition, this route would have experienced a substantial cumulative electric line loss between the Echanis site and the connection to the regional grid (in excess of 10 percent). For these reasons, this route was determined to be economically infeasible and legally problematic, and was therefore eliminated from further consideration.

### 2.4.2.3 East Steens Road to Fields Route Alternative

Another route that was considered would have headed east from the Echanis Substation and south along East Steens Road to the Field Substation (a distance of about 42 miles). From the Fields Substation the power would have been transmitted 106 mile north on the HEC 115-kV line to the BPA Harney line south of Hines. Along East Steens Road, the transmission line would have been located within the ROW of an existing distribution line that crosses BLM land. The primary disadvantage of this route was the substantial cumulative electric line loss that would occur between the Echanis site and the BPA Harney line (up to 37.5 percent) (Power Engineers, 2009). This level of electric line loss would translate into lost power sales from the Echanis Project and, thus, affect the financial feasibility of the project. In addition, at one location along this route there exists a narrow corridor between the Steens Mountain Wilderness and a WSA where making adjustments to the route to avoid protected area and existing improvements would have made transmission routing difficult. Placing the route outside this narrow corridor would be prohibited by Wilderness and CMPA prohibitions, as well as by Wilderness Review IMP restrictions. This route was determined to be legally problematic, not economically viable, and was eliminated from further consideration.



**Figure 2.0-11 Transmission Line Project Alternatives Considered but Rejected**

#### 2.4.2.4 West Route Underground Alternative

A variation of Alternative B - West Route was also considered, but rejected. This route alternative would have followed the alignment of Alternative B; however the 0.27 mile portion of the transmission line crossing the Blitzen Valley would have been placed underground instead of spanning the valley with an aerial crossing. The primary reason this alternative was eliminated from further consideration was because of the high construction costs (due to undergrounding the portion of the line crossing the Blitzen Valley) compared to the other route alternatives. A cost estimate prepared by the applicant concluded that the materials and labor costs for an underground crossing at this location would be 24 times the cost of an overhead span at this same location; \$17,674,206 and \$728,943, respectively (Power Engineers, 2010). The higher costs of underground construction are due primarily to costs associated with installing, operating, and maintaining the pressurized dielectric oil filled conduit pipe required to house, insulate, and cool the conductors. High cost microtunneling techniques would have been required to install the conduit pipe through areas of basalt rock. An additional concern with the underground alternative was the potential for line leakage. If there was a leak of dielectric oil, the resulting contaminated soil would be classified as a hazardous waste and any contaminated soil or ground water would need to be remediated (PSC, 2009). This cleanup could be expensive, depending upon the amount of oil leaked, the extent of the leak from the line, accessibility to the site for cleanup, and the potential effects on the environment. Thus, the increased costs for constructing the underground line, operating the line once it was constructed, and the potential future costs if an oil leak were to occur, resulted in this route being eliminated from further consideration.

### 2.5 PROJECT DESIGN FEATURES, BEST MANAGEMENT PRACTICES, AND COMPARISON OF ENVIRONMENTAL EFFECTS

The environmental analysis in this Draft EIS was conducted assuming specific Project Design Features (PDFs) and Best Management Practices (BMPs) would be incorporated into the project design and implemented during construction and operation of the Proposed Action and alternatives, including the Echanis Wind Energy Project. The PDFs and BMPs for the transmission line were originally proposed in the Plan of Development (POD) for the Echanis Substation to Diamond Junction 230kV Transmission Line Project prepared by Columbia Energy Partners in February 2009 (revised August 2009). Similar measures for the Echanis Project were included as conditions of approval in Exhibit B of the Harney County Conditional Use Permit No. 07-14 approved on April 18, 2007; as modified by the Harney County Planning Commission Site Plan Alteration approved on May 21, 2008.

A brief summary of the PDFs and BMPs that would apply to both the North Steens 230-kV Transmission Line Project and the Echanis Wind Energy Project are presented below:

- Poles and other structures would be placed to avoid sensitive areas (especially riparian areas, watercourses, and cultural resources) and to allow conductors to clearly span these features.
- Ground disturbance would be limited to that necessary to safely and efficiently install the proposed facilities.
- Fire protection measures would be followed, as required by state and federal regulations, to prevent wildfires that may cause damage to wildlife habitat.
- Appropriate traffic control measures would be used to ensure public safety during construction. Prior notice would be given for any extended delays or road blockages.
- Access roads would be maintained to have crossroad drainage to minimize the amount of channeling or ditches needed. Water bars would be installed at all alignment changes (curves) and significant grade changes.

- Access roads and other areas of ground disturbance within the construction limits would be watered, as needed, to remain compact and to avoid the creation of dust. Water, weed-free straw, wood chips, dust reducer, gravel, or a combination of these or similar control measures may be used.
- A noxious weed control strategy would be implemented to reduce the potential for weeds to invade new areas and to minimize the spread of weeds within the Project Area.
- Damage to resources and roads from construction, operation, and maintenance activities would be repaired. The primary objective would be to restore denuded areas, reduce the spread of noxious weeds, and reduce storm water runoff and soil erosion.
- Sensitive plant populations that occur within the ROW and work areas would be marked on the ground to ensure that the species are avoided. If sensitive plants are discovered during construction, a protective buffer zone would be established and the appropriate federal agency would be contacted immediately.
- If sensitive wildlife species are discovered during construction, operation, and maintenance activities within the ROW or work areas, a protective buffer zone would be established and the appropriate federal agency would be contacted immediately.
- If new probable historic, cultural, or paleontological resources are discovered during construction, the appropriate federal archaeologist would be immediately notified and potentially destructive work within 300 feet of the find would be halted. Construction crews and vehicles would be confined to established access roads and laydown areas and would not be allowed to travel cross-country near known sites.
- If human remains are discovered during construction, operation, and maintenance activities, all work in the immediate area would be stopped to protect the integrity of the find and the State Police, Burns Paiute Tribe, and the appropriate federal agency would be notified as soon as possible.
- Weathered steel poles, which have a rusted appearance, would be used to reduce visual contrasts.
- All employees and contractors working on or around transmission lines on federal lands during fire season (generally between April 1 and October 31) would have approved suppression tools and equipment.

A complete list of the PDFs and BMPs that would be incorporated into the North Steens 230-kV Transmission Line Project and the Echanis Wind Energy Project is included in Appendix A.

Even with implementation of the PDFs and BMPs described above and listed in Appendix A, a variety of environmental effects from construction and operation of the Proposed Action and alternatives would occur and require further mitigation to reduce or eliminate adverse effects. Mitigation measures designed to reduce or eliminate these effects are described in Section 3 under the specific heading for each biological, physical, or socioeconomic resource analyzed in this Draft EIS.

Consistent with the BLM NEPA Handbook (H-1790-1), this section of the Draft EIS includes a resource by resource comparison of the environmental effects of the Echanis Wind Energy Project and each action alternative of the North Steens 230-kV Transmission Line Project. This comparison is presented in Table 2.1 through Table 2.1-18.

**Table 2.1-1 Summary of Effects to Geology and Soils**

	Alternative A No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
			West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
Geology	Under No Action, existing conditions would remain and no additional environmental effects to geology would be created.	Seismically, the Project Area is not anticipated to be hazardous for general construction (Smith 2008).  Earthquakes have occurred and faults have been mapped in the region.  Since movement along faults can trigger mass movement, landslides may be a concern.	Seismically, the Project Area is not anticipated to be hazardous for general construction (Smith 2008).  Alternative B crosses seven mapped faults. Earthquakes can threaten structural integrity of facilities.  Since movement along faults can trigger mass movement, landslides may be a concern.	Seismically, the Project Area is not anticipated to be hazardous for general construction (Smith 2008).  Alternative B crosses six mapped faults. Earthquakes can threaten structural integrity of facilities.  Since movement along faults can trigger mass movement, landslides may be a concern.	Seismically, the Project Area is not anticipated to be hazardous for general construction (Smith 2008).  Alternative B crosses seven mapped faults. Earthquakes can threaten structural integrity of facilities.  Since movement along faults can trigger mass movement, landslides may be a concern.	Seismically, the Project Area is not anticipated to be hazardous for general construction (Smith 2008).  Alternative B crosses nine mapped faults. Earthquakes can threaten structural integrity of facilities.  Since movement along faults can trigger mass movement, landslides may be a concern.
Soils	Currently, land in project area is used for agriculture and grazing. These activities increase erosion through soil disturbance and changes to vegetation community structure.	Soil erosion could increase due to the construction of impervious surfaces.  Substation site consists of approximately 1.84 acres which would be cleared and covered with gravel and concrete foundations. O&M building would add 1,152 square feet of impervious surfaces.  Construction and operation of the 18.95 mile main access road could cause an increase in soil erosion due to vegetation clearance.  Construction includes 12.81 miles of new access road (30 ft width), 17.11 miles of string roads (16 ft width) and 6.14 miles of existing road improvements (additional 10 ft width).	Increased erosion and sedimentation due to clearing approx. 1.87 acres for transmission line poles and 0.69 acre for ICS facility  Increased runoff due to roads and impervious surfaces resulting in more erosion. Approx 0.2 miles of new roads and 2.0 miles of road improvements are planned.  Potential spills of harmful materials during construction	Increased erosion and sedimentation due to clearing approx 1.83 acres for transmission line poles and 0.69 acre for ICS facility  Increased runoff due to roads and impervious surfaces resulting in more erosion. Approx 0.2 miles of new roads and 2.0 miles of road improvements are planned.  Potential spills of harmful materials during construction	Increased erosion and sedimentation due to clearing approx 1.89 acres for transmission line poles and ICS facility  Increased runoff due to roads and impervious surfaces resulting in more erosion. Approx 0.2 miles of new roads and 2.0 miles of road improvements are planned.  Potential spills of harmful materials during construction	Increased erosion and sedimentation due to clearing approx 2.98 acres for transmission line poles and ICS facility  Increased runoff due to roads and impervious surfaces resulting in more erosion. Approx 5.03 miles of new roads are planned.  Potential spills of harmful materials during construction
Biological Soil Crusts (BSCs)	Ongoing grazing agriculture could diminish Biological Soils Crusts through soil compaction, direct disturbance, and changes to vegetation community structure.	Increased soil erosion due to construction activities including the destruction of BSCs and/or clearing of vegetation.  Introduction of exotic vegetation that does not support BSC recovery	Potential destruction to BSCs present in approx. 1.87 acres for transmission line poles and 0.69 acre for ICS facility  Introduction of exotic vegetation that does not support BSC	Potential destruction to BSCs present in approx 1.83 acres for transmission line poles and 0.69 acre for ICS facility  Introduction of exotic vegetation that does not support BSC	Potential destruction to BSCs present in approx 1.89 acres for transmission line poles and ICS facility  Introduction of exotic vegetation that does not support BSC recovery	Potential destruction to BSCs present in approx 2.98 acres for transmission line poles and ICS facility  Introduction of exotic vegetation

**Table 2.1-1 Summary of Effects to Geology and Soils**

Alternative A No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
		West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
	Potential spills of harmful materials during construction	recovery Potential spills of harmful materials during construction	recovery Potential spills of harmful materials during construction	Potential spills of harmful materials during construction	that does not support BSC recovery Potential spills of harmful materials during construction

**Table 2.1-2 Summary of Effects to Water Resources**

Alternative A No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
		West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
<p>Under the No Action Alternative, the Project components would not be constructed and access roads would not be improved or constructed. Water resources would continue to be affected by current use, including :</p> <p>Irrigation for dryland grazing</p> <p>Numerous canals that would continue to divert surface water.</p> <p>Irrigation returns would continue to be impaired with sediment, excess nutrients or high temperatures.</p> <p>Permanent access roads that are currently in place.</p>	<p>Main access road to the Echanis site would cross water bodies in nine locations, including Kiger Creek (once by bridge), Mud Creek (3 times), an intermittent tributary to Mud Creek (2 times), and an intermittent tributary to Kiger Creek (3 times).</p> <p>Temporary effects could include sedimentation in streams adjacent to areas of construction.</p>	<p>Route would cross four perennial streams, five intermittent streams, and two intermittent canals</p> <p>Approximately 0.41 mile of the transmission line would cross 100-year floodplain</p> <p>Increased runoff due to roads and impervious surfaces resulting in greater flooding or erosion</p>	<p>Route would cross four perennial streams, three intermittent streams, and three intermittent canals</p> <p>Approximately 1.04 miles of the transmission line would cross 100-year floodplain.</p> <p>Increased runoff due to roads and impervious surfaces resulting in greater flooding or erosion</p>	<p>Route would cross four perennial streams, two intermittent streams, and 2 intermittent canals</p> <p>Approximately 0.4 mile would cross 100-year floodplain</p> <p>Increased runoff due to roads and impervious surfaces resulting in greater flooding or erosion</p>	<p>Route would cross four perennial and 3 intermittent stream crossings (Kiger Creek is crossed twice)</p> <p>Increased runoff due to roads and impervious surfaces resulting in greater flooding or erosion</p>

**Table 2.1-3 Summary of Effects to Vegetation**

Alternative A No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
		West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
<p>Under the No Action Alternative, no new transmission lines, Substations, interconnection stations, or related wind energy facilities would be constructed and new or improved access roads would not be needed.</p> <p>Vegetation in the area would continue to be subject to the effects of agricultural practices, particularly cattle grazing.</p> <p>In addition, the introduction of noxious weed species to the region by agriculture, recreation and development would continue.</p>	<p>Approximately 1.84 acres would be cleared and covered with gravel and concrete foundations for the Substation site.</p> <p>An overhead collection line would be installed with 18 towers, resulting in 1.27 acres of disturbance for the pole sites and overland access.</p> <p>The total acreage from turbine tower sites is dependent on the number and location of turbine towers (approximately 40 to 69 poles), but is estimated to be a maximum of 2.41 acres.</p> <p>The new or improved access roads would result in loss of 54.04 acres of vegetation.</p> <p>While no plant species defined as special-status species for this analysis have been reported from surveys of the turbine strings, such species could occur on access road routes that have not yet been surveyed.</p> <p>Approximately 52.10 acres of big sagebrush steppe and 22.30 acres of juniper woodland would be affected.</p> <p>Smaller effected areas would include 8.06 acres of quaking aspen woodland, 2.66 acres of riparian shrub-woodland, 0.21 acre of marshes and emergent wetlands, and 3.90 acres of other upland vegetation types.</p> <p>An additional 2.00 acres of permanent effects to habitat are undetermined as to</p>	<p>Approximately 0.69 acres would be cleared and replaced with a gravel surface and concrete pads for the ICS Substation site.</p> <p>Transmission pole disturbance estimated to be a maximum of 1.87 acres.</p> <p>The new or improved access roads would result in loss of 4.25 acres of vegetation. Overland vehicle access would result in disturbance to up to 25.28 acres.</p> <p>In the ROW, there would be selective clearing of vegetation, primarily juniper trees when necessary.</p> <p>The ROW would not be chemically treated to control vegetation unless necessary to comply with requirements of a permitting agency.</p> <p>Approximately 10.76 acres of big sagebrush steppe, 6.02 acres of juniper woodland and 7.35 acres of native grassland would be affected.</p> <p>Smaller areas of effect include 0.61 acres of riparian meadow, 0.13 acre of riparian shrub-woodland, 0.01 acre of pond, and 3.04 acres of other upland vegetation types.</p> <p>An additional 2.56 acres of permanent effects to habitat are undetermined as to vegetation type.</p> <p>Direct or indirect impacts to special-status plant species if any are present in the project area.</p> <p>Possible introduction</p>	<p>Effects not listed below would be the same as in Alternative B-West Route.</p> <p>Transmission pole disturbance estimated to be a maximum of 1.87 acres.</p> <p>The new or improved access roads would result in loss of 3.13 acres of vegetation. Overland vehicle access would result in disturbance of up to 21.04 acres.</p> <p>Approximately 9.78 acres of big sagebrush steppe, 6.02 acres of juniper woodland and 5.07 acres of native grassland would be affected.</p> <p>Smaller areas of effect include 0.61 acre of riparian meadow, 0.13 acre of riparian shrub-woodland, and 2.04 acres of other upland vegetation types. An additional 2.52 acres of permanent effects to habitat are undetermined as to vegetation type.</p> <p>Temporary disturbance would affect up to 41.95 acres.</p> <p>Approximately 16.5 acres of big sagebrush steppe and 6.25 acres of native grassland, and 5.50 acres of agricultural land would be affected.</p> <p>Smaller areas of potential effect include 0.25 acre of riparian meadow and 11.00 acres of other upland vegetation types. An additional 4.79 acres of temporary effects to habitat are undetermined as to vegetation type.</p>	<p>Effects not listed below would be the same as in Alternative B-West Route.</p> <p>Transmission pole disturbance estimated to be a maximum of 1.89 acres.</p> <p>The new or improved access roads would result in loss of 3.13 acres of vegetation. Overland vehicle access would result in disturbance of up to 25.61 acres.</p> <p>Approximately 12.37 acres of big sagebrush steppe, 6.02 acres of juniper woodland and 5.77 acres of native grassland would be affected.</p> <p>Smaller areas of effect include 0.61 acre of riparian meadow, 0.13 acre of riparian shrub-woodland, and 3.31 acres of other upland vegetation types.</p> <p>An additional 1.58 acres of permanent effects to habitat are undetermined as to vegetation type.</p> <p>Temporary disturbance would affect up to 46.95 acres.</p> <p>Approximately 17.00 acres of big sagebrush steppe, 5.25 acres of exotic annual grassland, and 11.00 acres of native grassland would be affected.</p> <p>Smaller areas of potential effect include 0.25 acre of riparian meadow and 3.31 acres of other upland vegetation types.</p> <p>An additional 4.84 acres of temporary</p>	<p>Effects not listed below would be the same as in Alternative B-West Route.</p> <p>Transmission pole disturbance estimated to be a maximum of 2.98 acres.</p> <p>The new or improved access roads would result in loss of 9.76 acres of vegetation. Overland vehicle access would result in disturbance of up to 24.29 acres.</p> <p>Approximately 21.85 acres of big sagebrush steppe, 12.80 acres of dwarf shrub-steppe, and 3.56 acres of juniper woodland would be affected.</p> <p>Smaller affected areas include 0.24 acre of marsh/emergent wetland, 0.16 acre of riparian meadow, 0.09 acre of riparian shrub-woodland, and 4.00 acres of other upland vegetation types.</p> <p>An additional 3.67 acres of permanent effects to habitat are undetermined as to vegetation type.</p> <p>Temporary disturbance would affect up to 54 acres</p> <p>Approximately 25.50 acres of big sagebrush steppe, 10.50 acres of agricultural land, 6.25 acres of dwarf sagebrush steppe, 5.25 acres of native grassland, and 5.25 acres of salt desert shrub and 1.25 acres of other upland vegetation types would be affected.</p> <p>An additional 6.25 acres of temporary effects to habitat are undetermined as to vegetation type.</p>

	<p>vegetation type.</p> <p>Possible introduction and spread of noxious weeds and use of herbicides to control noxious weeds.</p> <p>Temporary disturbance would affect between 72.00 and 81.50 acres. Trampled vegetation and surface disturbance would be restored when construction is complete.</p> <p>Approximately 41.12 acres of big sagebrush steppe and 4.58 acres of quaking aspen woodland would be affected. An additional 13.10 acres of temporary effects to habitat are undetermined as to vegetation type.</p>	<p>and spread of noxious weeds and use of herbicides to control noxious weeds.</p> <p>Temporary disturbance would affect up to 47.20 acres. Approximately 16.75 acres of big sagebrush steppe and 11.5 acres of native grassland would be affected.</p> <p>Smaller areas of potential effect include 0.25 acre of riparian meadow and 0.1 acre of riparian woodland and 16.20 acres of other upland vegetation types. An additional 4.84 acres of temporary effects to habitat are undetermined as to vegetation type.</p>		<p>effects to habitat are undetermined as to vegetation type.</p>	
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**Table 2.1-4 Summary of Effects to Wetlands and Riparian Areas**

Alternative A No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
		West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
<p>Under the No Action Alternative, no new transmission lines, Substations, interconnection stations, or related wind energy facilities would be constructed and new or improved access roads would not be needed.</p> <p>The Echanis Project site would remain undeveloped and would continue to be used for livestock grazing and the existing HEC distribution line located along South Diamond Lane would remain above ground.</p> <p>Wetlands and riparian areas would continue to be affected by current uses.</p>	<p>The main access road to the Echanis site would affect 1.91 acres of PEM wetlands and 0.53 acres of PSS wetlands for a total wetland impact of 2.44 acres.</p> <p>Main access road to the Echanis site would cross riparian areas in nine locations, including Kiger Creek (once by bridge), Mud Creek (3 times), an intermittent tributary to Mud Creek (2 times), and an intermittent tributary to Kiger Creek (3 times).</p> <p>Main access road to the Echanis site would parallel streams, therefore affect riparian areas of Kiger Creek tributary 1 (0.7 miles), Mud Creek (1.9 miles) and Mud Creek Tributary (0.7 miles).</p> <p>Temporary effects could include sedimentation and vegetation damage in wetlands and riparian areas adjacent to areas of construction.</p>	<p>Transmission line would span 1.16 miles of wetland area, including five wetland crossings and ten riparian areas associated with four perennial streams and six intermittent streams or canals.</p> <p>Six poles would be placed in wetland areas resulting in permanent loss of 186 square feet or less than 0.01 acres.</p> <p>Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation.</p> <p>Permanent access roads would cross riparian areas associated with one perennial stream (Cucamonga Creek) and one intermittent stream (Tributary to Donner und Blitzen River).</p> <p>Temporary effects would include surface disturbance and vegetation damage from vehicles and equipment accessing pole locations, including one tensioning site that would temporarily affect 0.25 acres of wetland.</p> <p>Relocation and burial of the HEC distribution line would temporarily affect 2.45 acres of wetlands and potentially affect riparian areas at two intermittent waterbodies.</p> <p>Access road construction would temporarily remove woody vegetation at the crossing of Cucamonga Creek, and herbaceous vegetation at the crossing of the Tributary to the Donner und Blitzen River.</p>	<p>Transmission line would span 1.98 miles of wetlands, including riparian areas associated with four perennial streams and seven intermittent streams or canals.</p> <p>Thirteen poles would be placed in wetland areas resulting in permanent loss of 403 square feet or less than 0.01 acres.</p> <p>Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation.</p> <p>Permanent access roads would cross the same riparian areas as described for Alternative B.</p> <p>Temporary effects from vehicles and equipment accessing pole locations and tensioning sites, the relocation and burial of the HEC distribution line, and access road construction would be the same as described for Alternative B.</p>	<p>Transmission line would span 1.06 miles of wetlands, including riparian areas associated with four perennial streams and six intermittent streams or canals.</p> <p>Five poles would be placed in wetland areas resulting in permanent loss of 155 square feet or less than 0.01 acres.</p> <p>Overland access roads would affect 0.74 acres of PEM wetlands, possibly requiring removal of woody vegetation.</p> <p>Permanent access roads would cross the same riparian areas as described for Alternative B.</p> <p>Temporary effects from vehicles and equipment accessing pole locations and tensioning sites, the relocation and burial of the HEC distribution line, and access road construction would be the same as described for Alternative B.</p>	<p>Transmission line would span 0.62 miles of wetland area, including riparian areas associated with three perennial streams and six intermittent streams.</p> <p>Overland access roads would affect 0.49 acres of PEM wetlands, possibly requiring removal of woody vegetation.</p> <p>Permanent access roads would cross a riparian area associated with one perennial stream, crossing the stream on an existing bridge.</p> <p>Temporary effects would include removal of woody riparian vegetation at three transmission line crossing locations (two on Kiger Creek and one on Swamp Creek) during construction.</p>

**Table 2.1-5 Summary of Effects to Wildlife**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B				Alternative C – North Route
		West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option		
	<p><b>Permanent Effects:</b></p> <p>Fish Resources</p> <p>Permanent effects from the Echanis project on fish resources would primarily be associated with access road construction, which would increase sedimentation.</p> <p>Wildlife Resources</p> <p>Facility and road construction would occupy 91.7 to 92.7 acres of wildlife habitat.</p> <p>General Wildlife</p> <p>Permanent site features would directly and indirectly reduce the availability of wildlife habitat for foraging, courtship and breeding, rearing young, and cover for many general wildlife species.</p> <p>Bat mortality estimate is from 28 to 235 bat deaths per year.</p> <p>Raptor mortality estimate is from 0 to 22 raptors per year.</p> <p>Bird fatality estimate would be from 24 to 690 bird deaths per year, of which 19 to 538 would be passerines.</p> <p>Big Game</p> <p>Permanent Project footprint loss of mule deer winter range, elk winter range, pronghorn antelope range, and bighorn sheep habitat would all be less than one percent of their respective game management units.</p> <p>Special Status Species</p> <p>Permanent effects are likely limited for Preble's shrew.</p> <p>California Wolverines likely would be displaced from Project area.</p> <p>Of the ten special status bat species that could occur on-site, the silver-</p>	<p><b>Permanent Effects:</b></p> <p>Fish Resources</p> <p>The Alternative B transmission line would not permanently affect fish resources in the four perennial streams crossed.</p> <p>Wildlife Resources</p> <p>There would be 30.9 acres of habitat permanently lost from construction of Alternative B.</p> <p>New access roads would further fragment the existing Project Area, reducing the size of contiguous sagebrush, grassland, juniper, and riparian habitats.</p> <p>Big Game</p> <p>The 150-foot wide transmission line ROW would cross 101.7 acres of elk winter habitat, 342.5 acres of mule deer winter range, and 86.9 acres of antelope habitat.</p> <p>Special Status Species</p> <p>The permanent effects of Alternative B for Preble's shrew, California wolverine, and northern sagebrush lizard would be qualitatively the same to the effects described for Echanis. Bats are not known to collide with transmission lines, based on mortality surveys, so would be unlikely to have any effect beyond displacement by permanent Project features.</p> <p>Alternative B would result in a very small permanent loss of potential pygmy rabbit habitat.</p> <p>Greater sage-grouse are known to avoid roads and transmission lines, so effects on this species would be limited primarily to displacement by permanent Project features. It is unlikely that Alternative B would have any effect on the Little Kiger lek, since it would be out of direct line-of-sight of the transmission line.</p> <p>Special status waterfowl are prone to collisions with transmission lines, and where Alternative B crosses the Malheur NWR it is expected that some mortality would take place. Seven species of special status waterbirds occur in the Project Area: western least bittern, white-faced ibis, black tern,</p>	<p><b>Permanent Effects:</b></p> <p>The South Diamond Lane route option would have the same types of permanent and temporary effects as described for Alternative B, except for the changes noted below.</p> <p>Wildlife Resources</p> <p>There would be 25.7 acres of habitat permanently lost from construction of the South Diamond Lane Route Option.</p> <p>Big Game</p> <p>The 150-foot wide transmission line ROW for would cross 101.7 acres of elk winter habitat, 331.3 acres of mule deer winter range, and 24.2 acres of antelope winter range.</p> <p>Special Status Species</p> <p>Special status waterfowl are prone to collisions with transmission lines, and the South Diamond Lane Route crosses 4.1 miles of the Malheur NWR where it is expected that mortality would take place potentially affecting the seven species of special status waterbirds.</p> <p><b>Temporary Effects</b></p> <p>Construction activities would cause the short-term loss of approximately 41.8 acres of wildlife habitat.</p>	<p><b>Permanent Effects:</b></p> <p>Hog Wallow Route Option would have the same types of permanent and temporary effects as Alternative B, except for the changes noted below.</p> <p>Wildlife Resources</p> <p>There would be 31.4 acres of habitat permanently lost from construction of the Hog Wallow Route.</p> <p>Big Game</p> <p>The 150-foot wide transmission line ROW would cross 101.7 acres of elk winter habitat, 345.9 acres of mule deer winter range, and 95.6 acres of antelope winter range.</p> <p>Special Status Species</p> <p>Special status waterfowl are prone to collisions with transmission lines, and the Hog Wallow Route crosses 1.9 miles of the Malheur NWR where it is expected that some mortality would take place potentially affecting the seven species of special status waterbirds</p> <p><b>Temporary Effects</b></p> <p>Construction activities would cause the short-term loss of approximately 46.8 acres of wildlife habitat.</p>	<p><b>Permanent Effects:</b></p> <p>Alternative C would have the same permanent and temporary types of effects as Alternative B, except for the changes noted below.</p> <p>Wildlife Resources</p> <p>There would be 46.5 acres of habitat permanently lost from construction of Alternative C.</p> <p>Big Game</p> <p>The 150-foot wide transmission line ROW would cross 110.6 acres of elk winter habitat, and 466.1 acres of mule deer winter range, and 370.8 acres of antelope winter range.</p> <p>Special Status Species</p> <p>Alternative C would not cross the Malheur NWR or high-quality waterfowl habitat.</p> <p><b>Temporary Effects</b></p> <p>Construction activities would cause the short-term loss of approximately 56.3 acres of wildlife habitat.</p>	

**Table 2.1-5 Summary of Effects to Wildlife**

Alternative B					
Alternative A – No Action	Echanis Wind Energy Project	West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
	<p>haired bat and hoary bat are the only two that have been documented as fatalities at wind developments (Arnett et al 2007). However, these two species comprise the majority of bat fatalities in the Pacific Northwest.</p> <p>Greater sage-grouse would likely be displaced from their summer and winter habitats in the Echanis Project area.</p> <p>No suitable habitat exists on the Echanis site or main access road for the burrowing owl, and no northern goshawks or ferruginous hawks were observed during field surveys.</p> <p>Bald eagles could occur in Project area, but no bald eagle has been documented as a fatality from wind turbine collision.</p> <p>Golden eagles were present at both the Echanis site and immediately west of the Echanis site, but were observed over canyons and away from ridges where turbines are proposed (NWC 2010c).</p> <p>No raptor nests for any special status species was found within two miles of the Echanis site.</p> <p>There is a low likelihood that the six special status passerine species that occur at the site could be affected by collisions with the turbines at the Echanis site.</p> <p>It is possible that the Echanis Project could cause a low level of mortality for mountain quail from collision with turbines.</p> <p>Northern sagebrush lizard would be susceptible to crushing by vehicles, so an undetectable level of mortality may occur.</p> <p><b>Temporary Effects:</b> Construction of the main</p>	<p>trumpeter swan, snowy egret, Franklin's gull, and American white pelican. The Malheur NWR is highly valued waterfowl habitat and is located along a migratory pathway.</p> <p>Special status passerine and woodpecker species would be displaced from their locations of suitable habitat.</p> <p>If Mountain quail collisions are documented, the BLM and FWS would review mortality data and discuss whether additional mitigation measures would be required.</p> <p><b>Temporary Effects</b> Construction activities associated with Alternative B would not directly affect the four perennial fish bearing streams crossed by the transmission line. .</p> <p>Approximately 46.6 acres of wildlife habitat would be temporarily affected by construction of Alternative B.</p> <p>Construction activities would displace the more mobile mammals, birds, and reptiles from areas of vegetation and ground disturbance, but the less mobile small mammals and reptiles could be killed from crushing and entombment.</p> <p>Temporary effects on big game would include heavy equipment operation the presence of large numbers of construction workers, causing temporary displacement from areas around the Project. Because construction would not occur during winter months, an undetectable effect from loss of habitat in winter range would occur.</p> <p><b>Special Status Species</b> The temporary effects of Alternative B for Preble's shrew, California wolverine, bats, raptors, waterfowl and shorebirds, mountain quail, and northern sagebrush lizard would be qualitatively the same as the temporary effects of Echanis.</p> <p>Pygmy rabbits present in the areas of construction would predominantly be able to disperse into adjacent habitat to avoid harm.</p>			

**Table 2.1-5 Summary of Effects to Wildlife**

Alternative B					
Alternative A – No Action	Echanis Wind Energy Project	West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
	<p>access road would temporarily impact fish resources through sedimentation, and a small number of fish may be killed.</p> <p>Construction activities would cause the short-term loss of approximately 72.0 to 81.5 acres of wildlife habitat.</p> <p>Construction would displace wildlife from late spring through fall on the Echanis site, and would cause wildlife to disperse into adjacent habitats which would temporarily increase inter- and intra-specific competition.</p> <p>Big game species would disperse from the Project Areas during construction; carrying capacity likely would be reduced in the Project vicinity.</p> <p>Special Status Species</p> <p>Preble's Shrews would be displaced from temporary work areas through the short-term.</p> <p>Short-term displacement could occur for California Wolverine.</p> <p>It is not likely that construction would have an adverse impact on bats.</p> <p>Greater sage-grouse would be displaced from their summer brood range during construction.</p> <p>The main access road to Echanis is located as close as 1.2 miles to the Little Kiger lek, which is occupied but without line of sight to the road.</p> <p>Raptor nest and burrowing owl surveys would be conducted prior to construction, and if any nests or occupied owl burrows are encountered then appropriate avoidance would be undertaken in consultation FWS.</p> <p>Special status passerine</p>	<p>There is possibility that some individuals could be killed from collisions with vehicles.</p> <p>Greater sage-grouse would likely expend more energy avoiding construction areas through one brood-rearing season, and would disperse into adjacent suitable habitats.</p>			

**Table 2.1-5 Summary of Effects to Wildlife**

Alternative B					
Alternative A – No Action	Echanis Wind Energy Project	West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
	<p>and woodpecker species likely would be displaced into adjacent suitable habitat during one summer of construction.</p> <p>Construction is expected to have an undetectable effect on Mountain Quail.</p> <p>Northern sagebrush lizard would be susceptible to crushing during construction activities in sagebrush habitat on the Echanis site.</p>				

**Table 2.1-6 Summary of Effects to Land Use and Realty**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B			
		West Route (Proposed Action)	South Diamond Lane – Route Option	Hog Wallow – Route Option	Alternative C – North Route
<p>Under the No Action Alternative, no new transmission lines, substations, interconnection stations, or related wind energy facilities would be constructed.</p> <p>Improvements to existing access roads would not be needed and new access roads would not be constructed.</p> <p>No new ROW would be obtained from BLM or USFWS and the existing HEC distribution line located along South Diamond Lane would remain above ground.</p> <p>The Echanis site would remain undeveloped and would continue to be used for livestock grazing.</p>	<p>Project would involve the deployment and operation of 40 to 69 wind turbines on a 10,500 acre privately owned site in rural Harney County.</p> <p>Project would include approximately nine miles of 34.5-kV underground power collection lines, a new 200-foot by 400-foot Substation, and a 24-foot by 48-foot operations and maintenance (O&amp;M) building.</p> <p>The main access road would be 18.95 miles long and would cross approximately 14.73 miles of the Andrews RA and 4.22 miles of the Three Rivers RA, including approximately 7.12 miles within the Steens Mountain CMPA.</p> <p>Of the 18.95 mile total, 17.47 miles would be on private property and 1.48 miles would be on public land administered by the BLM. No portion of the main access road to the Echanis site would be located on public land within the CMPA.</p> <p>Approximately 84.7 acres of private property and 7.18 acres of BLM administered land would be affected by easement and ROW needs for the main access road</p>	<p>The transmission line would be approximately 28.87 miles long.</p> <p>Approximately 18.70 miles would cross privately-owned rangeland, 8.85 miles would cross BLM-administered land, and 1.32 miles would cross land (at two locations) within MNWR.</p> <p>Approximately 343.31 acres of ROW would be acquired from 10 different land owners to secure access across 28 privately-owned parcels.</p> <p>A total of approximately 157.97 acres of ROW would be required from BLM administered lands and approximately 24.05 acres would be required from land administered by the USFWS.</p> <p>The total ROW needs for the transmission line from all ownership categories would be 525.32 acres.</p> <p>Approximately 26.25 miles of the transmission line would cross the Andrews RA, and 2.62 miles would cross the Three Rivers RA. While approximately 5.89 miles of the transmission line would be located on private land within the Steens Mountain CMPA, no portion of the transmission line would cross public land within the CMPA.</p> <p>New and improved access roads (approximately 2.19 miles) and overland access routes (approximately 25.68 miles) would be placed within ROW obtained from underlying property owners.</p> <p>Overland access routes would be required on private land, BLM administered land, and land administered by the</p>	<p>The transmission line would be approximately 28.26 miles long.</p> <p>Approximately 18.08 miles of the alignment would cross privately-owned rangeland, 6.09 miles would cross land administered by the BLM, and 4.09 miles would cross land (in five locations) within the MNWR.</p> <p>Approximately 328.88 acres of ROW for the transmission line would be acquired from privately-owned parcels.</p> <p>A total of approximately 109.96 acres of ROW would be required from BLM-administered lands and approximately 75.28 acres would be required from lands administered by the USFWS.</p> <p>The total ROW needs for the transmission line from all ownership categories would be 514.10 acres.</p> <p>Approximately 25.22 miles of the transmission line would cross the Andrews RA, and 3.03 miles would cross the Three Rivers RA. As with Alternative B, the same approximately 5.89 miles of the transmission line would be located on private land within the Steens Mountain CMPA; however, no portion of the transmission line would cross public land within the CMPA.</p> <p>New and improved access roads (approximately 2.19 miles) and overland access routes (approximately 21.29 miles) would also require ROW from underlying property owners.</p> <p>Overland access routes would be required on private land, BLM-administered land, and land administered by the USFWS.</p> <p>Approximately 19.26 acres of additional ROW outside of the transmission line</p>	<p>The transmission line would be approximately 29.06 miles long.</p> <p>Approximately 18.73 miles of the alignment would cross privately-owned rangeland, 68.43 miles would cross land administered by the BLM, and 1.90 miles would cross land (in two locations) within the MNWR.</p> <p>Approximately 343.87 acres of ROW for the transmission line would be acquired from privately-owned parcels.</p> <p>A total of approximately 151.23 acres of ROW would be required from BLM-administered lands and approximately 33.67 acres would be required from land administered by the USFWS.</p> <p>The total ROW needs for the transmission line from all ownership categories would be 528.77.</p> <p>Approximately 26.66 miles of the transmission line would cross the Andrews RA, and 2.41 miles would cross the Three Rivers RA. As with Alternative B and the South Diamond Lane Route Option, the same approximately 5.89 miles of the transmission line would be located on private land within the Steens Mountain CMPA; however, no portion of the transmission line would cross public land within the CMPA.</p> <p>ROW would also be required from underlying property owners for new and improved access roads (approximately 2.19 miles) and overland access routes (approximately 25.99 miles).</p> <p>Approximately 21.79 acres of additional ROW outside of the transmission line ROW would be required to accommodate needed overland routes.</p>	<p>The transmission line would be approximately 45.95 miles long.</p> <p>Approximately 33.66 miles of the alignment would cross privately-owned cropland and rangeland, 12.10 miles would cross BLM administered land, and 0.19 mile would cross two separate parcels located adjacent to Highway 78 owned by the State of Oregon.</p> <p>Approximately 612.31 acres of ROW would be acquired from nearly 30 different land owners to secure access across more than 60 privately-owned parcels.</p> <p>Approximately 220.55 acres of ROW would be needed to cross lands administered by the BLM and approximately 2.98 acres would be needed to cross land owned by the State of Oregon.</p> <p>The total ROW needs from all ownership categories for this alternative would be 835.85 acres.</p> <p>Approximately 12.63 miles of the transmission line would cross the Andrews RA, and 33.31 miles would cross the Three Rivers RA. While approximately 5.89 miles of the transmission line would be located on private land within the Steens Mountain CMPA, no portion of the transmission line would cross public land within the CMPA.</p> <p>New access roads (approximately 5.03 miles) and overland access routes (approximately 25.05 miles) would also be placed within ROW obtained from underlying</p>

Table 2.1-6 Summary of Effects to Land Use and Realty

Alternative A – No Action	Echanis Wind Energy Project	Alternative B			Alternative C – North Route
		West Route (Proposed Action)	South Diamond Lane – Route Option	Hog Wallow – Route Option	
	<p>to the Echanis site.</p> <p>Approximately 17.11 miles of additional service roads (i.e. string roads) would be developed on the Echanis site. The new string roads would convert approximately 33.18 acres of existing rangeland to non-rangeland use.</p> <p>The wind turbines would convert about 2.41 acres to non-rangeland use, while the new Substation and O&amp;M building would convert about 1.85 acres to non-rangeland use.</p> <p>Ongoing operations and maintenance activities would involve periodic inspections and maintenance of the main access road to the Echanis site, as well as the 40 to 69 wind turbine on the site.</p> <p>Operations and maintenance of the wind turbines would include inspection and repair of towers, generators, turbine blades, and other equipment.</p> <p>Temporary effects on land use during construction would include the temporary interruption of grazing activities within all areas of proposed ground disturbance, structure assembly, materials storage, and equipment operation.</p> <p>Additional temporary effects related to</p>	<p>USFWS.</p> <p>Approximately 23.43 acres of additional ROW outside of the transmission line ROW would be required to accommodate overland routes.</p> <p>While approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA, none of the overland roads would cross Federal land within the CMPA.</p> <p>Approximately 168 poles would be placed on private land, approximately 80 poles would be placed on BLM administered land, and approximately 12 poles would be placed on USFWS administered land within the MNWR.</p> <p>While pole placement on refuge lands in the Blitzen Valley would be avoided, approximately 10 poles would be placed on refuge lands along a 1.06 mile segment of the alignment just inside the refuge boundary, west of the intersection of South Diamond Lane and Lava Beds Road.</p> <p>Up to 1.21 acres of private land, 0.57 acres of BLM-administered land, and 0.07 acres of USFWS administered land would be permanently converted to transmission line use. Construction of the interconnection station adjacent to the HEC 115-kV transmission line would permanently convert 0.69 acre of BLM-administered land currently used for grazing to transmission line use.</p> <p>Temporary effects on land use would occur along lands within MNWR where the existing 24.9-kV distribution line that runs along the south side of South Diamond Lane would be placed</p>	<p>ROW would be required to accommodate overland routes.</p> <p>While approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA, none of the overland roads would cross Federal land within the CMPA.</p> <p>Approximately 163 poles would be placed on private land, approximately 55 poles would be placed on BLM-administered land, and approximately 37 poles would be placed on USFWS-administered land within the MNWR, primarily along a 2.25 mile segment crossing the Blitzen Valley along South Diamond Lane, and a 1.06 mile segment about two miles east of that location just inside the refuge boundary west of the intersection of South Diamond Lane and Lava Beds Road.</p> <p>The 163 poles would permanently convert up to 1.17 acres of private land, 0.40 acres of BLM administered land, and 0.27 acres of USFWS administered land, to transmission line use. Construction of the interconnection station adjacent to the HEC 115-kV transmission line would permanently convert 0.69 acre of BLM-administered land currently used for grazing to transmission line use.</p> <p>Temporary effects on land use would occur along lands within MNWR where the existing 24.9-kV distribution line that runs along the south side of South Diamond Lane would be placed underground as part of the Project. Additional temporary effects, including the interruption of uses and activities at seven proposed laydown areas and 18 proposed pulling/tensioning sites, would be the same as</p>	<p>While approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA, none of the overland roads would cross Federal land within the CMPA.</p> <p>Approximately 169 poles would be placed on private land, approximately 76 poles would be placed on BLM-administered land, and approximately 17 poles would be placed on USFWS-administered land within the MNWR. Additional poles would be placed on refuge lands primarily along a 0.85 mile crossing of the Blitzen Valley and a 1.06 mile segment just inside the refuge boundary, west of the intersection of South Diamond Lane and Lava Beds Road (Figure 3.6-3).</p> <p>The 163 poles would permanently convert up to 1.17 acres of private land, 0.40 acres of BLM-administered land, and 0.27 acres of USFWS-administered land to transmission line use. In addition, construction of the interconnection station adjacent to the HEC 115-kV transmission line would permanently convert 0.69 acre of BLM administered land currently used for grazing to transmission line use.</p> <p>Temporary effects on land use would occur along lands within MNWR where the existing 24.9-kV distribution line that runs along the south side of South Diamond Lane would be placed underground as part of the Project. Additional temporary effects, including the interruption of uses and activities at nine proposed laydown areas and 18 proposed pulling/tensioning sites, would be the same as described for Alternative B.</p> <p>Temporary security fencing installed at seven laydown</p>	<p>property owners.</p> <p>Approximately 23.26 acres of additional ROW outside of the transmission line ROW would be required to accommodate overland routes. Of this total, approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA; however none of the overland roads would cross Federal land within the CMPA.</p> <p>Approximately 303 poles would be placed on private land, approximately 109 poles would be placed on BLM administered land, and possibly 2 poles would be placed on land owned by the State of Oregon.</p> <p>Up to 2.18 acres of private land, 0.79 acres of BLM-administered land, and less than 0.01 acres of state-owned land would be permanently converted to transmission line use. In addition, construction of the interconnection station adjacent to the HEC transmission line in Crane would permanently convert 0.69 acre of privately owned land to transmission line use.</p> <p>Temporary effects would include the interruption of uses and activities at the nine proposed laydown areas and 36 proposed pulling/tensioning sites. Most of the laydown areas and tensioning sites would be located on private land and would be placed within the boundaries of the 150-foot ROW, wherever practical.</p> <p>Additional temporary construction related effects that could affect land use include noise and disruption due to the presence of workers and</p>

**Table 2.1-6 Summary of Effects to Land Use and Realty**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B			Alternative C – North Route
		West Route (Proposed Action)	South Diamond Lane – Route Option	Hog Wallow – Route Option	
	<p>construction would include noise and disruption due to the presence of workers and equipment, and visual effects from the stockpiling of materials and the presence of large-scale construction equipment.</p>	<p>underground as part of the Project. The area along the 1.35-mile trench line within the refuge would be temporarily unavailable for agricultural and resource uses during relocation and burial of the distribution line.</p> <p>Additional temporary effects would include the interruption of uses and activities at eight proposed laydown areas and 19 proposed pulling/tensioning sites on both public and private land.</p> <p>Up to eight laydown areas (each about five acres in size) would be used for storage and distribution of construction materials and transmission line components. Most of the laydown areas and tensioning sites would be located on private land.</p> <p>Additional temporary construction related effects that could affect land use and grazing activities include noise and disruption due to the presence of workers and equipment, the visual effects from stockpiled materials and construction equipment, and the use of land for temporary laydown areas and active construction sites.</p> <p>Temporary security fencing installed at seven laydown areas within five different grazing allotments would preclude use of up to 35 acres of grazing land during the spring, summer and fall grazing seasons.</p>	<p>described for Alternative B.</p> <p>Temporary security fencing installed at five laydown areas within three different grazing allotments would preclude use of up to 25 acres during the spring, summer and fall grazing seasons.</p>	<p>areas within five different grazing allotments would preclude use of up to 35 acres of grazing land during the spring, summer and fall grazing seasons.</p>	<p>equipment, the visual effects from stockpiled materials and construction equipment, and the need to exclude livestock from temporary laydown areas and active construction sites.</p> <p>Temporary security fencing installed at six laydown areas within four different grazing allotments would preclude use of up to 30 acres of grazing land during the spring, summer and fall grazing seasons.</p>

Table 2.1-7 Summary of Effects to Recreation

Alternative A- No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane – Route Option	Hog Wallow – Route Option	Alternative C – North Route
Under the No Action Alternative, the Echanis Wind Energy Project and the associated transmission line alternatives would not be developed. No impacts to recreation would occur.	<p>The Project boundary includes approximately 2,353 acres of the CMPA but no wind turbines would be constructed within the CMPA.</p> <p>The Project would be most visible from the Mann Lake Recreation Site, Fish Lake campground, and travelers on Fields-Denio Road.</p> <p>No road closures are anticipated during construction.</p> <p>An increase in traffic is expected during construction but it not anticipated to be enough to deter recreators from visiting the area.</p> <p>Hikers could have views of turbines from portions of the Little Blitzen, Mud/Ankle, Big Indian, and Nye trails.</p> <p>Noise and visual disruption to recreation areas could occur due to the presence of workers, equipment, vehicles, and materials during construction.</p> <p>The could be a slight increase in noise levels at Mann Lake Campground.</p>	<p>The transmission line would cross 5.9 miles of the CMPA on private lands, 1.32 miles of the MNWR, and the Oregon High Desert National Recreation Trail.</p> <p>Hikers could have distant and intermittent views of the transmission line from the Buena Vista Trail and portions of the Little Blitzen, Mud/Ankle, Big Indian, and Nye trails.</p> <p>Few travelers on the Oregon High Desert National Recreation Trail would be affected by walking under the transmission line since much of the trail currently follows existing roads in some sections.</p> <p>The transmission line would cross the Blitzen Valley Auto Tour Route and visitors traveling this route would see the line, however it is expected there would be little to no change in the total number of visitors to the route.</p> <p>The transmission line would be 4 miles from the Buena Vista Overlook.</p> <p>Visitors traveling the High Desert Scenic Byway, (Highway 205) would see the transmission line when it crosses the Byway at KOP 72.</p> <p>The transmission line would be visible near the intersection of South Diamond Lane and Lava Beds Road and would remain visible until near the town of Diamond.</p> <p>Approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA; none of the overland roads would cross Federal land within the CMPA.</p> <p>The public use of access roads would be</p>	<p>This option would use existing ROW when traversing the MNWR and place approximately 3 miles of transmission line within the boundaries of MNWR.</p> <p>The transmission line would be easily visible from the moment vehicles turn from Highway 205 onto South Diamond Lane.</p> <p>Visitors traveling the High Desert Scenic Byway or Highway 205 would see the transmission line when it crosses at the intersection of the Byway and South Diamond Lane.</p> <p>The transmission line would run along the South Diamond Lane portion of the Blitzen Valley Auto Tour Route and would be 1 mile from the Buena Vista Overlook</p> <p>Travelers on Lava Beds Road would be in direct contact with approximately 5 miles of transmission line.</p> <p>While approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA, none of the overland roads would cross Federal land within the CMPA</p> <p>The public use of access roads would be determined on a case-by-case basis with the BLM. BLM would retain the right to permanently close roads on its lands.</p> <p>To limit recreationist accessibility into areas via new or improved access roads, all new access roads not required for</p>	<p>This option would traverse a total of 0.62 mile of MNWR.</p> <p>This route would cross Hog Wallow Seeding Road where it would be visible to travelers.</p> <p>The transmission line would cross the Blitzen Valley Auto Tour Route and the High Desert Scenic Byway on Highway 205, where the line would also be 4 miles from Buena Vista Overlook.</p> <p>While approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA, none of the overland roads would cross Federal land within the CMPA.</p> <p>No road closures are anticipated during construction. The public use of access roads would be determined on a case-by-case basis with the BLM. BLM would retain the right to permanently close roads on its lands.</p> <p>To limit recreationist accessibility into areas via new or improved access roads, all new access roads not required for maintenance would be closed as appropriate and in coordination with the BLM or USFWS Authorized Officer.</p> <p>Noise and visual disruption to recreation areas could occur due to the presence of workers, equipment, vehicles, and materials.</p>	<p>The transmission line intersects the Diamond Loop Backcountry Byway east of the town Diamond and crosses this byway in four different locations.</p> <p>The transmission line runs parallel to Lava Beds Road and intersects Highway 78 near the intersection of Lava Beds Road and Highway 78.</p> <p>The route would parallel the East Steens Road/Fields-Denio Road Route (Highway 78 - 330 cars daily) for approximately 10 miles and Diamond Loop Backcountry Byway for 6 miles which would place travelers along these two routes directly in view of the transmission line for extended periods.</p> <p>The transmission line would be approximately 3 miles from both the Kiger Wildhorse Viewing Area and Crane Hot Springs, and 2 miles from the Round Barn.</p> <p>The transmission line traverses six miles within the CMPA on privately-owned lands and seven miles of its length would be within the Kiger Mustang ACEC; however, no recreation conflicts are expected in these areas.</p> <p>The transmission line would cross the Oregon High Desert National Recreation Trail; however, few travelers on the Oregon High Desert National Recreation Trail would be affected by walking under the transmission line since much of the trail currently follows existing roads in some sections. Hikers on the Buena Vista Trail and portions of the Little Blitzen, Mud/Ankle, Big Indian, and Nye trails could have distant and intermittent views of the transmission line.</p> <p>Approximately 5.90 miles of overland roads would be located on private land within the Steens Mountain CMPA; none of the overland roads would cross Federal land within the CMPA.</p> <p>Public use of access roads would be determined on a case-by-case basis with the BLM and USFWS. To limit new or improved recreationist accessibility into areas, all new access roads not</p>

**Table 2.1-7 Summary of Effects to Recreation**

Alternative A- No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane – Route Option	Hog Wallow – Route Option	Alternative C – North Route
		determined on a case-by-case basis by the BLM and USFWS. To limit recreationist accessibility, all new access roads not required for maintenance would be closed as appropriate, in coordination with the BLM or USFWS Authorized Officer.  Noise and visual disruption to recreation areas could occur due to the presence of workers, equipment, vehicles, and materials.	maintenance would be closed as appropriate in coordination with the BLM or USFWS Authorized Officer.  Noise and visual disruption to recreation areas could occur due to the presence of workers, equipment, vehicles, and materials.		required for maintenance would be closed as appropriate and in coordination with the BLM or USFWS Authorized Officer.

**Table 2.1-8 Summary of Effects to Public Services**

	Alternative A- No Action	Echanis Wind Energy Project	Alternative B			Alternative C North Route
			West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
<b>Wildfire Protection Services</b>	No increase in demand anticipated.  Demand would be affected by population and development trends that are independent and unrelated to the proposed Project.	Increased use of vehicles and other motorized equipment during hot dry weather could increase the risk of fire.	Increased risk of fire during construction when weather is hot and dry.	Same as Alternative B - West Route.	Same as Alternative B - West Route.	Same as Alternative B - West Route.
<b>Law Enforcement Services</b>	Same as above.	No effect	No effect	No effect	No effect	No effect
<b>Educational Services</b>	Same as above.	No effect	No effect	No effect	No effect	No effect
<b>Health Care and Emergency Response Services</b>	Same as above.	No effect	No effect	No effect	No effect	No effect

**Table 2.1-9 Summary of Effects - Aesthetics and Visual**

	Alternative A - No Action	Alternative B			Alternative C North Route
		West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
Echanis turbines	Visual effects within the project area would include continuation of existing BLM management activities in the Project Area, including the North Steens Ecosystem Restoration Project, Five Creeks Rangeland Restoration Project, and the Steens Mountain Travel Management Plan.	<p>High level of change for East Steens Loop (KOP 47)</p> <p>Moderate level of change for Mann Lake and East Steens Loop (KOPs 46, 48)</p> <p>Low level of effect for East Steens Loop and the East Steens Overlook (KOPs 42, 44,45,61)</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>High level of change for East Steens Loop (KOP 47)</p> <p>Moderate level of change for Mann Lake and East Steens Loop (KOPs 46, 48)</p> <p>Low level of effect for East Steens Loop and East Rim Overlook (KOPs 42, 44, 45, 61)</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>High level of change for East Steens Loop (KOP 47)</p> <p>Moderate level of change for Mann Lake and East Steens Loop (KOPs 46, 48)</p> <p>Low level of effect for East Steens Loop and East Rim Overlook (KOPs 42, 44, 45, 61)</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>High level of change for 1 KOP 47</p> <p>Moderate level of change for Mann Lake and East Steens Loop (KOPs 46, 48)</p> <p>Low level of effect for East Steens Loop and East Rim Overlook (KOPs 42, 44, 45, 61)</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>
Transmission Line	Visual effects within the project area would include continuation of existing BLM management activities in the Project Area, including the North Steens Ecosystem Restoration Project, Five Creeks Rangeland Restoration Project, and the Steens Mountain Travel Management Plan.	<p>Low Effect for all KOPs</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>Low Effect for all KOPs</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>Moderate Effect views southbound on Highway 205 (KOP 87)</p> <p>Low Effect for views northbound on Highway 205 (KOP 71)</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>	<p>Low Effect for All KOPs</p> <p>Temporary effects to visual resources from dust and visible construction activities</p>

**Table 2.1-10 Summary of Effects to Cultural Resources**

	Alternative A - No Action	Echanis Wind Energy Project	Alternative B			Alternative C - North Route
			West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	
Archaeological Resources	No Action would have no adverse effects on NRHP eligible archaeological resources.	No temporary adverse effects to NRHP eligible archaeological resources. There would be permanent or long-term effects to NRHP eligible archaeological sites through direct disturbance and/or indirect visual effects. Avoidance is recommended for all potentially eligible sites. If avoidance is not possible, further testing and formal evaluations for NRHP eligibility should be conducted for each resource. Formal evaluations would include further documentation and inventory, and boundary delineation through testing.	No adverse temporary effects to NRHP eligible archaeological resources. There would be permanent or long-term effects to NRHP eligible archaeological sites through direct disturbance and/or indirect visual effects. Avoidance is recommended for all potentially eligible sites. If avoidance is not possible, further testing and formal evaluations for NRHP eligibility should be conducted for each resource. Formal evaluations would include further documentation and inventory, and boundary delineation through testing.	An archaeological survey was not conducted of archaeological resources in the South Diamond Lane Route Option.	No adverse temporary effects to the NRHP eligible archaeological resource. There would be permanent or long-term effects to the NRHP eligible archaeological site through direct disturbance and/or indirect visual effects. Avoidance is recommended for all potentially eligible sites. If avoidance is not possible, further testing and formal evaluations for NRHP eligibility should be conducted for the resource. Formal evaluations would include further documentation and inventory, and boundary delineation through testing.	No temporary adverse effects to NRHP eligible archaeological resources. There would be permanent or long-term effects to NRHP eligible archaeological sites through direct disturbance and/or indirect visual effects. Avoidance is recommended for all potentially eligible sites. If avoidance is not possible, further testing and formal evaluations for NRHP eligibility should be conducted for each resource. Formal evaluations would include further documentation and inventory, and boundary delineation through testing.
Architectural/Historic Resources	No Action would have no adverse effects on NRHP eligible architectural/historical resources	Since no survey and inventory of architectural/historical resources was conducted in this APE, no NRHP eligible architectural/historical resources were identified and no project effects were determined.	No NRHP eligible architectural/historical resources were identified in the West Route	No temporary or permanent adverse effects to NRHP eligible architectural/historical resources.	No NRHP eligible architectural/historical resources were identified in the Hog Wallow Route Option.	No temporary or permanent adverse effects to NRHP eligible architectural/historical resources.

**Table 2.1-11 Summary of Effects to Social and Economic Values and Environmental Justice**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
<p>No Action would lead to Harney County not receiving the potential employment, income, and output benefits created by the proposed Project.</p> <p>Additionally, the tax benefits of the Project would not be collected by the county under the No Action Alternative.</p>	<p>Short-term employment would consist of 100 employees for 9 months, of which 30 would be local residents.</p> <p>Employment would be generated or supported in other sectors as construction employees spend their wages at businesses in the county (induced effects). Non-resident construction workers are estimated to spend approximately \$1,400 per month on lodging, food, and gas.</p> <p>Increased household spending would generate approximately 15 jobs. Local jobs would also be supported by expenditure on goods and materials for the Project (indirect effect).</p> <p>Approximately \$3.5 million of local goods and services would be required for Project construction which is expected to generate approximately 30 jobs.</p> <p>Long-term employment for operations would consist of 10 workers. Employment opportunities resulting from purchase of Project-related materials is estimated at \$20,000 annually.</p> <p>Household spending of income from ROW lease payments during the operations phase are expected to generate approximately 5 jobs in the county.</p> <p>Short-term income from Project construction is estimated at \$3.5 million. Businesses that supply goods and services to the Project would receive indirect income effects estimated at \$1.0 million. Businesses such as grocery stores, restaurants, hotels, and gas stations are expected to receive an increase in local income by approximately \$470,000.</p> <p>Long-term income from Project operations would arise from employee compensation to operations workers (estimated at \$450,000 annually) and lease payments to private landowners (estimated at \$750,000) annually. These effects would result in increased household spending at local businesses, and raises income by employees and owners of these businesses by approximately \$100,000.</p> <p>The value of goods and materials</p>	<p>Short-term employment hired to construct the initial single-circuit transmission line for the Project would consist of 100 employees for 3 months, of which 50 would be local residents.</p> <p>Employment would be generated or supported in other sectors as employees spend wages at businesses in the county (induced effects). Non-resident workers are estimated to spend approximately \$1,400 per month on lodging, food, and gas.</p> <p>Increased household spending is expected to generate approximately 15 jobs.</p> <p>Long-term employment hired for maintenance and operations jobs would consist of 15 workers. Employment opportunities resulting from purchase of Project-related materials is estimated at \$150,000 annually. Some employment is expected to result from increased household spending due to Project-related income.</p> <p>Short-term income from Project payroll for construction is estimated to be \$2.0 million. Local income would increase during the construction period as one-time ROW payments are made to local households, totaling approximately \$580,000.</p> <p>Businesses that supply goods and services to the Project would receive indirect income effects estimated at \$630,000. Spending by construction workers is expected to increase local income by \$330,000.</p> <p>Long-term income from</p>	<p>Effects for the South Diamond Lane Route Option are expected to be equivalent to the effects estimated for Alternative B – West Route.</p> <p>Although the two routes have a different alignment on the west end, their total length is very similar (the South Diamond Lane Route is less than 5% shorter). This indicates that total construction and operation expenditures, and thus economic effects, should be approximately equal for the two routes.</p>	<p>Effects for the Hog Wallow Route Option are expected to be equivalent to the effects estimated for Alternative B – West Route.</p> <p>Although the two routes have a different alignment on the west end, their total length is very similar (the Hog Wallow Route is less than 1% longer). This indicates that total construction and operation expenditures, and thus economic effects, should be approximately equal for the two routes.</p>	<p>Short-term employment hired to construct the transmission line for the Project would consist of 260 employees for 3 months, of which 130 would be local residents.</p> <p>Employment generated by Project-related construction spending on local goods and services is estimated at 35 jobs, while the employment generated by increased spending by Project construction workers is estimated at 25 jobs.</p> <p>Long-term employment hired for maintenance and operations would be 15 workers. Employment opportunities resulting from purchase of Project-related materials is estimated at \$300,000 annually, which is expected to generate approximately 5 jobs.</p> <p>Short-term income from Project payroll for construction is estimated to be \$4.0 million. Local income would increase during the construction period as one-time ROW payments are made to local households, totaling approximately \$1.0 million.</p> <p>Income generated by Project-related construction spending on local goods and services is estimated at \$1.3 million, while the construction employment generated by increased spending by Project workers is estimated at \$600,000.</p> <p>Long-term income from Project operations as payroll to operations workers amounts to \$590,000, which would result in increased household spending at local businesses, and raises income by employees and owners of these businesses by</p>

**Table 2.1-11 Summary of Effects to Social and Economic Values and Environmental Justice**

Alternative A - No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
	<p>purchased during the operations phase would be approximately \$20,000, and income at local businesses that supply these inputs is not expected to increase.</p> <p>No property value effects are estimated for wind farm proximity/viewshed impairment.</p> <p>An estimated \$1.6 million is expected in increased real estate taxes and \$17.0 million in increased property taxes. The net present value of these is estimated at \$13.5 million. Subtracting the reduction in school-related funds from the state, the total net present value of the increased taxes is \$9.3 million and the annualized payment is \$0.63 million. If the Project exists for longer than 20 years, the total present value of value of tax payments over the life of the Project would be higher.</p> <p>This analysis did not identify disproportionately high or adverse effects to minority or low-income groups.</p>	<p>Project operations would arise from payroll to operations workers amounting to \$590,000, which would result in increased household spending at local businesses, and raises income by employees and owners of these businesses by approximately \$60,000.</p> <p>The value of goods and materials purchased by the Project during the operations phase is approximately \$150,000 and would result in a slight income increase at local businesses suppliers. There would be an estimated \$70,000 increase in income due to maintenance expenditures.</p>			<p>approximately \$140,000.</p> <p>Fiscal effects for this option are expected to be equivalent to the effects estimated for Alternative B – West Route. Although the two routes have a different alignment, the taxes imposed on the utility asset owner and leased landowner would be the same.</p>

**Table 2.1-12 Summary of Effects to Wild Horses and Burros and Areas of Critical Environmental Concern**

Alternative B					
Alternative A – No Action	Echanis Wind Energy Project	West Route (Proposed Action)	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
<p>Under the No Action Alternative, no new transmission lines, interconnection stations, or related facilities would be constructed and no new or improved access roads would be required.</p> <p>The potentially affected areas within HMAs would continue to be used for wild horse forage and range, and the Kiger Mustang ACEC would continue to be used for low-impact recreational pursuits, including camping, and plant and rock collection.</p>	<p>None of the improvements associated with the wind farm site would encroach onto BLM lands designated as HMA or ACEC.</p>	<p>Alternative B would extend 0.83 mile into the east unit of the Warm Springs HMA. The amount of ROW required in the HMA to accommodate the new line would be approximately 15.1 acres.</p> <p>Construction of the new interconnection station adjacent to the HEC 115-kV transmission line would permanently remove 0.69 acre of vegetation within the Warm Springs HMA currently available for wild horse forage and shelter.</p> <p>Alternative B would also require the construction of 2.17 miles of new access roads within the HMA that would permanently remove vegetation on up to 2.77 acres currently available for wild horse forage and shelter.</p> <p>Temporary effects would include noise and increased human activity during installation of the transmission line poles, construction of the new interconnection station, clearing and grading existing and new access roads, vehicle operation in areas where overland vehicle travel would occur, and use of temporary laydown areas and tensioning sites. These activities would result in additional surface disturbance and vegetation damage.</p> <p>Ongoing operations would involve periodic inspections and maintenance of the transmission line (including poles, insulators, and conductors), interconnection station, and access roads. Increased human activity during periods of construction and maintenance could cause wild horses to avoid these areas while humans are present.</p>	<p>The South Diamond Lane Route Option would extend approximately 0.32 mile into the east unit of the Warm Springs HMA. The amount of ROW required from HMA to accommodate the new line would be approximately 5.8 acres.</p> <p>Other effects would be the same as for Alternative B – West Route.</p>	<p>The Hog Wallow Route Option would extend approximately 0.41 mile into the east unit of the Warm Springs HMA. The amount of ROW required within the HMA to accommodate the new line would be approximately 7.5 acres.</p> <p>The South Diamond Lane Route Option would also require the construction of 2.17 miles of new access roads within the HMA that would permanently remove vegetation on up to 2.77 acres currently available for wild horse forage and shelter.</p> <p>Other effects would be the same as for Alternative B – West Route.</p>	<p>Alternative C would cross 7.27 miles of the Kiger Mustang ACEC, of which 4.46 miles is within the Kiger HMA. The amount of ROW required within the ACEC to accommodate the new line would be approximately 132.2 acres, and the amount required within the HMA would be approximately 81.1 acres.</p> <p>Alternative C would also require the construction of 3.48 miles of new access roads within the HMA that would permanently remove up to 6.76 acres of vegetation currently available for wild horse forage and shelter.</p> <p>Access road construction (including overland roads) would cross 5.89 miles of the Kiger Mustang ACEC affecting approximately 9.10 acres.</p> <p>Temporary effects would be the same as for Alternative B – West Route.</p>

**Table 2.1-13 Summary of Effects to Wilderness Areas, Wilderness Study Areas, and Wild and Scenic Rivers**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
<p>No new transmission lines, Substations, interconnection stations, or the Echanis Wind Energy Project, would be constructed.</p> <p>Improvements to existing access roads would not be needed and new access roads would not be constructed.</p> <p>No new ROW would be obtained from BLM or USFWS, and the Echanis site would remain undeveloped and continue to be used for livestock grazing.</p> <p>Land use and development on private parcels near WSRs, the Steens Mountain Wilderness Area, and WSAs would continue consistent with Harney County zoning regulations.</p>	<p>The Project is situated approximately 1.5 miles from the Steens Mountain Wilderness, and approximately 668 acres (0.4%) of the Steens Wilderness Area would have fore- to middle-ground views of the Project where opportunities for solitude would be diminished.</p> <p>No project facilities would be located within the Steens Mountain Wilderness.</p> <p>During construction, the northeastern most portion of the Wilderness Area would have limited views of the construction of the project, but due to the steep topography, limited access routes, and proximity to private property, effects to solitude are not expected.</p> <p>Wind turbines would be located within a few hundred meters of the Lower Stonehouse WSA, about 0.5 miles from the High Steens WSA, 3.0 miles from the West Peak WSA, 4.0 miles from the Stonehouse WSA, and 4.5 miles from the Heath Lake WSA. Project features would be visible from portions of all 5 of these WSAs.</p> <p>Opportunities for primitive and unconfined recreation would still exist in all WSAs, no facilities would impair access to these forms of recreation, and no project facilities would be constructed within any WSAs so that all would retain their naturalness values.</p> <p>During operations, noise from wind turbines would exceed ambient levels within the southern portion of the Lower Stonehouse WSA and would diminish opportunities for primitive and unconfined recreation.</p> <p>During construction, the Lower Stonehouse WSA would have unobstructed views of project-related construction activities and would be subject to project related noise in excess of ambient noise levels. In addition, maintenance activities for turbines could affect experiences of solitude in this area.</p>	<p>Approximately 37.9 acres or 2.7% of the total 1,420 acre Kiger Creek WSR would have background views of the transmission line where it would cross private and public lands, but effects would be minimal.</p> <p>No Wilderness Areas, WSAs, and WSR's are located within five miles of the northern portions of the transmission line alternatives located to the north of the analysis area. However, one Wilderness Area, five WSAs, and one WSR's do fall within the boundaries of the analysis area, as defined by the five mile radius viewshed.</p> <p>Approximately 822 acres (0.5%) of the Wilderness Area would have foreground to middleground views of the transmission line. Opportunities for solitude on those parts of the Steens Mountain Wilderness that would have views of the Project would be diminished.</p> <p>No project facilities would be located within the Steens Mountain Wilderness.</p> <p>Opportunities for primitive and unconfined recreation would still exist in all WSAs, no facilities would impair access to these forms of recreation, and no project facilities would be constructed within any WSAs so that all would retain their naturalness values.</p>	<p>Project effects to the Steens Mountain Wilderness Area, WSAs, and WSRs would be the same as for Alternative B – West Route.</p>	<p>Project effects to the Steens Mountain Wilderness Area, WSAs, and WSRs would be the same as for Alternative B – West Route.</p>	<p>Project effects to the Steens Mountain Wilderness Area, WSAs, and WSRs would be the same as for Alternative B – West Route.</p>

**Table 2.1-14 Summary of Effects to Transportation**

Alternative A.– No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane Route Option	Hog Wallow Route Option	Alternative C – North Route
<p>Under the No Action Alternative, no new transmission lines, Substations, interconnection stations, or related facilities would be constructed.</p> <p>Improvements to existing access roads would not be needed and no new access roads would be constructed.</p> <p>No workers, equipment, or Project components would be transported on state highways, county roads, BLM roads, or private roads and traffic disruptions, temporary road closures, and detours related to Project construction would not occur.</p>	<p>The 18.95 mile long main access road to the Echanis site would cross approximately 14.73 miles of the Andrews RA and 4.22 miles of the Three Rivers RA; including approximately 7.12 miles on private lands within the Steens Mountain CMPA.</p> <p>Approximately 17.47 miles of the access road would be on private property and 1.48 miles would be on public land administered by the BLM.</p> <p>Each workday there would be an increase in traffic in and around the Project Area due to the presence of construction workers and the delivery of project components and supplies.</p> <p>Specialized trucks would be used to transport the large components that make up each wind turbine to the project site. During peak activity, up to 36 truck trips per day would access the Project site using state highways and county roads, including Highway 20, Highway 205, and South Diamond Lane.</p> <p>The project Applicant would make improvements to the existing bridge on South Diamond Lane over the Donner und Blitzen River to remove the current load limits.</p> <p>During peak activity, up to five specialized trucks per hour would traveling at relatively low speed on South Diamond Lane could increase the risk of traffic accidents.</p>	<p>Approximately 2.19 miles of existing unpaved access roads would be widened and 0.19 miles of new access roads would be constructed across BLM and USFWS administered lands.</p> <p>Approximately 25.68 miles of overland access roads would be located on private land, BLM administered land, and a small amount of land administered by the USFWS.</p> <p>Approximately 5.90 miles of new overland roads on private land would be located within the Steens Mountain CMPA.</p> <p>Temporary effects on transportation would be associated with use of the state highways and county roads by construction workers and by trucks hauling equipment and project components would be similar to those described for Echanis.</p> <p>During peak activity as many as 24 truck trips per day (three truck trips per hour) would travel to and from the Project Area.</p> <p>Temporary traffic delays could be expected during installation of the transmission line along two short segments of South Diamond Lane where the transmission line would either parallel or cross the existing road.</p>	<p>Approximately 2.00 miles of improvements to existing access roads and 0.19 miles of new access roads would be constructed.</p> <p>Approximately 21.29 miles of overland access roads would be located on private land, BLM-administered land, and a small amount of land administered by the USFWS. Overland access roads would require no roadbed improvements.</p> <p>Approximately 5.90 miles of new overland roads on private land would be located within the Steens mountain CMPA.</p> <p>Temporary effects would be similar to the effects described for Alternative B – West Route.</p>	<p>Approximately 2.00 miles of improvements to existing access roads and 0.19 miles of new access roads would be constructed.</p> <p>Approximately 25.99 miles of overland access roads would be located on private land, BLM-administered land, and a small amount of land administered by the USFWS.</p> <p>Approximately 5.90 miles of new overland roads on private land, would be located within the Steens Mountain CMPA.</p> <p>Temporary effects would be the similar to those described for Alternative B – West Route.</p>	<p>Approximately 5.03 miles of new access roads would be constructed across private lands and BLM-administered lands.</p> <p>Approximately 25.05 miles of overland access roads would be located on both private land and BLM-administered land.</p> <p>Approximately 5.90 miles of new overland roads on private land would be located within the Steens Mountain CMPA.</p> <p>During construction, there would be an increase in traffic on local roads in and around the Project Area due to workers traveling to and from areas of construction and from trucks delivering construction materials, components, and supplies.</p> <p>Temporary traffic delays (less than one minute) could be expected during installation of the transmission line along short segments of Happy Valley Road where the transmission line would either parallel or cross the existing road.</p>

**Table 2.1-15 Summary of Effects to Public Health and Safety**

Component	Alternative A – No Action	Echanis Wind Energy Project	Alternative B			Alternative C – North Route
			West Route (Proposed Action)	S. Diamond Lane – Route Option	Hog Wallow – Route Option	
Fire Hazards	Under No Action the Echanis site would remain undeveloped and would continue to be used for livestock grazing.  No new fire hazards would be introduced to the Project Area.	While unlikely, a potential fire risk from malfunction of the wind turbine generators and transformers exists.  Risk of fire during construction could occur if sparks from equipment used during construction make contact with combustible material.	It is theoretically possible that an energized phase conductor could cause a fire if it were to fall to the ground and create an electrical arc that could ignite combustible material; however, this is a very unlikely event.  Sparks from equipment used during operation and maintenance (O&M) of the transmission line, interconnection stations, and Substation also pose a risk of fire.  Permanent effects from operation of the transmission line, interconnection stations, and Substation also include increased risk of fire due to inadequate clearance between vegetative fuel loads and Project facilities.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
EMF	No new sources of EMF would be developed or introduced to the Project Area.	No EMFs would be generated by the Echanis Wind Energy Project  EMFs associated with wind projects occur during the transmission of the energy produced by the turbines to the main electricity transmission grid for distribution.	EMFs would meet regulatory limits for public exposure in Oregon as well as regulatory limits or guidelines for peak fields established by national and international guideline setting organizations.  Magnetic fields from the proposed line would be within the regulatory limits of the two states that have established them and within guidelines for public exposure established by ICNIRP and IEEE. No project design features or mitigation measures are proposed.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
Hazardous Materials	No new sources of hazardous materials would developed or introduced to the Project Area.	Potential exists for release of hazardous materials to the environment due to improper use, storage, or disposal of hazardous materials.  An accidental release could contaminate vegetation, soil, and water, which could result in indirect effects to human and wildlife populations.  All major components of the wind turbines would undergo routine maintenance which would involve the use of small amounts of hazardous materials, such as grease, lubricants, paint, corrosion control coatings, and glycol-based coolants.	Potential exists for release of toxic materials into the environment from improper use, storage, or disposal of these materials. Releases could contaminate vegetation, soil, and water, which could result in indirect effects to human and wildlife populations.  Use of hazardous materials during Project construction, operation, and maintenance would pose potential health and safety hazards to construction and maintenance workers and nearby residents.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route

**Table 2.1-16 Summary of Effects to Air Quality and Climate Change**

Environmental Parameter	Alternative A – No Action	Echanis Wind Energy Project	Alternative B			Alternative C – North Route
			West Route (Proposed Action)	S. Diamond Lane – Route Option	Hog Wallow – Route Option	
Criteria Pollutants (combustion contaminants)	Unspecified amounts of VOC, CO, NO <sub>x</sub> , SO <sub>x</sub> , PM <sub>10</sub> , and PM <sub>2.5</sub> might be emitted (effects) elsewhere by mixed generating resources in lieu of wind farm operation.	Short-term temporary construction effects below threshold levels.	Short-term temporary construction effects below thresholds.	Same as Alternative B – West Route.	Same as Alternative B – West Route.	Same as Alternative B – West Route.
Fugitive Dust (earthmoving and road usage)	No construction or operational effects.	Short-term temporary construction effects below threshold levels.	Short-term temporary construction effects below thresholds.	Same as Alternative B – West Route.	Same as Alternative B – West Route.	Same as Alternative B – West Route.
Greenhouse Gases (combustion byproducts and SF <sub>6</sub> )	About 194,000 metric tonnes GHG might be emitted (effects) elsewhere by mixed generating resources in lieu of wind farm operation.	Short-term temporary construction effects.	Short-term temporary construction effects. <i>De minimis</i> operational effects notwithstanding minor fugitive losses of SF <sub>6</sub> .	Same as Alternative B – West Route.	Same as Alternative B – West Route.	Same as Alternative B – West Route.

**Table 2.1-17 Summary of Effects to Noise**

Alternative A – No Action	Echanis Wind Energy Project	Alternative B – West Route	South Diamond Lane – Route Option	Hog Wallow Route – Option	Alternative C – North Route
<p>Under the No Action Alternative, the proposed transmission line and wind turbines would not be installed; therefore, no effects would occur from noise related to these actions.</p>	<p>Construction of the wind farm would temporarily increase ambient noise levels in the immediate vicinity of the ROW through use of on-road vehicles, off-road equipment, and aircraft (3-day helicopter charter).</p> <p>Construction activity associated with the wind farm could temporarily cause ground-borne vibration. Ground-borne vibration would occur in the immediate vicinity of construction activities, particularly if rock drilling, pile driving, or blasting is required.</p> <p>Routine inspection and maintenance activities associated with the wind farm could increase ambient noise levels in the vicinity of the Project Area for brief periods of time.</p> <p>The nearest residential receptor to the wind turbine Project Area is approximately 2.9 miles away. At this location, the increased noise level caused solely by wind turbine operation is estimated at between 29 and 36 dBA.</p> <p>The nearest recreational receptor to the wind turbine Project Area is approximately 2.6 miles away. At this location, the increase noise level caused solely by wind turbine operation is estimated at between 31 and 38 dBA.</p>	<p>Temporary effects from Alternative B would be similar to those described in effects of the Echanis Wind Farm.</p> <p>The estimated construction-related noise levels at the one residence within 200 meters of the right-of-way would be about 63 to 69 dBA average for a few days at most. Consequently, the construction activities, although temporary, would be above the OEQC L10 (intrusive noise) and L50 (median noise) standards, but below the L1 (annoying noise) standard for daytime. In addition, there would be an increase in the ambient statistical noise levels, L10 or L50, of more than 10 dBA in any one hour.</p> <p>Vibration levels at the nearest residential receptor (561 feet away) would be about 70 to 80 VdB, which is well below the FTA damage threshold for buildings of 100 VdB. People may feel minor ground movement at greater distances, but because the construction activities are temporary and there is negligible potential for damage to fragile structures, this would not constitute an effect.</p> <p>At the nearest receptor (approximately 561 feet from the transmission line), the increase in ambient noise level caused solely by corona noise, if present, is estimated at between 18 and 38 dBA. Corona noise appears compliant with local standards; therefore, operational effects associated with corona noise are considered minor.</p> <p>Noise from routine inspection and maintenance activities should not result in perceptible noise level increases at the nearest sensitive receptor. However, some construction equipment used in road repairs may cause ambient background noise levels to temporarily increase beyond 10 dBA in any one hour.</p>	<p>The South Diamond Lane Route option of Alternative B would only change the noise effects one receptor. The transmission line would be located 7,124 feet from it, as opposed to 1,650 feet from it in Alternative B. The noise effects at this receptor would be reduced.</p> <p>All other effects to the other sensitive receptors would remain the same as those for the proposed West Route.</p> <p>The potential permanent and temporary noise and vibration effects and mitigation measures related to construction, operation, and maintenance activities that would occur on the South Diamond Lane Route would be similar to those described for the proposed West Route.</p>	<p>The Hog Wallow Route option of Alternative B would only change the noise effects for one receptor. The transmission line would be located 1,680 feet from it, as opposed to 1,650 feet in Alternative B. The noise effects would be slightly less for this receptor with this option.</p> <p>All other effects to the other sensitive receptors would remain the same as those for the proposed West Route.</p> <p>The potential permanent and temporary noise and vibration effects and mitigation measures related to construction, operation, and maintenance activities that would occur on the Hog Wallow Route would be similar to those described for the proposed West Route.</p>	<p>Potential permanent and temporary noise and vibration effects and mitigation measures related to construction, operation, and maintenance activities that would occur for the Alternative C North Route would be similar to those described for the Alternative B West Route. However, the nearest residential receptor to Alternative C is approximately 217 feet from the transmission line. This receptor and six others are all within 200 meters of the Project right-of-way. The distances from the sensitive receptors to the Alternative C Project Area are closer than those from the Alternative B.</p> <p>The estimated construction noise levels at the nearest sensitive receptor would be approximately 71 to 78 dBA average. The construction activities, although temporary, would be above the OEQC L<sub>10</sub> (intrusive noise) and L<sub>50</sub> (median noise) standards for daytime, and at times would be above the L<sub>1</sub> (annoying noise) standard of 75 dBA for daytime. In addition, there would be an increase in the ambient statistical noise levels, L<sub>10</sub> or L<sub>50</sub>, of more than 10 dBA in any one hour.</p> <p>Vibration levels of construction activity at the nearest receptor (217 feet) would be below the FTA damage threshold for buildings of 100 VdB. This is based on the vibration source levels for construction equipment at 7.62 meters (25 feet) compared to this alternative's nearest sensitive receptor at a distance of 66 meters (217 feet).</p> <p>Corona noise, if present, at the nearest receptor (217 feet) is estimated at between 27 and 47 dBA. Corona noise appears compliant with local standards; therefore, operational effects associated with corona noise are considered minor.</p> <p>Although most noise sources from routine inspection and maintenance activities should not be perceptible at the nearest sensitive receptor, some construction equipment used in road repairs may cause ambient background noise levels to increase beyond 10 dBA in any one hour.</p>

**Table 2.1-18 Summary of Effects to Alternative for Energy**

		Alternative B			
	Alternative A - No Action	West Route (Proposed Action)	S. Diamond Lane Route Option	Hog Wallow Route Option	Alternative C North Route
Renewable Electrical Power Supply	Under the No Action Alternative, the Echanis project would not be constructed and would not contribute to regional efforts to meet the 2025 RPS goal in Oregon, or the 2020 goal in California.	Results in increased supply of clean, renewable wholesale electric power available to utilities for retail sales.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
Power Transmission	No effect	Results in increased transmission of clean, renewable wholesale electric power available to utilities for retail sales.	Same as Alternative B - West Route	Same as Alternative B - West Route	Same as Alternative B - West Route
Power Distribution	No effect	No effect	No effect	No effect	No effect

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