CHAPTER 2 – PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

Chapter 2 describes the Proposed Action to accommodate the Applicant's proposal to construct, operate, and maintain a 500kV transmission line and ancillary facilities. Also presented are (1) the Project description, (2) alternatives to the Proposed Action and their development, (3) a summary comparison of alternatives, and (4) the preferred alternative(s). This chapter is organized in the following sections:

- 2.2 – Proposed Action: describes the Applicant's Proposed Action
- 2.3 – Project Description: describes the typical characteristics of the transmission line and ancillary facilities
- 2.4 – System Construction: describes anticipated construction activities, including regulatory requirements, standard operating procedures, and environmental design features of the Proposed Action for environmental protection
- 2.5 – Alternatives: describes the 12 transmission line alternative-route locations and 21 route variations that could accommodate the 500kV transmission line evaluated in this EIS, and the alternative of taking no action, and the development of alternatives
- 2.6 – Alternatives Reviewed but Eliminated from Further Consideration: describes alternatives considered but eliminated from detailed study and discusses the reasons for their elimination
- 2.7 – Summary Comparison of Alternatives: summarizes the results of the process of screening and comparing the alternative routes and identifies the alternative route exhibiting the least environmental impacts

Some portions of the alternative routes considered for the Proposed Action would not be in conformance with some aspects of the administering federal agency's land-use plan. In these cases, for the Project-specific selected alternative route, a LUPA would be required to amend decisions in the land-use plans and bring the Project into conformance with relevant plan direction. Potential LUPAs required for all alternatives considered for the Project are identified and analyzed in Chapter 5.

2.2 Proposed Action

As introduced in Section 1.1, the Project is being constructed as part of the Applicant's Energy Gateway Program for transmission expansion. The Project includes the following:

- Construction, operation, and maintenance of a 500kV single-circuit, AC transmission line from the Aeolus Substation near Medicine Bow in Carbon County, Wyoming to the Clover Substation near Mona in Juab County, Utah, a distance of 400 to 540 miles depending on the route selected
- Two series compensation stations, at points between the Aeolus and Clover substations, to improve the transport capacity and efficiency of the transmission line
- Communication regeneration stations (every 55 miles)
- Rebuild two existing 345kV transmission lines between the Clover and Mona Substations (in existing right-of-way)
- Reroute the Mona to Huntington 345kV transmission line through the Clover Substation

2.3 Project Description

2.3.1 System Components

Table 2-1 summarizes the typical design characteristics of the 500kV and 345kV transmission lines and the land that would be temporarily and/or permanently disturbed. The table is followed by descriptions of the various components of the transmission line system for the Project, including the transmission line structures, conductors, insulators, grounding system, and communication system.

TABLE 2-1
TYPICAL DESIGN CHARACTERISTICS OF THE 500-KILOVOLT AND 345-KILOVOLT TRANSMISSION LINES

Feature	Description
500-kilovolt Transmission Line	
Line length	Approximately 400 to 540 miles (depending on route selected)
Types of structures	Tangent/angle/deadend self-supporting steel-lattice and tangent H-frame
Structure height	Self-supporting steel-lattice (145 to 200 feet) H-frame (100 to 165 feet)
Span length	Self-supporting steel-lattice (1,000 to 1,500 feet) H-frame (1,200 to 1,300 feet)
Structures per mile	Self-supporting steel-lattice (Approximately 4 to 5) H-frame (approximately 4)
Right-of-way width	250 feet
Land Temporarily Disturbed	
Structure work area	250 by 250 feet per structure
Wire-pulling/tensioning	250 by 400 feet; two every 3 to 5 miles
Splicing sites	100 by 100 feet every 9,000 feet
Guard structures	150 by 75 feet; approximately 1.4 structures per 1 mile
Multi-purpose construction yards	30-acre site located approximately every 20 miles on private and/or public land (locations to be determined) (refer to Section 2.4.2)[1]
Helicopter fly yards	15-acre site located approximately every 5 miles[2]
Access roads (improve existing, spur, and new)	Improve existing, spur, and new roads would be a minimum of 14-foot-wide travel surface (in steeper terrain the travel surface width could be a maximum of 22 feet for radius of curves) plus disturbance for grading and drainage features (total distance to be determined)
Land Permanently Required	
Area occupied by structure (pad)	Self-supporting steel-lattice (60 by 60 feet per structure)
Series compensation stations	Two at 160 acres each
Communication regeneration station	100 by 100 feet with 75- by 75-foot fenced areas and a 12- by 32-foot building; five station approximately every 55 miles
Access roads (improve existing, spur, and new)	Improved existing, spur, and new roads would typically have a 14-foot-wide travel surface (in steeper terrain the travel surface width could be a maximum of 22 feet for radius of curves) plus disturbance for grading and drainage features (total distance to be determined)
Electrical Properties	
Nominal voltage	500-kilovolt (kV) alternating current line-to-line
Capacity	1,500 megawatts
Circuit configuration	Tangent single-circuit with three phases per structure, three subconductors per phase
Minimum ground clearance of conductor	35 feet minimum in accordance with PacifiCorp's standard practice

TABLE 2-1
TYPICAL DESIGN CHARACTERISTICS OF THE 500-KILOVOLT AND 345-KILOVOLT TRANSMISSION LINES

Feature	Description
345-kilovolt Transmission Lines	
Line lengths	3 segments totaling approximately 6.6 miles
Types of structures	Single-circuit steel H-frame, single-circuit steel monopole, and/or double-circuit steel monopole and angle/dead-end
Structure height	H-frame (80 to 140 feet) Steel monopole (85 to 130 feet) Double-circuit steel monopole (95 to 150 feet)
Span length	H-frame (800 to 1,200 feet) Single- and double-circuit monopoles (700 to 800 feet)
Structures per mile	H-frame (4 to 7 per mile)
Right-of-way width	Segments 4a and 4b in existing right-of-way Segment 4c (150 feet)
Land Temporarily Disturbed	
Structure work area	150 by 200 feet per structure
Wire-pulling/tensioning	150 by 400 feet; one site per 345kV segment
Splicing site	100 by 100 feet; one site for segments 4a and 4b
Guard structures	150 by 75 feet approximately 1.4 structures per 1 mile
Multi-purpose construction yards	10-acre site; one site located near Clover Substation
Helicopter fly yard	15-acre site located near Clover Substation (location to be determined)[2]
Access roads (improve existing, spur, and new)	Improve existing, spur, and new roads would be a minimum of 14 feet wide
Land Permanently Required	
Area occupied by structure (pad)	H-frame (5 by 40 feet per structure)
Access roads (improve existing, spur, and new)	Improve existing, spur, and new roads would be a minimum of 14 feet wide
Electrical Properties	
Nominal voltage	345kV alternating current line-to-line
Capacity	600 megawatts
Circuit configuration	Segments 4a and 4b tangent single-circuit with three phases per structure, two subconductors per phase. Segment 5 tangent single-circuit with three phases per structure, two subconductors in a double-bundle configuration
Minimum ground clearance of conductor	30 feet minimum in accordance with PacifiCorp's standard practice

SOURCE: Rocky Mountain Power 2013
NOTES:
[1]Multi-purpose construction yards include concrete batch plants, which would occur approximately every 60 miles except in areas where the Project could be serviced by existing concrete batch plants. Helicopter landing and refueling also would be located in the multi-purpose construction yards.
[2]Helicopter fly yards, which are used to transport materials to structure work areas during construction, may include space dedicated for refueling helicopters.

2.3.1.1 Types of Transmission Line Support Structures

The proposed transmission line circuits typically would be supported by four types of structures. The predominant 500kV transmission line structure would be self-supporting, steel-lattice, single-circuit (Figure 2-1). An alternate 500kV transmission line structure would be tubular, steel, H-frame. The predominant 345kV transmission line structure would be steel, H-frame single-circuit (Figure 2-2). Alternate 345kV structures would be a steel monopole, single-circuit and possibly a steel monopole, double-circuit. The alternative 500kV and 345kV structure types would be used in response to specific design needs—only when conditions or agency requirements warrant.

The predominant type of structures used would be the tangent structure configurations. Tangent structures are designed to support the conductors where the line angle at the structure location is typically 1 degree or less, meaning the transmission line is essentially in a straight line. Specialized structures are designed where the line must turn an angle (up to approximately 30 degrees). Each structure is individually designed, depending on the line angle and underlying soil and rock conditions, to withstand the pull of the wires in different directions. The greater line angles use angle structures with more complex insulator assemblies and stronger, heavier towers and have deeper, stronger foundations.

500kV Structures – Aeolus to Clover

The 500kV lattice structures would be fabricated with steel members treated to produce a dulled galvanized finish (to reduce reflectivity). The average distance between 500kV structures (span) would be 1,000 to 1,500 feet, or approximately 4 to 5 structures per mile. Structures would vary in height from 145 to 200 feet depending on terrain and the requirement to maintain minimum conductor clearances from the ground.

H-frame steel towers would be fabricated with a tubular self-weathering steel treatment to produce a rust-like finish. The average distance between 500kV towers would be 1,200 to 1,300 feet. Structure heights would vary depending on terrain and the requirement to maintain minimum conductor clearances from the ground. The 500kV single-circuit H-frame structures would vary in height from 100 to 165 feet.

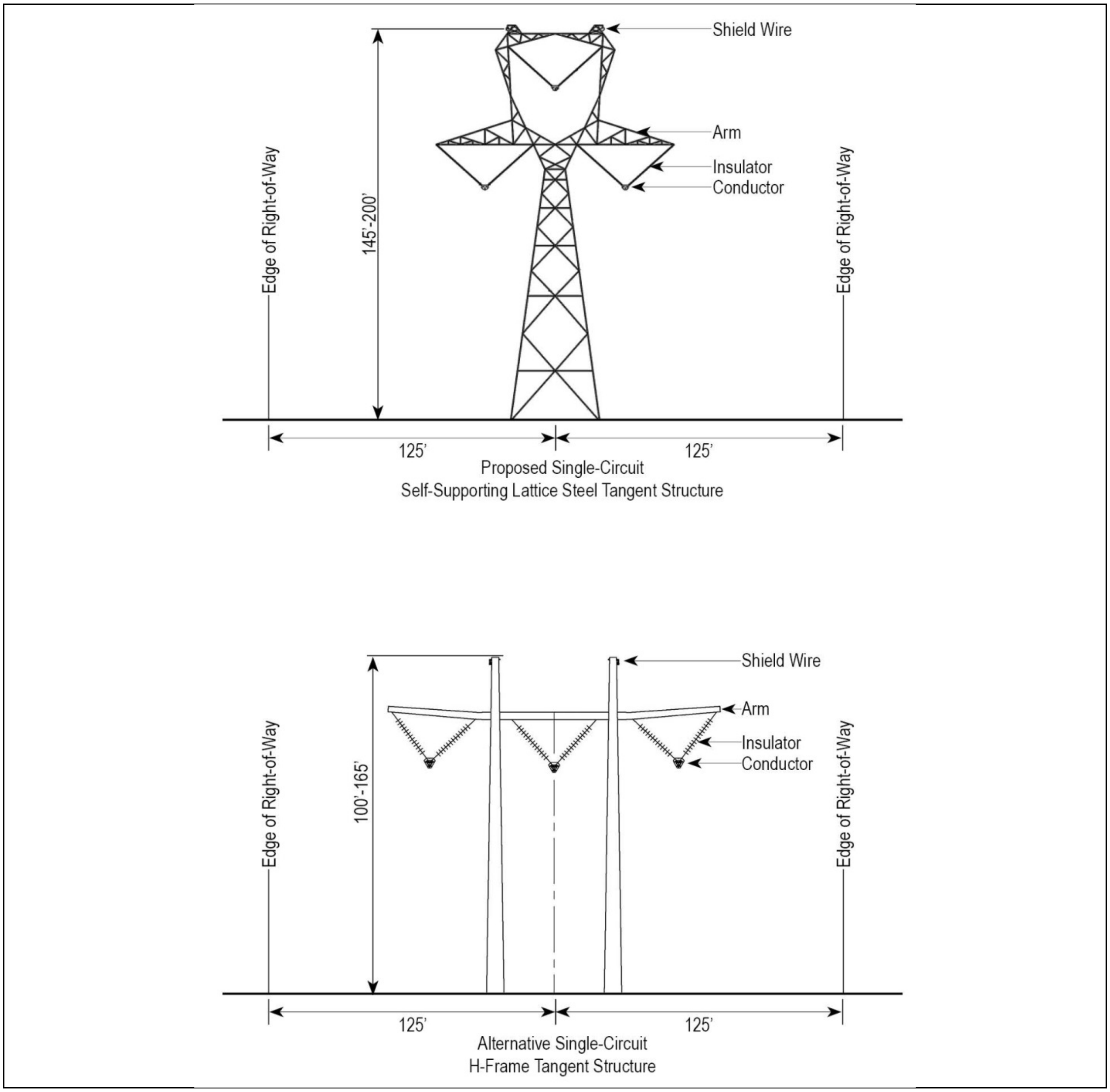


Figure 2-1 Typical 500-kilovolt Structures

345kV Structures – Clover to Mona

As mentioned previously, two existing 345kV transmission lines would be rebuilt in existing rights-of-way to electrically connect the Clover and Mona substations, and the existing Mona to Huntington 345kV transmission line would be rerouted through the Clover Substation. The average distance between 345kV H-frame tangent structures would be 800 to 1,200 feet, or approximately 4 to 6 structures per mile. H-frame structures would vary in height from 80 to 150 feet depending on terrain and the requirement to maintain minimum conductor clearances from the ground. The average distance between 345kV single- and double-circuit monopole structures would be 700 to 800 feet. Single-circuit monopole structures would vary in height from 85 to 130 feet, and double-circuit monopole structures would vary in height from 95 to 150 feet.

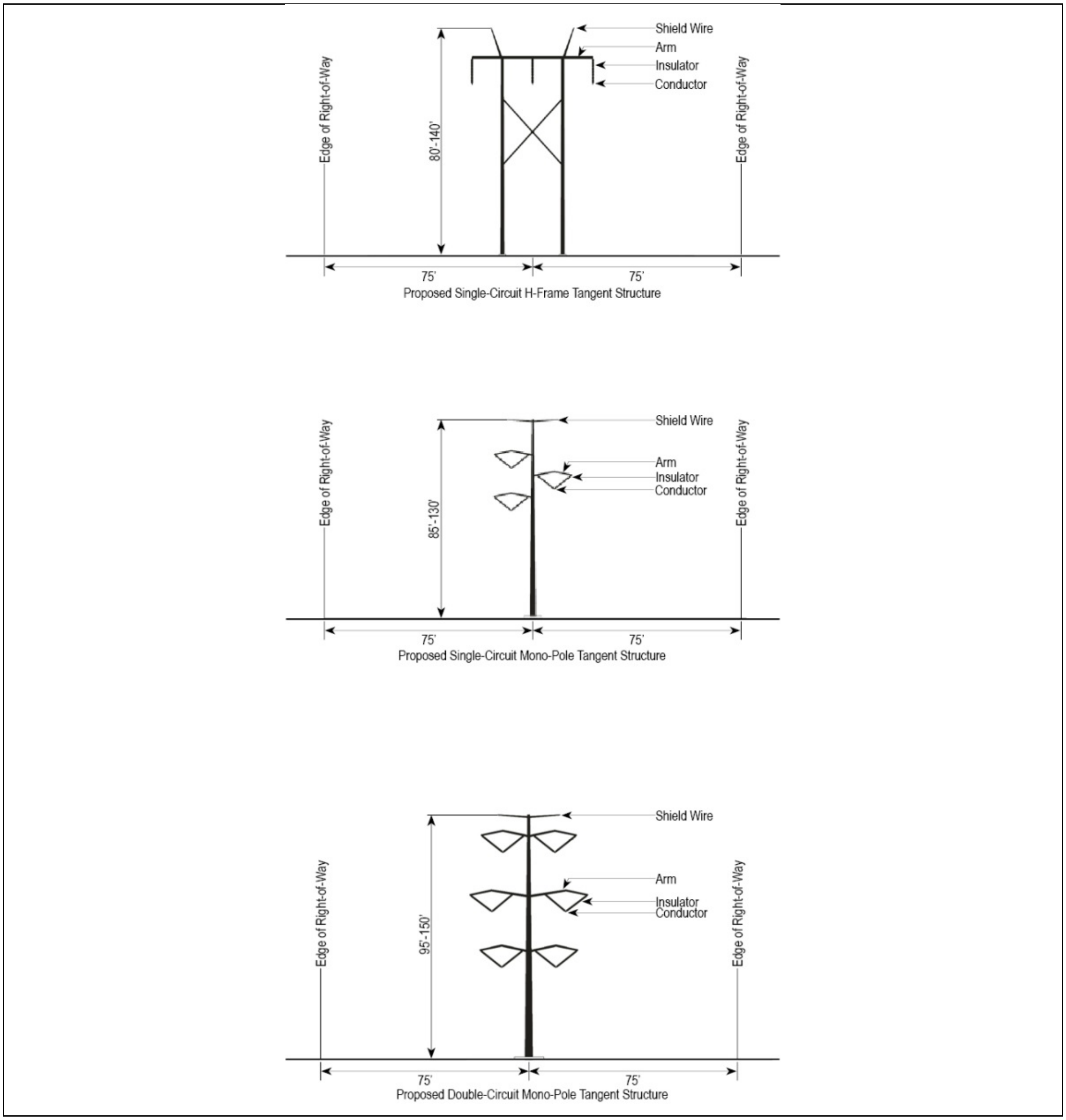


Figure 2-2 Typical 345-kilovolt Structures

2.3.1.2 Structure Foundations

The 500kV steel-lattice, single-circuit structures require four foundations with one on each of the four corners of the structures. The foundation diameter and depth would be determined during final design and are dependent on the type of soil or rock present at each site. Typically, the foundations for the self-supported, single-circuit tangent lattice structure would be composed of steel-reinforced concrete drilled piers with a typical diameter of 4 feet and a depth of approximately 15 feet.

The 500kV single-circuit, tubular steel, H-frame tangent structures require two foundations that typically would be steel-reinforced concrete drilled piers with a diameter of 6 feet and have an approximate depth of 25 feet. Typical foundation diameter, depth, and area are shown in Table 2-2.

TABLE 2-2
TYPICAL 500-KILOVOLT STRUCTURE TYPE FOUNDATIONS

Structure Type	Number of Foundations	Foundation Diameter (feet)	Foundation Depth (feet)	Area of Foundations (square feet)
Tangent, lattice	4	4.0	21.0	52.0
Small-angle lattice	4	4.0	27.0	52.0
Medium-angle lattice	4	4.0	30.0	52.0
Medium dead-end lattice	4	5.0	36.0	80.0
Heavy dead-end	4	5.0	41.0	80.0
Tangent H-frame, tubular steel	2	6.0	25.0	57.0
Angle H-frame, tubular steel	2	7.0	30.0	77.0
Dead-end H-frame, tubular steel	2	8.0	40.0	100.0
SOURCE: Rocky Mountain Power 2013				

The 345kV H-frame structures would be embedded directly into the ground and would not require concrete foundations. Monopole 345kV structures (both single- and double-circuit) would use drilled pier foundations. Typical foundation diameter, depth, and area are shown in Table 2-3.

TABLE 2-3
TYPICAL 345-KILOVOLT STRUCTURE TYPE FOUNDATIONS

Structure Type	Number of Foundations	Foundation Diameter (feet)	Foundation Depth (feet)	Area of Foundations (square feet)
Single Circuit				
Tangent H-frame	2	4.0	18.0	26.0
Tangent monopole	1	7.0	24.0	39.0
Small-angle monopole	1	7.5	26.0	45.0
Medium dead-end lattice	1	4.0	20.0	13.0
Heavy dead-end lattice	1	4.0	25.0	13.0
Double Circuit				
Tangent monopole	1	8.5	32.0	57.0
Small angle monopole	1	9.0	34.0	64.0
Medium dead-end monopole	1	10.5	40.0	87.0
Heavy dead-end monopole	1	12.0	45.0	114.0
SOURCE: Rocky Mountain Power 2013				

2.3.1.3 Conductors

The conductors are the wire cables strung between transmission line structures over which the electric current flows. The AC system for both the 500kV and 345kV would have three conductors strung on each single-circuit structure (referred to as a three-phase circuit). Each phase of the three-phase circuit would be composed of either three or two subconductor bundles. The subconductors are comprised of aluminum and steel with a nonspecular (dulled) finish, which reduces light reflected from the conductors. Details are provided in Section 2.2 of Appendix B.

2.3.1.4 Structure and Conductor Clearances

Conductor phase-to-phase and phase-to-ground clearance parameters are determined in accordance with National Electrical Safety Code (NESC), ANSI C2, produced by American National Standards Institute (ANSI). This code provides for minimum distance between conductors and the ground, crossing points of other lines and the transmission support structures, and other conductors, and minimum working clearances for personnel during energized operation and maintenance activities. Typically, the clearance of conductors above ground is a minimum of 35 feet for 500kV and 30 feet for 345kV. During detailed design, clearances may be increased to account for localized conditions

2.3.1.5 Insulators

Insulators are used to suspend the conductors from each structure. They inhibit the flow of electrical current from the conductor to the ground, the structure, or another conductor. Assemblies of insulators are designed to maintain electrical clearances between the conductors, structure, and ground and may be either "V" shaped or "I" shaped for the tangent structures, and "I" shaped for the dead-end structures. Details for both 500kV and 345kV insulators are provided in Section 2.3.1 of Appendix B.

2.3.1.6 Grounding System

AC transmission lines have the potential to induce currents on adjacent metallic structures such as transmission lines, railroads, pipelines, fences, or structures that are parallel to, cross, or are adjacent to the transmission line. A grounding system would be installed at the base of each structure to minimize the induction of currents on adjacent metallic structures. The grounding system would consist of copper ground rods embedded into the ground in immediate proximity to the structure foundation and connected to the structure by a buried copper lead. In some cases when the resistance to ground is higher than what is tolerable with the use of ground rods, a counterpoise cable (copper-clad or galvanized steel) would be installed 12 inches below ground and extend approximately 200 feet out from the structure. In some instances where geological conditions dictate, the counterpoise cable may need to extend beyond the right-of-way. Details of the grounding system and other additional hardware associated with the transmission line are provided in Sections 2.3.2 and 2.3.3 of Appendix B.

2.3.1.7 Communications System

Reliable and secure communication for system control and monitoring of the transmission system is required to maintain the operational integrity of the Project and of the overall interconnected system. Primary communications would be provided via the Overhead Optical Ground Wire (OPGW) installed on the peak of the structures, which also would act as one (total of two) of the lightning-protection shield wires. The second lightening-protection shield wire would be installed on the opposite peak of the transmission line structure. For the 500kV transmission lines, a secondary communications system for internal control and monitoring would be provided by the Applicant's existing microwave system, which would not require new microwave sites, but updated equipment may be installed at existing sites. Details are provided in Section 2.4.1 of Appendix B.

As the data signal is passed though the optical fiber cable, the signal degrades with distance. Consequently, signal regeneration stations are required to amplify the signals when the distance between substations or regeneration stations exceeds 55 miles. These stations consist of a 100- by 100-foot yard with a 12- by 32- by 9-foot-tall building, a 75- by 75-foot fenced yard, access road, and distribution power supply from the local distribution system. Regeneration stations typically are built within the right-of-way, as close to the transmission line as land use and physical features allow. Details are provided in Sections 2.4.2 and 4.1.6 of Appendix B.

2.3.2 Substations and Series Compensation Stations

Alterations and/or reconfigurations of three substations and construction of two series compensation substations would be needed for the Project. Following is a brief description of the substations and series compensation substations associated with the Project. Additional detail is provided in Sections 1.3 and 2.6 of Appendix B.

2.3.2.1 Aeolus Substation

The Aeolus Substation is planned for construction as part of the Energy Gateway West Transmission Project proposed also by the Applicant. It is anticipated that installation of substation equipment needed to interconnect the Project with the Aeolus Substation would be performed within the substation fenced yard.

2.3.2.2 Clover Substation

The Clover Substation is being constructed by the Applicant as part of the Energy Gateway Central Project (refer to Section 1.1). The 500kV equipment to accommodate the Project will be installed at the substation, including equipment to step-down the power from 500kV to 345kV to interconnect the Project with the Applicant's exiting 345kV system. It is anticipated that substation equipment needed for the Project and installed at the Clover Substation would be performed within the area considered under the Energy Gateway Central Project (refer to Section 1.1).

2.3.2.3 Mona Substation

Removal of old substation equipment and replacement with new equipment would be needed to accommodate the existing 345kV transmission lines being rebuilt and reconfigured (Segments 4A, 4B, and 4C) as part of this Project at the Mona Substation (refer to Section 1.1). However, this work would occur within the existing substation footprint and fenced yard.

2.3.2.4 Series Compensation Substations

Two series compensation stations are planned as part of the Project and would be located at approximately one-third (Series Compensation Substation No. 1) and at approximately two-thirds (Series Compensation Substation No. 2) the distance from the Aeolus Substation to the Clover Substation. These series compensation substations are required to improve the transport capacity and efficiency of the transmission line.

2.3.3 Access Roads

Access and service roads are essential for construction, operation, and maintenance of the transmission line. Large foundation-auger equipment, heavily loaded trucks, cranes, and specialized line-construction equipment would be required for construction, maintenance, and emergency restoration activities. Existing roads, existing roads that require improvements, and new roads would be needed for the Project. To the extent possible, existing roads would be used in their present condition without improvements. In areas where improvements would be required or deemed to be in the best interest of the Project for future use, the roads would be graded and/or graveled to provide a smooth all-weather travel surface.

2.3.3.1 Construction Access Roads

During construction, vehicular access would be required to each structure. New access roads would be constructed and existing roads widened as needed to provide a minimum of a 14-foot-wide travel way. Roads not required during operation would be restored to as close to their original condition as practicable or left as is, depending on landowner/land-managing-agency requirements.

Access on the right-of-way, other than in specific areas, would require a road with the minimum width of 14 feet (travel surface). In some cases, new roads that must be graded for access along steep slopes (side-hill roads) could exceed this width depending on the amount of displaced soil. These roads typically go directly from structure to structure, except on hillsides, ridgebacks, rock-outcrop areas, wash crossings, treed areas, or in areas where sensitive environmental resources would need to be avoided. In such cases, the road would follow suitable topography from structure to structure, would be constructed in areas that generally cause the least amount of overall disturbance, and may be outside the transmission line right-of-way.

The largest of the heavy equipment needed dictates the minimum road dimensions needed. To accommodate this equipment, road specifications require a 14-foot-wide travel way and 16- to 22-foot-wide road width in turns, The road disturbance area and travel way in areas of rolling to hilly terrain would require wider disturbance to account for cuts and fills, turning radii, and/or where vehicles are required to pass one another while traveling in opposite directions.

Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the locations of access roads would be documented in the POD described in Section 2.4. The locations and design of Project facilities would be completed when a route has been selected for construction. Ground disturbance associated with upgrading existing roads or constructing new roads was estimated through development of a predictive model that considers different types or levels of access required. This model is described in more detail in Section 2.5.1.2 under the subheading Impact Assessment and Mitigation Planning.

2.3.3.2 Operations Access Roads

Permanent transmission-line access roads developed for the Project are needed for access to and maintenance of transmission lines structures or ancillary facilities. These roads built for the Project generally are closed to the public and maintained by the Applicant.

During routine operations, vehicular access would be needed to reach each structure for periodic inspections and maintenance and to areas of forest or tall shrubs to control vegetation in the right-of-way for safe operation. The Applicant plans to employ live-line maintenance techniques, which requires use of high-reach bucket trucks and other trucks and equipment. For nonroutine maintenance requiring access by larger vehicles, the full width of the access road may be used. Roads would be repaired, as needed, but would not be graded routinely. In order to preserve the ability to enter rapidly, the road structure (cuts and fill) would be left in place. In an emergency (e.g., in the event of a structure or conductor failure) full emergency access, including cranes and other heavy equipment, would be needed. Based on historical reliability of the lattice and H-frame structures, it is anticipated that only a small fraction of the structure sites would require emergency access during the life of the Project.

2.4 System Construction

The following section and subsections describe the technical activities associated with construction, operation, and maintenance of the Project, including design features for environmental protection that are incorporated as part of the Applicant’s Project description.

The design, construction, operation, and maintenance of the Project would meet or exceed the requirements of the NESC, U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.

The activities described in this section would be refined during detailed design and engineering once a route has been selected for construction of the Project. Refinements would be either (1) consistent with the outcome of the impact assessment and mitigation planning disclosed in this EIS or (2) supplemental NEPA review would be required.

For the selected route, the BLM requires a POD for implementation and maintenance of the Project. The refined activities associated with construction, operation, and maintenance would be described in detail in the POD. The POD provides direction to the Applicant's construction personnel, construction contractor(s) and crews, CIC, environmental monitors, and agency personnel regarding specifications of construction. The POD also provides direction to the agencies and Applicant's personnel for operation and maintenance of the Project.

The content of the POD, which is carried forward from and/or refined from the information and data disclosed in the EIS, consists of (1) background information, direction, and implementation plans and (2) detailed mapping to facilitate execution of environmental protection and mitigation measures. Background information and direction includes the Project description, including explanation of Applicant's and agencies' roles and responsibilities; description of construction, operation, and maintenance activities; specification of land use and access; and description of design features and other measures for environmental protection to avoid sensitive environmental resources. The supporting implementation plans that would be included in the POD are listed and described in Table 2-4. The detailed mapping reflects the design features for environmental protection and other environmental mitigation as delineated in the EIS.

For some resources (e.g., biological, cultural, and paleontological resources), pedestrian surveys conducted using agency-approved protocols would be required prior to construction (and based on the final design of the Project). The survey results would be used by the agencies to refine the mitigation requirements and further inform the POD. Additionally, mitigation to offset or compensate for impacts on some regulated resources may require mitigation measures and conservation actions in order to achieve land-use plan goals and objectives and provide for sustained yield of natural resources on public lands, while continuing to honor the agency's multiple-use missions. The sequence of mitigation action would comply with the mitigation identified by the CEQ (40 CFR 1508.20) and BLM's *Draft - Regional Mitigation* Manual Section 1794 (refer to Appendix K for more detailed guidance) and could include measures for the BLM to consider for compensating for an impact by replacing or providing substitute resources or environments. Examples include creation or restoration of wetlands; offsite vegetation treatments to improve sage-grouse or migratory bird habitat; purchase of property or conservation easements to provide long-term protection for sage-grouse or migratory bird habitats; or appropriate mitigation for impacts to designated National Scenic and/or Historic Trails or those trails recommended as suitable for congressional designation. If applicable, additional mitigation requirements, including compensatory mitigation, would be approved by the agencies and incorporated into the POD prior to Project construction.

TABLE 2-4
IMPLEMENTATION PLANS FOR THE PLAN OF DEVELOPMENT

Plan	Description	Regulatory Compliance
Traffic and Transportation Management Plan	The purpose of the plan is to provide a description of the type of access associated with the construction, operation, and maintenance of the Project	Encroachment permit applications with appropriate road agencies

TABLE 2-4
IMPLEMENTATION PLANS FOR THE PLAN OF DEVELOPMENT

Plan	Description	Regulatory Compliance
Stormwater Pollution Prevention Plan Framework	Describes how erosion and sediment transport would be minimized to adjacent water	Title 40 Code of Federal Regulations (CFR) Parts 122 and 123
Spill Pollution Prevention, Containment, and Countermeasures Plan Framework	Provides preventive procedural actions for use of fuel, lubricant, or hazardous materials used during construction, operation, and maintenance of the Project within 100 feet of waterbodies, wetland boundaries, or within municipal watersheds	Compliance with applicable federal, state, and local regulations
Historic Properties Treatment Plan	The purpose of the Historic Properties Treatment Plan is to provide the methodology through which steps would be implemented to avoid, minimize, or mitigate impacts on historic properties	Section 106 of the National Historic Preservation Act
Blasting Plan Framework	Provides construction crews, the compliance inspection contractor, and environmental monitors with Project-specific information concerning blasting procedures (e.g., including the safe use and storage of explosives)	Compliance with applicable federal, state, and local laws and regulations
Plant and Wildlife Species Conservation Measures Plan	Assists the affected federal land-management agencies, and Project personnel in meeting their obligations to protect biological resources during the planning, design, and implementation of the Project	Endangered Species Act of 1973, Bald and Golden Eagle Protection Act (16 United States Code [U.S.C.] 668), Migratory Bird Treaty Act (16 U.S.C. 703), Bureau of Land Management (BLM) Manual 6840, BLM Executive Order 13112, BLM Executive Order 11990, Executive Order 13186; Sections 401, 402, and 404 of the Clean Water Act (CWA); Federal Land Policy Management Act (FLPMA), Wild Free-Roaming Horses and Burros Act of 1971, National Forest Management Act of 1976 (36 CFR 219), BLM Instruction Memorandum UT-IM-2010-071, U.S. Forest Service (USFS) Manual 2670, Memorandum of Understanding WO-230-2010-04 and #08-MU-1113-2400-264
Erosion, Dust Control, and Air Quality Plan	Addresses regulatory compliance, environmental concerns, mitigation recommendations, and monitoring to ensure impacts associated with construction activities are minimized as they relate to soil conservation and air quality	FLPMA (Public Law [P.L.] 94-579), U.S.C 1761-1771, 43 CFR 2800, 36 CFR 251.50, 36 CFR 220, National Pollutant Discharge Elimination System CWA (33 U.S.C. 1342), CWA Section 401: CWA (33 U.S.C. 1344)

TABLE 2-4
IMPLEMENTATION PLANS FOR THE PLAN OF DEVELOPMENT

Plan	Description	Regulatory Compliance
Hazardous Materials Management Plan Framework	Clearly identifies which legal requirements apply to specific types of hazardous materials	Occupational Safety and Health Administration (29 CFR 1900 et. seq.), CWA (40 CFR 100 et. seq.), Clean Air Act (40 CFR 50 et. seq.), Toxic Substances Control Act (40 CFR 700 et. seq.); Comprehensive Environmental Response, Compensation, and Liability Act/Superfund Amendments and Reauthorization Act (40 CFR 300 et. seq.), Solid and Hazardous Wastes (40 CFR 239 et. seq.), Hazardous Materials Transportation Act (49 CFR 100 et. seq.)
Emergency Preparedness and Response Plan Framework	Provides an overview of methods to be implemented if the need for emergency management is imminent	National Electric Safety Code, American National Standards Institute, American Medical Association Council on Scientific Affairs
Noxious Weed Management Plan	Based on the principles and procedures outlined in the BLM Integrated Weed Management Manual 9015 and Forest Service Noxious Weed Management Manual 2080	USFS Manual 2080, BLM Manual 9015, Federal Noxious Weed Act of 1974 (as amended 1990)
Fire Protection Plan	Detailed measures that would be implemented to (1) reduce the risk of starting a fire and (2) to suppress a fire in the event one does occur within the construction area during Project construction, operation, and maintenance	Subject to state, county, and federally enforced laws, ordinances, rules, and regulations
Stream, Wetland, Well, and Spring Protection Plan	Provides measures to protect these resources from potential impacts during construction, operation, and maintenance activities	Section 404 Nationwide Permit 12
Paleontological Resources Treatment Plan	Assists the affected federal land-managing agencies in planning and design efforts for the Project as it relates to paleontological resource issues	P.L. 91-190, 83 Statute 852, 42 U.S.C. 4321-4327, FLPMA, P.L. 111-011, Title VI, Subtitle D 16 U.S.C. 470aaa(4) (2009)
Reclamation, Revegetation, and Monitoring Framework Plan	The intent of this plan is to provide a framework for reclamation treatments to be applied to the Project on identification of construction-related disturbance, prevent unnecessary degradation of the environment during construction, rehabilitate temporary use areas, and reclaim disturbed areas such that these areas are ecologically functional and visually compatible with the surrounding environment to the greatest extent practicable.	BLM Terms and Conditions of Right-of-way Grants and Temporary Use Permits, 43 CFR 2881.2, BLM National Sage-Grouse Habitat Conservation Strategy 2004, Section 1.4.1, FLPMA, Section 101(a)(8), Endangered Species Act, as amended, Section 7(a)(2)

The POD would be developed by the Applicant in collaboration with the Agency Interdisciplinary Team and cooperating agencies (listed in Section 1.6.4), consisting of federal, state, and county agencies having jurisdictional or regulatory responsibilities and/or specialized knowledge for the Project. A series of POD conception and review cycles are planned for the Applicant and agencies, the intent of which is to provide ample opportunity for input from the Applicant and agencies to ensure requirements of both the Applicant and agencies are incorporated into the POD. Applicant and agency coordination meetings would be conducted during any or all of the POD conception and review cycles.

Although the federal agencies do not have authority over state or private land, the federal agencies have an obligation to disclose in the EIS the consequences of their decisions on nonfederal land and it is anticipated that the provisions of the POD would be applied consistently to state and private land as well as federal land, unless otherwise indicated by the state and by private landowners and documentation of the state or landowner decision(s) is provided to the CIC. Participation in the development of the POD by state and county cooperating agencies would give them the opportunity to concur with and/or adopt the terms and conditions of the POD to facilitate state and county licensing or permitting. The federal agencies do have an obligation to enforce the requirements of the NHPA and the ESA to protect important historic properties and threatened and endangered species, respectively, regardless of land jurisdiction or ownership.

For this Project, a POD that is based on information and data carried forward from the EIS, referred to as the NEPA POD, would be required as a condition of signing any ROD and incorporated by reference into any ROD issued based on the analysis in this EIS.

When resource pedestrian surveys (e.g., biological, cultural, paleontological resources) have been completed and the resulting reports have been approved by the agency (or agencies) responsible for overseeing the surveys, refinements to environmental protection measures in the POD would be incorporated and the agencies would be asked to review the refined POD, referred to as the construction POD. The approved construction POD would be required as a condition of granting any federal land-use authorization and would be incorporated by reference into any federal right-of-way grants, special use permit, license agreement, etc. Thereby, the Applicant agrees to be bound by all terms and conditions, stipulations, and mitigation prescribed in such documents. Notice to proceed with construction could then be issued. Any change to the POD after issuance of the notice to proceed would require NEPA review through a variance of or amendment to the POD.

The POD and other supporting documents would be housed at each of the BLM field offices, the national forest offices, and other affected federal land-managing agency offices crossed by the Project.

2.4.1 Land Requirements

New permanent and temporary land rights are required for the transmission line facilities. Permanent facilities include the transmission lines, access to the transmission lines, series compensation stations, and communication regeneration stations. Temporary facilities needed for construction include structure work areas, multi-purpose construction areas, and access roads.

The preliminary right-of-way application, filed by the Applicant with the BLM and USFS, requested a 250-foot-wide right-of-way for the 500kV single-circuit sections of the Project, and a 150-foot-wide right-of-way for Segment 4C. Additional right-of-way width may be required in areas where the proposed transmission line would turn at a sharp angle or where grounding may extend beyond the right-of-way. The determination of these widths is based on two criteria:

- Sufficient clearance must be maintained during a high wind event when the conductors are blown toward the edge of the right-of-way.
- Sufficient room must be provided within the right-of-way to perform transmission-line maintenance.

Access roads may be located outside of the transmission line right-of-way in areas of difficult terrain. Access roads would be identified in the POD and approved by the affected federal land-managing agencies in their respective RODs, as well as a use authorization issued by the affected agency.

During construction, temporary permission would be required from landowners and land-management agencies for off-right-of-way access, multi-purpose construction areas, pulling-and-tensioning sites, helicopter fly yards, and material storage.

New rights-of way would be obtained through right-of-way grants, special use permits, or easements negotiated between the Applicant and various federal, state, and local governments; other companies; and private landowners. As of the date of this document, the Applicant is contacting landowners to obtain rights-of-entry for surveys and for geotechnical investigations at selected locations. Additional landowners will be contacted as needed throughout the Project for additional surveys, including the geotechnical investigation.

2.4.2 Transmission Line Construction

Preconstruction meetings with each of the affected agencies would be conducted to introduce construction contractors (including the CIC) and their field representatives and agency points of contact, as well as to review mitigation measures in the appropriate use authorizations and POD and construction schedules. As construction proceeds, the construction engineer and/or agency inspectors would continue to monitor activities and right-of-way authorizations to ensure compliance or to initiate modifications, where necessary. An environmental specialist with appropriate qualifications (e.g., biologist, archaeologist, paleontologist) and approved by agencies with jurisdiction over applicable resources; would monitor construction activities at locations specified in the POD to ensure compliance with specific protections and/or mitigation described in this EIS, any ROD issued based on this analysis, the POD, appropriate use authorization for the Project, if approved. Any modifications to the POD would need to be approved by the affected federal land-managing agency. The protocol for variances to the POD would be described in the POD.

Figure 2-3 depicts the typical overland construction activities associated with construction of the 500kV lattice frame tangent structures. Additional figures depicting construction of the transmission line are located in Section 3.2 of Appendix B.

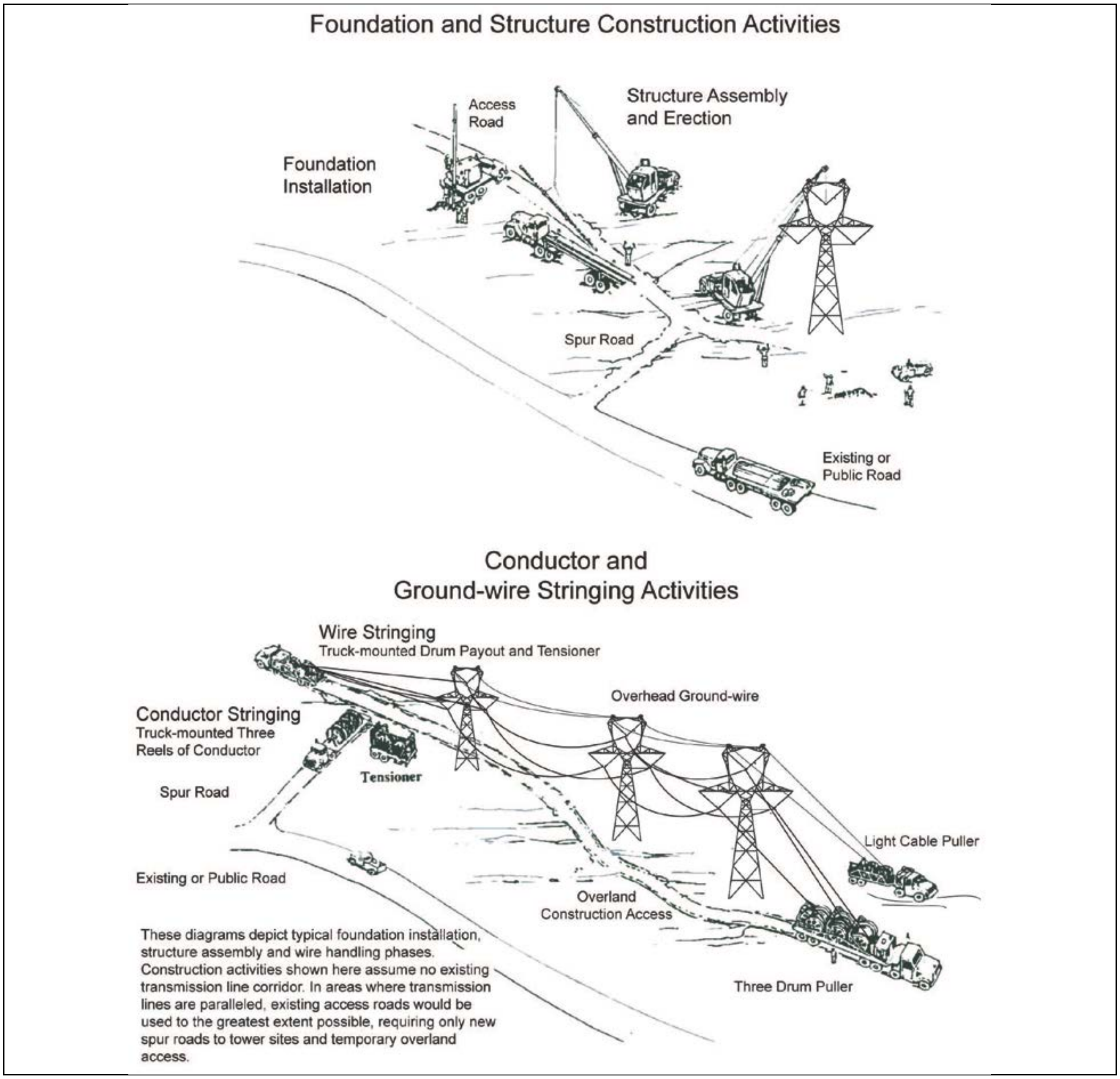


Figure 2-3 Typical Construction Activities

2.4.2.1 Surveying the Centerline

The engineering survey involves verifying and staking the centerline of the selected transmission line route, structure center hubs, right-of-way boundaries, access roads (where needed), spur roads to tower sites, and temporary work areas using existing roads or overland travel routes. Some engineering survey activities may begin as early as 2 years before the start of construction. Required cultural, paleontological, botanical, and wildlife resource surveys may begin once the transmission line route has been selected and certain engineering survey information is available. Depending on the route approved in the RODs, the centerline may be adjusted to accommodate engineering requirements and local modifications.

2.4.2.2 Geotechnical Investigation within the Right-of-way

The purpose of the geotechnical investigation is to collect information regarding subsurface stability, which would be used in the final design of each transmission tower structure and foundation. This activity is necessary and helps to ensure the system is designed and constructed to be safe, reliable, cost efficient and can reduce the overall temporary and permanent land disturbance within the right-of-way during construction and over the life of the Project.

The geotechnical investigations would consist of the drilling and sampling of soils to a typical depth of 50 to 60 feet below the ground's surface; however, borehole depth may exceed 60 feet depending on soil conditions. The boreholes would have a diameter of approximately 8 inches and typically would be backfilled with auger cuttings and on-site soils. Access roads and overland access routes as designed for the POD (and, therefore, for the right-of-way grant) would be used exclusively.

Helicopter-transported drill rigs may be used for geotechnical exploration in areas where existing roads do not provide adequate access or where overland travel is prohibited. Geophysical exploration techniques may be employed in areas where drilling is impractical to assist in subsurface characterization. Geophysical exploration techniques use instrumentation combined with surficial actuation to identify subsurface soil and rock stratification.

Geotechnical investigation will be conducted at both substation/series compensation locations and along the transmission line right of way. A description of activities is provided below broken down by facility and type of drilling to accomplish the geotechnical investigation.

Substations and/or Series Compensation Stations

As mentioned previously, the Aeolus Substation is planned as part of the Energy Gateway West Transmission Project and the Clover Substation expansion is planned as part of the Mona to Oquirrh Transmission Line Project; however, additional geotechnical evaluation would be conducted at both substation sites and the series compensation station sites to quantify subsurface conditions and engineering properties of fill and placement of required fill material.

The geotechnical investigation program would consist of drilling approximately 12 borings at each substation and series compensation station. Borings would be advanced to an approximate depth of 30 feet (depending on anticipated cuts and fills) using hollow stem auger, air-rotary, and/or ODEX (overburden drilling with eccentric bit) drilling methods. If competent bedrock is encountered, coring will be advanced 5 to 15 feet into competent rock. Refraction microtremor (or ReMi)[1] and field resistivity testing will be completed at the substation sites. Field resistivity measurements would be conducted in general accordance with the Wenner 4-pin[2] method.

Transmission Line

As of the date of this Draft EIS, the Applicant has conducted a preliminary geotechnical desktop study. In the final geotechnical investigation program for the transmission line, areas of concern identified in the geotechnical desktop study would be field-reviewed to determine validity of the data sources used in this report. Borings would be planned according to PacifiCorp's TA-071 standard with additional boring

[1] ReMi is a surface-performed geophysical survey based on principles of evaluating surface waves. The method uses equipment typically employed in seismic refraction surveys; i.e., seismograph, geophones placed in an array, and a seismic source (e.g., sledge hammer striking g on a metal plate).

[2] Wenner 4-pin is a commonly used technique for measuring soil resistivity; i.e., how much the soil resists the flow of electricity. An understanding of the soil resistivity and how it varies with depth in the soil is necessary to design the grounding electrodes for high-voltage transmission systems.

locations dictated by geotechnical desktop study. Certain boring locations may be eliminated as it is determined soil conditions are not anticipated to vary or borings from adjacent transmission lines can be used for design. Geotechnical investigation for this Project is anticipated to consist of site examinations, geotechnical drilling, select geophysical surveys, and laboratory testing.

The Applicant will prepare a more detailed summary of the total anticipated borings that will include the following:

- Land ownership
- Site substantiated access information
- Anticipated drill rig type and drilling method
- Anticipated soil types and subsurface lithology
- Anticipated access requirements

In general, anticipated drilling depths are 50 to 60 feet in competent soils.

Geotechnical Drilling Activities

Hollow Stem Auger Drilling

Auger drilling consists of rotating a drill stem to advance a toothed bit into the subsurface materials. The materials are brought up from the borehole by the rotation of a continuous helical fin on the outside of the drill stem. The drill stem is added in pieces (flights) as the boring advances downward. This is a dry method of drilling that typically requires no water, drilling mud, or pressurized air as a circulating fluid. The support equipment for auger drilling includes a truck or track-mounted water truck and the geologist/engineer vehicle.

Mud Rotary Drilling

Mud rotary drilling consists of rotating a smooth-walled hollow drill stem and advancing a variety of drill bits at the end of the drill stem. The materials are brought up from the borehole by pumped water, typically travelling down through the drill stem, out the bit, and flowing up the outside of the drill stem. The drilling mud and/or water pumped through the rods carries drill cuttings to the ground surface. A tub at the surface collects the drill cuttings and holds the water for recirculation. The equipment for mud rotary drilling includes the drill rig, a support vehicle for rods and equipment, a water truck, and the geologist/engineer’s vehicle.

Air Rotary Drilling

The air rotary drilling method is similar in principle to mud rotary drilling; however, this method uses compressed air as the circulating medium rather than water or mud slurry. Drill cuttings are retrieved from under a hood placed over the borehole or a cyclone. A special type of air rotary drilling involves the use of an air hammer. Compressed air is pumped through the drill pipe to an air hammer bit in the borehole. The pneumatic bit strikes the rock very rapidly. The equipment for air rotary drilling includes the drill, a support vehicle with drilling steel towing an air compressor, and the geologist/engineer’s vehicle.

Sonic Drilling

Sonic drilling uses a rotating drill string as with other drilling methods; however, this method uses a sonic drill head to impart a high-frequency vibration on the drill stem and open pipe casing/core barrel that is advanced into the subsurface materials. As the casing is advanced, soil and rock samples are forced up into the casing, providing a continuous sample of the subsurface soil and rock. The frequency of vibration can be changed to match the subsurface conditions, making this type of drilling generally faster than the other drilling methods. Sonic drills are normally mounted on larger transport vehicles. The support equipment for sonic drilling included a vehicle to carry the drill, a support vehicle for rods, and the geologist/engineer's vehicle.

Under-Reamer Type Drilling (ODEX System)

The under-reamer drilling method uses tooling in which an outer drill casing is advanced along with the drill bit (more or less simultaneously, depending on the manufacturer). The drill bit has a section that moves outward through eccentric action when the drill rods are rotated, thereby making the borehole larger than the casing. The larger-diameter hole allows the casing to follow along behind the bit by being hammered or pushed as the hole is drilled. The bit is typically a tungsten-carbide button bit that is driven by a percussion air hammer during rotation. A common name for this type of drilling is ODEX, which is an acronym for overburden drilling with eccentric bit. Drill cuttings are removed by compressed air travelling down the drill rod to the bit and returning via the annulus between the drill rod and casing lifting the cuttings to the surface. The air path can be reversed similar to the method used by reverse circulation drilling. The support equipment for under-reaming drilling includes an air compressor, a support vehicle to carry casing, and the geologist/engineer's vehicle.

Cone Penetration Test Drilling

The cone penetration test (CPT) is a testing method used to determine the engineering properties of soils and delineate soil lithology. The test method consists of pushing an instrumented cone at a constant rate (typically between 1.5 to 2.5 centimeters per second) that measures tip (cone) resistance and friction resistance along the sides. The CPT delineates soil layers from the ratio of cone-to-side-friction resistance (friction ratio). Typical cone tips have a cross-sectional area of either 4 to 6 square inches (10 or 15 square centimeters); corresponding to diameters of 1.4 to 1.7 inches (3.6 and 4.4 centimeters). CPT drilling provides excellent geotechnical information in softer formations but is not the preferred method for soils with gravel, medium dense sands or hard fine-grained soils. The CPT drill is mounted in a box truck or on a track/all-terrain rig. The support equipment for CPT drilling includes a support truck for equipment, and the geologist/engineer's vehicle.

Drilling Rig Types

The drilling equipment described above is commonly mounted on road-legal two-wheel-drive and four-wheel-drive trucks, tracked vehicles, oversized-tire all-terrain vehicles (ATV) or on platform rigs. Platform rigs can be transported in pieces to the site via helicopter. The type of drilling rig used is dependent on the access difficulties to the boring location and the sampling methods required. Other vehicles and equipment normally mobilized to each boring location include: a water truck and/or support vehicle, large air compressor, geologist's pickup truck or utility vehicle, and possibly another support truck. In some areas, earthwork equipment would be required to assist with access to the boring location or tracked support vehicles including the water truck would be required. The drilling subcontractor must be equipped to provide four-wheel-drive and tracked support and drilling vehicles as demanded by the terrain.

2.4.2.3 Access Roads

Roads enable access to the right-of-way and tower sites for both construction and long-term maintenance of the transmission lines. Access roads must be sufficient to bear the weight and endure heavy construction vehicle use. All roads needing improvement would be upgraded or new roads would be constructed in accordance with the Applicant's published standards for road construction, or according to BLM (BLM 2011c), USFS, state, and/or local requirements for road construction, or private landowner agreements, to be outlined in the POD. In the event the Applicant's published standards for road construction conflict with federal, state, or local requirements, the construction contractor(s) would coordinate with the CIC (or appropriate land-management agency representative in areas where the CIC does not have authority) to resolve the conflicting standards. However, existing paved and unpaved highways and roads would be used, where possible, for the transportation of materials and equipment from the storage yards to the areas where they would be needed along the transmission line right-of-way. Private landowners and affected agencies would be consulted before road construction begins. Specific plans for the construction, rehabilitation, and/or maintenance of roads, including the locations of access roads, would be documented in the POD. The process for analyzing the potential effects of construction and reclamation (or maintenance) of access roads is presented in Section 2.5.1.2.

In order to limit the amount of new access roads for the Project, existing roads within 750 feet of the centerline for the 500kV transmission line and 400 feet for the 345kV transmission line (half of the length of the typical span) are proposed to be used for access to the Project right-of-way and ancillary facilities. Where existing access roads or similar linear features in the landscape could be used as access roads without improvements, only spur roads to the Project facilities would be constructed. Beyond 400 feet for the 345kV line and 750 feet for the 500kV line from the centerline, constructing a new road from tower to tower typically would result in less ground disturbance than building spur roads from existing roads to each tower site or work area. The number of new spur roads would be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning). Some existing roads could require upgrading to meet the Applicant, BLM, or USFS published standards for road construction. All existing roads would be left in a condition equal to or better than their condition prior to construction, in accordance with federal, state, and/or local road standards or private landowner agreements.

Where required to meet the access needs of the Project, roads may be built as either temporary or permanent access. Where required for construction purposes only, or in temporary work areas (e.g., wire pulling-and-tensioning sites, concrete batch plants, etc.), temporary roads may be needed. Temporary roads serve the needs for Project access during the construction phase. Temporary roads would not be needed for operation and maintenance purposes. On completion of construction activities, temporary access roads would be reclaimed according to the procedures specified in the POD. Conversely, where required for construction, operation, and maintenance purposes, or where landowners or land-management agencies require, access roads would be constructed for permanent use.

As mentioned previously, all new and improved access roads, temporary or permanent, would be built with a travel-surface width of at least 14 feet, with final size depending on site-specific conditions and as specified in the POD. The road travel surface typically would be an unpaved, native surface. Curves would require a wider surface (e.g., 16 to 22 feet wide). Additionally, it is anticipated turnout areas (100 by 10 feet that includes tapers on each end) would be required for every 1,000 feet of new access road during the construction phase of the Project. On completion of construction, these turnout areas would be reclaimed according to the procedures specified in the POD as approved by the agencies.

New roads that must be graded for access along steep slopes (side-hill roads) could exceed a 14-foot width with a maximum of 22 feet plus disturbance for grading and drainage, with the total disturbed width varying depending on the amount of displaced soil. In addition, roads may be routed around specific areas to either avoid sensitive resources or due to topography. Helicopters may be used for structure placement in limited areas where there are environmental constraints (i.e., where access is difficult due to rough terrain), or where it is economically or technologically feasible; however, access roads to each structure location would be required.

Erosion- and sedimentation-control measures such as water bars, culverts, sediment basins, or perimeter control would be installed for new and improved roads as required to minimize erosion during, and subsequent to, construction of the Project. These features would be constructed in accordance with the Applicant's standards (PacifiCorp TA 503 and TA 504) and other reclamation requirements, as approved by the appropriate land-managing agency or landowner and included in the POD. To the maximum extent possible, drainages would be crossed at grade. Where such crossings are not feasible, culverts may be constructed (some of which may be temporary).

To reduce permanent Project disturbance where operation and maintenance access would be required, temporary road construction methods (e.g., overland drive-and-crush; clear-and-cut) may be implemented where feasible. Overland drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped, thereby minimizing disturbance to root mass and organics in the soil. Soil may be compacted but no surface soil is removed. Overland clear-and-cut is the removal of all vegetation at or near ground level to improve or provide suitable access for equipment. All vegetation is removed using aboveground cutting methods that leave the root crown intact. Soil is compacted but no surface soil is removed. Construction of new and improved access roads potentially would generate excessive dust during the construction process, as well during pass-through Project access use. Appropriate dust-control measures would be implemented at locations along the route, as needed, based on federal, state, and/or county requirements. Methods to minimize dust and erosion control associated with existing and new access also would be approved by the agencies and provided in the POD.

In certain areas, it could be necessary to close roads after construction to restrict future access for general and undesired use. Such areas would be identified through negotiations with the landowner or land-management agency. Methods for road closure or management may include implementing signs and physical barriers (e.g., locking gates, obstructing the path with earthen berms or boulders, ripping the road bed, planting vegetation, and/or depositing construction material or slash on the road surface) in a manner consistent with reclamation practices to be identified in the POD. Closed access routes would have to be reopened where right-of-access is impeded for maintenance and emergency restoration repairs.

2.4.2.4 Multi-purpose Construction Yards

Construction would begin with establishment of multi-purpose construction yards to be used for material laydown and storage, structure staging, helicopter landing, storage, refueling, construction trailers, and vehicle parking. These yards would be approximately 30 acres (with one approximate 10-acre site near the Mona Substation) located approximately every 20 miles along the route and would serve as field offices, reporting locations for workers, parking space for vehicles and equipment, and sites for material storage, fabrication assembly, concrete batch plants (when existing batch plants are out of range), and stations for equipment maintenance. Details are provided in Section 3.2.2 of Appendix B.

2.4.2.5 Site Preparation

Site Clearing

Clearing of natural vegetation would be required for construction purposes (to include but not limited to access, spur roads, and structure sites), clearances for electrical safety, long-term maintenance, and reliability of the transmission line. Within the right-of-way, mature vegetation would be removed under or near the conductors to provide adequate electrical clearance as required by the NESC and DOE. Clearing activities would be in compliance with *PacifiCorp Transmission and Distribution Vegetation Management Program Specification Manual* (PacifiCorp 2007) as a requirement of the North American Electric Reliability Council (NERC) Vegetation Management Standard FAC-003-1 Transmission Vegetation Management Program or as negotiated with the agencies in specific locations.

Typical Structure Site and Work Area

At each structure site, work areas are required to facilitate the safe operation of equipment and construction operations. In typical work areas in flat terrain, an area 250 by 250 feet for 500kV and 150 by 200 feet for 345kV of temporary disturbance would be required for equipment and construction tasks. In that work area, the permanent disturbance associated with the structure footings would be up to 60 by 60 feet for the 500kV line and 5 by 40 feet for the 345kV line. The work area would be cleared of vegetation only to the extent needed. Access in the work area would be overland travel with minimal grading required in the work site. After construction, all temporary work areas would be restored.

Specific structure sites and work areas would be approved by the agencies and identified in the POD once a final route has been determined.

Structure Site and Work Areas in Steep or Rough Terrain

At each structure site in rough and steep terrain, work areas required would vary depending on the site conditions. Work areas may be larger and structure work areas may require additional clearing and grading to accommodate cranes used by construction and maintenance crews. Extensive grading along steep slopes would be required to accommodate some tower sites. Any crane pads developed for construction would be left in place when approved by agencies. Removed topsoil would be replaced and seeded. Erosion control measures would be implemented in a manner consistent with reclamation practices to be identified in the POD as needed to maintain soils until new vegetation can take effect. However, these site-specific mitigation measures would be included in the final POD mapping volume.

2.4.2.6 Installation of Structure Foundations

Excavations for structure foundations would be made using power equipment or blasting techniques, where required. Where the site conditions permit, a vehicle-mounted power auger or backhoe would be used to excavate the foundation holes. In rocky areas, the foundation holes could be excavated by drilling and blasting or special rock anchors could be installed. In extremely sandy areas, soil stabilization by water or a gelling agent could be used during excavation. The CIC and the BLM or USFS would be notified in advance of any required blasting so the area can be cleared. A blasting plan would be developed, approved by the agencies, and incorporated into the POD.

Each 500kV support structure would require the installation of foundations, which are typically drilled concrete piers. First, four holes would be excavated for each structure. The holes would be drilled using truck- or track-mounted augers of various sizes depending on the diameter and depth requirements of the hole to be drilled. Each foundation would extend approximately 2 feet above the ground surface. Details are provided in Section 3.2.4 of Appendix B.

Each 345kV H-frame structure would require the poles to be directly embedded in the ground. Holes would be drilled in the ground using a truck- or track-mounted auger. The diameter of the hole excavated for embedment is typically the pole diameter plus 18 inches. Each 345kV monopole support structure would require the installation of foundations, which typically are drilled concrete piers. The holes would be drilled using truck- or track-mounted augers of various sizes depending on the diameter and depth requirements of the hole to be drilled. Details are provided in Section 3.2.4 of Appendix B.

Typically, and because of the remote location of much of the transmission line route, concrete would be provided from portable batch plants set up approximately every 20 to 30 miles along the line route in one of the yards. Concrete would be delivered directly to the site in concrete trucks with a capacity of up to 10 cubic yards. In the more developed areas along the route and in proximity to the substations, the construction contractor may use local concrete providers to deliver concrete to the site when economically feasible.

2.4.2.7 Erect Support Structures

The 500kV steel-lattice structures would be assembled on site, except where helicopter-assisted delivery is employed. Steel members for each structure would be delivered to the site by flatbed truck. Assembly would be facilitated on site by a truck-mounted crane. Subsequent to assembly, the structures would be lifted onto foundations using a large crane designed for erecting towers. The crane would move along the right-of-way from structure site to structure site erecting the towers.

The 345kV H-frame, single-circuit (and double-circuit) monopole structures would be framed on site. Two methods of assembly can be used to accomplish this, the first of which is to assemble the poles, braces, cross arms, hardware, and insulators on the ground. A crane is then used to set the fully framed structure by placing the poles in the excavated holes. Alternatively, aerial framing can be used by setting the poles in the ground first and assembling the braces, cross arms, hardware, and insulators in the air. A crane would move along the right-of-way from structure site to structure site setting the structures.

2.4.2.8 Ground Rod Installation

AC transmission lines have the potential to induce currents on adjacent metallic structures such as transmission lines, railroads, pipelines, fences, or structures that are parallel to, cross, or are adjacent to the transmission line. The methods and equipment needed to mitigate these conditions would be determined through electrical studies of the specific situation.

As standard practice and as part of the design of the Project, electrical equipment and fencing at the substation would be grounded. All fences, metal gates, pipelines, metal buildings, and other metal structures adjacent to the right-of-way that cross or are within the transmission line right-of-way would be grounded. If applicable, grounding of metallic objects outside of the right-of-way also may be needed, depending on the distance from the transmission line as determined through the electrical studies. These actions take care of the majority of induced-current effects on metallic facilities adjacent to the line by shunting the induced currents to ground through ground rods, ground mats, and other grounding systems, thus reducing the effect that a person may experience when touching a metallic object near the line (i.e., reduce electric shock potential). In the case of a longer parallel facility, such as a pipeline parallel to the Project over many miles, additional electrical studies would be undertaken to identify any additional mitigation measures (more than the standard grounding practices) that would need to be implemented to prevent damaging currents from flowing onto the parallel facility, and to prevent electrical shock to a person that may come in contact with the parallel facility.

During final design of the transmission line segments, appropriate electrical studies would be conducted to identify the issues associated with paralleling other facilities and the types of equipment that would need to be installed (if any) to mitigate the effects of the induced currents.

2.4.2.9 String Conductors, Shield Wire, and Fiber Optic Ground Wire

Conductors, insulators, hardware, and stringing sheaves would be delivered to each tower site for installation. The towers and poles would be rigged with insulator strings and stringing sheaves at each shield wire and conductor position (refer to Figure 2-3); however, some structures could be erected with insulators and travelers already installed. For public protection during wire installation, guard structures would be erected over highways, railroads, transmission lines, structures, and other obstacles. Guard structures consist of H-frame poles and aerial equipment placed on either side of an obstacle. These structures prevent shield wire, conductors, or equipment from falling on an obstacle.

Equipment for erecting guard structures includes augers, line trucks, pole trailers, and small cranes. Guard structures may not be required for small roads or may be accommodated by line trucks. On such occasions, other safety measures such as barriers, flagmen, or other traffic control would be used.

Sites for pulling-and-tensioning equipment measure approximately 250 by 400 feet and two would occur every 3 to 5 miles and 100- by 100-foot splicing sites would occur approximately every 9,000 feet, which is the length of a standard reel of conductor. When construction occurs in steep and rough terrain, these sites may require larger, less symmetrical pulling-and-tensioning or splicing areas. Once a final route has been determined, pulling-and-tensioning and splicing sites would be identified in the POD. Likewise, sites for pulling-and-tensioning equipment on either side of a large angle structure may be off the right-of-way. Temporary use authorizations would have to be obtained from the land-managing agency or private landowner for these sites, as needed.

A pilot line would be pulled (strung) from structure to structure (or pole to pole) by helicopter, truck, or four- wheel-drive vehicle and threaded through the stringing sheaves at each structure. A stronger line that is larger in diameter then would be attached to the pilot line and strung. This is called the pulling line. This process is repeated until the shield wire and conductor are pulled through all sheaves. Shield wire and conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. Details are provided in Section 3.2.6 of Appendix B.

2.4.2.10 Cleanup and Site Reclamation

Right-of-way construction sites, multi-purpose yards, and access roads would be kept orderly. Refuse and trash would be removed from the sites and disposed of in an approved landfill. In remote areas, trash and refuse would be removed to a construction staging area until proper disposal can be facilitated. No open burning of construction trash would occur without appropriate approval.

The right-of-way would be reclaimed through methods described in the reclamation plan, as specified in the POD. All practical means would be made to reclaim the land to its original contour and natural drainage patterns. Revegetation activities along the right-of-way would conform to the Applicant’s vegetation management standards as approved by the agencies. Reclamation seed mixture would conform to land-managing-agency requirements and approval, and would be outlined in the POD. Details are provided in Section 3.2.7 of Appendix B.

2.4.3 Communications System

OPGW for the communications system would be installed at the same time as the conductors on each of the transmission line structures. It would be tensioned in the same way.

2.4.3.1 Regeneration Stations

Similar to substation construction, the selected area is graded, vegetation is removed, and a layer of crushed rock is installed. Typically, a 12- by 32- by 9-foot-tall building or equipment shelter (metal or concrete) would be constructed on the site. An emergency generator with a liquid-petroleum gas-fuel tank would be installed at the site inside the fenced area. Two diverse communication cable routes (aerial and/or buried) from the transmission right-of-way to the equipment shelter would be installed.

2.4.3.2 Access Roads

Access roads to each regeneration station would be constructed using a bulldozer or grader, followed by a roller to compact and smooth the ground. Front-end loaders would be used to move the soil locally or off site. Either gravel or asphalt would be applied to the prepared base layer. The all-weather-road surface would be graveled.

2.4.4 Series Compensation Station Construction

A typical construction sequence for series compensation station (and substations) sites is described below. All equipment and materials would be hauled to the site via truck.

The site first would be graded. Large earth-moving equipment (dump trucks, water trucks, graders, backhoes, and dozers) would be used at all sites. Dump trucks would be used to bring in fill (as needed), road-surfacing materials, and haul away unused excavation materials. Multiple crews may be used at the larger sites as well as to complete station/substation start-up. Site(s) would be graded flat with a drainage slope. Site design may include additional drainage features and/or retention ponds. Water trucks would be used to control dust during site grading and construction.

Once the site is level, a 7-foot-high security and access-control fence, with 1 foot of barbed wire at the top, would be erected around the site(s).

Foundations would be excavated and footings/piers poured. One of two types of foundation, drilled piers or slabs, would be used. Excavation of foundations would use either a large drill rig or backhoe, depending on the size of the site. Reinforcing steel and/or equipment anchor bolts would be placed in the excavation along with concrete forms prior to the pouring of concrete. Excavation material not suitable for reuse would be hauled away and properly disposed of.

Control buildings would be constructed of either masonry block or pre-engineered steel and construction would be either concurrent with the foundations (masonry block) or subsequent to foundations (pre-engineered steel).

Poured foundations would be trenched to allow for installation of conduit, grounding conductors, and conductors via cable trench. Once conductors are installed and connections made, the trenches would be backfilled and in some cases a sand bedding material would be in-filled prior to concrete backfilling.

Equipment (circuit breakers, disconnect switches, transformers, reactors, capacitors, series capacitors, surge arrestors and instrument transformers, etc.) would be set on the completed foundations using cranes and man-lifts as needed. Rigid tubular bus would be used for the main conductors and flexible cable connections made to the equipment. All high voltage conductors would be supported on insulators.

Control and protection panels would be installed in the control building and connected to equipment in the yard using control and power cables installed in the cable trenches and conduits.

The entire site would be finished with a crushed-rock surfacing material, spread, and compacted as necessary.

Once construction is complete, all equipment, protective and control systems would be tested prior to start-up and energizing.

Further details for complete substation construction are provided in Section 3.4 of Appendix B.

2.4.5 Special Construction Techniques

2.4.5.1 Blasting

The 500kV lattice-structure foundations and the 345kV monopole-structure foundations normally would be installed using drilled shafts or piers and 345kV H-frame structures would be directly embedded. If hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock to reach the required depth to install the structure foundations. Precise locations where blasting is expected would be identified based on a site-specific geotechnical study carried out as part of detailed design and a blasting plan included in the POD.

2.4.5.2 Helicopter Use

Helicopters could be used in rough terrain where access is difficult or where access through environmentally sensitive areas cannot be avoided. Project construction activities potentially facilitated by helicopters may include delivery of construction laborers, equipment, and materials to structure sites; structure placement; hardware installation; and wire stringing operations. Helicopters also may be used to support the administration and management of the Project by the construction contractor or Applicant. Details are provided in Section 3.5.2 of Appendix B.

2.4.5.3 Water Use

Construction of the transmission lines and series compensation substations would require water. Major water uses are for transmission line structure and series compensation station foundations, and dust control during right-of-way and series compensation station grading and site work. The required water would be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights would be required. Construction of the transmission line could require approximately 107 million gallons (plus or minus depending on the alternative route constructed) of water and construction of the series compensation stations could require 17 million gallons of water. Details are provided in Section 3.5.3 of Appendix B.

2.4.6 Construction Elements

2.4.6.1 Construction Workforce and Equipment

Tables 2-5 through 2-6 show the estimated duration, number of crews, the number of workers and the types of equipment required to construct the proposed 500kV transmission line. Table 2-7 shows the same information for the construction associated with the series compensation stations. For purposes of this EIS, work occurring at the Aeolus, Clover, and Mona substations has been accounted for as part of other projects in the Applicant’s Energy Gateway Program (refer to section 1.1). The Project would consist of several phases of construction at various locations and the 500kV portion of the project would be divided into three spreads for construction. The information below combines the three spreads for the Applicant’s preferred route and is presented as a typical condition for alternative route construction. Regular field meetings would be held with the CIC and environmental monitors to review the process and its implementation. Details are provided in Sections 3.6.1 and 3.6.2 of Appendix B.

TABLE 2-5
WORK FORCE ESTIMATION – DURATION AND TOTALS FOR CONSTRUCTION OF A 500-KILOVOLT TRANSMISSION LINE

Work Item	Estimated Duration (Weeks)[1]	Number of Crews[2]	Number of Workers per Crew[2]	Total Number of Workers[2]
Construction management/supervision – contractor	90 to 121	3	10	30
Construction maintenance and repairs	91 to 121	3	8	24
Construction management – owner	91 to 121	3	5	15
Inspection	91 to 121	3	12	36
Contractor mobilization	16	9	3	27
Receive and handle materials	82 to 114	6	4	24
Survey/stake access roads and structure pads	44 to 85	6	3	18
Construct access roads and structure pads	44 to 85	4	9	36
Survey/stake new structure locations	44 to 85	3	3	9
Tree removal/clearing	21 to 32	4	9	36
Excavate structure holes	33 to 84	6	2	12
Tie and haul rebar	33 to 84	3	5	15
Set forms and pour concrete	33 to 84	3	13	39
Batch plant(s) and concrete trucks	33 to 84	3	13	39
Haul steel and materials	33 to 84	3	3	9
Haul blocking and shake-out steel	33 to 84	3	4	12
Assemble structures – tangent	33 to 84	18	9	162
Assemble structures – deadend	33 to 84	6	12	72
Bottom setting crews (legs and body ext.)	33 to 84	3	8	24
Tower torqueing crew	33 to 84	3	5	15
Erect structures	28 to 72	6	10	60
Backbolt and torque after erection	28 to 72	6	3	18
Load, haul, and spot overhead optical ground wires, overhead ground wire, and conductors	33 to 68	3	5	15
Install and remove guard structures	33 to 68	3	5	15
Install overhead optical ground wire, overhead ground wire, and conductors	33 to 68	3	12	36
Sage, deadend, clip, dampers, spacers	33 to 68	18	6	108
Final clean up (gig sheet)	33 to 63	3	4	12
Reclamation/restoration	33 to 63	6	4	24
			Total	942

SOURCE: Rocky Mountain Power 2013
NOTES:
[1]Duration in weeks is a range that would be applied to 1 of 3 construction spreads.
[2]Number of crews and workers are associated with all three construction spreads.

TABLE 2-6
TYPICAL EQUIPMENT AND DURATION OF USE
FOR CONSTRUCTION OF A 500-KILOVOLT TRANSMISSION LINE

Equipment	Quantity[1]	Hours per Day	Days per Week	Estimated Duration (weeks)[2]
Project Management/Inspection				
Truck – pickup	45	6	6	91 to 121
Project Supervision – Contractor				
Truck – pickup	30	8	6	91 to 121
Maintenance – Contractor				
Truck – pickup	3	6	6	91 to 121
Truck – flatbed (1-ton)	6	6	6	91 to 121
Truck – mechanics (2-ton)	15	8	6	91 to 121
Survey				
Truck – pickup	3	4	6	44 to 85
Truck – flatbed (1-ton)	3	4	6	44 to 85
Multi-purpose Yards				
Truck – pickup	3	4	6	92 to 114
Truck – flatbed (1-ton)	3	2	6	92 to 144
Truck – flatbed (2-ton)	3	2	6	92 to 144
Forklift (5-ton)	3	8	6	92 to 144
Forklift (10-ton)	3	8	6	92 to 144
Crane RT (20-ton)	3	2	6	92 to 144
Trailer – office	3	10	6	92 to 144
Generator – portable (office)	3	10	6	92 to 144
Tree Clearing				
Truck – pickup	4	8	6	21 to 32
Truck – flatbed (1-ton)	4	4	6	21 to 32
Truck – flatbed (2-ton)	2	4	6	21 to 32
Truck – semi-trailer	8	8	6	21 to 32
Trailer – timber haul, with pup	8	8	6	21 to 32
Loader – with grapple	4	6	6	21 to 32
Loader – bucket	4	6	6	21 to 32
Slasher	4	6	6	21 to 32
Chain saws	12	8	6	21 to 32
Road Building				
Truck – pickup	4	2	6	44 to 85
Truck – flatbed (1-ton)	4	2	6	44 to 85
Truck – flatbed (2-ton)	4	4	6	44 to 85
Truck – water	3	6	6	44 to 85
Truck – fuel	3	4	6	44 to 85
Truck – dump (10 cubic yards)	8	6	6	44 to 85
Truck – semi-trailer	8	6	6	44 to 85
Trailer – lowboy	8	6	6	44 to 85
Backhoe – with bucket	4	6	6	44 to 85
Loader – with bucket	8	6	6	44 to 85
Loader – with brusher/grubber	6	8	6	44 to 85
Grader – road	4	8	6	44 to 85
Dozer – with blade	8	8	6	44 to 85
Dozer – with ripper	3	8	6	44 to 85

TABLE 2-6
TYPICAL EQUIPMENT AND DURATION OF USE
FOR CONSTRUCTION OF A 500-KILOVOLT TRANSMISSION LINE

Equipment	Quantity[1]	Hours per Day	Days per Week	Estimated Duration (weeks)[2]
Foundations				
Truck – pickup	9	8	6	33 to 84
Truck – flatbed (1-ton)	18	4	6	33 to 84
Truck – flatbed (2-ton)	6	5	6	33 to 84
Truck – water	3	6	6	33 to 84
Truck – fuel	3	4	6	33 to 84
Truck – dump (10-cubic yard)	6	6	6	33 to 84
Truck – semi-trailer	6	8	6	33 to 84
Trailer – lowboy	3	6	6	33 to 84
Trailer – flatbed	6	6	6	33 to 84
Truck – flatbed with boom (5-ton)	3	6	6	33 to 84
Truck – concrete	12	6	6	33 to 84
Drill rig – digger	6	8	6	33 to 84
Drill rig – pneumatic wagon	3	6	6	33 to 84
Backhoe – with bucket	3	4	6	33 to 84
Dozer – with blade	3	4	6	33 to 84
Loader – with bucket	3	4	6	33 to 84
Crane RT (20-ton)	3	4	6	33 to 84
Forklift (5-ton)	3	4	6	33 to 84
Loader – bobcat	3	4	6	33 to 84
Generator – portable (5 horsepower)	6	4	6	33 to 84
Trailer – office	3	10	6	33 to 84
Generator – portable (office)	3	10	6	33 to 84
Material Hauling				
Truck – flatbed (1-ton)	3	4	6	33 to 114
Truck – flatbed (2-ton)	3	4	6	33 to 114
Truck – semi-trailer	3	8	6	33 to 114
Truck – flatbed with boom (5-ton)	3	4	6	33 to 114
Trailer – flatbed	18	8	6	33 to 114
Forklift (10-ton)	3	4	6	33 to 114
Steel Assembly				
Truck – pickup	12	8	6	33 to 84
Truck – flatbed (1-ton)	60	4	6	33 to 84
Truck – flatbed (2-ton)	9	8	6	33 to 84
Truck – water	3	6	6	33 to 84
Crane RT (20-ton)	18	4	6	33 to 84
Compressor – pneumatic	18	6	6	33 to 84
Generator – portable (5 horsepower)	6	2	6	33 to 84
Trailer – office	3	10	6	33 to 84
Generator – portable (office)	3	10	6	33 to 84
Steel Erection – Conventional[3]				
Truck – pickup	9	8	6	28 to 72
Truck – flatbed (1-ton)	18	4	6	28 to 72
Truck – flatbed (2-ton)	6	4	6	28 to 72
Crane RT (20-ton)	6	6	6	28 to 72
Crane RT (75-ton)	6	6	6	28 to 72

TABLE 2-6
TYPICAL EQUIPMENT AND DURATION OF USE
FOR CONSTRUCTION OF A 500-KILOVOLT TRANSMISSION LINE

Equipment	Quantity[1]	Hours per Day	Days per Week	Estimated Duration (weeks)[2]
Crane (150- to 250-ton)	6	6	6	28 to 72
Dozer – with blade	6	6	6	28 to 72
Compressor - pneumatic	6	4	6	28 to 72
Steel Erection – Helicopter[4]				
Truck – pickup	9	8	6	12 to 24
Truck – flatbed (1-ton)	18	4	6	12 to 24
Truck – flatbed (2-ton)	6	4	6	12 to 24
Crane RT (20-ton)	3	6	6	12 to 24
Crane RT (75-ton)	3	6	6	12 to 24
Crane (150- to 250-ton)	3	6	6	12 to 24
Dozer – with blade	6	6	6	12 to 24
Compressor - pneumatic	6	4	6	12 to 24
Truck – pickup	6	8	6	6 to 12
Truck – flatbed (1-ton)	6	4	6	6 to 12
Truck – mechanics (2-ton)	3	4	6	6 to 12
Truck – fuel	3	2	6	6 to 12
Helicopter – skylift/skycrane (large)	3	8	6	6 to 12
Wire Installation				
Truck – pickup	18	8	6	33 to 68
Truck – flatbed (1-ton)	30	6	6	33 to 68
Truck – flatbed (2-ton)	6	8	6	33 to 68
Truck – water	3	6	6	33 to 68
Truck – flatbed with boom (5-ton)	18	8	6	33 to 68
Truck – splicing	3	4	6	33 to 68
Truck – semi-trailer	9	8	6	33 to 68
Trailer – flatbed	12	4	6	33 to 68
Trailer – lowboy	9	4	6	33 to 68
Trailer – reel stand	36	4	6	33 to 68
Crane RT (35-ton)	9	2	6	33 to 68
Puller – triple drum	3	2	6	33 to 68
Puller – single drum	3	2	6	33 to 68
Puller – sockline	6	2	6	33 to 68
Tensioner – conductor	3	2	6	33 to 68
Tensioner – shield wire	3	2	6	33 to 68
Dozer – sagging	6	2	6	33 to 68
Dozer – with blade	6	2	6	33 to 68
Backhoe – with bucket	3	2	6	33 to 68
Drill rig – digger	3	2	6	33 to 68
Compressor – pneumatic	3	2	6	33 to 68
Generator – portable (5 horsepower)	6	2	6	33 to 68
Helicopter – pilot line (small)	3	8	6	33 to 68
Restoration				
Truck – pickup	9	6	6	33 to 63
Truck – flatbed (1-ton)	9	6	6	33 to 63
Truck – flatbed (2-ton)	3	4	6	33 to 63
Truck – water	3	6	6	33 to 63

TABLE 2-6
TYPICAL EQUIPMENT AND DURATION OF USE
FOR CONSTRUCTION OF A 500-KILOVOLT TRANSMISSION LINE

Equipment	Quantity[1]	Hours per Day	Days per Week	Estimated Duration (weeks)[2]
Truck – dump (10-cubic yard)	3	6	6	33 to 63
Truck – semi-trailer	3	6	6	33 to 63
Trailer – lowboy	3	6	6	33 to 63
Backhoe – with bucket	3	4	6	33 to 63
Loader – with bucket	3	4	6	33 to 63
Grader – road	3	8	6	33 to 63
Dozer – with blade	3	8	6	33 to 63
Tractor – 4-wheel drive with chisel and/or seeder	3	8	6	33 to 63

SOURCE: Rocky Mountain Power 2013
NOTES:
[1]Quanity of equipment is associated with all three construction spreads.
[2]Estimated duration in weeks is a range that would be applied to 1 of 3 construction spreads.
[3]Steel erection – conventional: use this set of equipment values if structure erection is considered to be by conventional ground based methods.
[4]Steel Erection – helicopter: use this set of equipment values if structure erection is considered to include heavy-lift helicopter methods.

TABLE 2-7
ESTIMATED PERSONNEL AND EQUIPMENT
FOR CONSTRUCTION OF A 500-KILOVOLT SERIES COMPENSATION STATION

Activity and Duration	Equipment Type	Quantity of Equipment	Number of Workers
Site development (40 days)	Scraper – Cat 631	4	35
	Dozer – Cat D9	1 pushing and ripping	
	Dozer – Cat D8	1 fill cat	
	Grader – Cat 16G	2	
	Roller compactor – Cat 583	2	
	Excavator – Cat 330	1 slopes and ditching	
	Water truck	2	
	Water storage	1	
	Water self-loader tower	1	
	Pump – 4”	1	
	Water tanker	2	
	GPS laser	1	
	All-terrain vehicle (ATV) for grader	1	
	Mechanic truck	1	
	Fuel truck	1	
	Pickup – ¾-ton extended cab	2	
	Pickup – 1-ton crew cab	6	
	Office trailer	1	
	Port-a-potty	4	
	Dumpster	1	
Foundations (40 days)	Drill – Texoma 600	1 for bus supports (typical)	30
	Drill – Watson 3100	1 for towers (typical)	
	Boom truck – 33-ton, National 14110	1	
	Boom truck – 17-ton, JLG1700JBT	1	
	Excavator – Cat 315	1	
	Roller compactor – Bomag BW124	1	

TABLE 2-7
ESTIMATED PERSONNEL AND EQUIPMENT
FOR CONSTRUCTION OF A 500-KILOVOLT SERIES COMPENSATION STATION

Activity and Duration	Equipment Type	Quantity of Equipment	Number of Workers
	Plate compactor – Wacker WP1550	2	
	Rubber tire backhoe – Cat 326	1	
Foundations (40 days)	End dump	1	30
	Water truck	1	
	Mechanic truck	1	
	Fuel truck	1	
	GPS laser	1	
	ATV for grader	1	
	Pickup – ¾-ton extended cab	2	
	Pickup – 1-ton crew cab	2	
	Utility-terrain vehicle	3	
	Office trailer	1	
	Port-a-potty	4	
	Dumpster	3	
Grounding (80 days)	Trencher – DitchWitch R100	2	8
	Dozer – Cat D3	2	
	MiniEx – Hitachi EX40	2	
	Air compressor – Ingersoll Rand 185	2	
	Boom truck – 17-ton, JLG1700JBT	1	
	Reel Stand on Trailer	2	
	Pickup – 1-ton crew cab	2	
	Pickup – ¾-ton extended cab	1	
	Office Trailer	1	
	Tools and materials Conex	2	
Cable trench and conduits (60 days)	Excavator – Cat 315	2	8
	Roller compactor – Bomag BW124	1	
	Plate compactor – Wacker WP1550	2	
	Rubber tire backhoe – Cat 326	1	
	End dump (also supports grounding crews)	1	
	Water truck (also supports grounding crews)	1	
	Mechanic truck (also supports grounding crews)	1	
	Fuel truck (also supports grounding crews)	1	
	Air compressor – Ingersoll Rand 185	1	
	Flatbed truck 10-ton	2	
	Boom Truck – 17-ton, JLG1700JBT	1	
	Threading machine – Rigid 535A	4	
	Pickup – 1-ton crew cab	4	
	Pickup – ¾-ton extended cab	1	
	Office trailer	1	
	Tools and materials (Conex)	2	
Steel structures (40 days)	Crane – Grove RT600E	1	12
	Boom truck – 33-ton, National 14110	2	
	Boom truck – 17-ton, JLG1700JBT	1	
	Manlift	2	

TABLE 2-7
ESTIMATED PERSONNEL AND EQUIPMENT
FOR CONSTRUCTION OF A 500-KILOVOLT SERIES COMPENSATION STATION

Activity and Duration	Equipment Type	Quantity of Equipment	Number of Workers
Equipment install, insulators and bus (40 days)	Boom truck – 33-ton, National 14110	2	20
	Boom truck – 17-ton, JLG1700JBT	2	
	Manlift	4	
	Welder truck	4	
	Tools and materials (Conex)	2	
Control wiring (40 days)	Boom truck – 17-ton, JLG1700JBT	2	20
	Manlift	4	
	Small puller	3	
	Reel stand on trailer	2	
	Flatbed truck 10-ton	1	
	¾-ton van	4	
	Tools and materials (Conex)	2	
	Fiber splicer van	1	
	Office trailer	1	
	Port-a-potty	3	
	Dumpster	3	

SOURCE: Rocky Mountain Power 2013

2.4.6.2 Removal of Facilities and Waste Disposal

Series compensation stations and right-of-way construction would generate a variety of solid wastes including concrete, hardware, and wood debris. The solid wastes generated during construction would be recycled or hauled away for disposal at a suitable facility based on their properties. Excavation along the right-of-way and at the series compensation stations would generate solid wastes that potentially could be used as fill; however, surplus excavated material would be removed for disposal. Excavated material that is clean and dry would be spread along the right-of-way if approved by the landowner or local land-management agency.

The majority of surplus excavated materials associated with series compensation station construction results from spoils created during site grading. Very little of the soil excavated during foundation installation is waste product. Above-grade waste may consist of packing material such as crates, pallets, and paper wrapping to protect equipment during shipping. It is assumed a 12-yard dumpster would be filled and dumped once a week with waste material for the duration of each substation project.

2.4.6.3 Construction Schedule

The Applicant intends to continue to refine the design of the Project during the BLM approval process and commence construction of the Project in 2018 and placing the Project in-service date in 2020. Final engineering surveys would determine the exact locations of towers, access roads, and other features prior to the start of construction and would be included in the POD. Due to the broad scope of construction, the varied nature of construction activities, and the geographic diversity of the Project area, the Applicant intends to hire multiple contractors to complete Project work within the projected time frame and in accordance with industry performance standards. The Proposed Action likely would involve multiple construction contracts over a probable 3-year period. Multiple segments would be under construction at the same time. The majority of construction activity would occur in the first 2 years followed by revegetation and reclamation activities. Details are provided in Section 3.6.4 of Appendix B.

Construction Season

Construction would take place year-round as weather and conditions allow. The cost of construction can be affected by the construction season. While construction during the summer season may be preferred, there are issues that may require winter construction. Weather conditions typically prohibit construction at higher elevations during winter months. Project schedule, financing, design, and/or material delivery may not fit within the summer season. Power outages associated with interconnecting facilities cannot necessarily be taken at times convenient for construction (e.g., outages that must be coordinated with peak-demand periods or outages scheduled for other projects). Environmental issues and soil conditions also may dictate construction of portions of the line during certain times of the year. Seasonal and spatial restrictions on construction activities would be implemented unless an exception to the stipulation is granted by agency personnel, in accordance with agency policy or land use plans, in certain areas to avoid or reduce impacts on wildlife. The potential seasonal and spatial restrictions vary by species and are described in Appendix E.

2.4.7 System Operation and Maintenance

Operation and maintenance activities would include transmission line patrols, climbing inspections, structure and conductor inspection and maintenance, insulator washing in selected areas as needed, and access-road repairs. The Applicant would keep necessary work areas around structures clear of vegetation and would limit the height of vegetation along the right-of-way in accordance with the PacifiCorp clearing specifications and vegetation management plans (PacifiCorp 2007). The method for vegetation management is called the Wire-Border Zone method. This method results in two zones of clearing and revegetation. The wire zone is the linear area along the right-of-way under the wires and extending 10 feet outside of the outermost phase conductor. After initial clearing, vegetation in the wire zone would be maintained to consist of native grasses, legumes, herbs, ferns and other low-growing shrubs that remain under 5 feet tall at maturity. The border zone is the linear area along each side of the right-of-way extending from the wire zone to the edge of the right-of-way. Vegetation in the border zone would be maintained to consist of tall shrubs or short trees (up to 25 feet high at maturity), grasses, and forbs. Periodic inspection and maintenance of each of the substations and communications facilities is also a key part of operating and maintaining the electrical system. Details are provided in Section 4.1 of Appendix B. System operation and maintenance activities would be conducted as specified in the POD to meet system safety and reliability requirements. These activities would be conducted similarly regardless of the alignment of the route selected for the transmission line (i.e., are common to all alternatives considered for the Project).

2.4.7.1 Emergency Maintenance

The implementation of routine operation and maintenance activities on the transmission line would minimize the need for most emergency repairs; however, emergency maintenance activities are often necessary to repair natural hazard, fire, or man-caused damages to a line. In the event of an emergency, the Applicant would notify the federal land-managing-agency Authorized Officer and respond as quickly as possible to restore power. The necessary equipment required for emergency repairs would be similar to that needed for regular maintenance. However, on occasion, additional equipment could be required. Although restoration of the line would have priority, an effort would be made to protect crops, plants, wildlife, and resources of importance. Reclamation procedures following completion of repair work would be similar to those prescribed for construction and would be provided in the POD. Details are provided in Section 4.2 of Appendix B.

2.4.8 Environmental Design Features of the Proposed Action

Early in the process, land-use plans relevant to the Project were reviewed to identify best-management practices and other measures that mitigate potential impacts, and were compiled into a comprehensive list. Among the land-use plans, there was much redundancy and the list was condensed to be more concise. The measures are of two types. One type comprises measures the Applicant would implement as standard practice of construction, operation, and/or maintenance, as applicable. Referred to as design features of the Proposed Action for environmental protection, these environmental design features are part of the Applicant’s Project description. Table 2-8 is a list of the environmental design features, and for each feature, the table indicates the phase of the Project the design feature would apply to and indicates the applicable environmental resource. These environmental design features are applied to all lands, regardless of jurisdiction or ownership, where appropriate. The other type comprises measures that the Applicant agrees to apply selectively through the planning process to avoid, reduce, or minimize impacts of the Project. These selective mitigation measures are described in Section 2.5.1.2.

2.4.9 Decommissioning

At the end of the useful life of the transmission line (projected to be at least 50 years, most likely longer), if the facilities were no longer required, the transmission lines and associated facilities would be decommissioned. At such time, a plan for dismantling and removing conductors, insulators, and hardware from the right-of-way would be developed and approved by the permitting agencies. Tower and pole structures would be removed and foundations demolished below ground surface and buried. All permanent disturbances would be restored in accordance with a Termination and Reclamation Plan approved by the federal land-managing-agency Authorized Officer, as appropriate. Since it is not possible to know which facilities would be needed and would remain and/or facilities that would be removed, and it is difficult to predict the status of land use and policy regarding decommissioning and reclamation at a point that far in the future, the effects of decommissioning of the Project are not analyzed in this EIS. Requirements for decommissioning and reclamation (including environmental protection) would have to be addressed in a comprehensive Termination and Reclamation Plan (or equivalent) when decommissioning is proposed.

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Feature	Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
		Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	Biological Resources														
1.	In construction areas where recontouring is not required, vegetation would be left in place wherever possible, and original contour would be maintained to avoid excessive root damage and allow for resprouting in accordance with the reclamation plan. Vegetation not consistent with minimum clearance distances between trees and transmission lines must be removed to ensure line safety and reliability (required by North American Electric Reliability Council Transmission Vegetation Management Program).	●	●	●					●		●	●	●	●	●
2.	In construction areas (e.g., multi-purpose construction yards, tower-site work areas, spur roads from existing access roads) where there is ground disturbance or where recontouring is required, surface reclamation would occur as required by the landowner or land-management agency. The method of reclamation would normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, installing cross drains for erosion control, placing water bars in the road, and filling ditches. All areas on lands administered by federal agencies disturbed as a part of the construction and/or maintenance of the proposed power line would be seeded with a seed mixture appropriate for those areas. The federal land-managing agency would approve a seed mixture that fits	●		●			●	●	●		●	●	●	●	

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	**Geotechnical Investigations**	**Design and Engineering**	**Construction**	**Operation and Maintenance**	**Location – Specific Application**	**Streams/Washes**	**Wetlands/Springs**	**Geology/Soils**	**Paleontology**	**Sensitive Wildlife Species**	**Sensitive Plant Species**	**Land Use**	**Visual Resources**	**Cultural Resources**
	each range type. Seeding methods typically would include drill seeding, where practicable; however, the federal land-managing agency may recommend broadcast seeding as an alternative method in some cases. A Reclamation, Revegetation, and Monitoring Framework Plan identifying reclamation stipulations (e.g., topsoil stripping and storage, alleviation of soil compaction in construction areas, timing of reclamation activities, species lists, monitoring methods, standards for reclamation success, bond release criteria, etc.) would be developed and incorporated in the Plan of Development (POD), which would be approved by the affected federal land-managing agency prior to the issuance of a right-of-way grant or special-use authorization, respectively.														
3.	Special status species, threatened and endangered species, or other species of particular concern would be considered in accordance with management policies set forth by appropriate land-management or wildlife-management agencies (e.g., Bureau of Land Management [BLM], U.S. Fish and Wildlife Service [FWS], state wildlife agencies, etc.). This would entail conducting surveys for plant and wildlife species of concern along the transmission line route selected for construction and associated facilities (e.g., access and spur roads, staging areas, etc.) as agreed on by	●	●	●		●					●	●			

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness									
							Water Resources		Earth Resources		Biological Resources					
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	the agencies. Survey protocols must be accepted or recommended by the affected federal land-managing agency, FWS, and state wildlife agencies, as appropriate. In cases for which such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat, which may include altering the placement of roads or towers, where practicable as approved by the landowner and construction inspection contractor (CIC), as well as monitoring activities.														
4.	The Applicant would design and construct all new or rebuilt transmission facilities to its raptor-safe design standards, including *Suggested Practices for Avian Protection on Power Lines; The State of the Art in 2006* (Avian Power Line Interaction Committee [APLIC] 2006); *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2012); PacifiCorp's Avian Protection Plan, updated June 2011 (PacifiCorp 2011); and PacifiCorp's substation guidelines. Series compensation stations must incorporate animal protections in accordance with the Applicant's standards.		●	●							●				

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
5.	To prevent the spread of noxious weeds, a Noxious Weed Management Plan would be developed and incorporated into the POD, which would be approved by the affected federal land-managing agencies prior to the issuance of a right-of-way grant or special-use authorization, respectively. This plan would be based on the principles and procedures outlined in the BLM Integrated Weed Management Manual 9015 and Forest Service Noxious Weed Management Manual 2080. On private land, the Plan will be approved by a county weed management officer.	●		●	●							●	●		
6.	Avoid vegetation clearing and other construction and maintenance activities when possible during the migratory bird nesting season, between February 1 and August 31; however, dates may vary depending on species, current environmental conditions, results of preconstruction surveys, and approval by agency biologists or agency-approved environmental inspectors in coordination with agency biologists.	●		●	●			●			●				
7.	If vegetation clearing and other construction and maintenance activities could not be avoided during the migratory bird nesting season (between February 1 and August 31), migratory bird and nest surveys would be required within 7 days of any ground-disturbing activities. A spatial nest buffer would be placed around each active nest	●		●	●						●				

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Feature	Application Phase: Geotechnical Investigations	Application Phase: Design and Engineering	Application Phase: Construction	Application Phase: Operation and Maintenance	Application Phase: Location – Specific Application	Effectiveness: Water Resources: Streams/Washes	Effectiveness: Water Resources: Wetlands/Springs	Effectiveness: Earth Resources: Geology/Soils	Effectiveness: Earth Resources: Paleontology	Effectiveness: Biological Resources: Sensitive Wildlife Species	Effectiveness: Biological Resources: Sensitive Plant Species	Effectiveness: Land Use	Effectiveness: Visual Resources	Effectiveness: Cultural Resources
	detected during the surveys until such time as the nest is determined through monitoring to be no longer occupied. Appropriate spatial nest buffers (by species or guild) and nest monitoring requirements would be identified using the best available scientific information through coordination with the FWS and other appropriate agencies and would be provided in a nest management plan incorporated into the POD.														
8.	Agency guidelines for raptor protection during the breeding season would be followed. Refer to Appendix E.	●	●	●	●						●				
9.	Based on preconstruction surveys and results of Section 7 consultation, state and federally designated sensitive plants, habitat, or rare/slow regenerating vegetation communities would be flagged and structures would be placed to allow spanning of these features, where feasible, within the limits of standard structure design.		●	●		●						●			
	Cultural Resources														
10.	In consultation with appropriate land-management agencies and the State Historic Preservation Officers and in accordance with the Programmatic Agreement (to comply with Section 106 of the National Historic Preservation Act) entered into among the BLM; U.S. Forest Service (USFS); Bureau of Indian Affairs; the states of Wyoming, Colorado, and Utah; consulting parties, and tribes specific mitigation	●	●	●										●	●

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	**Geotechnical Investigations**	**Design and Engineering**	**Construction**	**Operation and Maintenance**	**Location – Specific Application**	**Streams/Washes**	**Wetlands/Springs**	**Geology/Soils**	**Paleontology**	**Sensitive Wildlife Species**	**Sensitive Plant Species**	**Land Use**	**Visual Resources**	**Cultural Resources**
	measures for cultural resources would be developed and implemented to mitigate any identified adverse impacts. These may include Project modifications to avoid adverse impacts, cultural resources, monitoring of construction activities, and data recovery studies.														
	Design, Construction, Operation, and Maintenance														
11.	The Applicant would continue to follow studies performed on electric magnetic field research. The Applicant relies on the findings of public health specialists and international scientific organizations for guidelines regarding electric magnetic fields.			●	●										
12.	Transmission-line materials that have been designed and tested to minimize corona would be used. A bundle configuration and larger conductors would be used to limit audible noise, radio interference, and television interference due to corona. Tension would be maintained on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking. Caution would be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.		●	●											

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
Design Feature		Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
13.	The Applicant would apply grounding or other methods where possible to eliminate problems of induced currents and voltages onto conductive objects sharing the same right-of-way, to meet the appropriate codes.			●	●								●		
14.	A Fire Protection Plan would be developed and incorporated into the POD, which would be approved by the BLM and USFS prior to the issuance of a right-of-way grant or special-use authorization, respectively. Operate all internal and external combustion engines on federally managed lands per 36 Code of Federal Regulations 261.52, which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified.	●		●	●										
15.	The transmission line would be patrolled regularly and properly maintained in compliance with applicable safety codes.				●										
16.	During and after construction of the transmission line, the right-of-way would be free of non-biodegradable debris. Slash would be left in place or disposed of in accordance with requirements of the land-management agency or landowner.	●		●	●				●						
Earth Resources															
17.	In disturbed temporary work areas, the topsoil would be	●		●					●				●		

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	salvaged/segregated and distributed and contoured evenly over the surface of the disturbed area after construction completion. The soil surface would be seeded with an agency-recommended seed mix and left rough to help reduce potential for weeds and wind erosion.														
18.	Grading would be minimized by driving overland in areas approved in advance by the land management agency within pre-designated work areas whenever possible.	●		●		●			●				●	●	
19.	In consultation with appropriate land-management agencies, specific mitigation measures for paleontological resources would be developed and implemented to mitigate any identified adverse impacts. These measures would include: ■ preparation of a Paleontological Resources Treatment Plan; ■ paleontological surveys; ■ education of construction personnel; ■ monitoring ground disturbance; ■ deposition in a paleontological repository; and ■ curation.	●	●	●		●				●					
	Land Use														
20.	On agricultural land, the right-of-way would be aligned, insofar as is practicable, to reduce the impact on farm operations and agricultural production.		●			●							●		

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
21.	The Applicant would respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures where possible. The transmission lines would be patrolled by air or inspected on the ground on a periodic basis, in compliance with the Applicant's standards, so damaged insulators or other line materials that could cause interference are repaired or replaced.				●								●		
22.	Fences, gates, and walls would be replaced, repaired, or reclaimed to their original condition as required by the landowner or the land-management agency in the event they are removed, damaged, or destroyed by construction activities. Fences would be braced before cutting. Temporary gates or enclosures would be installed only with the permission of the landowner or the land-management agency and would be removed/reclaimed following construction. Cattle guards or permanent access gates would be installed where new permanent access roads cut through fences on land administered by an affected federal agency or other grazing lands. Temporary gates across breached fences may be required when livestock are actively grazing an area in which the breached fence is located when construction activities have halted for a time. Should construction activities prevent use	●		●	●								●		

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Feature	Application Phase: Geotechnical Investigations	Application Phase: Design and Engineering	Application Phase: Construction	Application Phase: Operation and Maintenance	Application Phase: Location – Specific Application	Effectiveness: Water Resources: Streams/Washes	Effectiveness: Water Resources: Wetlands/Springs	Effectiveness: Earth Resources: Geology/Soils	Effectiveness: Earth Resources: Paleontology	Effectiveness: Biological Resources: Sensitive Wildlife Species	Effectiveness: Biological Resources: Sensitive Plant Species	Effectiveness: Land Use	Effectiveness: Visual Resources	Effectiveness: Cultural Resources
	of a facility such as a corral when that corral is needed to facilitate movement of livestock, then the Applicant would provide a temporary corral to facilitate movement of livestock. This temporary gate would prevent livestock on one side of the fence from going to the other side through the breach. Calving, lambing, and trailing areas (pathways over which livestock are moved to facilitate proper grazing management) would be avoided in the Project right-of-way and ancillary facilities. Calving season generally occurs between December and February. Lambing season generally occurs between March and June. Trailing areas (areas where livestock producers move livestock across lands to facilitate proper grazing management) can occur throughout the Project area and timing may vary throughout the year. Prior to construction, the Applicant would coordinate with the applicable land-managing agency or private landowner to avoid areas used for calving, lambing, and trailing during construction.														
23.	In cultivated agricultural areas, soil compacted by construction activities would be de-compacted. Construction activities would occur as practical to minimize impacts on agricultural operations.	●		●		●			●				●		

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
Design Feature		Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
24.	Where work would occur on hazardous and contaminated sites, the Applicant must seek approval from the U.S. Environmental Protection Agency. Work on contaminated sites must avoid remedial structures (e.g., capped areas, treatment, or monitoring wells, etc.) and workers must use adequate worker protection measures for working in contaminated areas.		●	●		●			●				●		
25.	Towers and/or conductors and/or shield wires would be marked with high-visibility devices (i.e., marker balls or other marking devices) where required by governmental agencies with jurisdiction (i.e., Federal Aviation Administration). Tower heights would be less than 200 feet to avoid the need for aircraft obstruction lighting.		●	●	●	●								●	
Multiple Resources															
26.	All construction-vehicle movement outside the right-of-way would be restricted to pre-designated access, contractor-acquired access, public roads, or overland travel approved in advance by the applicable land-management agency, unless authorized by the CIC.	●		●	●		●	●	●	●	●	●	●	●	●
27.	The spatial limits of construction activities including vehicle movement would be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents indicating survey or construction limits would be applied to rocks, vegetation, structures, fences, etc.			●			●	●	●	●	●	●	●	●	●

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	**Geotechnical Investigations**	**Design and Engineering**	**Construction**	**Operation and Maintenance**	**Location – Specific Application**	**Streams/Washes**	**Wetlands/Springs**	**Geology/Soils**	**Paleontology**	**Sensitive Wildlife Species**	**Sensitive Plant Species**	**Land Use**	**Visual Resources**	**Cultural Resources**
28.	Prior to construction, the CIC would instruct all personnel on the protection of cultural, ecological, and other natural resources such as (a) federal and state laws regarding antiquities, paleontological resources and plants and wildlife, including collection and removal; (b) the importance of these resources; (c) the purpose and necessity of protecting them; and (d) reporting and procedures for stop work.	●		●			●	●		●	●	●		●	●
29.	All requirements of those entities having jurisdiction over air-quality matters would be adhered to. Any necessary dust-control plans would be developed and permits for construction activities would be obtained. Open burning of construction trash would not be allowed, unless permitted by appropriate authorities.			●					●				●		
30.	Hazardous material would not be drained onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be removed to a disposal facility authorized to accept such materials within one week of Project completion. A Spill Pollution Prevention, Containment, and Countermeasures Plan Framework, will be developed as part of the POD.	●		●	●		●	●	●		●	●			

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	Visual Resources														
31.	Dull-galvanized steel for lattice towers, nonspecular conductor and gray insulators, would be used to reduce visual impacts. Other permanent structures and fencing associated with the Project would be painted a color from the BLM's standard environmental colors. This color selection would be based on the landscape setting (e.g., sagebrush, pinyon-juniper, etc.) and through consultation with the BLM and the Applicant.		●	●									●	●	●
	Water Resources														
32.	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) would be repaired or replaced if they are damaged or destroyed by construction activities to their pre-disturbed condition as required by the landowner or land-management agency. Should construction activities prevent use of a watering facility while grazing in that area, then the Applicant would provide alternate sources of water and/or alternate sources of forage where water is available.	●		●			●	●					●		
33.	Refueling and storing potentially hazardous materials would not occur within a 100-foot radius of a water body, a 200-foot radius of all identified private water wells, and a 400-foot radius of all identified municipal or community water wells. Spill preventive and containment measures or	●		●	●		●	●							

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

	Design Feature	Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
		Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	practices would be incorporated as needed. Consistent with BLM Riparian Management Policy, surface-disturbing activities within 328 feet (100 meters) of a riparian area would be required to meet exception criteria defined by BLM, such as acceptable measures to protect riparian resources and habitats by avoiding or minimizing stormwater runoff, sedimentation, and disturbance of riparian vegetation, habitats, and wildlife species. Mitigation measures would be developed on a site-specific basis, in consultation with the affected federal land-managing agency, and incorporated into the final POD. If any disturbance were anticipated within 20 feet of the edge of a riparian area or other wetland habitat, a silt fence or certified weed-free wattle would be installed along the travel route on the wetland side unless the wetland is up-gradient.														
34.	Adhere to interagency developed methods of avoidance, inspection, and sanitization as described in the *Operational Guidelines for Aquatic Invasive Species Prevention* and Equipment Cleaning (USFS 2009b). If control of fugitive dust near sensitive water bodies is necessary, water would be obtained from treated municipal sources or drafted from sources known to contain no aquatic invasive species. Support vehicles, drill rigs, water trucks and drafting	●		●	●		●	●							

TABLE 2-8
DESIGN FEATURES OF THE PROPOSED ACTION FOR ENVIRONMENTAL PROTECTION

		Application Phase					Effectiveness								
							Water Resources		Earth Resources		Biological Resources				
	Design Feature	Geotechnical Investigations	Design and Engineering	Construction	Operation and Maintenance	Location – Specific Application	Streams/Washes	Wetlands/Springs	Geology/Soils	Paleontology	Sensitive Wildlife Species	Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
	equipment would be inspected and sanitized, as necessary, following interagency-approved operational guidelines.														
Additional Features Applicable to Geotechnical Investigations															
35.	Adhere to state standards for abandoning drill holes where groundwater is encountered.	●					●								
36.	Crossings of dry washes would be made during dry conditions, when possible. Repeated crossings would be limited to the extent possible but made at the same locations, if possible.	●					●								
37.	If a riparian crossing were required during wet periods with saturated soil conditions, vehicles would not be allowed to travel when soils are moist enough for deep rutting (4 or more inches deep) to occur unless prefabricated equipment pads were installed over the saturated areas or other measures were implemented to prevent rutting. Equipment with low-ground-pressure tires, wide tracks, or balloon tires would be used when possible.	●					●	●	●						
38.	Canal and/or ditch crossings would require placement of temporary bridges or improvement of existing crossings.	●											●		
39.	To minimize vehicle collisions with wildlife, a speed limit of 15 miles per hour would be employed on overland access routes.	●									●		●		

2.5 Alternatives

A number of alternative transmission line routes were developed for detailed study in the EIS. This section provides a summary of the process used to develop the alternative routes (Section 2.5.1) and provides a general description of the alternative routes (Section 2.5.2). Alternative routes considered but eliminated from detailed analysis are discussed in Section 2.6.

2.5.1 Study and Analysis Methods

The following text summarizes the methods used for developing, studying, analyzing, and comparing the alternative routes developed in response to the need for the Project and the need for the affected federal agencies to respond to the Applicant's application for a right-of-way on federal land. Consistent with Section 102(2)(A) of NEPA, the process described uses "a systematic interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making, which may have an impact on man's environment" (as specified in 40 CFR 1507.2).

The summary begins with an explanation of the development of the preliminary alternative routes and initial review of those routes by federal, state, and local agencies; tribal representatives; and the public (Section 2.5.1.1). It is followed by a description of baseline data collection and the method for assessing impacts and applying measures to reduce or eliminate those impacts (Section 2.5.1.2); and the method for comparing the alternative routes (Section 2.5.1.3), from which a route exhibiting the least impact emerges. The process is summarized in Figure 2-4. In concert with environmental results, administrative and management factors are considered by the participating agencies to derive the Agency Preferred Alternative (Section 2.7.1). System planning and reliability, engineering, costs, safety, schedule, and constructability are among the factors the Applicant considers to identify its Applicant Preferred Alternative (Section 2.7.2).

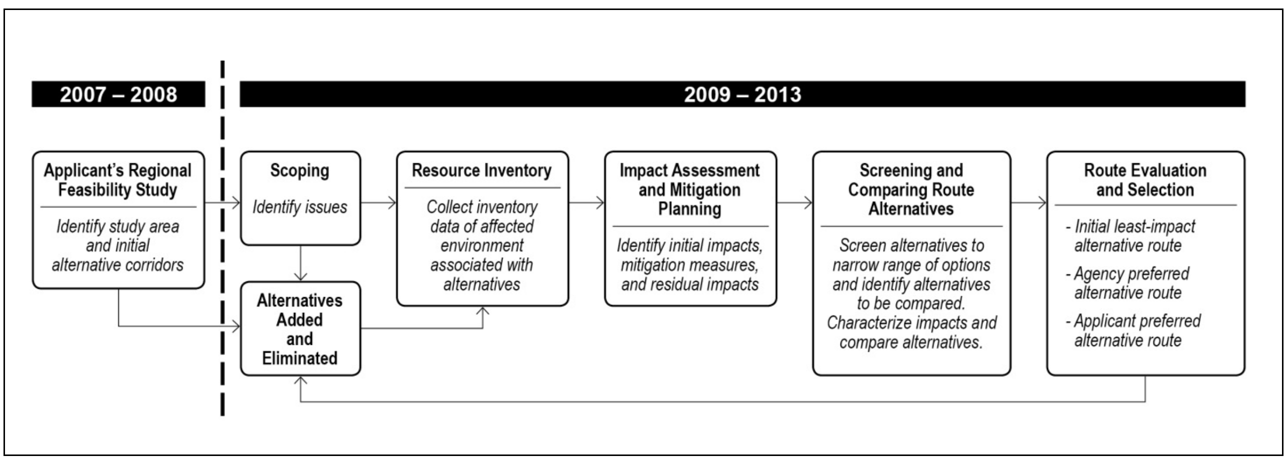


Figure 2-4 Energy Gateway South Transmission Project Environmental Study Process

2.5.1.1 Developing Alternatives

Siting Study

A siting study report was prepared to document the chronological and systematic development of a network of reasonable and feasible alternative corridors and routes for the Project, beginning with feasibility studies in 2006 and continuing through the public and agency scoping process and initial environmental analysis for the EIS. Figure 2-5 is a timeline of the major milestones in the development of the Project and highlights Applicant- and BLM-directed activities in development of the alternative routes that are being studied and analyzed in this EIS. In general, alternative route development occurred through study and review activities conducted in four stages, including:

- **Feasibility Studies.** A series of feasibility studies conducted by the Applicant that contributed to identifying preliminary siting corridors that were refined into preliminary alternative routes submitted to the BLM and USFS in applications for right-of-way and special-use authorization, respectively, in December 2008. The preliminary siting corridors were refined by identifying federally designated utility corridors throughout the study area and locating the siting corridors in federally designated utility corridors, to the extent possible (i.e., where suitable when reviewing for environmental, geographic, or engineering/electric system reliability concerns). Generally, the designated utility corridors include existing transmission lines and other existing linear facilities. Maps 2-1a and 2-1b present existing utility corridors considered in the development of preliminary alternative routes.
- **Agency Review of the Preliminary Alternative Routes**. Agency reviews that took place prior to scoping and resulting modifications to the preliminary alternative routes from January 2009 through October 2010 when the Applicant submitted a revised right-of-way application to reflect a project reduced in geographic scope.
- **Public Review and Comment on the Preliminary Alternative Routes**. Modifications to the preliminary alternative routes based on comments received from the public and agencies during the scoping process, which initiated the preparation of this EIS.
- **Review of Alternative Routes through Environmental Studies.** A description of modifications to the alternative routes based on the results of the inventory of environmental resources, preliminary results of the assessment of potential impacts, and comparison of alternative routes.

Rather than repeat the explanation, the *Energy Gateway South Transmission Project Siting Study Report* (EPG 2012) is incorporated by reference, and can be found on the BLM's Project website at: http://www.blm.gov/wy/st/en/info/NEPA/documents/hdd/gateway_south.html or from the BLM Wyoming State Office, 11 BLM field offices, or three national forests participating in preparation of the EIS (Rocky Mountain Power 2012).

Scoping

Early in the process, the (1) Proposed Action, (2) agencies' purpose and need, (3) Applicant's interests and objectives, and (4) preliminary alternative routes that could accommodate the proposed transmission line, were reviewed by the relevant agencies and the interested public through the scoping process. The scoping process and results are documented in the *Energy Gateway South Transmission Project EIS Scoping Report* (BLM 2011a), available on the BLM Project website and at the 11 BLM field offices and three national forests participating in the preparation of the EIS. The scoping process also is summarized in Chapter 5.

As a result of concerns and issues identified during scoping, the preliminary routes were refined to establish the network of alternative transmission line routes to be studied and analyzed for the EIS.

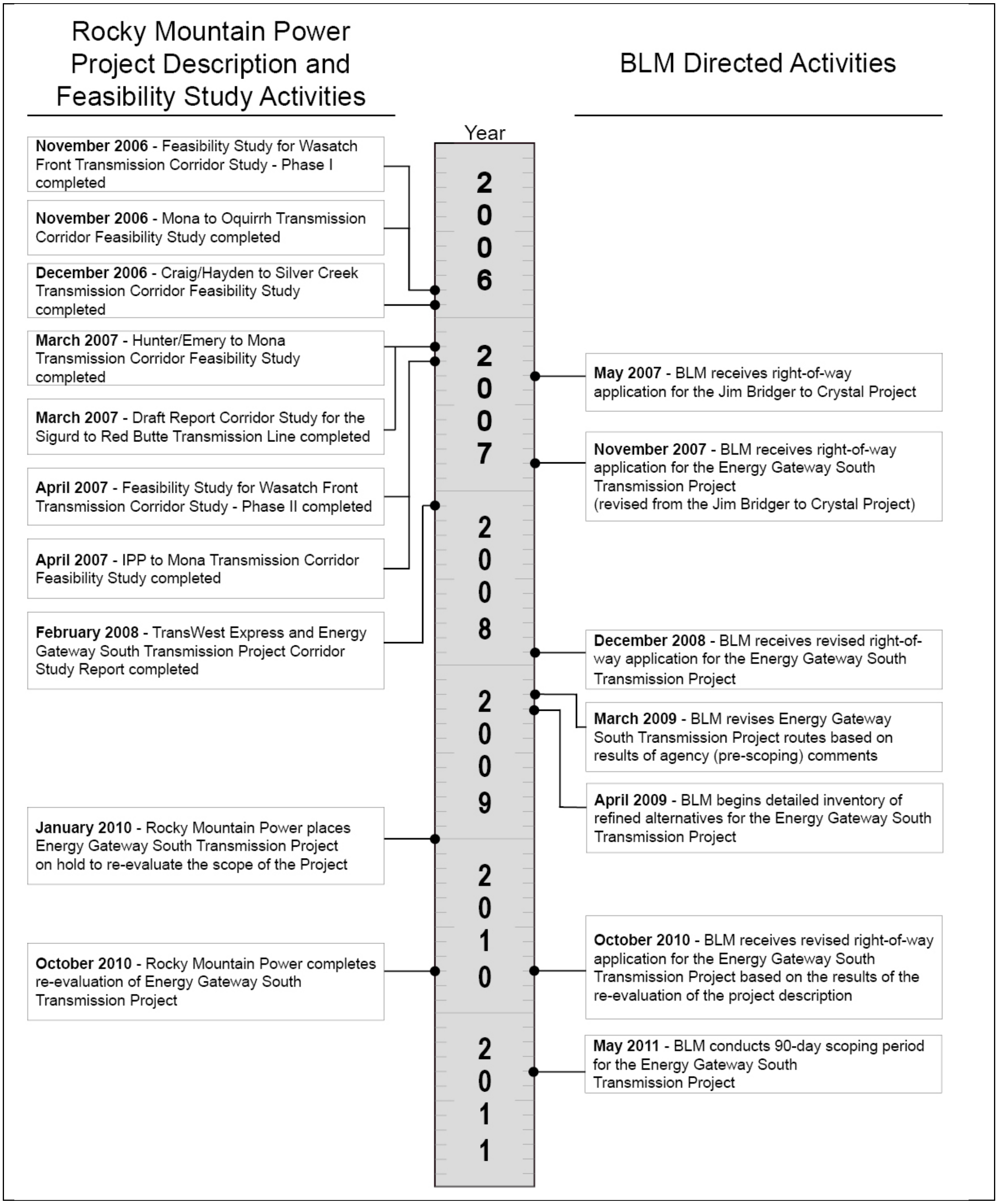
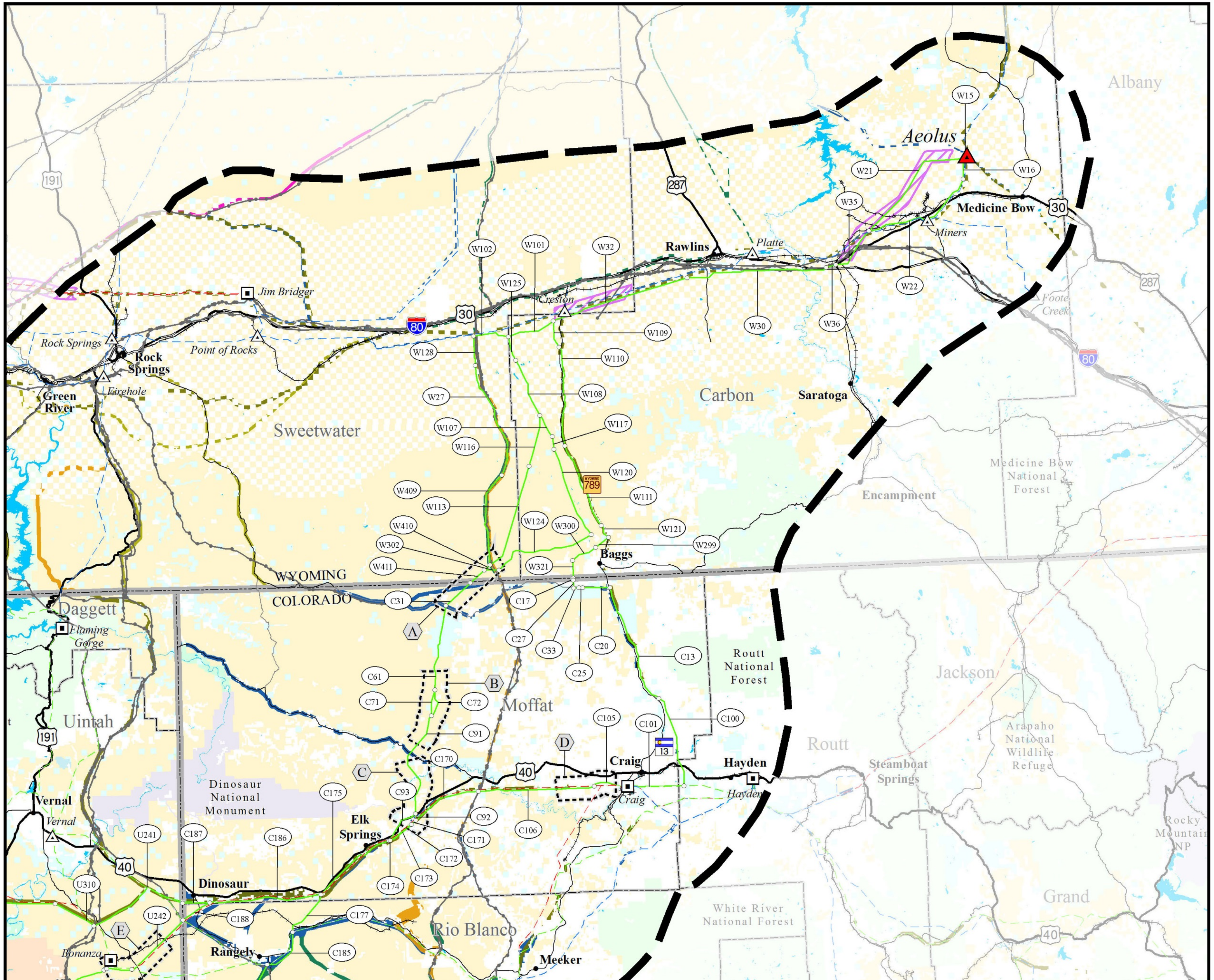


Figure 2-5 Timeline of Major Milestones in Development of the Project



Map 2-1a

Linear Facilities and Utility Corridors Northern Area

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Linear Facilities

- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 138kV Transmission Line
- Pipeline[1]

Federal and State Utility Corridors

Designated Utility Corridors (from BLM resource management plans and USFS land and resource management plans)

- Underground
- Window
- Designated Underground
- Designated Surface

West-wide Energy Corridors (WWEC)

- Underground Energy Corridor
- Surface Energy Corridor

State Transmission Line Corridor

- State of Wyoming Greater Sage-grouse Transmission Line Corridor[2]

Project Features

- Project Area Boundary
- Substation (Project Terminal)
- Alternative Route
- Link Number
- Link Node
- 345kV Proposed Rebuild (Segment 4a and 4b - Inset B)
- 345kV Proposed Reroute (Segment 4c - Inset B)
- Series Compensation Station Siting Area

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Indian Reservation
- National Park Service
- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- State Land
- Private Land

General Reference

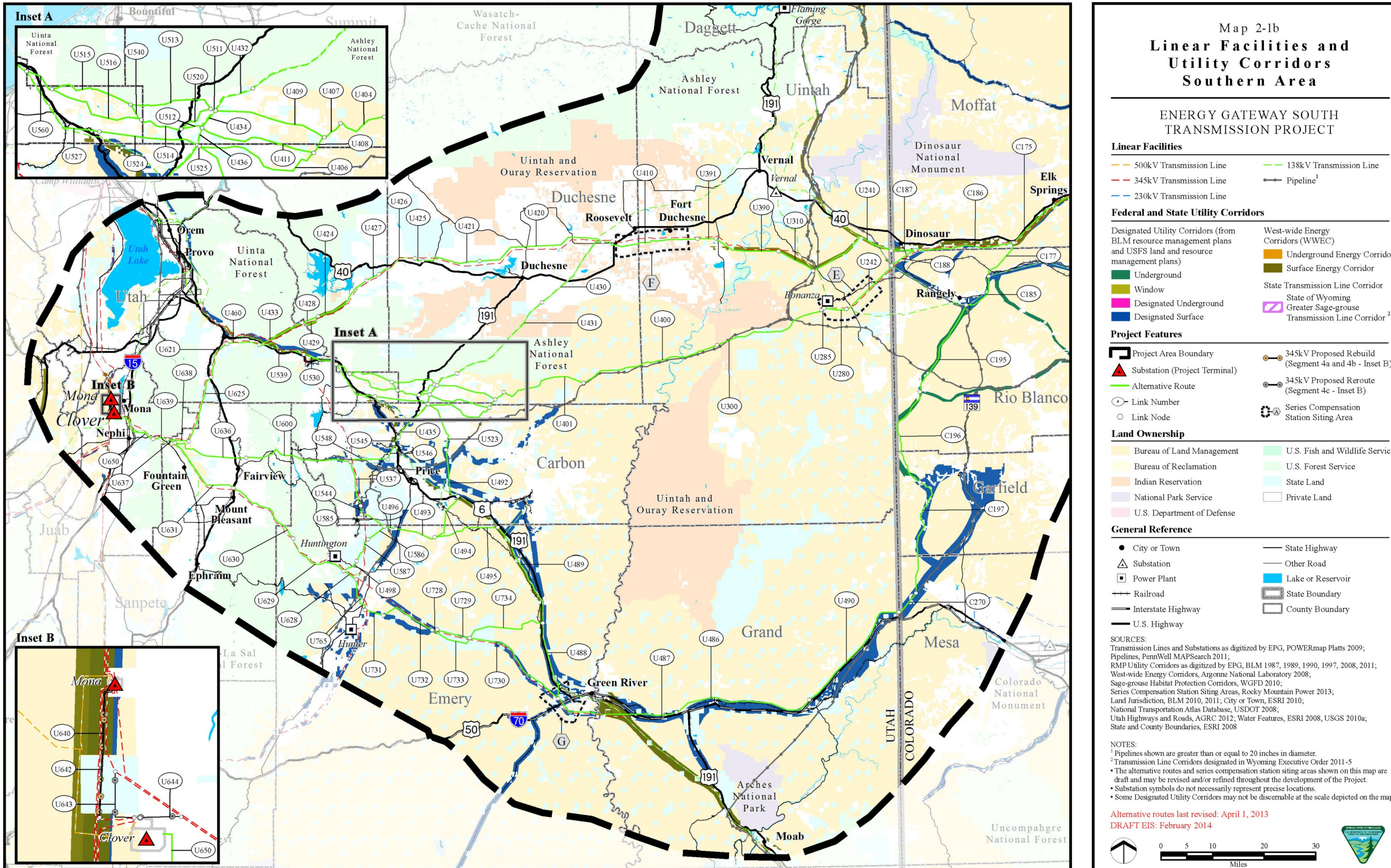
- City or Town
- Substation
- Power Plant
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- Other Road
- Lake or Reservoir
- State Boundary
- County Boundary

SOURCES:
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
Pipelines, PennWell MAPSearch 2011;
RMP Utility Corridors as digitized by EPG, BLM 1987, 1989, 1990, 1997, 2008, 2011;
West-wide Energy Corridors, Argonne National Laboratory 2008;
Sage-grouse Habitat Protection Corridors, WGFD 2010;
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008

NOTES:
[1] Pipelines shown are greater than or equal to 20 inches in diameter.
[2] Transmission Line Corridors designated in Wyoming Executive Order 2011-5
- The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.
- Some Designated Utility Corridors may not be discernable at the scale depicted on the map.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

0 5 10 20 30
Miles


Map 2-1b
Linear Facilities and Utility Corridors Southern Area
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT
Linear Facilities
500kV Transmission Line
345kV Transmission Line
230kV Transmission Line
138kV Transmission Line
Pipeline[1]
Federal and State Utility Corridors
Designated Utility Corridors (from BLM resource management plans and USFS land and resource management plans)
Underground
Window
Designated Underground
Designated Surface
West-wide Energy Corridors (WWEC)
Underground Energy Corridor
Surface Energy Corridor
State Transmission Line Corridor
State of Wyoming Greater Sage-grouse Transmission Line Corridor[2]
Project Features
Project Area Boundary
Substation (Project Terminal)
Alternative Route
Link Number
Link Node
345kV Proposed Rebuild (Segment 4a and 4b - Inset B)
345kV Proposed Reroute (Segment 4c - Inset B)
Series Compensation Station Siting Area
Land Ownership
Bureau of Land Management
Bureau of Reclamation
Indian Reservation
National Park Service
U.S. Department of Defense
U.S. Fish and Wildlife Service
U.S. Forest Service
State Land
Private Land
General Reference
City or Town
Substation
Power Plant
Railroad
Interstate Highway
U.S. Highway
State Highway
Other Road
Lake or Reservoir
State Boundary
County Boundary
SOURCES:
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
Pipelines, PennWell MAPSearch 2011;
RMP Utility Corridors as digitized by EPG, BLM 1987, 1989, 1990, 1997, 2008, 2011;
West-wide Energy Corridors, Argonne National Laboratory 2008;
Sage-grouse Habitat Protection Corridors, WGFD 2010;
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008
NOTES:
[1] Pipelines shown are greater than or equal to 20 inches in diameter.
[2] Transmission Line Corridors designated in Wyoming Executive Order 2011-5
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.
• Some Designated Utility Corridors may not be discernable at the scale depicted on the map.
Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014
0 5 10 20 30
Miles
Inset A
Inset B
Uinta National Forest
Ashley National Forest
Uintah and Ouray Reservation
Dinosaur National Monument
Arches National Park
Colorado National Monument
Uncompahgre National Forest
Daggett
Uintah
Moffat
Duchesne
Utah
Carbon
Emery
Grand
Juab
Sanpete
Mesa
Garfield
Rio Blanco
Vernal
Roosevelt
Fort Duchesne
Dinosaur
Rangely
Elk Springs
Orem
Provo
Utah Lake
Mona
Clover
Nephi
Fountain Green
Fairview
Mount Pleasant
Ephraim
Price
Huntington
Hunter
Green River
Moab
Bonanza
UTAH
COLORADO

2.5.1.2 Studying and Analyzing Alternatives

Law, policy, and the issues identified through the scoping process guide what studies of the natural, human, and cultural environments federal agencies must conduct and address in an interdisciplinary manner in the EIS. The studies for this Project were designed to develop an inventory of environmental data reflecting the existing condition of the environment in sufficient detail to:

- Predict potential or probable impacts on the environment brought about by the construction, operation, and maintenance of the proposed transmission line, access roads, and ancillary facilities along each of the alternative transmission line routes.
- Prepare realistic recommendations to reduce or eliminate impacts identified during the analysis.
- Compare the alternative routes based on interdisciplinary resource analysis and identify the alternative route exhibiting the least impact for each environmental resource category studied, as well as for the environment as a whole.
- Meet the environmental reporting requirements of the BLM, in coordination with cooperating federal and state agencies and county and local governments.

Resource Inventory

Data on the existing condition of each resource were gathered and compiled, between September 2011 and April 2012, from the most recent data available—primarily literature, published and unpublished reports, land use plans, maps, and agency databases. Data gathered for land use and visual resources were verified by field reconnaissance. Following the initial inventory effort, BLM requested other federal, state, and land and resource management agencies to refine and verify the data collected and provide information regarding additional issues, concerns, policies, and regulations. The data were compiled in a GIS at scales of 1:24,000 and 1:100,000.

For most of the resources, inventories were developed to describe the existing environment in the study corridors along the alternative routes in sufficient detail to assess potential direct and indirect impacts that could result from the proposed Project. The width of the study corridor varies for each resource based on the area that potentially could be affected (Table 2-9) and was determined by the Agency Interdisciplinary Team. Analysis of air quality is based on regional data. Data used to assess potential impacts on social and economic conditions are countywide and statewide and are not extracted for study-corridor-level analysis.

TABLE 2-9
STUDY CORRIDORS BY RESOURCE

Resource	Study-Corridor Width (miles)
Earth resources	2
Paleontological resources	2
Water resources	2
Biological resources (vegetation, special status plants, wildlife, special status wildlife, fish and aquatics)	2
Land use	2
Parks, preservation, and recreation	2
Transportation and access	2
Special designations and other management areas	2
Wilderness areas, wilderness study areas, and non-wilderness study area lands with wilderness characteristics	2
Inventoried roadless areas and unroaded/undeveloped areas	2

TABLE 2-9 STUDY CORRIDORS BY RESOURCE	
Resource	**Study-Corridor Width (miles)**
Visual resources	6
National trails system	6
Cultural resources	4
NOTE: Analysis of air quality is based on regional data. Data and information used to assess potential social and economic impacts are based on countywide and statewide data and are not extracted for corridor-level assessment.	

The alternative routes (and study corridors) are centered on a line referred to as the "reference centerline." The reference centerlines were mapped and verified by aerial and field reconnaissance in detail sufficient for analysis for the EIS. Precise locations of the centerline would be refined through engineering surveys on the route selected for the transmission line prior to Project construction. The alternative routes are shown on the maps in "links," which are segments of a route sharing common endpoints determined by the point of intersection with other, adjacent links. To facilitate analysis and reference, mileposts are marked along the reference centerline of each link. Resource data collected for the area within a study corridor are input, stored, and retrieved by link number and milepost (to 0.1 mile). Where appropriate, resource discussions in this document (principally Chapter 3) refer to links and mileposts to provide a geographic reference to the resource data. Maps displaying resource inventory data are in Volume II – Maps. The results of the inventory of resources are documented by link and milepost in resource inventory summaries and maps. Preliminary resource inventory maps were distributed in January 2012 to the lead and cooperating agencies to review and comment on the adequacy of the data prior to proceeding with impact assessment and mitigation planning.

Impact Assessment and Mitigation Planning

Impacts on the environment can result directly (caused by the action and occurs at the same time and place) or indirectly (caused by the action and is later in time or farther removed in distance, but still reasonably foreseeable) and can be temporary (short term), long-term, or permanent. The assumptions for each resource define temporal scope of analysis. In this analysis, temporary environmental effects predicted to occur during Project construction that would be anticipated to return to a preconstruction condition at or within 5 years of the end of construction were considered short-term impacts. Environmental effects that would be anticipated to remain for the life of the Project (approximately 50 years), were considered long-term impacts. Permanent impacts are those that would be anticipated to endure beyond the life of the Project, including irreversible and irretrievable commitment of resources. Impacts can be beneficial (positive) or adverse (negative) and can vary in significance from no change or only slightly discernible change to a full modification of the environment. Cumulative impacts result from the incremental effect of an action when added to other past, present, and reasonably foreseeable future actions and can result from individually minor but collectively significant actions taking place over a period of time. The approach used to address cumulative effects is described in Chapter 4.

Once the environmental inventory (baseline resource data) was compiled for each alternative route and the data were reviewed by the lead and cooperating agencies, potential effects of the proposed Project were assessed and measures were recommended, where appropriate, to avoid, reduce, or eliminate the impacts (refer to Section 3.1.3.1). The process of assessing impacts and applying measures to reduce impacts is a systematic interdisciplinary analysis that first identifies initial impacts based on a comparison of the proposed Project (i.e., the predicted types and amounts of disturbance) and the existing condition of the environment (pre-Project). Then, measures may be applied selectively on a case-by-case basis and often in localized areas to effectively reduce impacts further, thereby resulting in residual impacts, or the impacts remaining after the application of the selective measures. Figure 2-6 provides an overview of the impact assessment and mitigation planning process. .

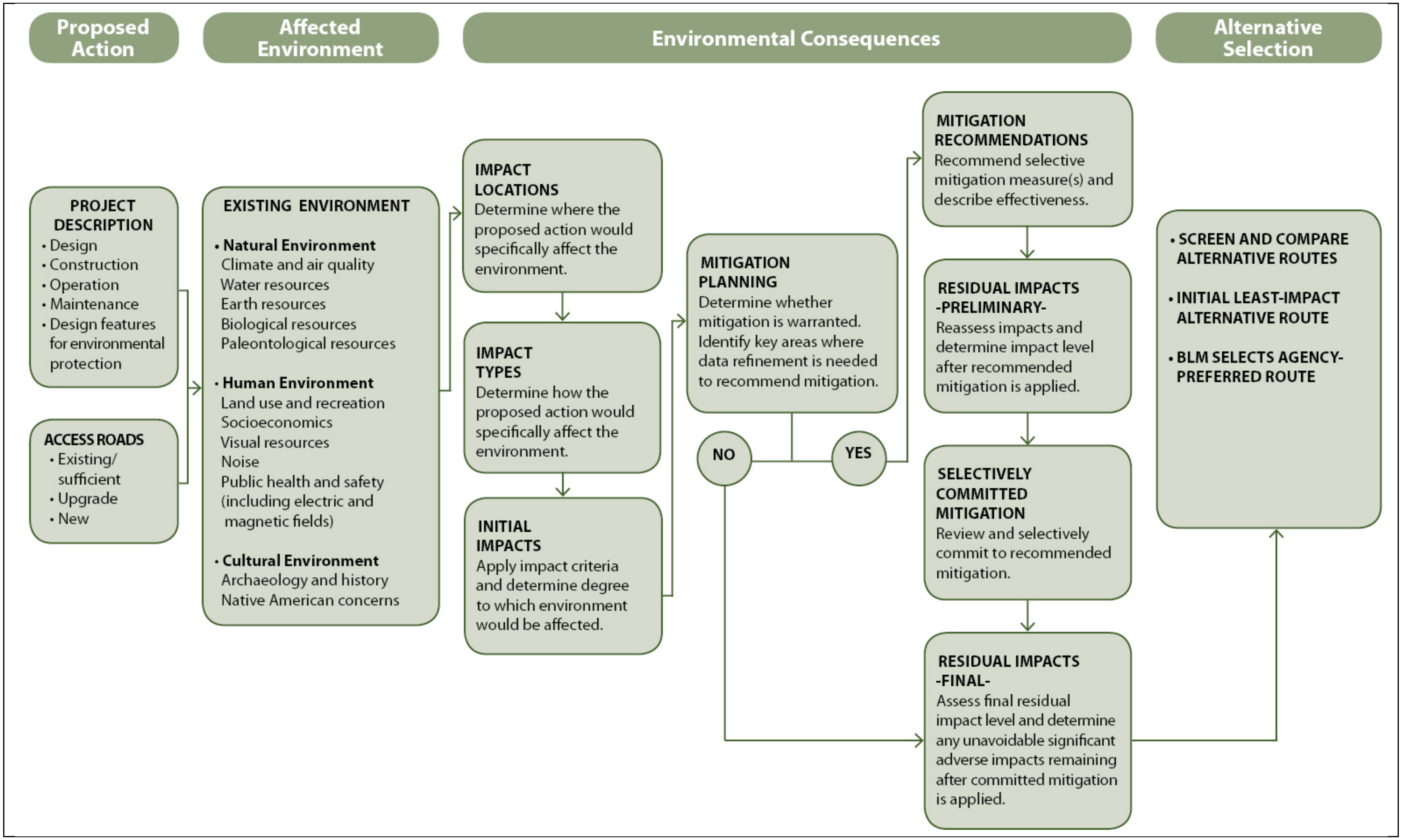


Figure 2-6 Impact Assessment and Mitigation Planning Process

Estimated Ground Disturbance and Vegetation Clearing

The first step of the analysis was to determine the types and amount of ground disturbance that could occur based on the design and typical specifications of the proposed facilities, construction techniques (including design features of the Proposed Action for environmental protection [refer to Table 2-8]) and equipment used, extent and duration of the construction, requirements for operation of the transmission line and associated facilities, and activities associated with routine maintenance.

Most of the potential impacts that could occur, including ground disturbance, would result from the following construction activities:

- Upgrading existing roads or constructing new roads for access where needed
- Preparing tower sites, multi-purpose construction yards, staging areas, helicopter refueling sites, and communication regeneration station sites
- Assembling and erecting tower structures
- Stringing conductors (e.g., wire-pulling and -tensioning sites and wire-splicing sites)

In addition, impacts on some resources would occur following construction from the presence of the transmission lines and access roads. Also, periodic maintenance activities could cause temporary impacts.

Since the Project facilities have not yet been designed and locations of the transmission line facilities are not known, for the purpose of estimating impacts, the amount of ground that could be disturbed as a result of implementation of the Project was estimated based on the typical design characteristics of the 500kV and 345kV transmission line segments and ancillary facilities (Section 2.3.1), including tower sites, multi-purpose construction yards, communication regeneration station sites, etc. The estimated ground disturbance associated with using existing access roads or upgrading or constructing access roads (Table 2-10) also was considered. Temporary ground disturbance during construction would be associated with structure work areas, wire-splicing sites, wire-pulling and wire-tensioning sites, multi-purpose construction yards, and temporary access roads. Permanent ground disturbance would be associated with structure base areas, communication regeneration station sites, and permanent access roads. Estimated ground disturbance for the 500kV transmission line and series compensation stations is presented in Table 2-11 and for the 345kV line segments is presented in Table 2-12

TABLE 2-10
ACCESS LEVELS AND POTENTIAL AREAS OF GROUND DISTURBANCE

Access Level	Description and Assumptions for Analysis	Area of Ground Disturbance (acres)[1]
1	Use existing road (0 to 15 percent slope) within half the distance of the typical span from the Project centerline, 1.25 miles of existing access roads per mile of transmission line, 60 percent of existing access roads would require 8-foot-wide improvements (including cut-and-fill), 0.625 miles of 22-foot-wide spur roads (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas required for every 1,000 feet of access road.[2]	2.8
2	Use existing road (greater than 15 percent slope) within half the distance of the typical span from the Project centerline, 2.25 miles of existing access roads per mile of transmission line, 60 percent existing access roads would require 12-foot-wide improvements (including cut-and-fill), 1.125 miles of 32-foot-wide spur roads (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas required for every 1,000 feet of access road.[2]	6.7
3	Construct new access road (0 to 8 percent slope), 1.25 miles of new 20-foot-wide road (including cut-and-fill) per mile of transmission line, 100-foot-long by 10-foot-wide pullout areas would be required for every 1,000 feet of access road.[3]	3.2

TABLE 2-10
ACCESS LEVELS AND POTENTIAL AREAS OF GROUND DISTURBANCE

Access Level	Description and Assumptions for Analysis	Area of Ground Disturbance (acres)[1]
4	Construct new access road (8 to 15 percent slope); 1.5 miles of new 24-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas required for every 1,000 feet of access road.[4]	4.5
5	Construct new access road (15 to 30 percent slope); 2.0 miles of new 29-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas would be required for every 1,000 feet of access road.[4]	7.3
6	Construct new access road (greater than 30 percent slope); 2.5 miles of new 55-foot-wide road per mile of transmission line, 100-foot-long by 10-foot-wide turnout areas would be required for every 1,000 feet of access road.[4]	17.0

NOTES:
[1]Numbers are approximate.
[2]Includes Existing Roads – No Improvement and Existing Roads – Improvements Required as described in Appendix B, Section 2.5.
[3]Includes New Roads – Bladed, New Roads – Overland Travel and Temporary Roads as described in Appendix B, Section 2.5.
[4]Includes New Roads – Bladed and Temporary Roads as described in Appendix B, Section 2.5

TABLE 2-11
SUMMARY OF ESTIMATED GROUND DISTURBANCE AND VEGETATION CLEARING FOR THE 500-KILOVOLT TRANSMISSION LINE AND SERIES COMPENSATION STATIONS

Alternative Routes	Temporary Disturbance (acres)[1, 4]	Permanent Disturbance (acres)[2, 4]	Total Disturbance (acres)	Transmission Line Right-of-way Vegetation Clearing (acres)[3, 4]	Access Roads	
					Existing[5]	New[6]
Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)						
Alternative WYCO-B and Route Variations						
WYCO-B (Applicant Preferred Alternative)	2,342	995	3,337	350	108.1	96.4
WYCO-B-1	2,347	982	3,329	351	107.2	97.7
WYCO-B-2 (Agency Preferred Alternative)	2,341	984	3,325	341	110.6	93.9
WYCO-B-3	2,342	992	3,334	335	109.9	94.6
Alternative WYCO-C and Route Variations						
WYCO-C	2,410	999	3,409	336	124.2	86.2
WYCO-C-1	2,415	986	3,401	336	123.3	87.5
WYCO-C-2	2,409	989	3,398	326	126.7	83.7
WYCO-C-3	2,410	996	3,407	320	126.0	84.4
Alternative WYCO-D and Route Variation						
WYCO-D	2,862	1,132	3994	296	166.3	83.7
WYCO-D-1	2,862	1,140	4,002	281	168.1	81.9
Alternative WYCO-F and Route Variations						
WYCO-F	2,506	1,026	3,532	347	118.7	100.2
WYCO-F-1	2,511	1,013	3,525	347	117.8	101.5
WYCO-F-2	2,505	1,016	3,521	337	121.2	97.7
WYCO-F-3	2,507	1,023	3,530	331	120.5	98.4

TABLE 2-11
SUMMARY OF ESTIMATED GROUND DISTURBANCE AND VEGETATION CLEARING FOR THE 500-KILOVOLT TRANSMISSION LINE AND SERIES COMPENSATION STATIONS

Alternative Routes	Temporary Disturbance (acres)[1, 4]	Permanent Disturbance (acres)[2, 4]	Total Disturbance (acres)	Transmission Line Right-of-way Vegetation Clearing (acres)[3, 4]	Access Roads	
					Existing[5]	New[6]
Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)						
COUT BAX-B	3,194	1,616	4,810	2,273	158.5	120.7
COUT BAX-C	3,315	1,589	4,904	2,332	171.6	118.1
COUT BAX-E	3,361	1,428	4,789	2,244	180.1	111.4
Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)						
Alternative COUT-A and Route Variation						
COUT-A	2,380	1,430	3,810	1,901	101.6	104.4
COUT-A-1	2,352	1,450	3,802	1,942	98.9	106.7
Alternative COUT-B and Route Variations						
COUT-B	2,498	1,453	3,951	2,166	116.2	99.8
COUT-B-1	2,465	1,451	3,916	2,287	116.2	96.5
COUT-B-2	2,481	1,458	3,939	2,321	118.2	96.0
COUT-B-3	2,476	1,455	3,931	2,393	115.9	98.0
COUT-B-4	2,480	1,455	3,935	2,328	117.9	96.3
COUT-B-5	2,452	1,572	4,024	2,386	116.2	97.7
Alternative COUT-C and Route Variations						
COUT-C	2,401	1,620	4,021	2,235	118.0	91.8
COUT-C-1	2,371	1,619	3,990	2,385	120.5	85.9
COUT-C-2	2,387	1,622	4,009	2,419	122.5	85.9
COUT-C-3 (Agency Preferred Alternative)	2,383	1,657	4,040	2,484	120.5	87.1
COUT-C-4	2,383	1,660	4,043	2,395	117.4	90.5
COUT-C-5	2,379	1,529	3,908	2,460	115.4	92.2
Alternatives COUT-H and COUT-I						
COUT-H (Applicant Preferred Alternative)	2,294	1,402	3,696	2,088	121.3	79.3
COUT-I	2,748	1,611	4,359	2,151	138.7	101.5

SOURCE: Assumptions for the calculations are derived from the Applicant's description of the Project (Appendix B).

NOTES:

[1]Temporary Disturbance: Estimated area of disturbance associated with structure work areas (250 by 250 feet per structure), wire tensioning/pulling sites (250 by 400 feet; two every 3-5 miles), wire splicing sites (100 by 100 feet every 9,000 feet), multipurpose construction yards (30-acre site located approximately every 20 miles), helicopter fly yards (15 acre site; located approximately every 5 miles), guard structures (150 by 75 feet; approximately 1.4 structures per 1 mile), and temporary access roads (refer to Table 2-1).

[2]Permanent Disturbance: Estimated area of disturbance associated with the area occupied by structures (pads) (60 by 60 feet per structure), communication regeneration stations (100 by 100 feet, one station approximately every 55 miles), series compensation stations, and permanent access roads (refer to Tables 2-1 and 2-2).

[3]Right-of-way Vegetation Clearing: vegetation clearing has been estimated within the transmission line right-of-way only. Calculations only include vegetation types with the potential to grow more than 5 feet tall (aspen, mountain forest, mountain shrub, pinyon-juniper, and riparian), and overlap with other disturbance within Project right-of-way. Vegetation clearing was not calculated for access roads due to the access road design not being available for the alternative routes at this time and is required to accurately identify locations of temporary and permanent access roads. Temporary and permanent disturbance calculations include estimated disturbance for all access roads.

[4]Disturbance calculations include an additional 5 percent contingency. Acres in table are rounded and, therefore, columns may not sum exactly.

[5]Miles of the reference centerline that are anticipated to use existing and/or improved existing access roads.

[6]Miles of the reference centerline that are anticipated to use newly constructed and/or overland access.

TABLE 2-12
SUMMARY OF ESTIMATED GROUND DISTURBANCE AND VEGETATION CLEARING FOR THE 345-KILOVOLT TRANSMISSION LINE SEGMENTS

Segments	Temporary Disturbance (acres)[1, 4]	Permanent Disturbance (acres)[2, 4]	Total Disturbance (acres)	Transmission Line Right-of-way Vegetation Clearing (acres)[3, 4]
Segment 4A	24	7	32	0
Segment 4B	24	7	32	0
Segment 4C	23	6	29	0

SOURCE: Assumptions for the calculations are derived from the Applicant's description of the Project (Appendix B).
NOTES:
[1] Temporary Disturbance: Estimated area of disturbance associated with structure work areas (150 by 200 feet per structure), one multipurpose construction yard (10 acre site divided among the three segments), one helicopter fly-yard (15 acre site divided among the three segments), wire tensioning/pulling sites (150 by 400 feet per segment), wire splicing sites (100 by 100 feet for Segment 4A and 4B), and guard structures (150 by 75 feet approximately 1.4 structures per 1 mile) (refer to Table 2-1).
[2] Permanent Disturbance: Estimated area of disturbance associated with the area occupied by structures (pads) and permanent access roads (refer to Table 2-1 and 2-2).
[3] Right-of-way Vegetation Clearing: vegetation clearing has been estimated within the transmission line right-of-way only. Calculations only include vegetation types with the potential to grow more than 5 feet tall (aspen, mountain forest, mountain shrub, pinyon-juniper, and riparian), and overlap with other disturbance within Project right-of-way. Vegetation clearing was not calculated for access roads due to the access road design not being available for the alternative routes at this time and is required to accurately identify locations of temporary and permanent access roads. Temporary and permanent disturbance calculations include estimated disturbance for all access roads.
[4] Disturbance calculations include an additional 5 percent contingency. Acres in table are rounded and, therefore, columns may not sum exactly.

As described in Section 2.3.3, existing access roads would be used in their present condition without improvements, to the extent possible, to limit new disturbance for the Project. In areas where improvements are required or deemed to be in the best interest of the Project for future use, the roads would be graded and/or graveled to provide a smooth all-weather travel surface. In areas where it is not practicable to use existing roads to fulfill the access requirements of the Project, the existing road would be upgraded or a new road would be constructed. Since the Project facilities have not yet been designed and locations of the transmission line facilities are not known, for the purpose of estimating impacts, ground disturbance associated with upgrading existing roads or constructing new roads was predicted through the development of a model. The predictive model was developed to (1) consider where existing roads can be used for Project construction, operation, and maintenance and where improved or new roads are required; (2) estimate potential ground disturbance resulting from the construction of new spur roads, improvement of existing access roads, and construction of new access roads; and (3) establish a baseline condition for access to conduct initial impact assessments for each resource evaluated in the EIS (e.g., visual resources, biological resources, land use, etc.).

Access levels are predictions of the general type of access (i.e., use existing roads, improve existing roads, or construct new roads) that would be required for every mile of each Project route alternative, and the associated amount of disturbance the access level would create. Although the method incorporates road design criteria, it does not go to the level of actual road design. As a result, some variation is anticipated between the disturbance predictions generated from the access-level modeling and the actual disturbance of designed and engineered access roads. Access-level disturbance predictions have been developed to be conservative to ensure predictions for ground disturbance are not underestimated in relation to actual Project disturbance and impacts. For purposes of analyzing impacts on resources and assessing likely ground disturbance associated with the Project, the following six access levels, based primarily on slope, were developed based on information provided in the Applicant's description of the Project:

- Access Level 1: Use existing roads (0 to 15 percent slope)
- Access Level 2: Use existing roads (greater than 15 percent slope)
- Access Level 3: Construct new access, flat to rolling terrain (0 to 8 percent slope)
- Access Level 4: Construct new access, rolling terrain (8 to 15 percent slope)
- Access Level 5: Construct new access, steep terrain (15 to 30 percent slope)
- Access Level 6: Construct new access, very steep terrain (greater than 30 percent slope)

In addition to ground disturbance, vegetation types that have the potential to grow more than 5 feet tall (e.g., aspen, montane forest, mountain shrub, pinyon-juniper, and riparian) would be cleared from the transmission line right-of-way using methods described in Appendix B, Section 4.1.5. Areas of the right-of-way were identified where these vegetation communities occur. Ground disturbance within the right-of-way associated with access roads, structure work areas, wire-splicing sites, wire-pulling/tensioning sites, and multi-purpose construction yards where these vegetative communities occur would overlap with the areas of transmission line right-of-way vegetation clearing. Table 2-10 provides an overview of the area of ground disturbance associated with the various access levels. Table 2-11 provides a summary comparison of the Project alternatives predicted disturbance (based on access levels and temporary and permanent Project facilities) and vegetation clearing.

Initial Impacts

As described in the previous section, based on estimated ground disturbance and resource inventory data reflecting the existing environment, each resource specialist determined the types and amounts of impacts that could occur on the resource (i.e., initial impacts). Computer-assisted models were developed to support this determination, which allowed the method used for each resource to be tailored to specific requirements, criteria, and assumptions for analysis of each resource. Qualitative and quantitative variables of resource sensitivity, resource quantity, and estimated ground disturbance were considered in predicting the intensity of initial impacts. The intensity of the environmental effect also can vary. In this analysis, the intensity of impacts was described in the following levels: high impact—that could cause substantial change or stress to an environmental resource or use (severe adverse or exceptional beneficial effects); moderate impact—that potentially could cause some change or stress to an environmental resource or use (readily apparent effects); low impact—that could be detectable but slight; and no identifiable impact. What constitutes a low, moderate, or high impact on a resource varies by resource and is described in the study methodology for each resource (Chapter 3), as are the assumptions for analysis made regarding each resource.

Mitigation Planning and Effectiveness

After initial impacts were identified for each resource, measures to mitigate impacts for environmental protection (refer to Table 2-13) were applied to avoid, reduce, or minimize moderate or high impacts. Selective mitigation measures were developed in collaboration with the BLM and cooperating agencies and include measures or techniques recommended or required (depending on land ownership) by BLM and USFS after initial impacts were identified and assessed. As such, selective mitigation measures provide a planning tool for minimizing potential adverse impacts.

For some resources (e.g., biological, cultural, and paleontological resources), pedestrian surveys conducted using agency-approved protocols would be required prior to construction (and based on the final design of the Project). The survey results would be used by the agencies to refine the mitigation requirements and further inform the POD. Additionally, mitigation to offset or compensate for impacts on some regulated resources may require mitigation measures and conservation actions in order to achieve land-use plan goals and objectives and provide for sustained yield of natural resources on public lands, while continuing to honor the agency's multiple-use missions. The sequence of mitigation action would comply with the mitigation identified by the CEQ (40 CFR 1508.20) and BLM's *Draft - Regional*

Mitigation Manual Section 1794 (refer to Appendix K for more detailed guidance) and could include measures for the BLM to consider for compensating for an impact by replacing or providing substitute resources or environments. Examples include creation or restoration of wetlands; offsite vegetation treatments to improve sage-grouse or migratory bird habitat; purchase of property or conservation easements to provide long-term protection for sage-grouse or migratory bird habitats; or appropriate mitigation for impacts to designated National Scenic and/or Historic Trails or those trails recommended as suitable for congressional designation. If applicable, additional mitigation requirements, including compensatory mitigation, would be approved by the agencies and incorporated into the POD prior to Project construction.

Once an alternative route is selected, the Applicant would coordinate with the BLM and other land-management agencies or landowners, as appropriate, to refine the implementation of mitigation at specific locations or areas based on final Project design. For example, if a road closure was recommended, the Applicant would work with the applicable land-management agency or landowner to determine the specific method of road closure most appropriate for the site or area (e.g., barricading with a locking gate, obstructing access on the road using an earthen berm or boulders, revegetating the roadbed, or obliterating the road and returning it to its natural contour and vegetation). This detailed mitigation would be incorporated into the POD prior to Project construction.

Residual Impacts

Residual impacts are the environmental effects that remain after selective mitigation measures are applied. After the locations of potential residual impacts were identified, the intensities of such potential residual impacts anticipated to occur from implementation of an alternative along the reference centerline were assessed and mapped (Volume II). They are discussed in the environmental effects sections for each resource in this chapter.

The description of residual effects anticipated for each alternative should be reviewed in conjunction with the resource inventory maps provided in Volume II. Several of the alternative routes considered in this EIS share common links and would result in similar environmental effects. Rather than repeating information, in most cases the descriptions of alternative routes have been abbreviated, as appropriate, to focus on the effects unique to an alternative route.

2.5.1.3 Screening and Comparing Alternatives

Through a systematic analysis, as shown in Figure 2-7, the alternative routes were screened and compared to narrow the number of alternative routes and to determine the most environmentally acceptable routes to be addressed in the EIS.

Once the impacts along each of the alternative routes had been analyzed, the alternative routes were screened and compared to identify which were most environmentally preferable and to eliminate from further consideration less preferable ones (in accordance with criteria at 40 CFR 1502.14). Screening and comparing the routes was conducted progressively in three levels, as illustrated in Figure 2-7, for all of the alternative routes. Level 1 screening focused on comparison of segments of alternative routes in localized areas. Level 2 screening focused on larger subregional areas. Level 3 screening involved combining the suitable segments of routes from the first two levels of screening to form complete routes.

The results of the screening and comparison establish the basis for characterizing the impacts of remaining, complete alternative routes and comparing those alternative routes. The results of the comparison of alternative routes are presented in Section 2.7.

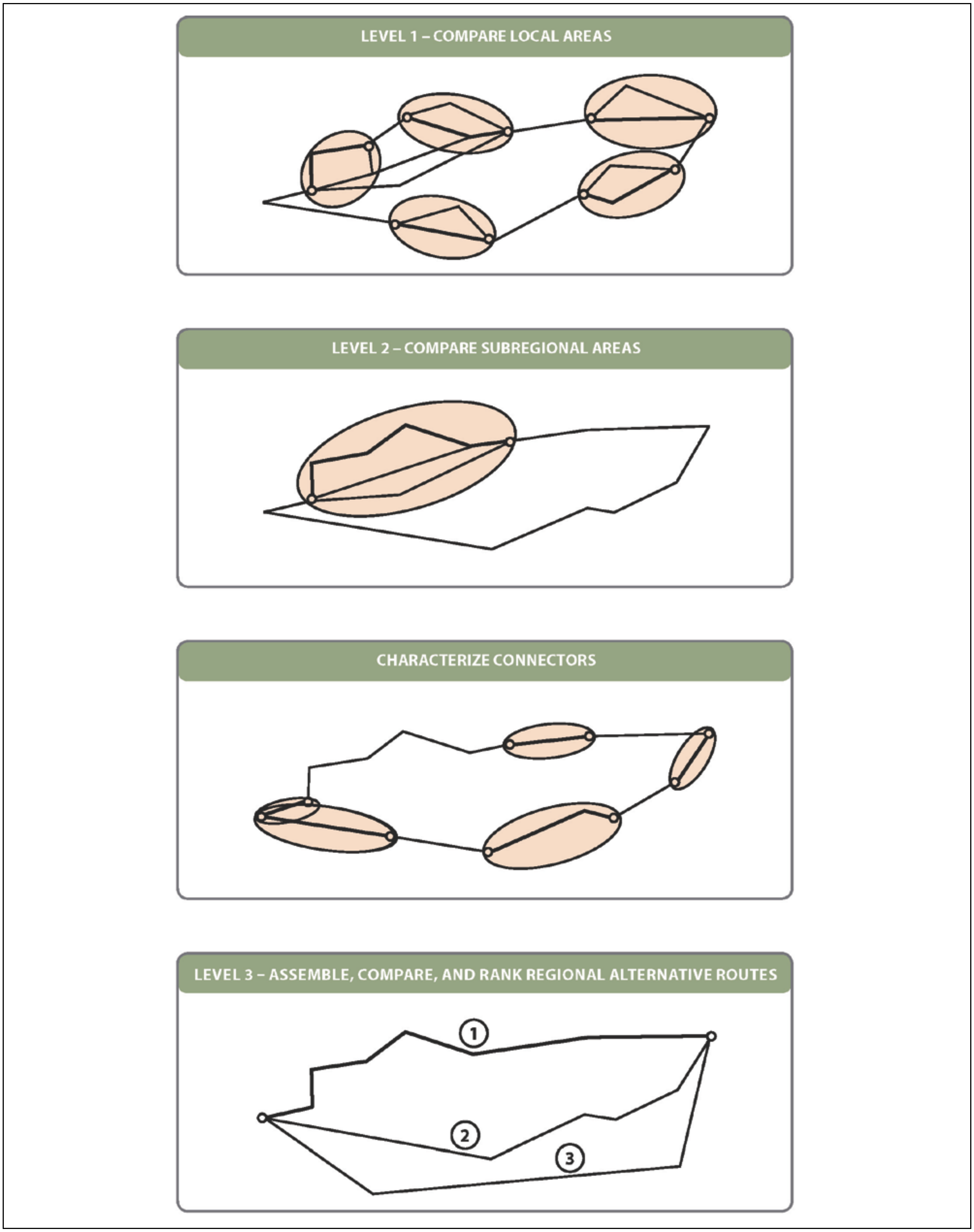
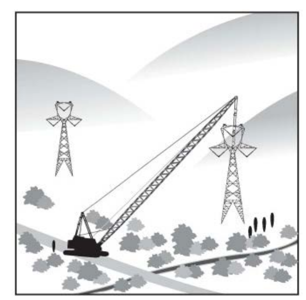
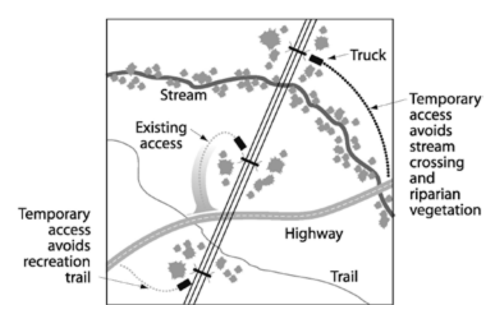
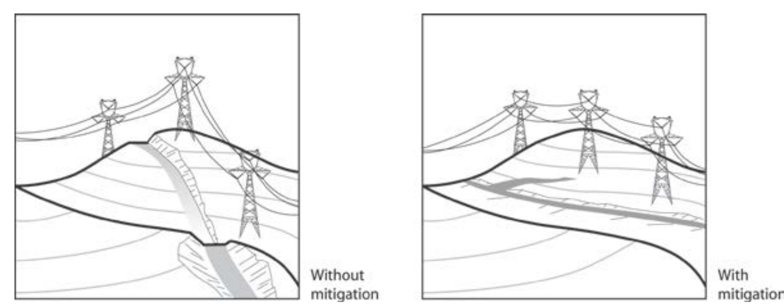


Figure 2-7 Alternative Routes Screening and Comparison Approach

TABLE 2-13
SELECTIVE MITIGATION MEASURES

Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
1. <u>Disturbance to Sensitive Soils and Vegetation</u> Existing access roads/trails would not be widened or otherwise upgraded for construction and maintenance in areas, where soils and vegetation are particularly sensitive to disturbance, except in areas where repairs are necessary to make existing roads/trails passable and safe determined by the land-management agency.		●	●	●	●	●	●		●	●	●	●	●
					Avoiding unnecessary access road upgrades would limit the amount of habitat disturbed or removed. In addition, the avoidance of road upgrades would not allow for vehicular traffic to increase significantly, thereby reducing the potential for indirect effects such as damage or loss of vegetation, spread of noxious weeds, harassment of wildlife, vandalism of cultural resources, and disturbance to sensitive land uses (e.g., parks, preservation, and recreation areas).								
2. <u>Sensitive Resources Avoidance</u> There would be no blading of new access roads in certain areas of sensitive resources (e.g., perennial streams, riparian areas, wetlands, historic trails) during construction (or maintenance). In these particular areas, existing crossings would be used at perennial streams, national recreational trails, and irrigation channels and existing or overland access routes are to be used for construction and maintenance in these select areas. To minimize ground disturbance, overland routes must be flagged with easily seen markers, and the route must be approved in advance.		●	●	●	●	●	●		●	●		●	●
					Selective Mitigation Measure 2 is effective for the same reasons as Selective Mitigation Measure 1. Minimizing ground-disturbing construction activities in the same vicinity as streams would limit disturbance to riparian areas and/or streambeds, therefore avoiding turbidity and sedimentation. In addition, it would limit land use conflicts with trails and/or disruption of sensitive views.								

<table>
<tr><th colspan="14">TABLE 2-13
SELECTIVE MITIGATION MEASURES</th></tr>
<tr><th rowspan="3">Mitigation Measure</th><th rowspan="3">Mitigation Examples</th><th colspan="3">Mitigation Application Phase</th><th colspan="9">Mitigation Effectiveness</th></tr>
<tr><th rowspan="2">Design And Engineering</th><th rowspan="2">Construction</th><th rowspan="2">Operation And Maintenance</th><th colspan="2">Water Resources</th><th colspan="2">Earth Resources</th><th colspan="2">Biological Resources</th><th rowspan="2">Land Use</th><th rowspan="2">Visual Resources</th><th rowspan="2">Cultural Resources</th></tr>
<tr><th>Surface Water/Special Aquatic Sites</th><th>Groundwater/Wells</th><th>Geology/Soils</th><th>Paleontology</th><th>Sensitive Wildlife Species</th><th>Sensitive Plant Species</th></tr>
<tr><td rowspan="2">3. <u>Minimize Slope Cut and Fill</u>

The alignment of any new access roads or cross-country routes in designated areas would follow the landform contours where practicable to minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, providing that such alignment does not impact other resource values. In addition to reducing ground disturbance associated with the construction of new access roads, modification to the size and/or configuration of the permanent structure work areas facilitated by minor structure design adjustments would allow cut and fill slopes to be minimized and contoured to blend with existing topography to the extent practicable.</td><td rowspan="2">
</td><td rowspan="2">●</td><td rowspan="2"></td><td rowspan="2">●</td><td>●</td><td>●</td><td>●</td><td>●</td><td></td><td>●</td><td></td><td>●</td><td>●</td></tr>
<tr><td colspan="9">Following the existing land contours and terrain, particularly in steep terrain, minimizes the cutting and filling of slopes, and ensures the form and line of the landscape is not visually interrupted. This results in reducing visual contrast between the exposed ground of the road or structure work areas and the surrounding environment. Also, water runoff is less likely to accelerate soil erosion (minimizing potential damage from rutting, drilling), which in turn protects adjacent vegetation.</td></tr>
<tr><td rowspan="2">4. <u>Minimize Tree Clearing</u>

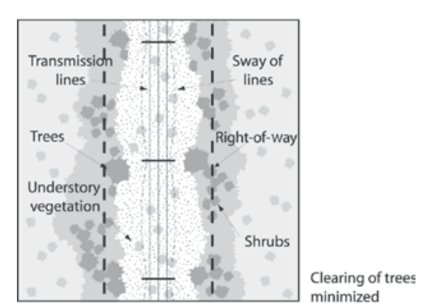
Removal of trees in the right-of-way would be minimized to limit disturbance to timber resources, reduce visual contrast, and protect sensitive habitat, to the extent practicable to satisfy conductor-clearance requirements (i.e., PacifiCorp Vegetation Management Standards). Trees and other vegetation would be removed selectively (e.g., edge feathering) to blend the edge of the right-of-way into adjacent vegetation patterns, as practicable and appropriate. To protect biological resources, only trees over 5 feet tall would be selectively removed in riparian habitats.</td><td rowspan="2">
</td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td>●</td><td>●</td><td>●</td><td></td><td>●</td><td></td><td>●</td><td>●</td><td></td></tr>
<tr><td colspan="9">Selectively removing vegetation (i.e., trees) within and along the edges of the right-of-way reduces disruption of habitat, minimizes removal of timber resources, and reduces the visual contrast between the right-of-way and the surrounding environment. Furthermore, “feathering” the edges of the right-of-way instead of cutting trees and vegetation in a straight line results in a more gradual modification to the environment.</td></tr>
</table>

TABLE 2-13
SELECTIVE MITIGATION MEASURES

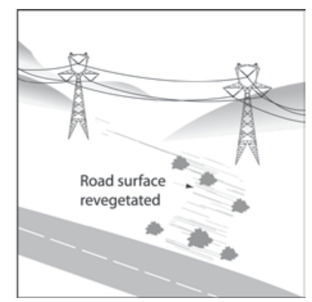
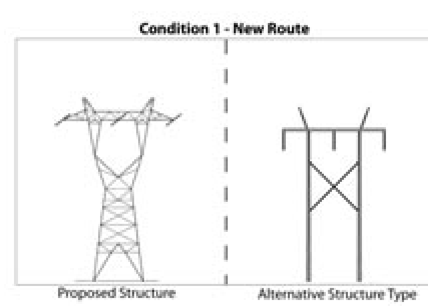
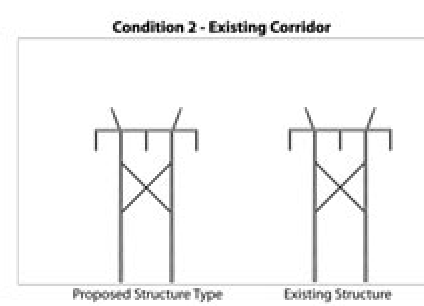
Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
5. **Minimize New or Improved Accessibility** To limit new or improved access into the Project area, as well as earthwork associated with the construction of tower pads in extremely steep terrain, all new or improved access (e.g., blading, widening existing access) and tower pads that would not be required for maintenance would be closed or rehabilitated using the most effective and least environmentally damaging methods appropriate to that area and developed through consultation with the landowner or land-management agency. Methods for road closure or management include installing and locking gates, obstructing the path (e.g., earthen berms, boulders, redistribution of woody debris), revegetating and mulching the surface of the roadbed to make it less apparent, restoring the road to its natural contour and vegetation, or constructing waterbars to ensure proper drainage. Tower pads would be contoured to match existing grade and revegetated to the extent practicable to reduce their visual dominance in extremely steep terrain.	 			●	●	●	●		●	●	●	●	●
					Closing access roads where they are not needed after construction protects the resources in that area from further disturbance for the reasons described in Selective Mitigation Measure 1.								
6. **Tower Design Modification** The tower design may be modified or an alternative tower type (or finish materials) may be used to minimize visual contrast or to address site-specific constraints (e.g., terrain, airports, raptor perching etc.), if practical and consistent with Avian Power Line Interaction Committee and Applicant standards.	 	●							●		●	●	●
					Flexibility in designing the tower or use of different tower types would allow tower structures to be more adapted to specific site situations (i.e., Condition 1 – New Route, Condition 2 – Existing Corridor). For example, in areas where there are sensitive views and an existing corridor, the proposed line would parallel an existing line and match the type of tower used along the existing line and therefore minimize visual contrast. Additionally, tower design modification could be used to minimize perching opportunities for aerial predators where sensitive prey species occur (e.g., sage-grouse).								

TABLE 2-13
SELECTIVE MITIGATION MEASURES

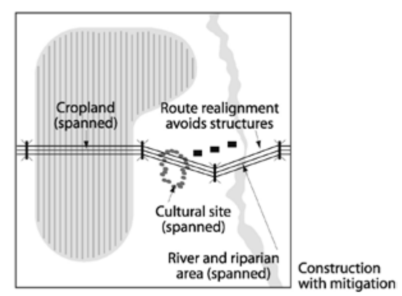
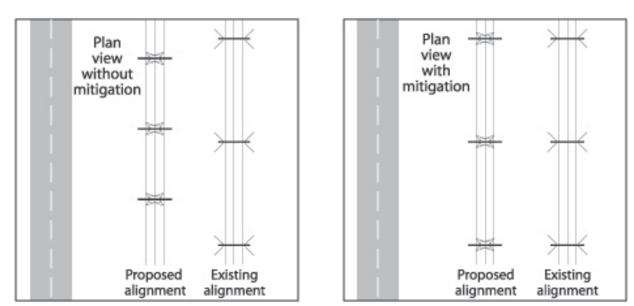
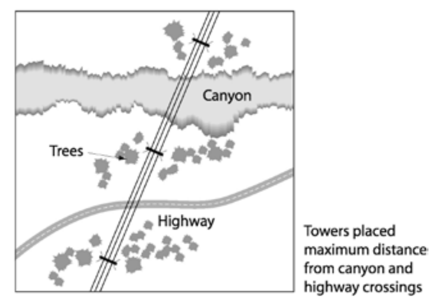
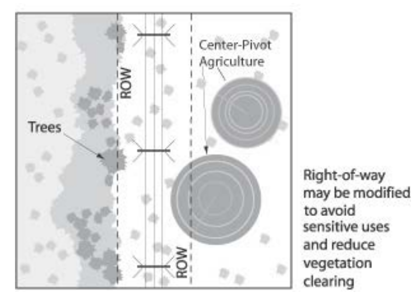
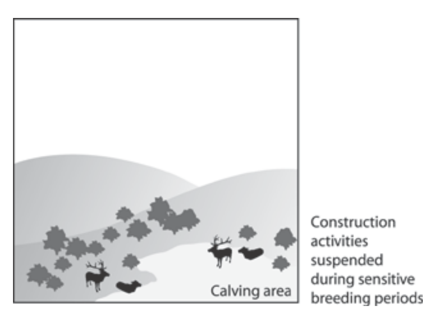
Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
7. **Span and/or Avoid Sensitive Features** Within the limits of standard tower design and in conformance with engineering and Applicant requirements, structures would be located to allow conductors to clearly span identified sensitive features. Structures would be placed so as to avoid sensitive features, including, but not limited to, wetlands, riparian areas, water courses, hazardous substance remediation, and cultural sites, to the extent possible. Avoidance measures may include selective tower placement, spanning sensitive features, or realigning access routes.		●			●	●	●	●	●	●	●	●	●
					Flexibility in the placement of towers allows for sensitive features to be avoided. Realigning the towers along a route or realigning the route can result in avoiding or minimizing direct impacts on resources, such as cultural and biological resources, as well as land uses such as agriculture, parks, preservation, hazardous substance remediation, and recreation areas.								
8. **Match Transmission Line Spans** Standard tower design would be modified to correspond with spacing of existing transmission line structures of the same voltage, where feasible and within limits of standard tower design, to reduce visual contrast and/or potential operational conflicts. The normal span would be modified to correspond with existing towers, but not necessarily at every location.		●									●	●	●
					Matching tower spacing with existing parallel lines reduces the visual space occupied by the towers and minimizes the amount of contrast between the man-made structures and the landscape.								

TABLE 2-13
SELECTIVE MITIGATION MEASURES

Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
9. <u>Maximize Span at Crossings</u> At highway, canyon, and trail crossings, towers would be placed at the maximum feasible distance from the crossing within limits of standard tower design and in conformance with engineering and Applicant requirements to reduce visual impacts and potential impacts on recreation values and to increase safety at these locations.		●									●	●	●
					Placing towers at a maximum distance from major or sensitive crossings (i.e., roads and trails) would reduce visual impacts and potential safety hazards (i.e., vehicle collision with tower).								
10. <u>Helicopter Construction</u> Helicopter placement of towers during construction and helicopter patrol and maintenance may be used where practicable to reduce surface impacts in environmental constraint areas (e.g., inventoried roadless areas) or steep terrain locations (e.g., Baxter Pass).			●	●	●	●	●	●	●	●	●	●	●
					Using helicopters to place towers in steep terrain or otherwise sensitive areas reduces land use and natural resource impacts as a result of construction activities. The decrease of ground disturbances would reduce the loss of vegetation, accelerated soil erosion, potential damage to cultural resources, and visual impacts.								

<table>
<tr><th colspan="14">TABLE 2-13
SELECTIVE MITIGATION MEASURES</th></tr>
<tr><th rowspan="3">Mitigation Measure</th><th rowspan="3">Mitigation Examples</th><th colspan="3">Mitigation Application Phase</th><th colspan="9">Mitigation Effectiveness</th></tr>
<tr><th rowspan="2">Design And Engineering</th><th rowspan="2">Construction</th><th rowspan="2">Operation And Maintenance</th><th colspan="2">Water Resources</th><th colspan="2">Earth Resources</th><th colspan="2">Biological Resources</th><th rowspan="2">Land Use</th><th rowspan="2">Visual Resources</th><th rowspan="2">Cultural Resources</th></tr>
<tr><th>Surface Water/Special Aquatic Sites</th><th>Groundwater/Wells</th><th>Geology/Soils</th><th>Paleontology</th><th>Sensitive Wildlife Species</th><th>Sensitive Plant Species</th></tr>
<tr><td rowspan="2">11. <u>Minimize Right-of-way Clearing</u>

Clearing of the right-of-way would be minimized to reduce visual contrast and avoid sensitive features including, but not limited to, land uses, biological resources, and cultural sites. In select areas, the right-of-way width may be modified (within the limits of PacifiCorp Vegetation Management Standards and standard tower design) to protect sensitive resources, but current land uses would be allowed to continue unabated, provided the use meets applicable standards.</td><td rowspan="2">
</td><td rowspan="2">●</td><td rowspan="2">●</td><td rowspan="2">●</td><td>●</td><td>●</td><td></td><td></td><td>●</td><td>●</td><td>●</td><td>●</td><td>●</td></tr>
<tr><td colspan="9">Limiting the width of the area cleared in the right-of-way reduces the amount of vegetation (i.e., trees) removed at the edges of and within the right-of-way, minimizing the loss of habitat and reducing visual contrast between the cleared areas and the surrounding environment. In limited circumstances, the width of the right-of-way may be reduced to accommodate a land use (i.e., residential).</td></tr>
<tr><td rowspan="2">12. <u>Seasonal and Spatial Plant and Wildlife Restrictions</u>

To minimize disturbance to identified plant and wildlife species during sensitive periods, construction and maintenance activities would be restricted in designated areas unless exceptions are granted by the Authorized Officer or his/her designated representative and other applicable regulatory agencies (e.g., U.S. Fish and Wildlife Service, state wildlife agencies). A list of seasonal wildlife restrictions are presented in Appendix E, Table E-10.</td><td rowspan="2">

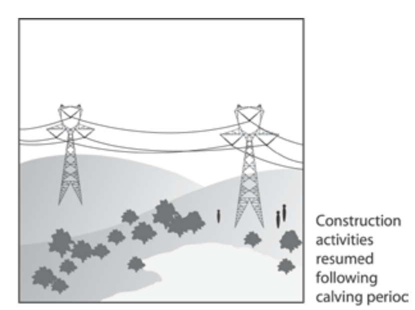

</td><td rowspan="2"></td><td rowspan="2">●</td><td rowspan="2">●</td><td></td><td></td><td></td><td></td><td>●</td><td>●</td><td></td><td></td><td></td></tr>
<tr><td colspan="9">Restricting construction activities or maintenance during identified sensitive periods eliminates potential disturbance of plants or wildlife during these critical periods of their life cycles.</td></tr>
</table>

TABLE 2-13
SELECTIVE MITIGATION MEASURES

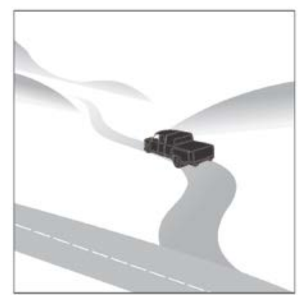
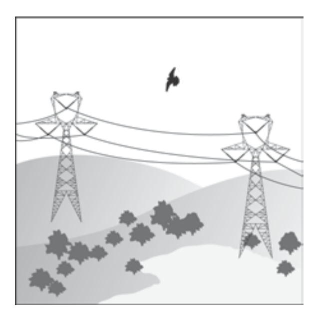
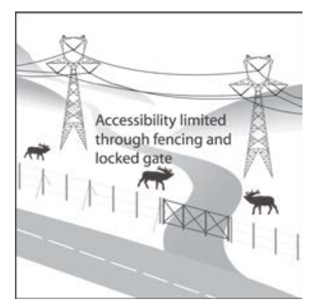
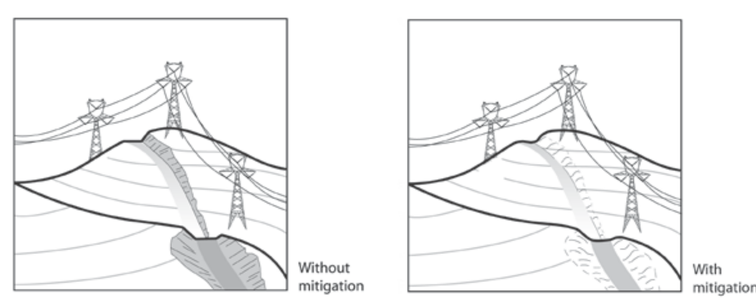
Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
13. **<u>Overland Access</u>** The Construction Contractor would use overland access to the greatest extent possible in areas where no grading would be needed to access work areas. Overland access would consist of drive-and-crush and/or clear-and-cut travel. Drive-and-crush is vehicular travel to access a site without significantly modifying the landscape. Vegetation is crushed but not cropped. Soil is compacted, but no surface soil is removed. Clear-and-cut is considered as brushing off (removal) of all vegetation to improve or provide suitable access for equipment. All vegetation is removed using aboveground cutting methods that leave the root crown intact. Prior to work beginning, overland access routes would be staked to a minimum width of 14 feet and would be specified in the POD. The appropriate use of overland access routes would be restricted based on dry or frozen soil conditions, seasonal weather conditions, and relatively flat terrain.	 		●	●	●	●	●		●		●	●	●
					Overland access would avoid or minimize the removal of surface soil and vegetation, reducing the potential for erosion and loss of habitat. In addition, avoiding the construction of a new road would reduce the potential for increased traffic and the associated indirect effects.								
14. **<u>Flight Diverters and Perch Deterrents</u>** Shield wires, guy wires, and overhead optical ground wire along portions of the transmission line that have a high potential for avian collisions would be marked with flight diverters or other Bureau of Land Management or U.S. Forest Service approved devices in accordance with agency requirements and Reducing Avian Collisions with Power Lines, The State of the Art in 2012 (Avian Power Line International Committee 2012). Portions of the transmission line that cross through, or are adjacent to, waterfowl and general migratory pathways or habitat for high priority species may be marked to reduce the risk of avian collisions. This measure may also include use of devices to deter raptors from perching on transmission line structures in habitat for high priority prey species (e.g., sage-grouse). The specific segments where these devices would be used would be determined in consultation with the appropriate agencies.			●	●					●			●	
					Marking guy wires and overhead optical ground wires on segments of the transmission lines that cross through, or are adjacent to, high priority avian habitat or where risk of avian collisions are elevated would minimize the risk of avian collision. Installation of perch deterrents on tower structures would reduce potential for increased raptor predation on sensitive prey species.								

TABLE 2-13
SELECTIVE MITIGATION MEASURES

Mitigation Measure	Mitigation Examples	Mitigation Application Phase: Design And Engineering	Mitigation Application Phase: Construction	Mitigation Application Phase: Operation And Maintenance	Mitigation Effectiveness – Water Resources: Surface Water/Special Aquatic Sites	Water Resources: Groundwater/Wells	Earth Resources: Geology/Soils	Earth Resources: Paleontology	Biological Resources: Sensitive Wildlife Species	Biological Resources: Sensitive Plant Species	Land Use	Visual Resources	Cultural Resources
15. <u>Limit Accessibility in Sensitive Habitats</u> Where feasible, access roads that traverse sensitive habitats (e.g., crucial winter range) would be gated or otherwise blocked to limit public access.			●	●					●		●		●
					Selective Mitigation Measure 15 is effective for the same reasons as Selective Mitigation Measure 12. Limiting access to sensitive areas would reduce the potential for indirect effects associated with increased traffic.								
16. <u>Blend Road Cuts or Grading</u> Soil amendments, mineral emulsions, or asphalt emulsions (i.e., Permeon™ or approved equal) would be applied, or grading techniques such as slope rounding and slope scarification would be used to blend road and pad cuts into the landscape in areas of steep terrain where grading is necessary, in rocky areas, or where soil color would create strong landscape contrasts.		●	●	●			●					●	●
					Similar to Selective Mitigation Measure 3, the implementation of grading techniques (i.e., slope rounding and slope scarification) would reduce the visual contrast between exposed ground and the surrounding environment. The application of this mitigation would be determined in the field, during or after construction, by the Compliance Inspection Contractor and Bureau of Land Management or U.S. Forest Service Authorized Officers.								

2.5.2 Transmission Line Alternative Routes

The alternative routes are organized in three primary groupings: one grouping in the northern portion of the Project area and two groupings in the southern portion of the Project area. Each of the groupings has multiple alternative routes and some of the alternative routes have route variations. An entire route from Aeolus to Clover would be one alternative route in the north and one alternative route in the south. For purposes of analysis and ease of reference, the routes are composed of smaller, interconnecting segments, or links. The 500kV transmission line alternative routes and route variations, and associated links, are listed in Table 2-14 (the Agency Preferred Alternative and the Applicant Preferred Alternative are indicated). A description of each alternative route and route variation is presented in Sections 2.5.2.1, 2.5.2.2, and 2.5.2.3. Figures 2-8a, through 2-8c, 2-9, and 2-10a through 2-10d are schematic drawings that illustrate each of the alternative routes and route variations. The 345kV transmission line segments and associated links are listed in Table 2-16 (there are no alternative routes for these short segments). Table 2-16 lists jurisdiction and the existing linear facilities that would be parallel to the proposed 500kV transmission line along each alternative route and route variation. Comparison of the alternative routes is presented in Section 2.7.

TABLE 2-14
500-KILOVOLT TRANSMISSION LINE
ALTERNATIVE ROUTES, ROUTE VARIATIONS, AND ASSOCIATED LINKS

Alternative Route	Length (miles, approximate)	Links
Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)		
Alternative WYCO-B and Route Variations		
WYCO-B (Applicant Preferred Alternative)	204.5	W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175
WYCO-B-1	204.9	W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C72, C91, C92, C171, C173, C174, C175
WYCO-B-2 (Agency Preferred Alternative)	204.5	W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, C93, C175
WYCO-B-3	204.5	W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, C92, C171, C172, C174, C175
Alternative WYCO-C and Route Variations		
WYCO-C	210.4	W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175
WYCO-C-1	210.8	W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C72, C91, C92, C171, C173, C174, C175
WYCO-C-2	210.4	W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, C93, C175
WYCO-C-3	210.4	W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, C92, C171, C172, C174, C175

TABLE 2-14 500-KILOVOLT TRANSMISSION LINE ALTERNATIVE ROUTES, ROUTE VARIATIONS, AND ASSOCIATED LINKS		
Alternative Route	**Length (miles, approximate)**	**Links**
Alternative WYCO-D and Route Variation		
WYCO-D	250.0	W15, W16, W22, W35, W36, W30, W32, W109, W110, W111, W121, W299, W300, W321, C17, C27, C33, C25, C20, C13, C100, C101, C105, C106, C170, C171, C173, C174, C175
WYCO-D-1	250.0	W15, W16, W22, W35, W36, W30, W32, W109, W110, W111, W121, W299, W300, W321, C17, C27, C33, C25, C20, C13, C100, C101, C105, C106, C170, C171, C172, C174, C175
WYCO-F and Route Variations		
WYCO-F	218.9	W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175
WYCO-F-1	219.3	W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C72, C91, C92, C171, C173, C174, C175
WYCO-F-2	218.9	W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, C93, C175
WYCO-F-3	218.9	W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, C92, C171, C172, C174, C175
Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)		
COUT BAX-B	279.2	C177, C185, C195, C196, C197, C270, U490, U486, U487, U730, U729, U728, U732, U731, U765, U628, U629, U630, U631, U637, U639, U650
COUT BAX-C	289.7	C177, C185, C195, C196, C197, C270, U490, U486, U487, U488, U734, U733, U732, U731, U765, U628, U629, U630, U631, U637, U639, U650
COUT BAX-E	291.5	C177, C185, C195, C196, C197, C270, U490, U486, U487, U488, U489, U495, U493, U496, U585, U544, U537, U600, U636, U637, U639, U650
Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)		
Alternative COUT-A and Route Variation		
COUT-A	206.0	C186, C187, U241, U310, U390, U391, U410, U420, U421, U425, U426, U427, U424, U429, U433, U460, U621, U625, U638, U639, U650
COUT-A-1	205.6	C186, C187, U241, U310, U390, U391, U410, U420, U421, U425, U426, U427, U424, U428, U433, U460, U621, U625, U638, U639, U650
Alternative COUT-B and Route Variations		
COUT-B	216.0	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, U436, U524, U527, U530, U539, U460, U621, U625, U638, U639, U650
COUT-B-1	212.7	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U511, U513, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650

TABLE 2-14 500-KILOVOLT TRANSMISSION LINE ALTERNATIVE ROUTES, ROUTE VARIATIONS, AND ASSOCIATED LINKS		
Alternative Route	**Length (miles, approximate)**	**Links**
COUT-B-2	214.2	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U511, U520, U514, U540, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-B-3	213.9	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, U512, U514, U516, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-B-4	214.2	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, U512, U514, U540, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-B-5	213.9	C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U511, U520, U514, U516, U560, U530, U539, U460, U621, U625, U638, U639, U650
Alternative COUT-C and Route Variations		
COUT-C	209.8	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U525, U524, U527, U530, U539, U460, U621, U625, U638, U639, U650
COUT-C-1	206.4	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U409, U511, U513, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-C-2	207.9	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U409, U511, U520, U514, U540, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-C-3 (Agency Preferred Alternative)	207.6	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U409, U511, U520, U514, U516, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-C-4	207.9	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U411, U512, U514, U540, U515, U560, U530, U539, U460, U621, U625, U638, U639, U650
COUT-C-5	207.6	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U411, U512, U514, U516, U560, U530, U539, U460, U621, U625, U638, U639, U650
Alternatives COUT-H and COUT-I		
COUT-H (Applicant Preferred Alternative)	200.6	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U525, U435, U545, U546, U548, U600, U636, U637, U639, U650
COUT-I	240.2	C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U523, U492, U494, U493, U496, U586, U587, U498, U629, U630, U631, U637, U639, U650
NOTE: A link is a segment of the route between two nodes. Links are displayed on Maps 2-2a and 2-2b.		

TABLE 2-15 345-KILOVOLT TRANSMISSION LINE SEGMENTS AND ASSOCIATED LINKS		
Segment	**Length (miles, approximate)**	**Link(s)**
Segment 4A	2.4	U642
Segment 4B	2.4	U640
Segment 4C	1.8	U643, U644
NOTE: Links are displayed on Maps 2-1a and 2-1b		

TABLE 2-16 500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION										
					Jurisdiction (miles crossed)					
Alternative Route	**Overall Length (miles)**	**Parallel to Existing Transmission Line (miles [percent])**	**New Transmission Line Route (miles [percent])**	**Parallel Condition**	**Bureau of Land Management**	**U.S. Forest Service**	**National Park Service**	**State**	**Tribal**	**Private**
Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)										
Alternative WYCO-B and Route Variations										
WYCO-B (Applicant Preferred Alternative)	204.5	24.8 (12%)	179.7 (88%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 23.9 miles parallel to transmission lines between 300 to 2,000 feet[1] ▪ Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 5.7 miles parallel to pipelines within 300 feet ▪ 38.6 miles parallel to pipelines between 300 to 2,000 feet	125.8	0.0	0.0	14.7	0.0	64.0
WYCO-B-1	204.9	24.8 (12%)	180.1 (88%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 23.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 5.7 miles parallel to pipelines within 300 feet ▪ 38.6 miles parallel to pipelines between 300 to 2,000 feet	127.3	0.0	0.0	13.7	0.0	63.9
WYCO-B-2 (Agency Preferred Alternative)	204.5	19.3 (9%)	185.2 (91%)	▪ 1.0 mile parallel to transmission lines within 300 feet[1] ▪ 18.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 5.7 miles parallel to pipelines within 300 feet ▪ 38.6 miles parallel to pipelines between 300 to 2,000 feet	124.1	0.0	0.1	14.7	0.0	65.6
WYCO-B-3	204.5	24.8 (12%)	179.7 (88%)	▪ 4.4 miles parallel to transmission lines within 300 feet[1] ▪ 20.4 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 5.7 miles parallel to pipelines within 300 feet ▪ 38.6 miles parallel to pipelines between 300 to 2,000 feet	125.4	0.0	0.0	14.7	0.0	64.4
Alternative WYCO-C and Route Variations										
WYCO-C	210.4	28.8 (14%)	181.6 (86%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 27.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 23.0 miles parallel to pipelines within 300 feet ▪ 60.4 miles parallel to pipelines between 300 to 2,000 feet	127.3	0.0	0.0	15.0	0.0	68.1
WYCO-C-1	210.8	28.8 (14%)	182.0 (86%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 27.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 23.0 miles parallel to pipelines within 300 feet ▪ 60.4 miles parallel to pipelines between 300 to 2,000 feet	128.8	0.0	0.0	14.0	0.0	68.0

TABLE 2-16
500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Parallel Condition	Jurisdiction (miles crossed) Bureau of Land Management	U.S. Forest Service	National Park Service	State	Tribal	Private
WYCO-C-2	210.4	23.3 (11%)	187.1 (89%)	▪ 1.0 mile parallel to transmission lines within 300 feet[1] ▪ 22.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 23.0 miles parallel to pipelines within 300 feet ▪ 60.4 miles parallel to pipelines between 300 to 2,000 feet	125.6	0.0	0.1	1.0	0.0	69.7
WYCO-C-3	210.4	28.8 (14%)	181.6 (86%)	▪ 4.4 miles parallel to transmission lines within 300 feet[1] ▪ 24.4 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 23.0 miles parallel to pipelines within 300 feet ▪ 60.4 miles parallel to pipelines between 300 to 2,000 feet	126.9	0.0	0.0	15.0	0.0	68.5
Alternative WYCO-D and Route Variation										
WYCO-D	250.0	92.6 (37%)	157.4 (63%)	▪ 12.1 miles parallel to transmission lines within 300 feet[1] ▪ 80.5 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times (one of the three crossings occurs near Craig, Colorado where these two lines are on the same double-circuit structures) ▪ 9.1 miles parallel to pipelines within 300 feet ▪ 54.8 miles parallel to pipelines between 300 to 2,000 feet	105.8	0.0	0.0	25.3	0.0	118.9
WYCO-D-1	250.0	92.6 (37%)	157.4 (63%)	▪ 15.5 miles parallel to transmission lines within 300 feet[1] ▪ 77.1 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times (one of the three crossings occurs near Craig, Colorado where these two lines are on the same double-circuit structures) ▪ 9.1 miles parallel to pipelines within 300 feet ▪ 54.8 miles parallel to pipelines between 300 to 2,000 feet	105.4	0.0	0.0	25.3	0.0	119.3
Alternative WYCO-F and Route Variations										
WYCO-F	218.9	24.8 (13%)	194.1 (87%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 23.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 6.1 miles parallel to pipelines within 300 feet ▪ 7.8 miles parallel to pipelines between 300 to 2,000 feet	140.7	0.0	0.0	14.9	0.0	63.3
WYCO-F-1	219.3	24.8 (13%)	194.5 (87%)	▪ 0.9 mile parallel to transmission lines within 300 feet[1] ▪ 23.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 2.0 mile parallel to pipelines within 300 feet ▪ 7.8 miles parallel to pipelines between 300 to 2,000 feet	142.2	0.0	0.0	13.9	0.0	63.2

TABLE 2-16
500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Parallel Condition	Jurisdiction (miles crossed): Bureau of Land Management	U.S. Forest Service	National Park Service	State	Tribal	Private
WYCO-F-2	218.9	19.3 (9%)	199.6 (91%)	▪ 1.0 mile parallel to transmission lines within 300 feet[1] ▪ 18.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 6.1 miles parallel to pipelines within 300 feet ▪ 47.7 miles parallel to pipelines between 300 to 2,000 feet	139.0	0.0	0.1	14.9	0.0	64.9
WYCO-F-3	218.9	24.8 (11%)	194.1 (89%)	▪ 4.4 miles parallel to transmission lines within 300 feet[1] ▪ 20.4 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Miners to Sinclair 230kV transmission line once, Bears Ears to Bonanza 345kV transmission line three times, and Hayden to Artesia 138kV three times ▪ 6.1 miles parallel to pipelines within 300 feet ▪ 41.7 miles parallel to pipelines between 300 to 2,000 feet	140.3	0.0	0.0	14.9	0.0	63.7
Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)										
COUT BAX-B	279.2	101.5 (36%)	177.7 (64%)	▪ 2.2 miles parallel to transmission lines within 300 feet[1] ▪ 99.2 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses the Rangely to Meeker 138kV transmission line once, the Mounds SW Park to Moab 138kV transmission line once, Huntington to Pinto 345kV transmission line once, the Huntington to Emery 345kV transmission line once, Mona to Huntington 345kV transmission line three times, Jerusalem to Nebo 138kV transmission line once, Nebo to Martin Marietta 138kV transmission line once, and the Mona to Bonanza 345kV transmission line once ▪ 9.2 miles parallel to pipelines within 300 feet ▪ 27.3 miles parallel to pipelines between 300 to 2,000 feet	172.7	16.9	0.0	30.9	0.0	58.7
COUT BAX-C	289.7	91.4 (32%)	198.3 (68%)	▪ 12.1 miles parallel to linear facilities within 300 feet[1] ▪ 79.4 miles parallel to linear facilities between 300 to 2,000 feet[1] • Crosses the Rangely to Meeker 138kV transmission line once, the Mounds SW Park to Moab 138kV transmission line twice, Huntington to Pinto 345kV transmission line once, the Huntington to Emery 345kV transmission line once, Mona to Huntington 345kV transmission line three times, Jerusalem to Nebo 138kV transmission line once, Nebo to Martin Marietta 138kV transmission line once, and the Mona to Bonanza 345kV transmission line once ▪ 27.3 miles parallel to pipelines within 300 feet ▪ 36.6 miles parallel to pipelines between 300 to 2,000 feet	179.3	16.9	0.0	34.8	0.0	58.7
COUT BAX-E	291.5	70.9 (24%)	220.6 (76%)	▪ 28.4 miles parallel to transmission lines within 300 feet[1] ▪ 42.5 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses the Rangely to Meeker 138kV transmission line once, the Mounds SW Park to Moab 138kV transmission line three times, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, Nebo to Martin Marietta 138kV transmission line once, and the Mona to Bonanza 345kV transmission line once ▪ 9.4 miles parallel to pipelines within 300 feet ▪ 33.8 miles parallel to pipelines between 300 to 2,000 feet	191.0	7.7	0.0	27.1	0.0	65.7

TABLE 2-16 500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION										
					Jurisdiction (miles crossed)					
Alternative Route	**Overall Length (miles)**	**Parallel to Existing Transmission Line (miles [percent])**	**New Transmission Line Route (miles [percent])**	**Parallel Condition**	**Bureau of Land Management**	**U.S. Forest Service**	**National Park Service**	**State**	**Tribal**	**Private**
Colorado to Utah – U.S. Highway 40 to Central, Utah, to Clover (COUT)										
Alternative COUT-A and Route Variation										
COUT-A	206.0	123.7 (60%)	82.3 (40%)	▪ 11.9 miles parallel to transmission lines within 300 feet[1] ▪ 111.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line 10 times, Upalco to Ashley 138kV transmission line once, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.6 miles parallel to pipelines within 300 feet ▪ 11.1 miles parallel to pipelines between 300 to 2,000 feet	55.4	20.0	0.0	24.8	0.0	105.8
COUT-A-1	205.6	121.4 (59%)	84.2 (41%)	▪ 11.5 miles parallel to transmission lines within 300 feet[1] ▪ 109.9 miles parallel to transmission lines between 300 to 2,000 feet[1] • Similar but crosses the Mona to Bonanza 345kV transmission line two times less that COUT-A. ▪ 2.6 miles parallel to pipelines within 300 feet ▪ 11.1 miles parallel to pipelines between 300 to 2,000 feet	55.4	20.0	0.0	24.8	0.0	105.8
Alternative COUT-B and Route Variations										
COUT-B	216.0	163.0 (75%)	53.0 (25%)	▪ 52.8 miles parallel to transmission lines within 300 feet[1] ▪ 110.1 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	56.2	19.1	0.0	26.4	7.8	106.5
COUT-B-1	212.7	150.7 (71%)	62.0 (29%)	▪ 45.5 miles parallel to transmission lines within 300 feet[1] ▪ 105.2 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	61.6	20.9	0.0	23.2	7.8	99.2

TABLE 2-16 500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION										
					Jurisdiction (miles crossed)					
Alternative Route	**Overall Length (miles)**	**Parallel to Existing Transmission Line (miles [percent])**	**New Transmission Line Route (miles [percent])**	**Parallel Condition**	**Bureau of Land Management**	**U.S. Forest Service**	**National Park Service**	**State**	**Tribal**	**Private**
COUT-B-2	214.2	150.7 (70%)	63.5 (30%)	▪ 45.5 miles parallel to transmission lines within 300 feet[1] ▪ 105.2 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	58.8	20.5	0.0	26.0	7.8	101.1
COUT-B-3	213.9	153.0 (72%)	60.9 (28%)	▪ 45.7 miles parallel to transmission lines within 300 feet[1] ▪ 107.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	58.4	19.1	0.0	25.2	7.8	103.4
COUT-B-4	214.2	153.0 (71%)	61.2 (29%)	▪ 45.7 miles parallel to transmission lines within 300 feet[1] ▪ 107.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	58.8	20.5	0.0	25.2	7.8	101.9

TABLE 2-16 500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION										
					Jurisdiction (miles crossed)					
Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Parallel Condition	Bureau of Land Management	U.S. Forest Service	National Park Service	State	Tribal	Private
COUT-B-5	213.9	150.7 (70%)	63.2 (30%)	45.5 miles parallel to transmission lines within 300 feet[1] ▪ 107.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line once, Hayden to Artesia 138kV transmission line once, Artesia to Vernal 138kV transmission line once, Bonanza to Vernal 138kV transmission line once, Mona to Bonanza 345kV transmission line six times, Upalco to Panther 138kV transmission line 15 times, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 10.9 miles parallel to pipelines between 300 to 2,000 feet	58.4	19.1	0.0	26.0	7.8	102.6
Alternative COUT-C and Route Variations										
COUT-C	209.8	106.5 (51%)	103.3 (49%)	▪ 14.0 miles parallel to transmission lines within 300 feet[1] ▪ 92.5 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	91.2	9.2	0.0	31.1	2.7	75.6
COUT-C-1	206.4	98.3 (48%)	108.1 (52%)	▪ 7.1 miles parallel to transmission lines within 300 feet[1] ▪ 91.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	98.2	11.0	0.0	28.9	2.7	65.6

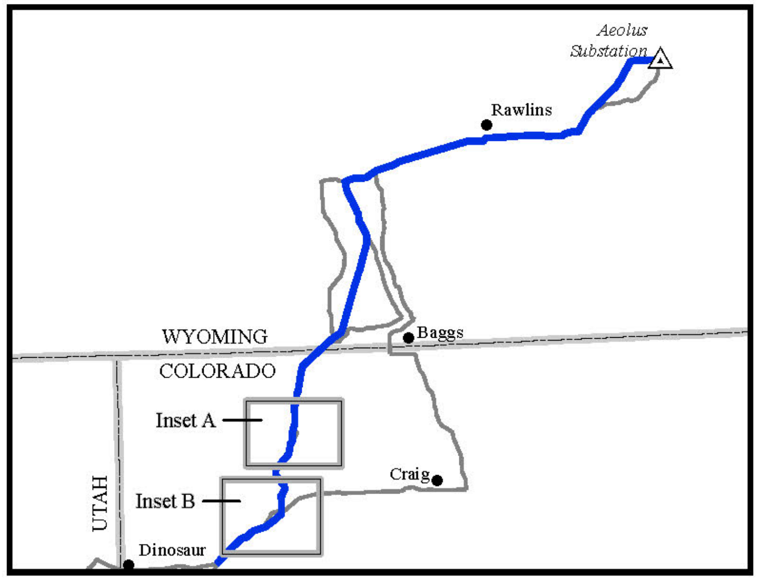
TABLE 2-16
500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Parallel Condition	Jurisdiction (miles crossed)					
					Bureau of Land Management	U.S. Forest Service	National Park Service	State	Tribal	Private
COUT-C-2	207.9	98.3 (47%)	109.6 (53%)	▪ 7.1 miles parallel to transmission lines within 300 feet[1] ▪ 91.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza 345kV transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	95.4	10.6	0.0	31.7	2.7	67.5
COUT-C-3 (Agency Preferred Alternative)	207.6	98.3 (47%)	109.3 (53%)	▪ 7.1 miles parallel to transmission lines within 300 feet[1] ▪ 91.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza 345kV transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	95.0	9.2	0.0	31.7	2.7	69.0
COUT-C-4	207.9	98.3 (47%)	109.6 (53%)	▪ 7.0 miles parallel to transmission lines within 300 feet[1] ▪ 91.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza 345kV transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	95.6	10.6	0.0	33.7	2.7	65.3

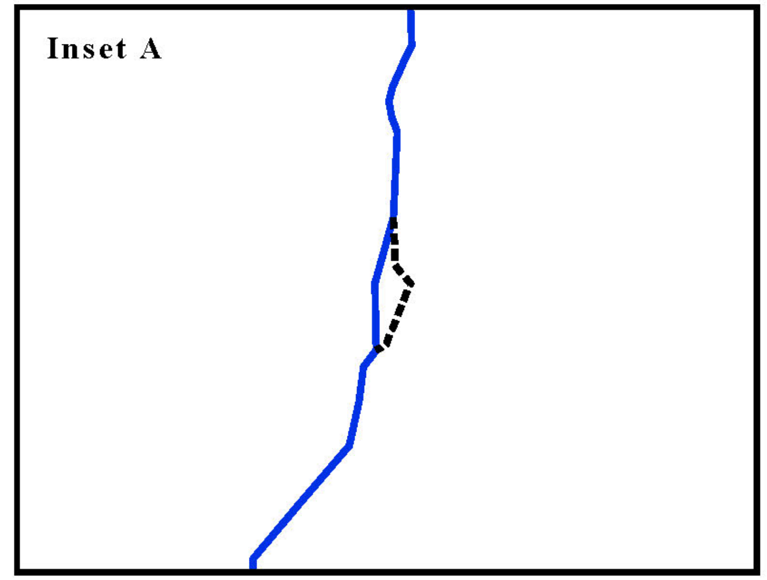
TABLE 2-16
500-KILOVOLT TRANSMISSION LINE PARALLEL CONDITIONS AND JURISDICTION BY ALTERNATIVE ROUTE AND ROUTE VARIATION

Alternative Route	Overall Length (miles)	Parallel to Existing Transmission Line (miles [percent])	New Transmission Line Route (miles [percent])	Parallel Condition	Jurisdiction (miles crossed)					
					Bureau of Land Management	U.S. Forest Service	National Park Service	State	Tribal	Private
COUT-C-5	207.6	98.3 (47%)	109.3 (53%)	▪ 7.0 miles parallel to transmission lines within 300 feet[1] ▪ 91.3 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line once, Spanish Fork to Carbon 138kV transmission line twice, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Bonanza 345kV transmission line five times, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, and Nebo to Martin Marietta 138kV transmission line once ▪ 2.3 miles parallel to pipelines within 300 feet ▪ 27.4 miles parallel to pipelines between 300 to 2,000 feet	95.2	9.2	0.0	33.7	2.7	66.8
Alternatives COUT-H and COUT-I										
COUT-H (Applicant Preferred Alternative)	200.6	62.5 (31%)	138.1 (69%)	▪ 4.3 miles parallel to transmission lines within 300 feet[1] ▪ 58.2 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Upalco to Panther 138kV transmission line twice, Carbon to Helper 138kV transmission line once, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line once, Mona to Huntington 345kV transmission line twice, Jerusalem to Nebo 138kV transmission line once, Nebo to Martin Marietta 138kV transmission line once, and Mona to Bonanza 345kV transmission line once. ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 36.5 miles parallel to pipelines between 300 to 2,000 feet	96.2	7.7	0.0	25.6	2.7	68.4
COUT-I	240.2	89.8 (37%)	150.4 (63%)	▪ 2.3 miles parallel to transmission lines within 300 feet[1] ▪ 87.5 miles parallel to transmission lines between 300 to 2,000 feet[1] • Crosses Bears Ears to Bonanza 345kV transmission line twice, Rangely to Artesia 138kV transmission line once, Bonanza to Rangely 138kV transmission line once, Mounds SW Park to Helper 138kV transmission line once, Spanish Fork to Emery 345kV transmission line once, Spanish Fork to Huntington 345kV transmission line twice, McFadden to Huntington Plant 138kV transmission line once, Huntington to Pinto 345kV transmission line once, Huntington to Emery 345kV transmission line once, Mona to Huntington 345kV transmission line three times, Jerusalem to Nebo 138kV transmission line once, Nebo to Martin Marietta 138kV transmission line once, and Mona to Bonanza 345kV transmission line once. ▪ 2.5 miles parallel to pipelines within 300 feet ▪ 28.4 miles parallel to pipelines between 300 to 2,000 feet	123.1	16.9	0.0	36.0	2.7	61.5

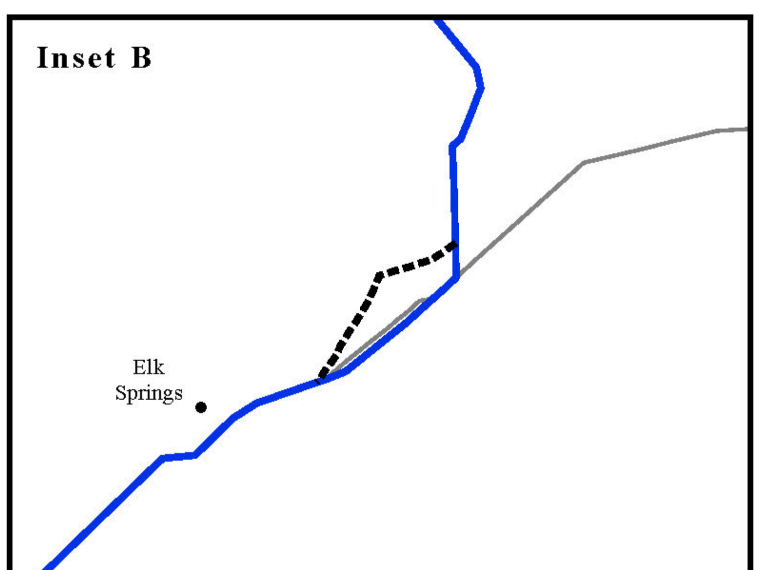
NOTES:
Transmission lines include 18kV, 230kV, 345kV, and 500kV transmission lines.
kV = Kilovolt



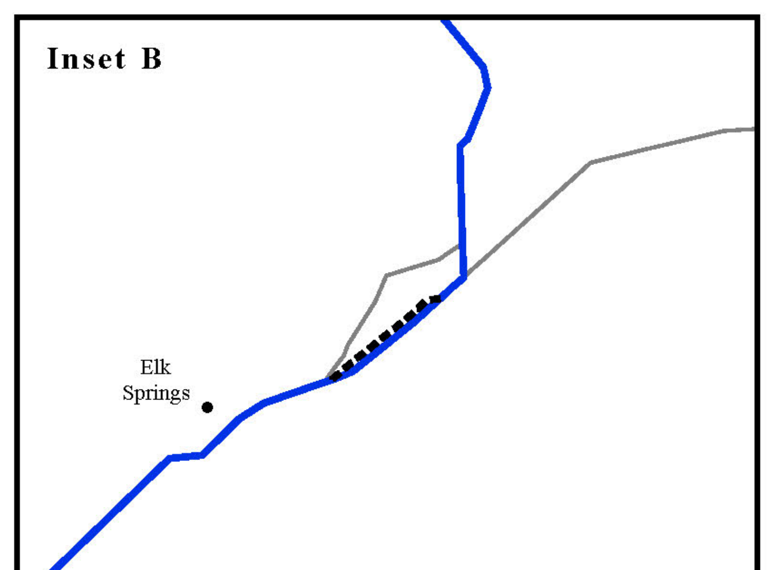
ALTERNATIVE WYCO-B - APPLICANT PREFERRED
W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175



ROUTE VARIATION WYCO-B-1
W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, ***C72***, C91, C92, C171, C173, C174, C175



ROUTE VARIATION WYCO-B-2 - AGENCY PREFERRED
W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, ***C93***, C175



ROUTE VARIATION WYCO-B-3
W15, W21, W35, W36, W30, W32, W101, W125, W108, W116, W113, W410, W411, C31, C61, C71, C91, C92, C171, ***C172***, C174, C175

Figure 2-8a

Alternative Route Schematics

Alternative WYCO-B and Route Variations

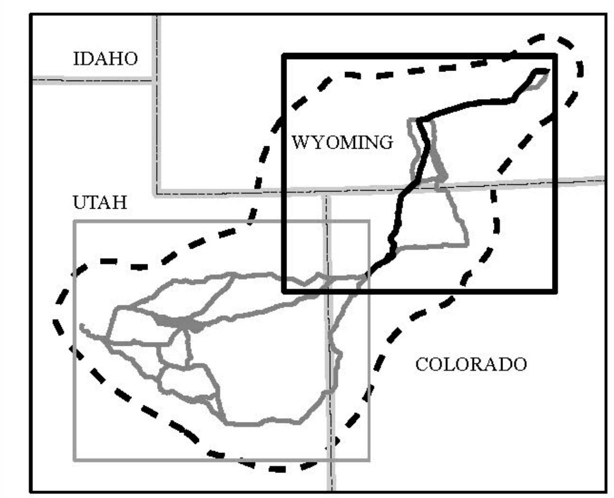
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

Alternative WYCO-B - Applicant and Agency Preferred[1]
Route Variation
All Other Alternative Routes

General Reference

City or Town
Substation (Project Terminal)
State Boundary

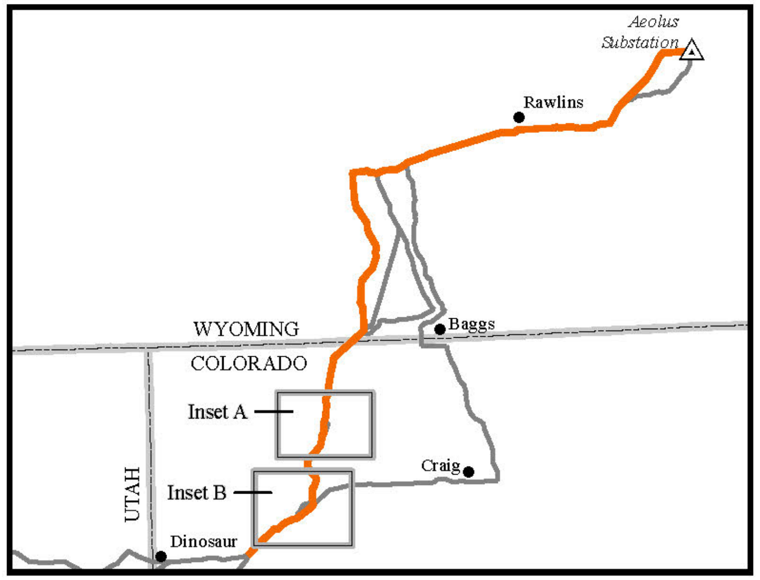


SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

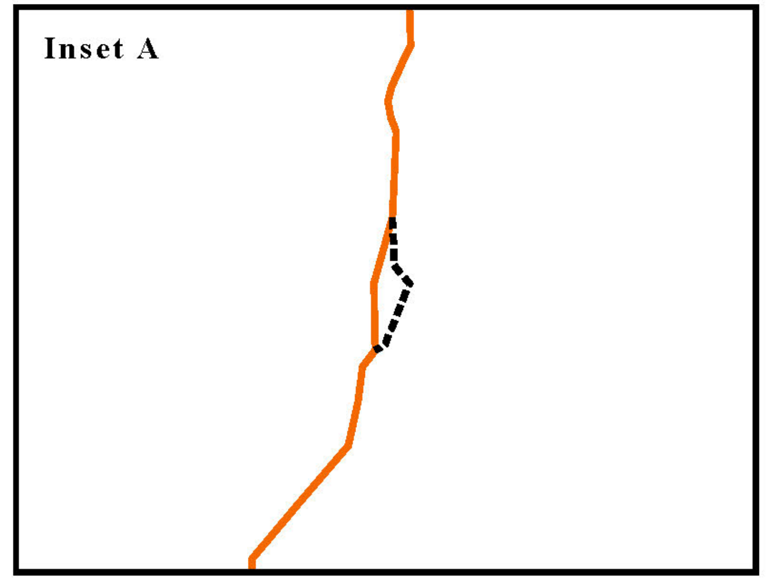
NOTES:
[1]Applicant Preferred Alternative is Alternative WYCO-B, and Agency Preferred Alternative is Route Variation WYCO-B-2.
- Link numbers for route variations are in bold and italicized.
- The alternative routes shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

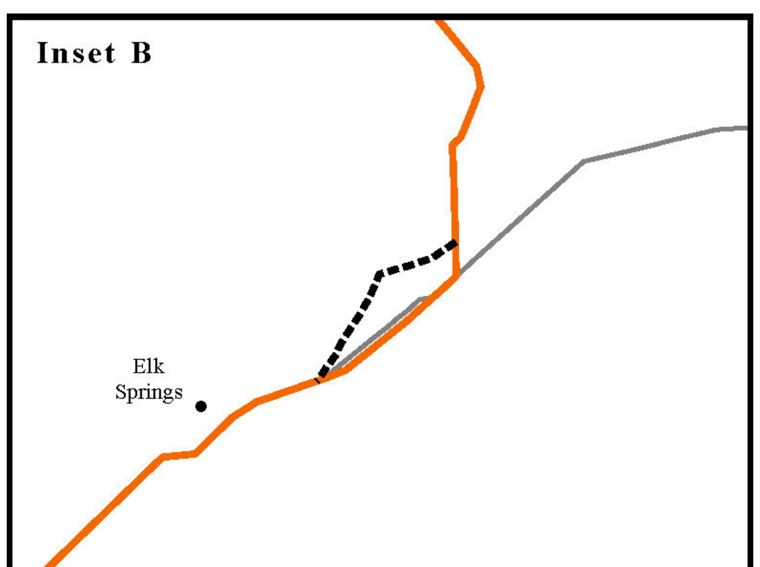
Not to scale



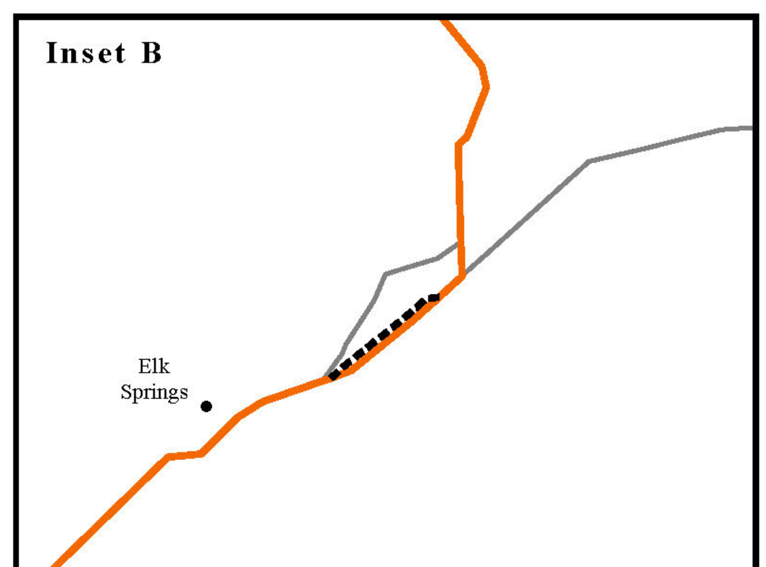
ALTERNATIVE WYCO-C
W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175



ROUTE VARIATION WYCO-C-1
W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, ***C72***, C91, C92, C171, C173, C174, C175



ROUTE VARIATION WYCO-C-2
W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, ***C93***, C175



ROUTE VARIATION WYCO-C-3
W15, W21, W35, W36, W30, W32, W101, W102, W128, W27, W409, W410, W411, C31, C61, C71, C91, C92, C171, ***C172***, C174, C175

Figure 2-8b

Alternative Route Schematics

Alternative WYCO-C and Route Variations

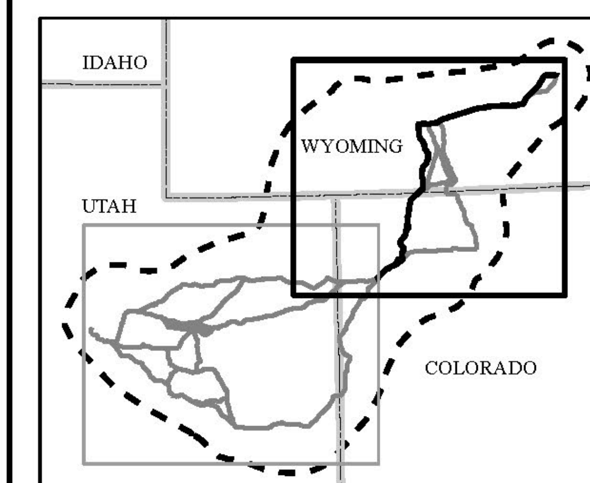
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

- Alternative WYCO-C
- Route Variation
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary



SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

NOTES:
- Link numbers for alternative route variations are in bold and italicized.
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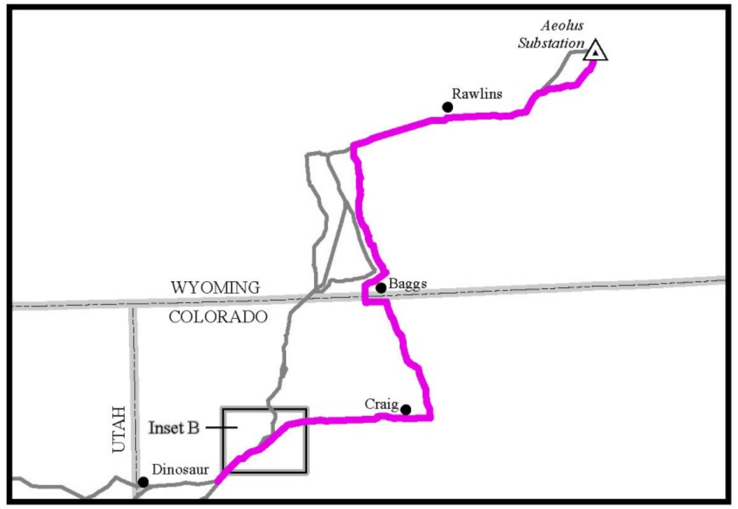
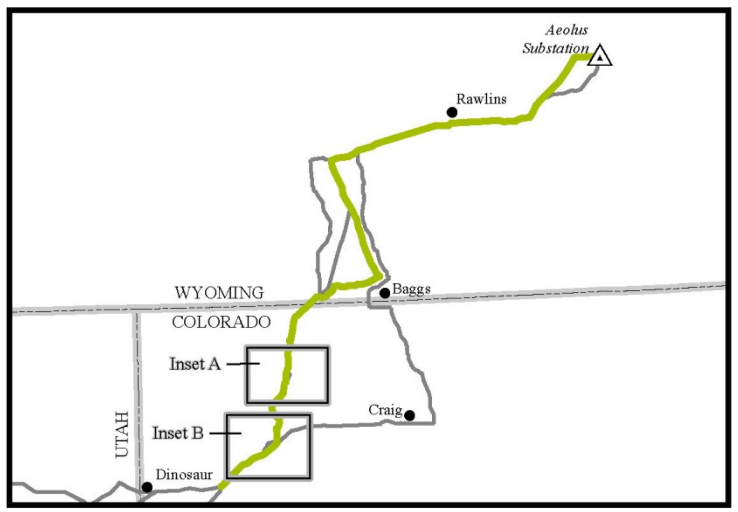
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

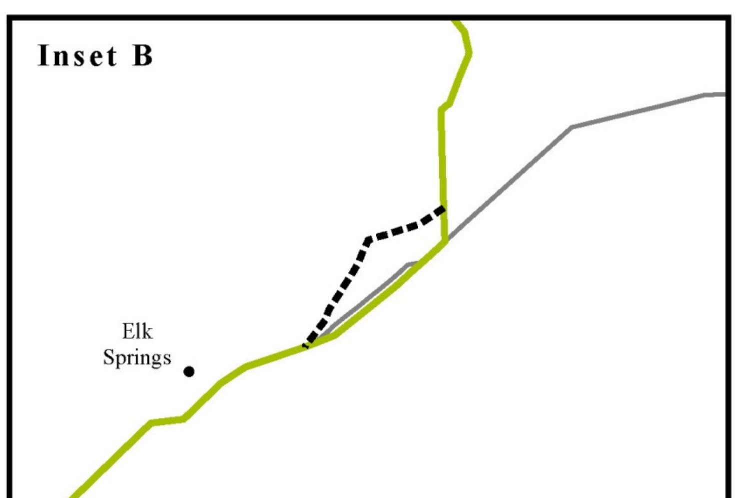
Not to scale



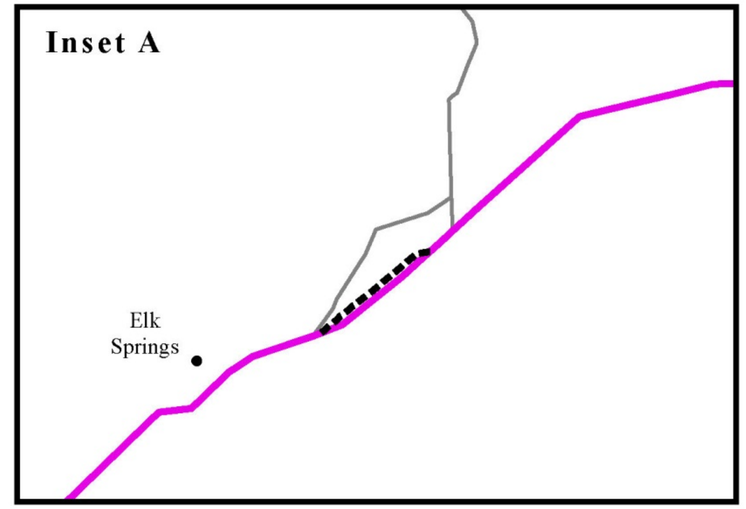
ALTERNATIVE WYCO-D
W15, W16, W22, W35, W36, W30, W32, W109, W110, W111, W121, W299, W300, W321, C17, C27, C33, C25, C20, C13, C100, C101, C105, C106, C170, C171, C173, C174, C175



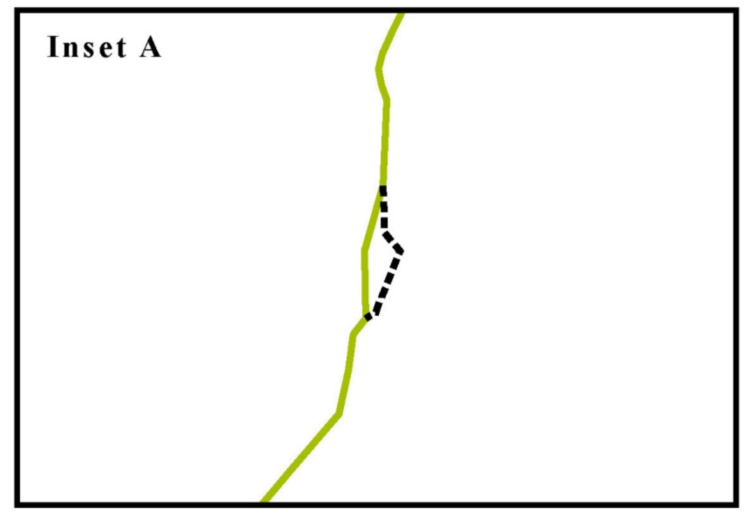
ALTERNATIVE WYCO-F
W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, C92, C171, C173, C174, C175



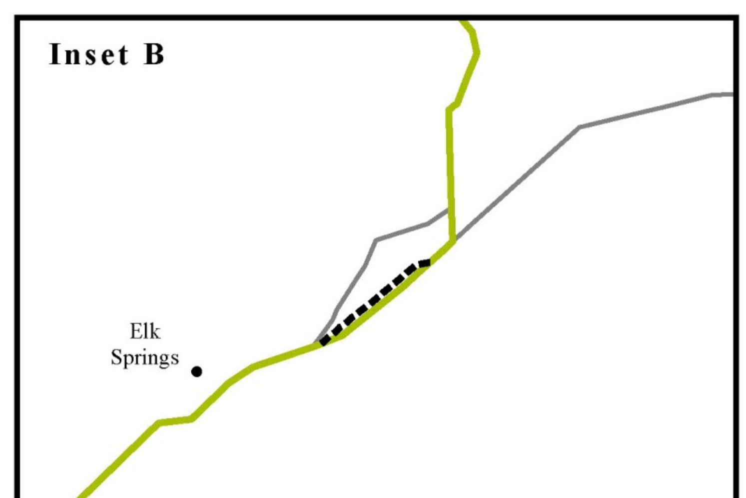
ROUTE VARIATION WYCO-F-2
W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, ***C93***, C175



ROUTE VARIATION WYCO-D-1
W15, W16, W22, W35, W36, W30, W32, W109, W110, W111, W121, W299, W300, W321, C17, C27, C33, C25, C20, C13, C100, C101, C105, C106, C170, C171, ***C172***, C174, C175



ROUTE VARIATION WYCO-F-1
W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, ***C72***, C91, C92, C171, C173, C174, C175



ROUTE VARIATION WYCO-F-3
W15, W21, W35, W36, W30, W32, W101, W125, W108, W107, W117, W120, W124, W302, W411, C31, C61, C71, C91, C92, C171, ***C172***, C174, C175

Figure 2-8c

Alternative Route Schematics

Alternatives WYCO-D, WYCO-F and Route Variations

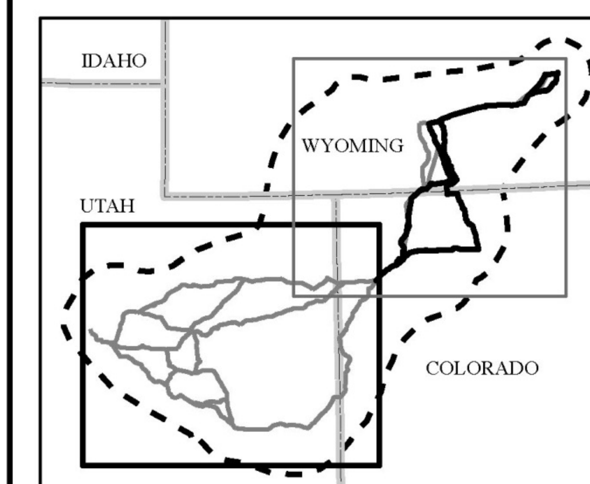
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

- Alternative WYCO-D
- Alternative WYCO-F
- Route Variation
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary



SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

NOTES:
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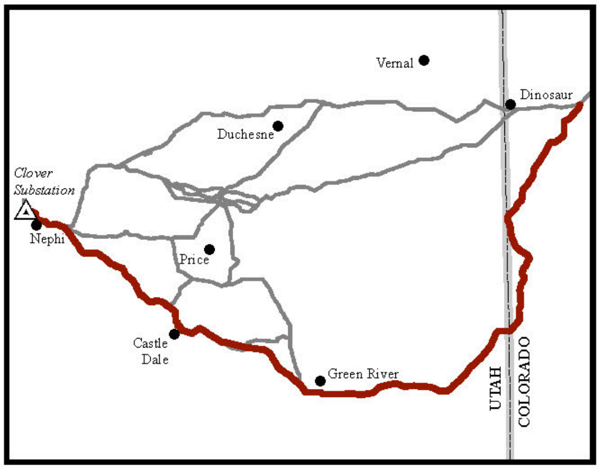
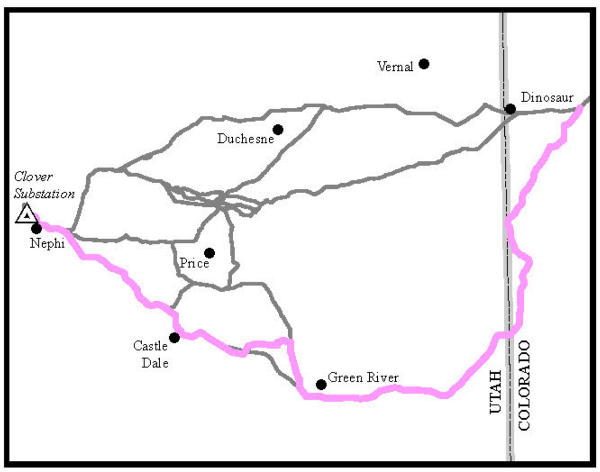
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

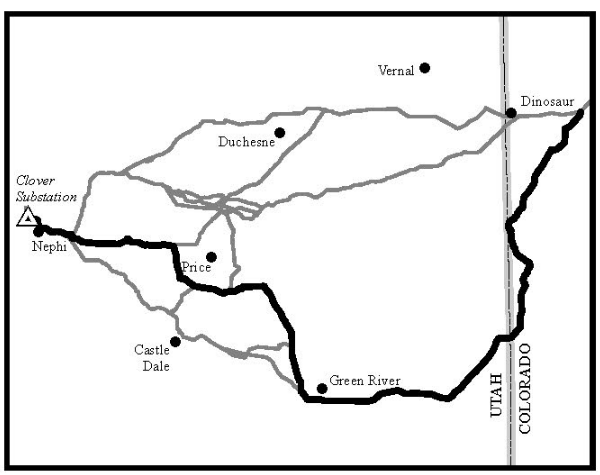
Not to scale



ALTERNATIVE COUT BAX-B
C177, C185, C195, C196, C197, C270, U490, U486, U487, U730, U729, U728, U732, U731, U765, U628, U629, U630, U631, U637, U639, U650



ALTERNATIVE COUT BAX-C
C177, C185, C195, C196, C197, C270, U490, U486, U487, U488, U734, U733, U732, U731, U765, U628, U629, U630, U631, U637, U639, U650



ALTERNATIVE COUT BAX-E
C177, C185, C195, C196, C197, C270, U490, U486, U487, U488, U489, U495, U493, U496, U585, U544, U537, U600, U636, U637, U639, U650

Figure 2-9

Alternative Route Schematics

Alternatives COUT BAX-B, COUT BAX-C and COUT BAX-E

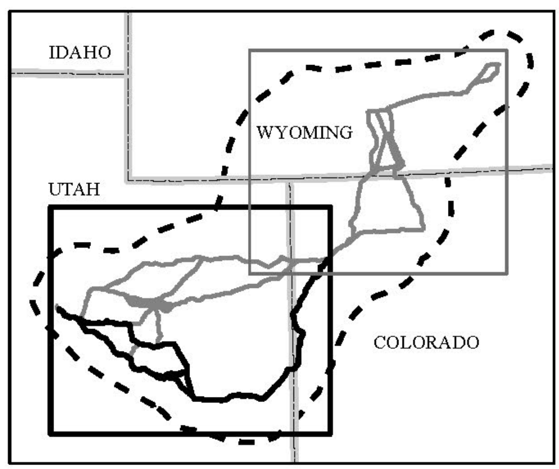
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

- Alternative COUT BAX-B
- Alternative COUT BAX-C
- Alternative COUT BAX-E
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary



SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

NOTES:
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• Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

Not to scale

Figure 2-10a

Alternative Route Schematics

Alternative COUT-A and Route Variation

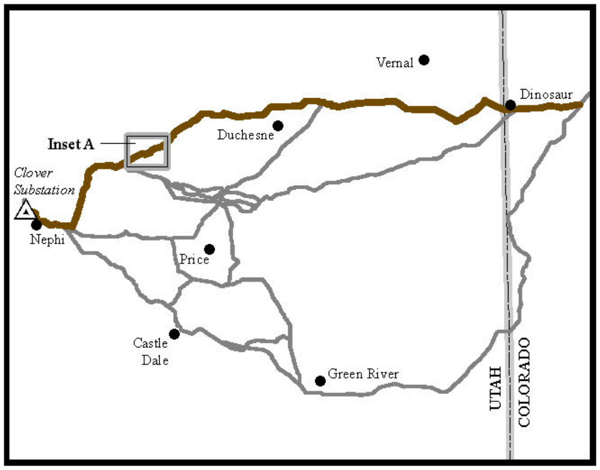
ENERGY GATEWAY SOUTH
TRANSMISSION PROJECT

Project Features

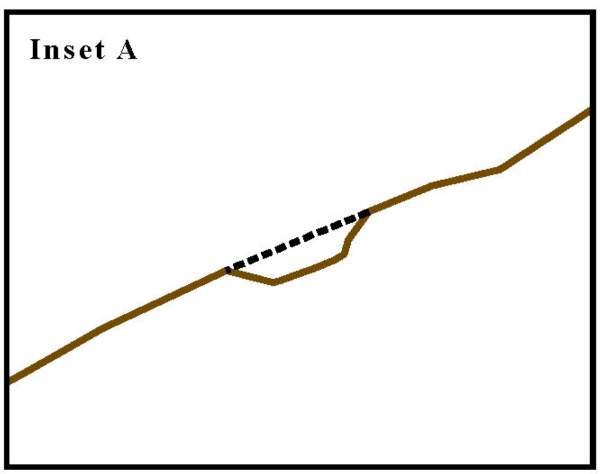
- Alternative COUT-A
- Route Variation
- All Other Alternative Routes

General Reference

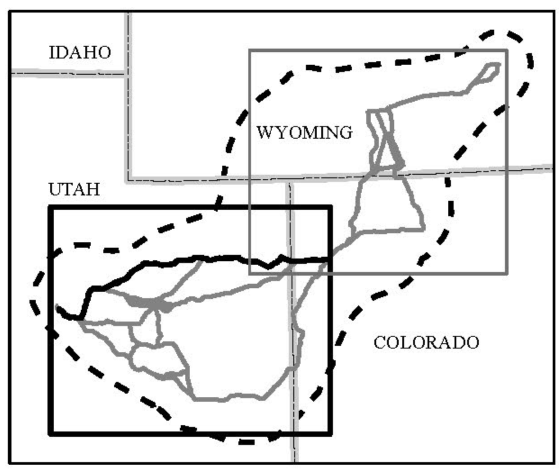
- City or Town
- Substation (Project Terminal)
- State Boundary



ALTERNATIVE COUT-A
C186, C187, U241, U310, U390, U391, U410, U420, U421, U425, U426, U427, U424, U429, U433, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-A-1
C186, C187, U241, U310, U390, U391, U410, U420, U421, U425, U426, U427, U424, ***U428***, U433, U460, U621, U625, U638, U639, U650



SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

NOTES:
- Link numbers for alternative route variations are in bold and italicized.
- The alternative routes shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

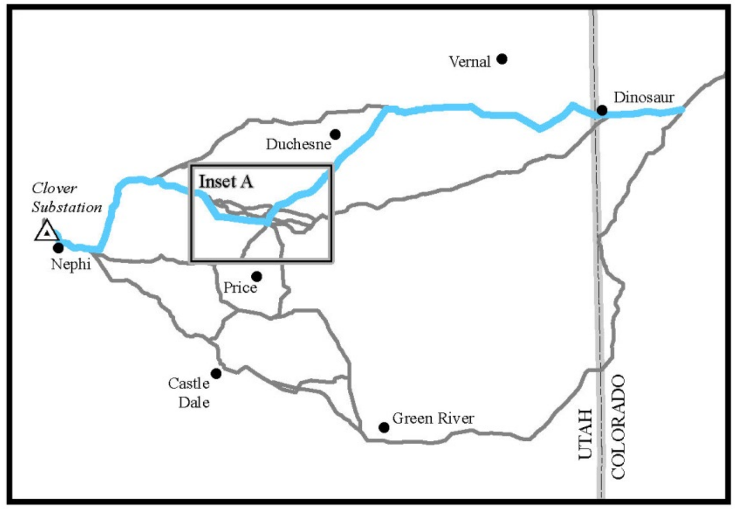
Not to scale

Figure 2-10b

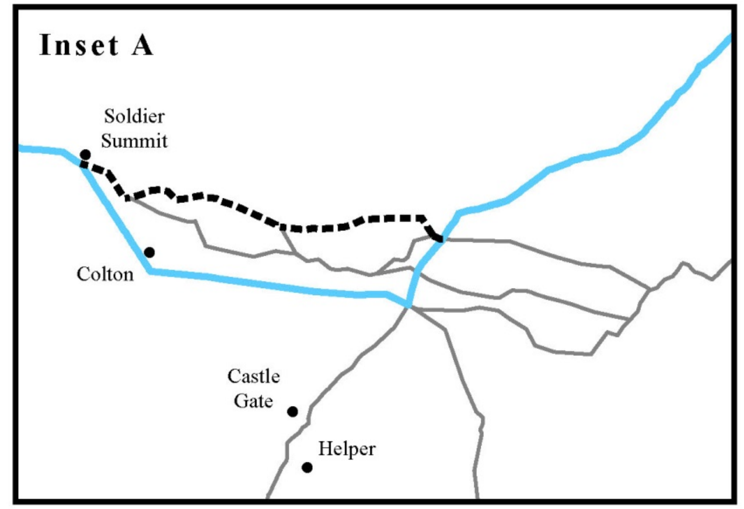
Alternative Route Schematics

Alternative COUT-B and Route Variations

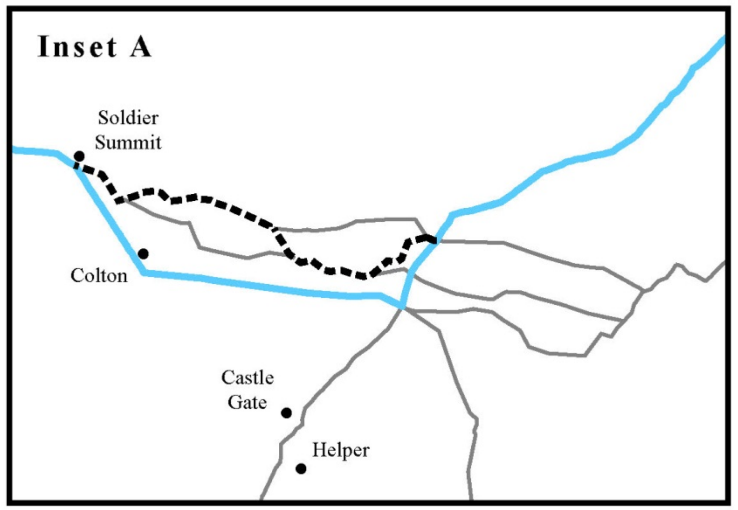
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT



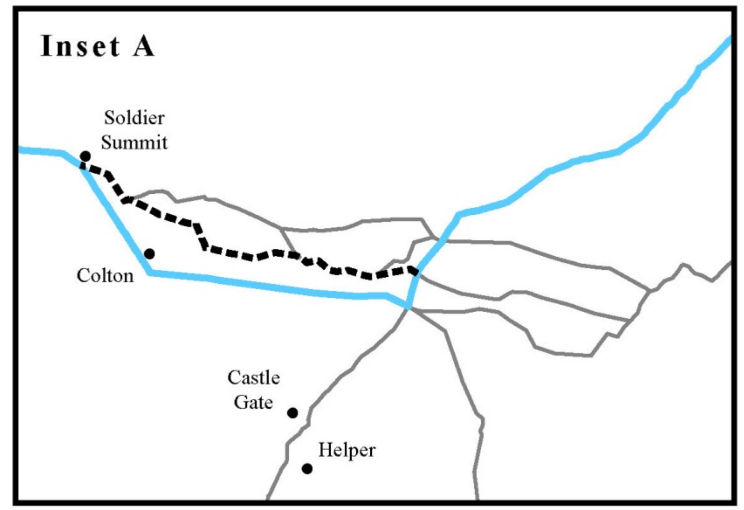
ALTERNATIVE COUT-B
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, U436, U524, U527, U530, U539, U460, U621, U625, U638, U639, U650



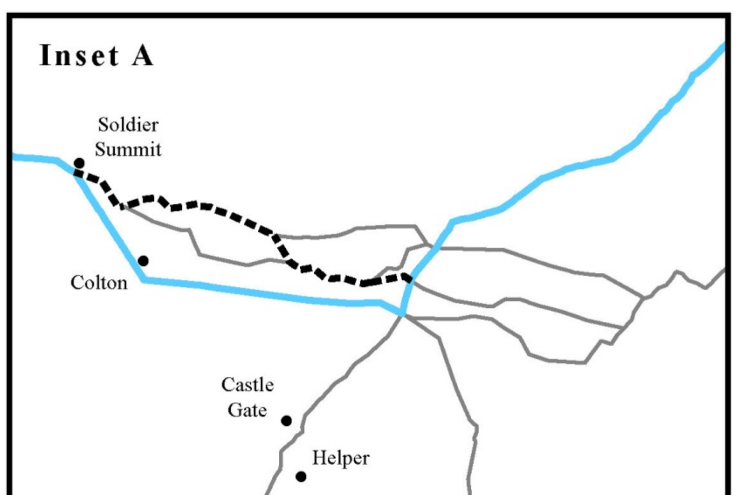
ROUTE VARIATION COUT-B-1
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, ***U511, U513, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



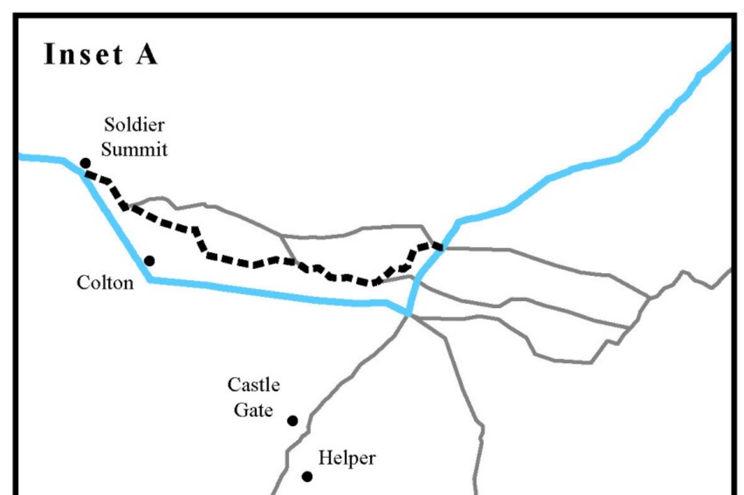
ROUTE VARIATION COUT-B-2
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, ***U511, U520, U514, U540, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-B-3
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, ***U512, U514, U516, U560***, U530, U539, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-B-4
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, U434, ***U512, U514, U540, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



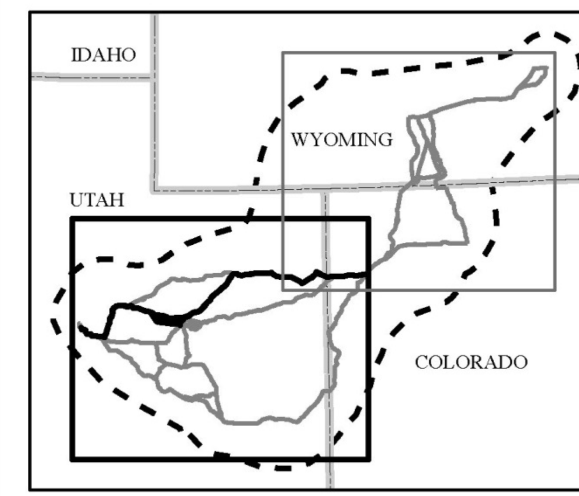
ROUTE VARIATION COUT-B-5
C186, C187, U241, U310, U390, U391, U410, U430, U431, U432, ***U511, U520, U514, U516, U560***, U530, U539, U460, U621, U625, U638, U639, U650

Project Features

- Alternative COUT-B
- Route Variation
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary

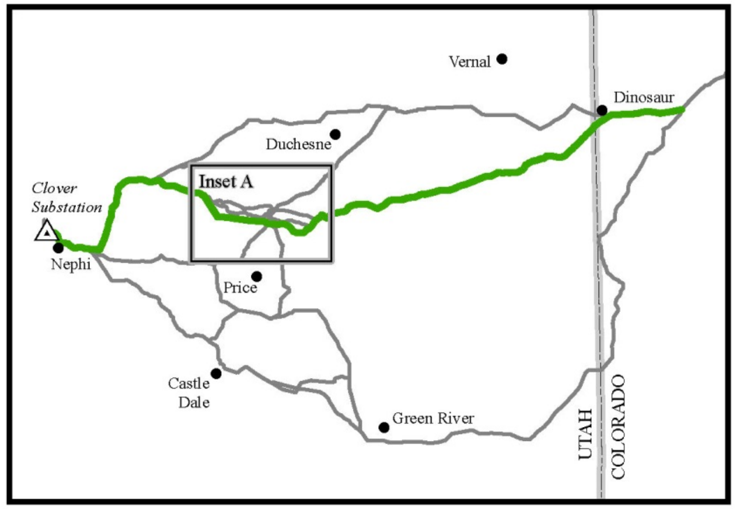


SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

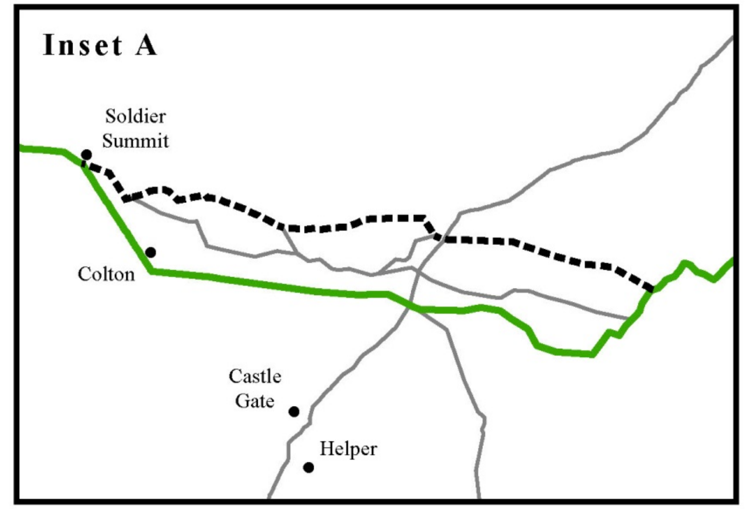
NOTES:
- Link numbers for alternative route variations are in bold and italicized.
- The alternative routes shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

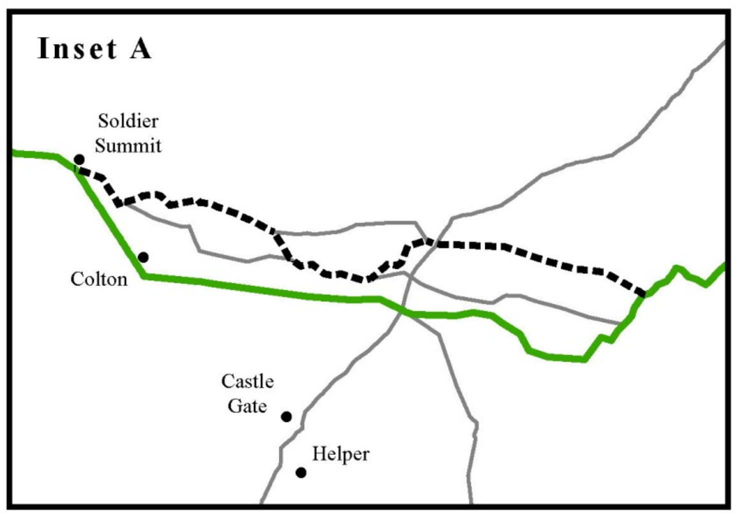
Not to scale



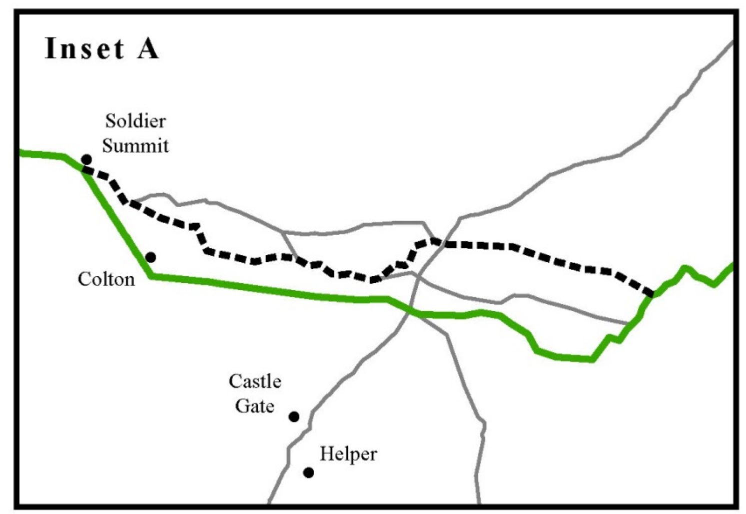
ALTERNATIVE COUT-C
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U525, U524, U527, U530, U539, U460, U621, U625, U638, U639, U650



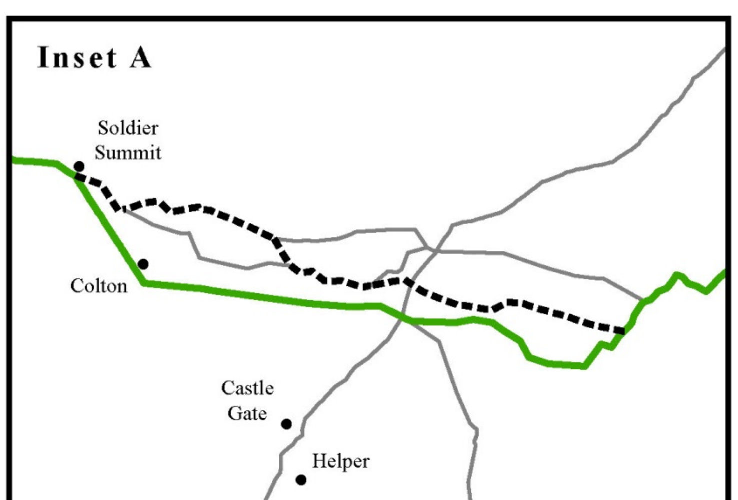
ROUTE VARIATION COUT-C-1
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, ***U409, U511, U513, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



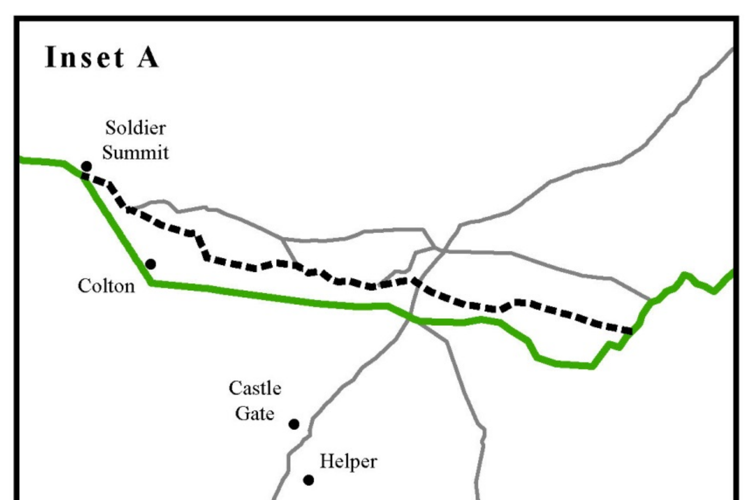
ROUTE VARIATION COUT-C-2
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, ***U409, U511, U520, U514, U540, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-C-3 - AGENCY PREFERRED
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, ***U409, U511, U520, U514, U516, U560***, U530, U539, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-C-4
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, ***U411, U512, U514, U540, U515, U560***, U530, U539, U460, U621, U625, U638, U639, U650



ROUTE VARIATION COUT-C-5
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, ***U411, U512, U514, U516, U560***, U530, U539, U460, U621, U625, U638, U639, U650

Figure 2-10c

Alternative Route Schematics

Alternative COUT-C and Route Variations

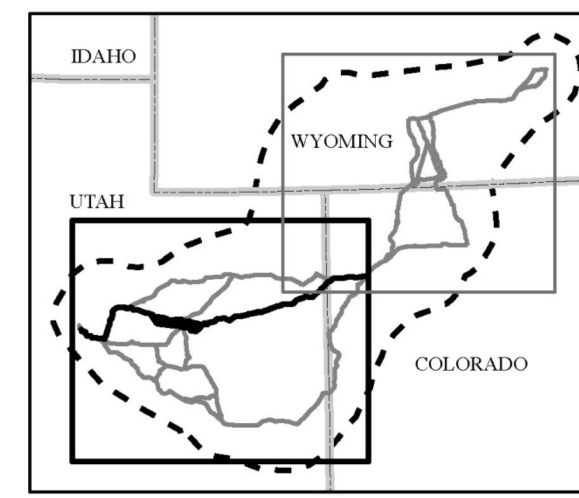
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

- Alternative COUT-C
- Route Variation
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary

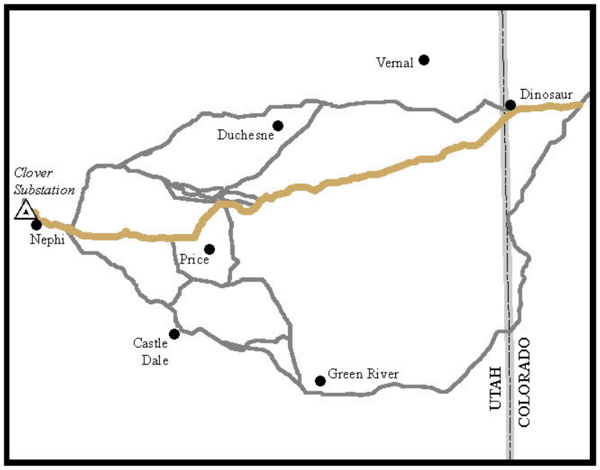


SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

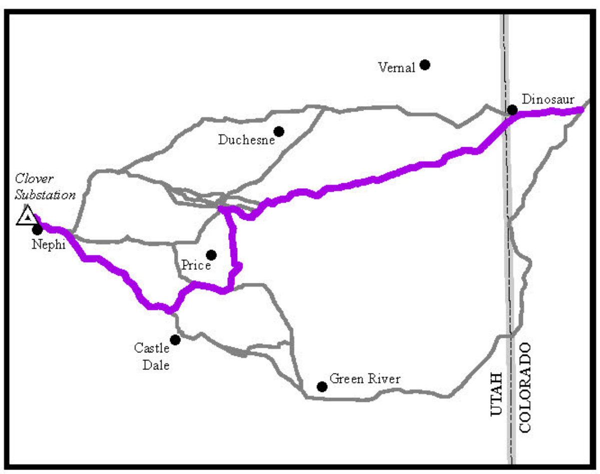
NOTES:
• Link numbers for alternative route variations are in bold and italicized.
• The alternative routes shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

Not to scale



ALTERNATIVE COUT-H - APPLICANT PREFERRED
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U525, U435, U545, U546, U548, U600, U636, U637, U639, U650



ALTERNATIVE COUT-I
C186, C188, U242, U280, U285, U300, U400, U401, U404, U407, U408, U406, U523, U492, U494, U493, U496, U586, U587, U498, U629, U630, U631, U637, U639, U650

Figure 2-10d

Alternative Route Schematics

Alternatives COUT-H and COUT-I

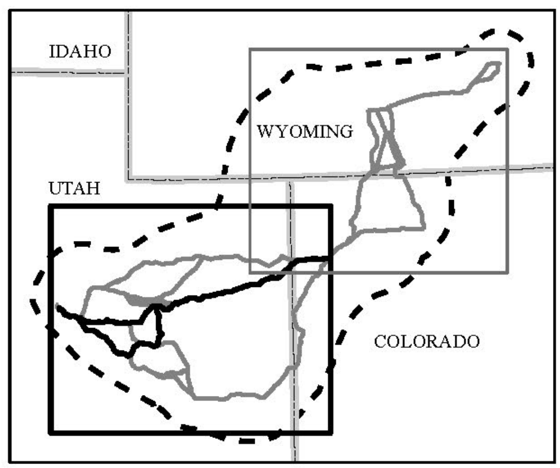
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Project Features

- Alternative COUT-H
- Alternative COUT-I
- All Other Alternative Routes

General Reference

- City or Town
- Substation (Project Terminal)
- State Boundary

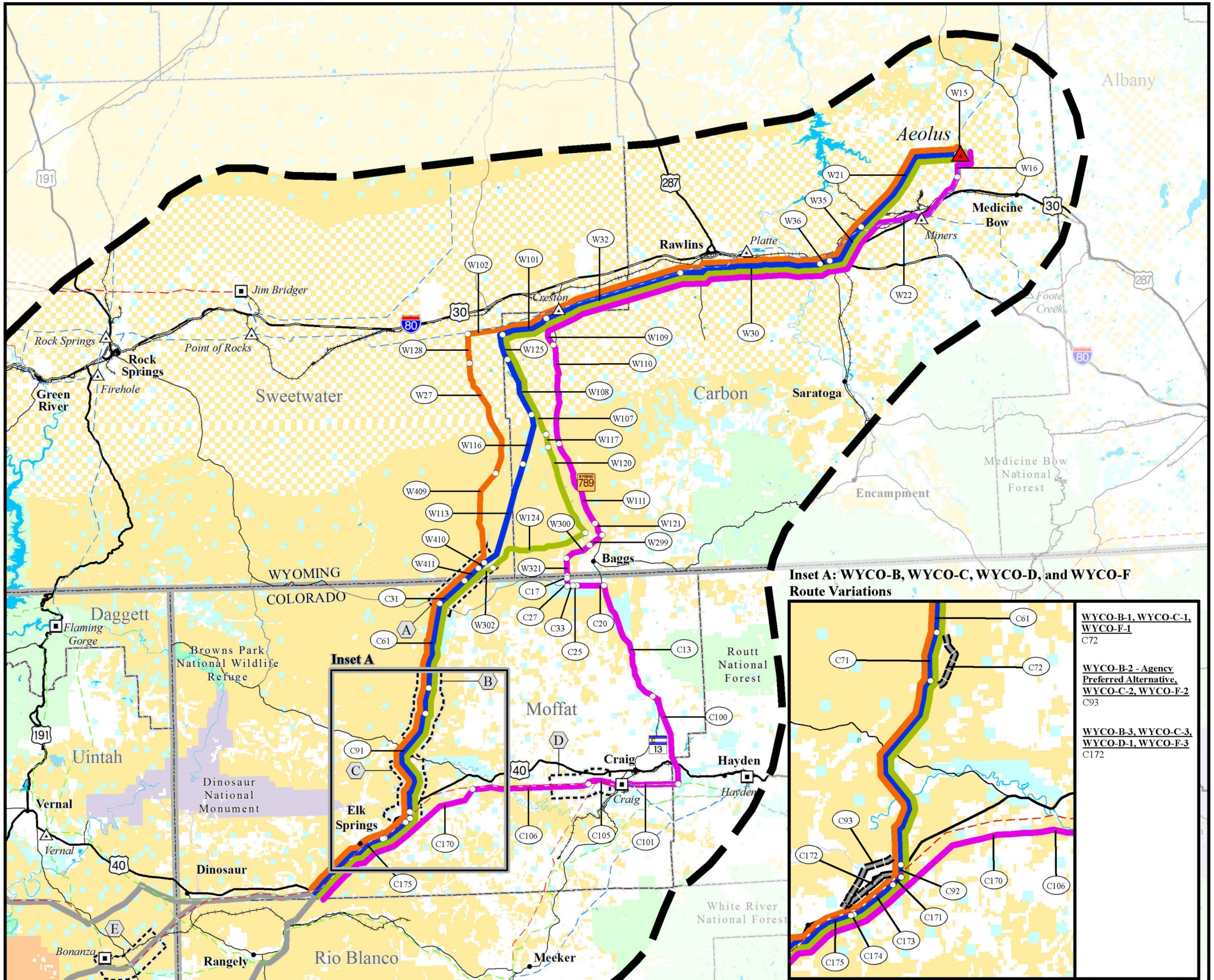


SOURCES:
City or Town, ESRI 2010;
State Boundaries, ESRI 2008

NOTES:
- The alternative routes shown on this map are draft and may be revised and/or refined throughout the development of the Project.
- Substation symbols do not necessarily represent precise locations.

Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

Not to scale



Map 2-2a

Alternative Routes Northern Area

ENERGY GATEWAY SOUTH TRANSMISSION PROJECT

Alternative Routes[1, 2, 3, 4]

- WYCO-B - Applicant and Agency Preferred Alternative[5]
- WYCO-C
- WYCO-D
- WYCO-F
- All Other Alternative Routes
- Alternative Route Variations (Inset A)

Other Project Features

- Project Area Boundary
- Substation (Project Terminal)
- Link Number
- Link Node
- Series Compensation Station Siting Area

Land Ownership

- Bureau of Land Management
- Bureau of Reclamation
- Indian Reservation
- National Park Service
- U.S. Department of Defense
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- State Land
- Private Land

General Reference

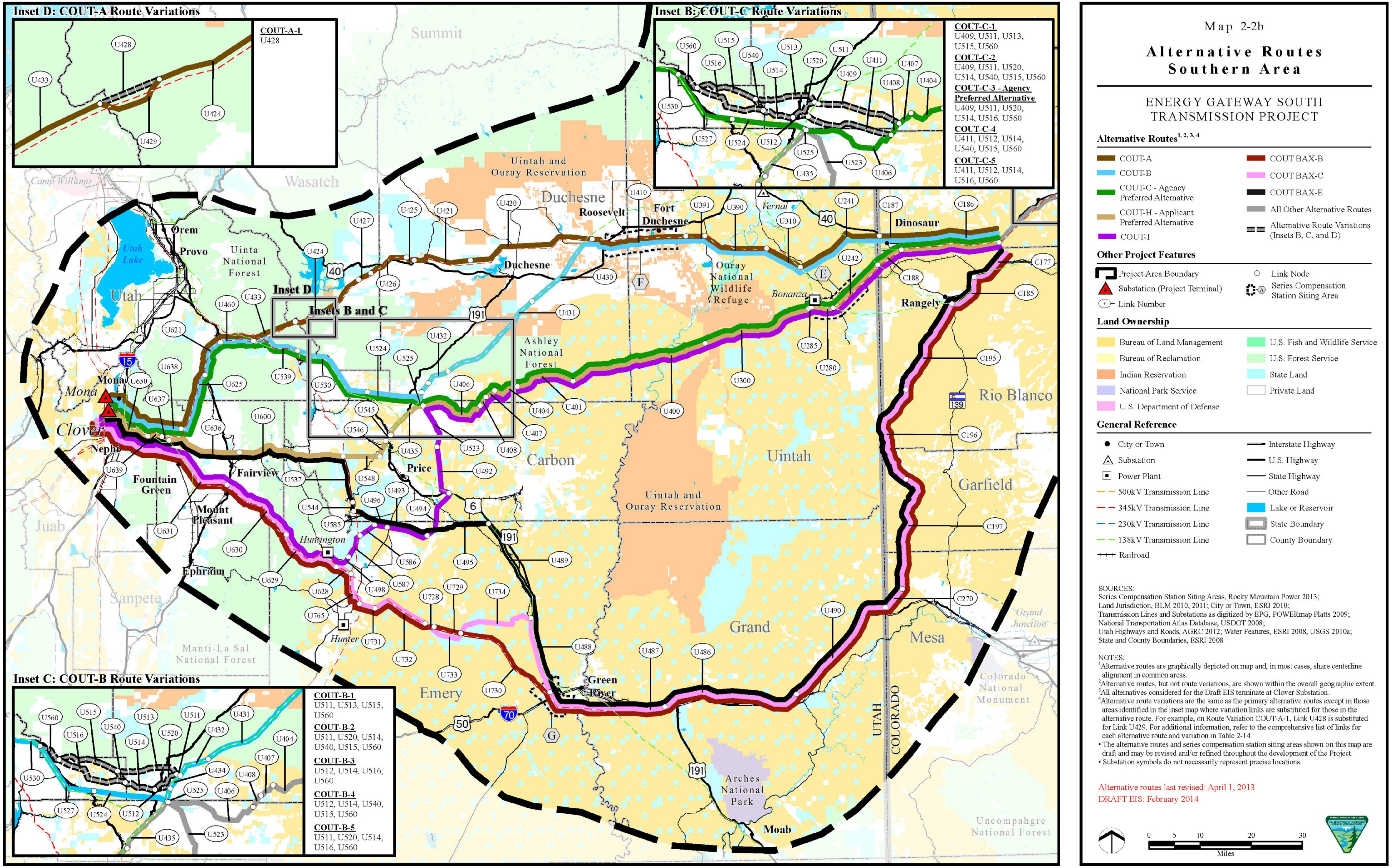
- City or Town
- Substation
- Power Plant
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 138kV Transmission Line
- Railroad
- Interstate Highway
- U.S. Highway
- State Highway
- Other Road
- Lake or Reservoir
- State Boundary
- County Boundary

SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008

NOTES:
[1]Alternative routes are graphically depicted on map and, in most cases, share centerline alignment in common areas.
[2]Alternative routes, but not route variations, are shown within the overall geographic extent.
[3]All alternatives considered for the Draft EIS terminate at Clover Substation.
[4]Alternative route variations are the same as the primary alternative routes except in those areas identified in the inset map where variation links are substituted for those in the alternative route. For example, on Route Variations WYCO-B-1, WYCO-C-1, and WYCO-F-1, Link U72 is substituted for Link U71. For additional information, refer to the comprehensive list of links for each alternative route and variation in Table 2-14.
[5]Applicant Preferred Alternative is Alternative WYCO-B, and Agency Preferred Alternative is Route Variation WYCO-B-2.
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.

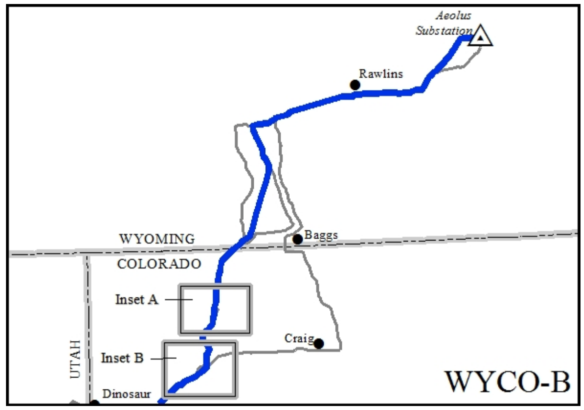
Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014

0 5 10 20 30
Miles


Map 2-2b
Alternative Routes
Southern Area
ENERGY GATEWAY SOUTH
TRANSMISSION PROJECT
Alternative Routes[1, 2, 3, 4]
COUT-A
COUT-B
COUT-C - Agency Preferred Alternative
COUT-H - Applicant Preferred Alternative
COUT-I
COUT BAX-B
COUT BAX-C
COUT BAX-E
All Other Alternative Routes
Alternative Route Variations (Insets B, C, and D)
Other Project Features
Project Area Boundary
Substation (Project Terminal)
Link Number
Link Node
Series Compensation Station Siting Area
Land Ownership
Bureau of Land Management
Bureau of Reclamation
Indian Reservation
National Park Service
U.S. Department of Defense
U.S. Fish and Wildlife Service
U.S. Forest Service
State Land
Private Land
General Reference
City or Town
Substation
Power Plant
500kV Transmission Line
345kV Transmission Line
230kV Transmission Line
138kV Transmission Line
Railroad
Interstate Highway
U.S. Highway
State Highway
Other Road
Lake or Reservoir
State Boundary
County Boundary
SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008
NOTES:
1 Alternative routes are graphically depicted on map and, in most cases, share centerline alignment in common areas.
2 Alternative routes, but not route variations, are shown within the overall geographic extent.
3 All alternatives considered for the Draft EIS terminate at Clover Substation.
4 Alternative route variations are the same as the primary alternative routes except in those areas identified in the inset map where variation links are substituted for those in the alternative route. For example, on Route Variation COUT-A-1, Link U428 is substituted for Link U429. For additional information, refer to the comprehensive list of links for each alternative route and variation in Table 2-14.
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.
Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014
0 5 10 20 30
Miles
Inset D: COUT-A Route Variations
COUT-A-1
U428
Inset B: COUT-C Route Variations
COUT-C-1
U409, U511, U513, U515, U560
COUT-C-2
U409, U511, U520, U514, U540, U515, U560
COUT-C-3 - Agency Preferred Alternative
U409, U511, U520, U514, U516, U560
COUT-C-4
U411, U512, U514, U540, U515, U560
COUT-C-5
U411, U512, U514, U516, U560
Inset C: COUT-B Route Variations
COUT-B-1
U511, U513, U515, U560
COUT-B-2
U511, U520, U514, U540, U515, U560
COUT-B-3
U512, U514, U516, U560
COUT-B-4
U512, U514, U540, U515, U560
COUT-B-5
U511, U520, U514, U516, U560
Insets B and C
Inset D
Summit
Wasatch
Duchesne
Uintah
Carbon
Emery
Grand
Juab
Sanpete
Utah
Mesa
Garfield
Rio Blanco
UTAH
COLORADO
Uintah and Ouray Reservation
Uinta National Forest
Ashley National Forest
Manti-La Sal National Forest
Ouray National Wildlife Refuge
Arches National Park
Colorado National Monument
Uncompahgre National Forest
Utah Lake
Orem
Provo
Mona
Clover
Nephi
Fountain Green
Fairview
Mount Pleasant
Ephraim
Huntington
Hunter
Price
Duchesne
Roosevelt
Fort Duchesne
Vernal
Bonanza
Dinosaur
Rangely
Green River
Moab
Grand Junction
Camp Williams

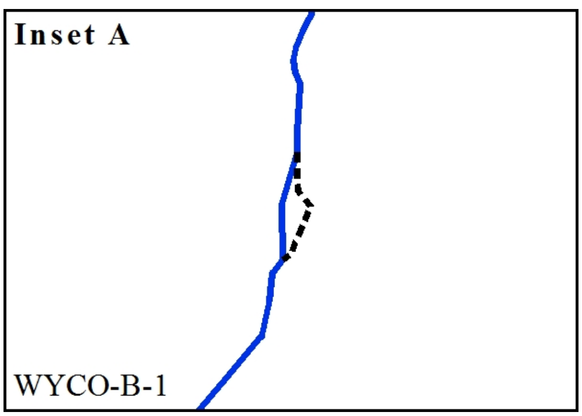
2.5.2.1 Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO)

Alternative WYCO-B (Applicant Preferred Alternative)



Alternative WYCO-B exits the planned Aeolus Substation to the southwest and crosses Interstate 80 (I-80) approximately 10 miles east of Sinclair, Wyoming. The alternative route continues west on the southern side of I-80 (approximately 3 to 5 miles south) for approximately 57 miles at which point it parallels Wamsutter Road (on the east side of the road) south for approximately 15 miles. At that point, the route continues southwest crossing Flat Top Mountain, continuing toward the Wyoming and Colorado border, approximately 22 miles west of Baggs, Wyoming.

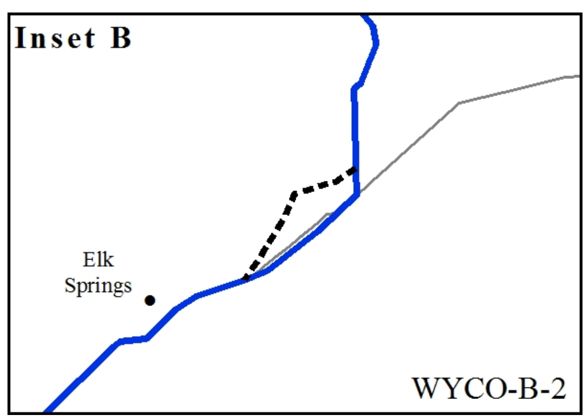
The alternative route continues south/southwest through the Sevenmile Ridge area where it crosses the Little Snake River, the western edge of the Godiva Rim, and Colorado State Highway 318 in an area approximately 10 miles northwest of Maybell, Colorado. The alternative route continues south crossing the Yampa River 5 miles northeast of Cross Mountain Gorge, and then U.S. Highway 40 at a point approximately 12 miles southwest of Maybell. The alternative route continues southwest for approximately 22 miles paralleling the existing Bonanza to Bears Ears 345kV and the Hayden to Artesia 138kV transmission lines to a point south of U.S. Highway 40, approximately 20 miles east of Dinosaur, Colorado.



From U.S. Highway 40, the alternative route could be combined with either the Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover alternative routes or the Colorado to Utah – U.S. Highway 40 to Central Utah to Clover alternative routes to reach the Clover Substation terminus of the Project.

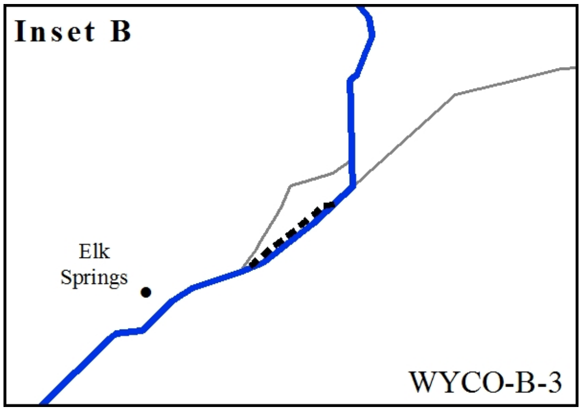
<u>Route Variation WYCO-B-1</u>

A localized variation to the Alternative WYCO-B is approximately 14 miles northwest of Maybell, Colorado, in the Little Snake River valley. This route variation is east of Alternative WYCO-B for a distance of approximately 5 miles, limiting land-use conflicts and engineering constraints by crossing the Little Snake River north of where Alternative WYCO-B crosses the river.



<u>Route Variation WYCO-B-2 (Agency Preferred Alternative)</u>

A localized variation to the Alternative WYCO-B is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids the Tuttle Ranch Conservation Easement, occurring north of Alternative WYCO-B for a distance of approximately 6 miles paralleling U.S. Highway 40 and crossing the Deerlodge Road entrance to Dinosaur National Monument.

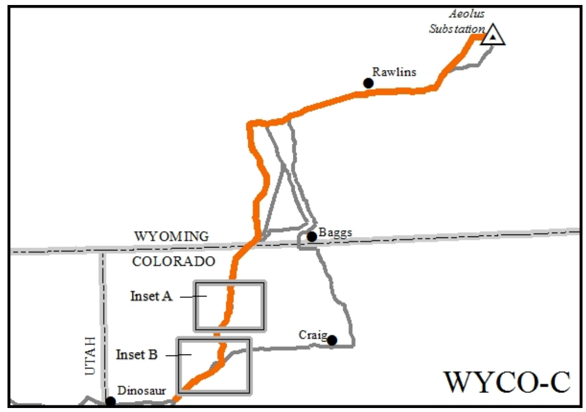


Route Variation WYCO-B-3

A localized variation to the Alternative WYCO-B is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids crossing Deerlodge Road and parallels closer to the existing transmission line through the Tuttle Ranch Conservation Easement than Alternative WYCO-B for a distance of approximately 5 miles.

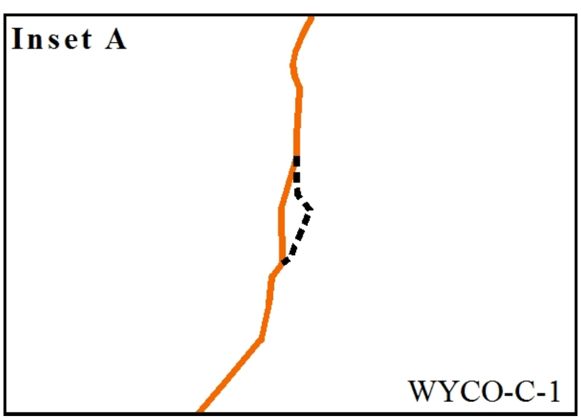
Alternative WYCO-C

Alternative WYCO-C exits the planned Aeolus Substation to the southwest and crosses I-80 approximately 10 miles east of Sinclair, Wyoming. The alternative route continues west on the southern side of I-80 (approximately 3 to 5 miles south) for approximately 63 miles before veering to the south to parallel an underground pipeline corridor south for approximately 46 miles toward the Wyoming and Colorado border. The underground pipeline corridor that this alternative route parallels is approximately 10 miles east of the Adobe Town Wilderness Study Area (WSA).



The alternative route continues south/southwest through the Sevenmile Ridge area where it crosses the Little Snake River, the western edge of the Godiva Rim, and Colorado State Highway 318 in an area approximately 10 miles northwest of Maybell, Colorado. The alternative route continues south crossing the Yampa River 5 miles northeast of Cross Mountain Gorge, and then U.S. Highway 40 at a point approximately 12 miles southwest of Maybell. The alternative route continues southwest paralleling the Bonanza to Bears Ears 345kV and the Hayden to Artesia 138kV transmission lines for approximately 22 miles south of U.S. Highway 40 to approximately 20 miles east of Dinosaur, Colorado.

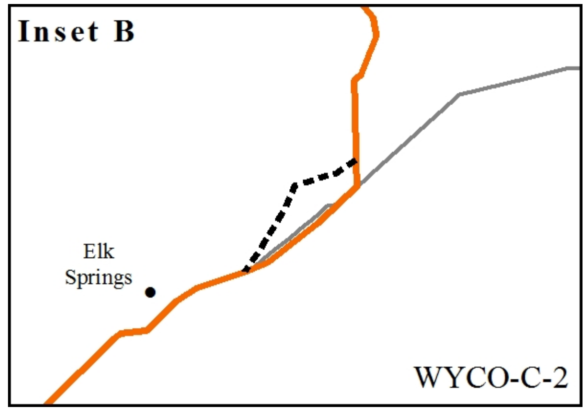
From U.S. Highway 40, the alternative route could be combined with either the Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover alternative routes or the Colorado to Utah – U.S. Highway 40 to Central Utah to Clover alternative routes to reach the Clover Substation terminus of the Project.



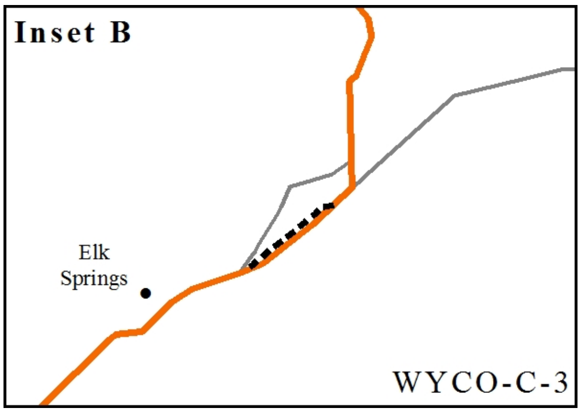
Route Variation WYCO-C-1

A localized variation to the Alternative WYCO-C is approximately 14 miles northwest of Maybell, Colorado in the Little Snake River valley. This route variation is east of Alternative WYCO-C for a distance of approximately 5 miles, limiting land-use conflicts and engineering constraints by crossing the Little Snake River north of where Alternative WYCO-C crosses the river.

Route Variation WYCO-C-2



A localized variation to the Alternative WYCO-C is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids the Tuttle Ranch Conservation Easement, occurring north of Alternative WYCO-C for a distance of approximately 6 miles paralleling U.S. Highway 40 and crossing the Deerlodge Road entrance to Dinosaur National Monument.

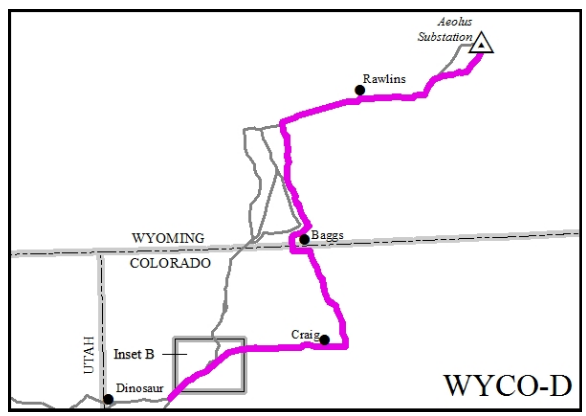


Route Variation WYCO-C-3

A localized variation to the Alternative WYCO-C is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids crossing Deerlodge Road and parallels closer to the existing transmission line through the Tuttle Ranch Conservation Easement than Alternative WYCO-C for a distance of approximately 4.5 miles.

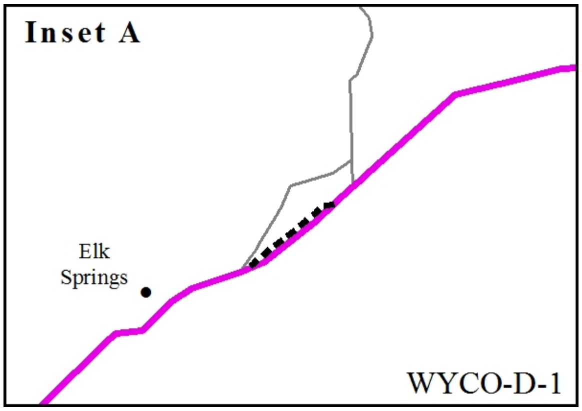
Alternative WYCO-D

Alternative WYCO-D exits the planned Aeolus Substation to the south/southwest paralleling the Difficulty to Miners 230kV transmission line, crossing U.S. Highway 30 twice near Hanna, Wyoming, continuing toward I-80. It crosses I-80 approximately 10 miles east of Sinclair, Wyoming. The alternative route then continues west on the southern side of I-80 (approximately 3 to 5 miles south) for approximately 48 miles at which point it parallels Wyoming Highway 789 (on the east side of the highway) south toward Baggs, Wyoming, for approximately 40 miles. It crosses the Wyoming and Colorado border approximately 7 miles southwest of Baggs.



The alternative route turns east toward Colorado State Highway 13 where it continues south toward Craig, Colorado, paralleling the east side of the highway for approximately 27 miles. The alternative route turns west where it parallels the Hayden to Artesia 138kV transmission line toward the Craig Power Plant. From the plant, it continues west paralleling the Hayden to Artesia 138kV and the Bears Ears to Bonanza 345kVtransmission lines along U.S. Highway 40 for approximately 60 miles to a point approximately 20 miles east of Dinosaur, Colorado.

From U.S. Highway 40, the alternative route could be combined with either the Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover alternative routes or the Colorado to Utah – U.S. Highway 40 to Central Utah to Clover alternative routes to reach the Clover Substation terminus of the Project.



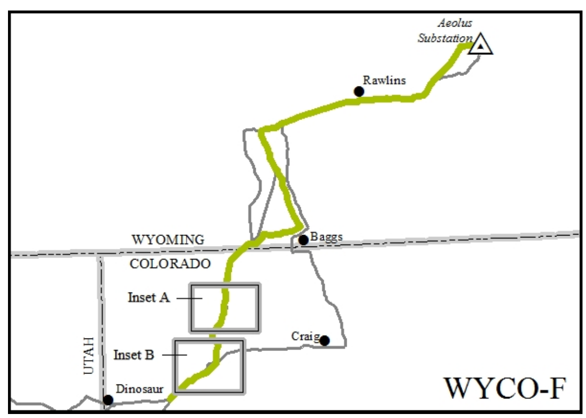
Route Variation WYCO-D-1

A localized variation to the Alternative WYCO-D is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids crossing Deerlodge Road and parallels closer to the existing transmission line through the Tuttle Ranch Conservation Easement than Alternative WYCO-D for a distance of approximately 4.5 miles.

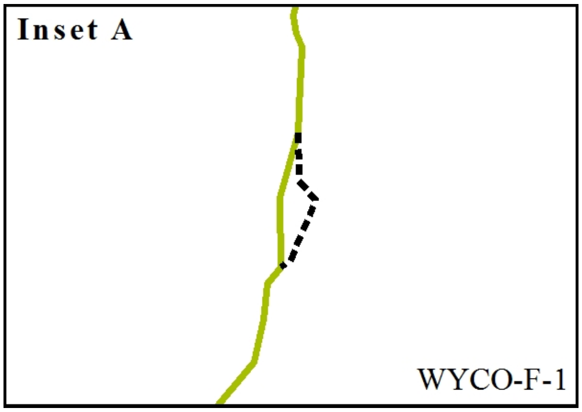
Alternative WYCO-F

Alternative WYCO-F exits the planned Aeolus Substation to the southwest and crosses I-80 approximately 10 miles east of Sinclair, Wyoming. The alternative route continues west on the southern side of I-80 (approximately 3 to 5 miles south) for approximately 57 miles. The alternative route then parallels Wamsutter Road (on the east side of the road) south for approximately 20 miles. The alternative route continues south, approximately 3 miles to the west of Wyoming Highway 789. North of Baggs, Wyoming, the alternative route turns west (south of Flat Top Mountain) for approximately 15 miles, then southwest to cross the Wyoming -and Colorado border, approximately 20 miles west of Baggs.

The alternative route continues south/southwest through the Sevenmile Ridge area where it crosses the Little Snake River, the western edge of the Godiva Rim, and Colorado State Highway 318 in an area approximately 10 miles northwest of Maybell, Colorado. The alternative route continues south crossing the Yampa River 5 miles northeast of Cross Mountain Gorge, and then U.S. Highway 40 at a point approximately 12 miles southwest of Maybell. The alternative route continues southwest for approximately 22 miles paralleling the existing Bonanza to Bears Ears 345kV and the Hayden to Artesia 138kV transmission lines to a point south of U.S. Highway 40, approximately 20 miles east of Dinosaur, Colorado.



From U.S. Highway 40, the alternative route could be combined with either the Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover alternative routes or the Colorado to Utah – U.S. Highway 40 to Central Utah to Clover alternative routes to reach the Clover Substation terminus of the Project.

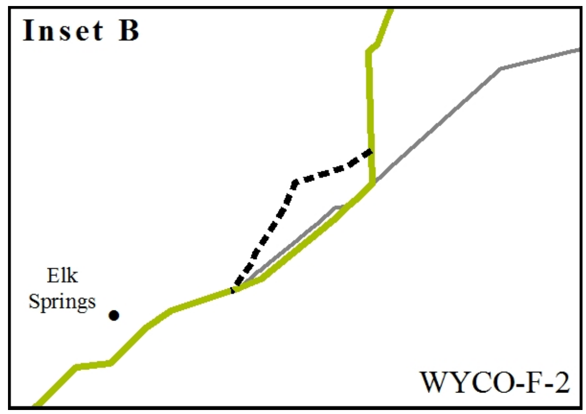


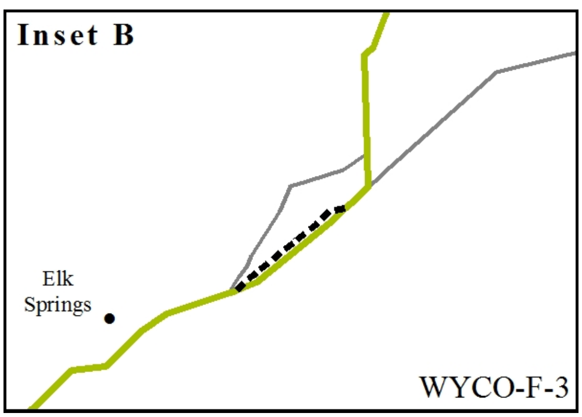
Route Variation WYCO-F-1

A localized variation to the Alternative WYCO-F is approximately 14 miles northwest of Maybell, Colorado in the Little Snake River valley. This route variation is east of Alternative WYCO-F for a distance of approximately 5 miles, limiting land-use conflicts and engineering constraints by crossing the Little Snake River north of where Alternative WYCO-F crosses the river.

Route Variation WYCO-F-2

A localized variation to the Alternative WYCO-F is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids the Tuttle Ranch Conservation Easement, occurring north of Alternative WYCO-F for a distance of approximately 6 miles paralleling U.S. Highway 40 and crossing the Deerlodge Road entrance to Dinosaur National Monument.



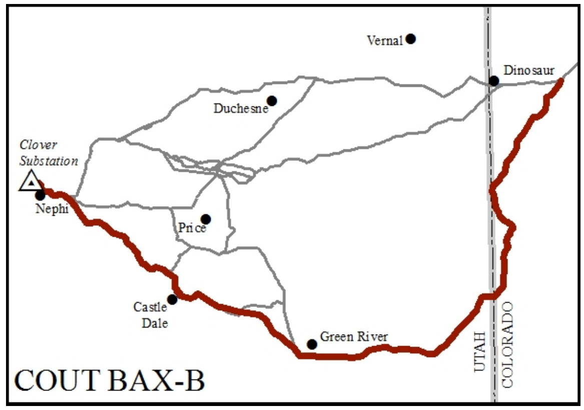


Route Variation WYCO-F-3

A localized variation to the Alternative WYCO-F is approximately 12 miles southwest of Maybell, Colorado. This route variation avoids crossing Deerlodge Road and parallels closer to the existing transmission line through the Tuttle Ranch Conservation Easement than Alternative WYCO-F for a distance of approximately 4.5 miles.

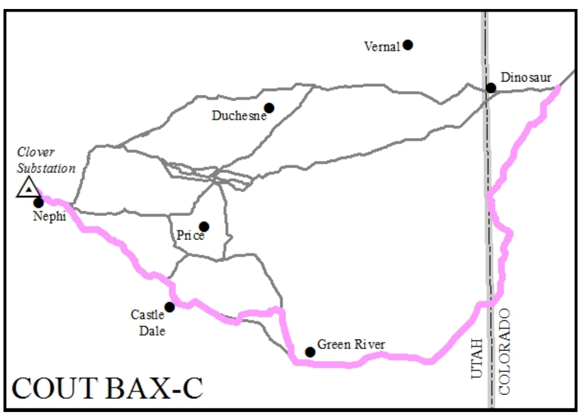
2.5.2.2 Colorado to Utah – U.S. Highway 40 to Baxter Pass to Clover (COUT BAX)

Alternative COUT BAX-B



Alternative COUT BAX-B begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route heads southwest toward the Rangely to Meeker 138kV transmission line. The alternative route then parallels the existing transmission line on the east and south as it crosses Colorado State Highway 139. The alternative route continues southwest toward the Colorado/Utah border where it parallels a pipeline corridor for approximately 40 miles through the Baxter Pass area and continuing south toward Interstate 70 (I-70). It crosses the Colorado/Utah border approximately 1 mile north of I-70.

The alternative route heads west into Utah paralleling the north side of I-70 toward Green River, Utah, for approximately 60 miles. It then crosses to the south side of I-70 near Green River, Utah, and parallels the Huntington to Pinto 345kV transmission line for approximately 50 miles as it crosses the Green River continuing northwest through the San Rafael Swell area. At that point, the alternative route continues west toward Castle Dale, Utah, where it parallels the Huntington to Emery 345kV and the Spanish Fork to Emery 345kVtransmission lines north toward the Huntington Power Plant. It then parallels the Huntington to Mona 345kV transmission line through the Wasatch Plateau northwest toward Mount Pleasant, Utah, continuing toward Fountain Green, Utah where it continues west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

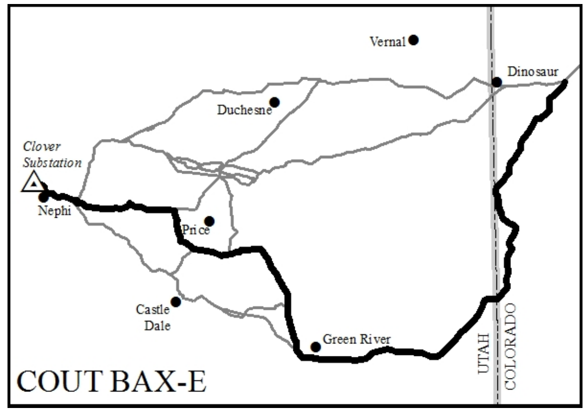


Alternative COUT BAX-C

Alternative COUT BAX-C begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route moves southwest toward the Rangely to Meeker 138kV transmission line. The alternative route then parallels the Rangely to Meeker 138kV transmission line on the east and south as it crosses Colorado State Highway 139. The alternative route continues southwest toward the Colorado and Utah border where it parallels a pipeline corridor for approximately 40 miles through the Baxter Pass area continuing south toward I-70. It crosses the Colorado/Utah border approximately 1 mile north of I-70.

The alternative route heads west into Utah paralleling the north side of I-70 toward Green River, Utah, for approximately 60 miles. It then crosses to the south side of I-70 near Green River, Utah, and parallels the Huntington to Pinto 345kV transmission line as it crosses the Green River and I-70 where it continues north paralleling U.S. Highway 6 and the Mounds Southwest Park to Moab 138kV transmission line for approximately 12 miles. It then continues west through the San Rafael Swell area along the Green River Cuttoff Road (County Road 401), then roughly parallels the Hunter to Pinto 345kV transmission line. It then continues west toward Castle Dale, Utah, where it parallels the Huntington to Emery 345kV and the Spanish Fork to Emery 345kV transmission lines north toward the Huntington Power Plant. It then parallels the Huntington to Mona 345kV transmission line through the Wasatch Plateau northwest toward Mount Pleasant, Utah, continuing toward Fountain Green, Utah, where it continues west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

Alternative COUT BAX-E

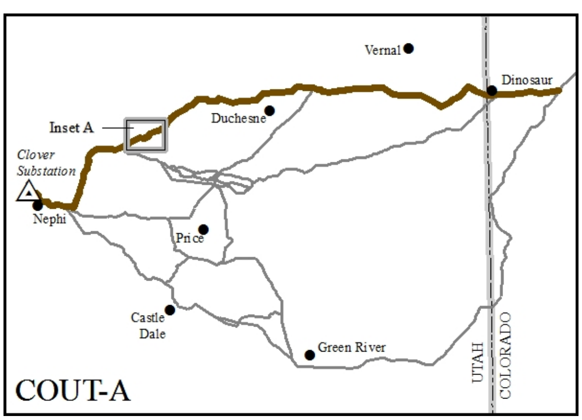


Alternative COUT BAX-E begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this starting point, the alternative heads southwest toward the Rangely to Meeker 138kV transmission line. The alternative route then parallels the Rangely to Meeker 138kV transmission line on the east and south as it crosses Colorado State Highway 139. The alternative route continues southwest toward the Colorado and Utah border where it parallels a pipeline corridor for approximately 40 miles through the Baxter Pass area, continuing south toward I-70, and crossing the Colorado and Utah border approximately 1 mile north of I-70.

The alternative route heads west into Utah, paralleling the north side of I-70 toward Green River, Utah, for approximately 60 miles. It then crosses to the south side of I-70 near Green River, Utah, and parallels the Huntington to Pinto 345kV transmission line as it crosses the Green River and I-70, where it continues north paralleling the Mounds Southwest Park to Moab 138kV transmission line and on the east side of U.S. Highway 6 for approximately 33 miles to a point approximately 14 miles southeast of Wellington, Utah. The alternative route continues west toward the Spanish Fork to Huntington 345kV and the Spanish Fork to Emery 345kV transmission lines then parallels these two lines north for approximately 10 miles before continuing west following a pipeline corridor over the Wasatch Plateau where it crosses the Energy Loop Scenic Byway as it continues toward Fairview, Utah, north of Cottonwood Canyon continuing west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah and the Clover Substation.

2.5.2.3 Colorado to Utah – U.S. Highway 40 to Central Utah to Clover (COUT)

Alternative COUT-A

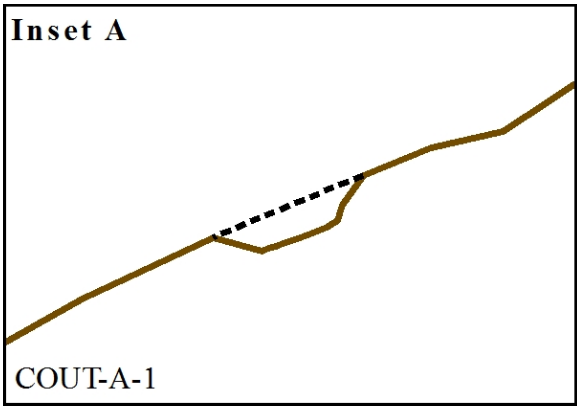


Alternative COUT-A begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route parallels, on the south side, the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado and Utah border.

The alternative route parallels the existing Bonanza to Mona 345kV transmission line west in the Uinta Basin, south of Roosevelt, Utah and north of Duchesne, Utah, continuing through the Fruitland, Utah, area. From there it continues southwest through the Uinta National Forest south of Strawberry Reservoir (avoiding the Chipman Creek Inventoried Roadless Area [IRA]) and crosses U.S. Highway 6 near the Sheep Creek Road intersection. Upon crossing U.S. Highway 6, the alternative route continues paralleling the Bonanza to Mona 345kV transmission line toward Thistle, Utah, where it turns south and crosses U.S. Highway 89 near Birdseye, Utah, then continuing south/southwest to a point approximately 5 miles north of Fountain Green, Utah. The alternative route continues paralleling the Bonanza to Mona 345kV transmission line west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

Route Variation COUT-A-1

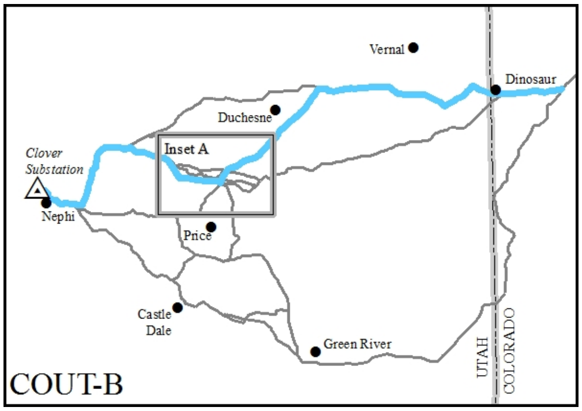
A localized variation to the Alternative COUT-A is approximately 6 miles southwest of the Strawberry Reservoir. The alternative route variation maintains paralleling on the northern side of the Bonanza to Mona 345kV transmission line while avoiding two crossings of the line. It crosses through the Chipman Creek IRA (Uinta National Forest Roadless Area #418008) for a distance of approximately 3.4 miles.



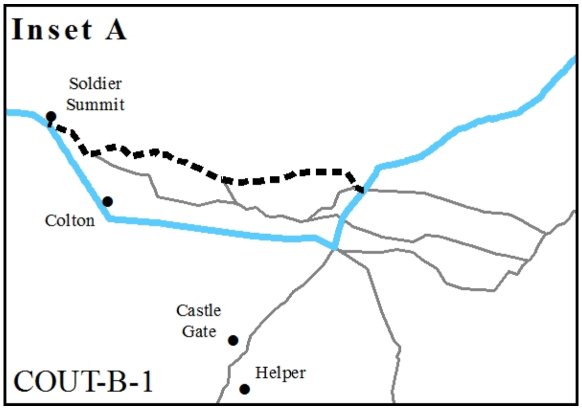
Alternative COUT-B

Alternative COUT-B begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route parallels the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado and Utah border.

The alternative route parallels the existing Bears Ears to Bonanza 345kV line west for approximately 45 miles to a point near Myton, Utah. It then continues southwest paralleling the Carbon to Ashley 138kV transmission line for approximately 45 miles to a point 10 miles northeast of Helper, Utah. It then continues west through the Emma Park area toward U.S. Highway 6 and parallels the Spanish Fork to Carbon 138kV transmission line northwest for approximately 25 miles. From there it parallels the Bonanza to Mona 345kV transmission line toward Thistle, Utah, where it turns south and crosses U.S. Highway 89 near Birdseye, Utah, continuing south/southwest to a point approximately 5 miles north of Fountain Green, Utah. The alternative route continues to parallel the Bonanza to Mona 345kV transmission line west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

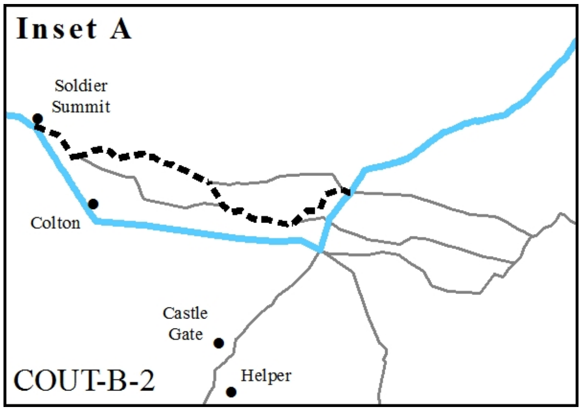


Route Variation COUT-B-1



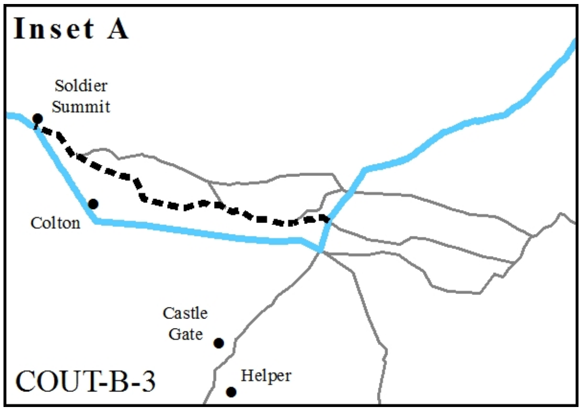
A localized variation to the Alternative COUT-B is in the Emma Park area approximately 13 miles north of Helper, Utah. This route variation deviates from Alternative COUT-B on Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B, where it traverses Reservation Ridge following the Reservation Ridge Scenic Backway toward Soldier Summit for a distance of approximately 18 miles where it integrates back into Alternative COUT-B.

Route Variation COUT-B-2



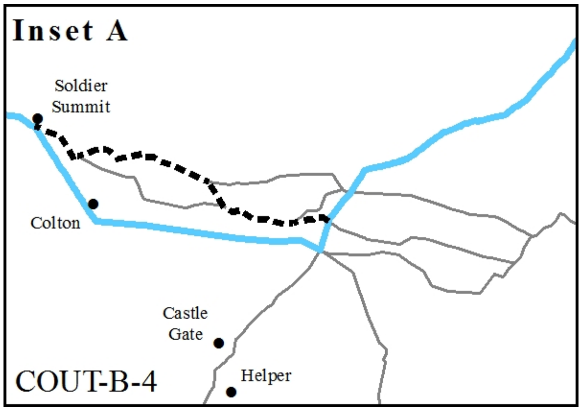
A localized variation to the Alternative COUT-B is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-B on Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B, dropping southwest toward U.S. Highway 191 where it follows the highway through Indian Canyon for approximately 2 miles; it then crosses the highway continuing northwest for approximately 6 miles toward Reservation Ridge where it traverses the western end of the ridge following the Reservation Ridge Scenic Backway toward Solder Summit for a distance of approximately 12 miles where it integrates back into Alternative COUT-B.

Route Variation COUT-B-3



A localized variation to the Alternative COUT-B is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-B to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B and to avoid Reservation Ridge associated with comparable links of Route Variations COUT-B-1 and COUT-B-2. The variation is south of Argyle Ridge crossing U.S. Highway 191 heading west/northwest toward Solder Summit for a distance of approximately 21 miles where it integrates back into Alternative COUT-B.

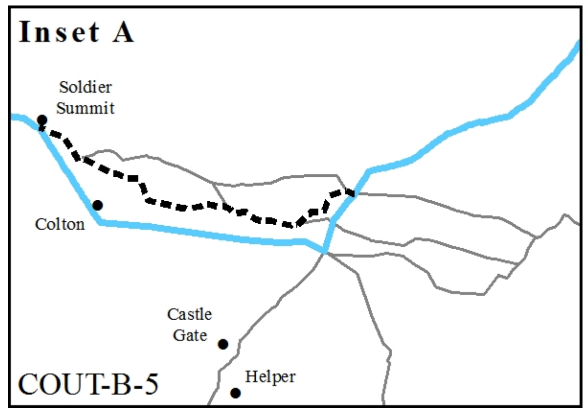
Route Variation COUT-B-4



A localized variation to the Alternative COUT-B is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-B south of Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B, crossing U.S. Highway 191 heading northwest for approximately 6 miles toward Reservation Ridge where it then traverses the western end of the ridge following the Reservation Ridge Scenic Backway toward Solder Summit for a distance of approximately 12 miles where it integrates back into Alternative COUT-B.

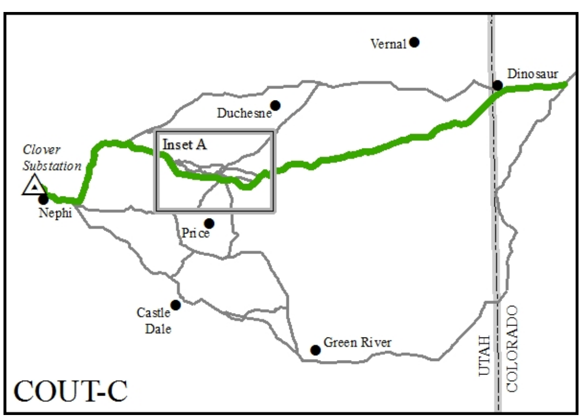
Route Variation COUT-B-5

A localized variation to the Alternative COUT-B is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-B on Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B, dropping southwest toward U.S. Highway 191 where it follows the highway through Indian Canyon for approximately 2 miles. It then crosses U.S. Highway 191 headed west/northwest toward Solder Summit for a distance of approximately 18 miles where it integrates back into Alternative COUT-B.



Alternative COUT-C

Alternative COUT-C begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route parallels the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado/Utah border.

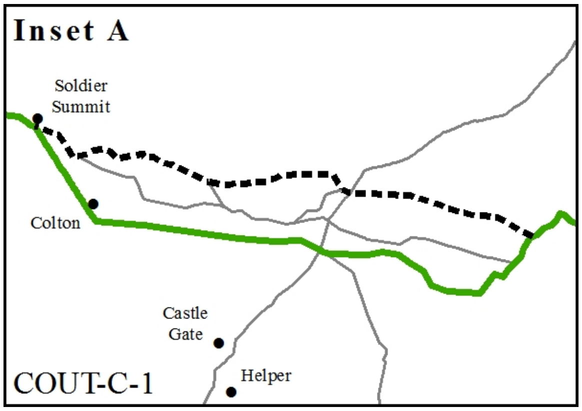


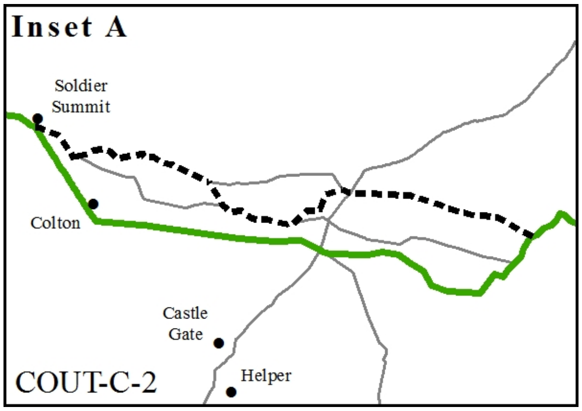
This alternative route continues to follow the Bears Ears to Bonanza 345kV transmission line southwest toward the Bonanza Power Plant. The alternative route then continues west/southwest following an underground pipeline and crossing the Green River approximately 8 miles north of Sand Wash boat launch, continuing through the Tavaputs Plateau toward the Emma Park area. It continues west toward U.S. Highway 6 and parallels the Spanish Fork to Carbon 138kV transmission line northwest for approximately 25 miles. It continues paralleling the Bonanza to Mona 345kV transmission line toward Thistle, Utah, turning south and crosses U.S. Highway

89 near Birdseye, Utah, continuing south/southwest to a point approximately 5 miles north of Fountain Green, Utah. The alternative continues to parallel the Bonanza to Mona 345kV transmission line west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

Route Variation COUT-C-1

A localized variation to the Alternative COUT-C is in the Argyle Ridge and Emma Park areas approximately 13 miles north of Helper, Utah. This route variation deviates from Alternative COUT-C traversing Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-C for approximately 12 miles, and then traverses Reservation Ridge following the Reservation Ridge Scenic Backway toward Soldier Summit for a distance of approximately 18 miles where it integrates back into Alternative COUT-C.



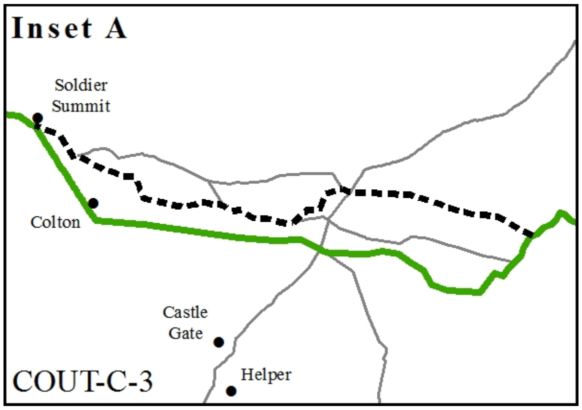


Route Variation COUT-C-2

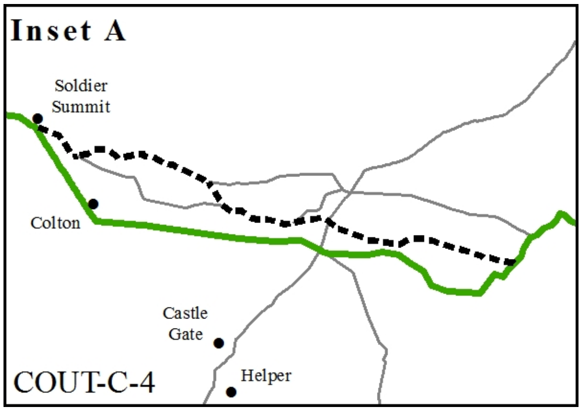
A localized variation to the Alternative COUT-C is in the Argyle Ridge and Emma Park areas approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-C traversing Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-C for approximately 13 miles, and then dropping southwest toward U.S. Highway 191 where it follows the highway through Indian Canyon for approximately 2 miles. It then crosses the highway continuing northwest for approximately 6 miles toward Reservation Ridge where it traverses the western end of the ridge following the Reservation Ridge Scenic Backway toward Solder Summit for a distance of approximately 12 miles where it integrates back into Alternative COUT-C.

Route Variation COUT-C-3 (Agency Preferred Alternative)

A localized variation to the Alternative COUT-C is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-C to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B and to avoid Reservation Ridge associated with comparable links of route variations COUT-C-1 and COUT-C-2. The variation traverses Argyle Ridge for approximately 12 miles, then dropping southwest toward U.S. Highway 191, following the highway through Indian Canyon for approximately 2 miles; it



then crosses the highway heading west/northwest toward Solder Summit for a distance of approximately 21 miles where it integrates back into Alternative COUT-C.

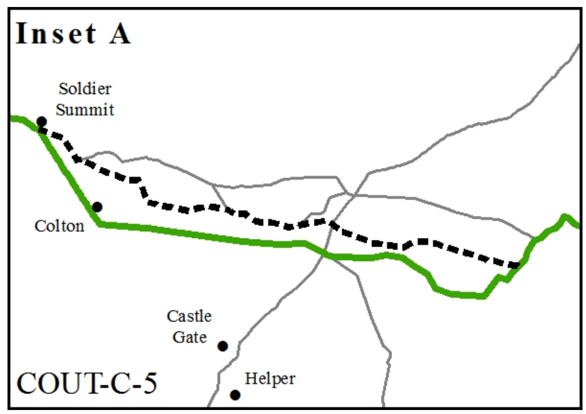


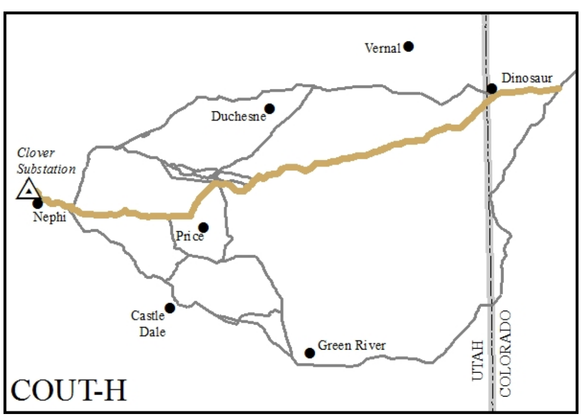
Route Variation COUT-C-4

A localized variation to the Alternative COUT-C is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-C south of Argyle Ridge to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B, heading west toward U.S. Highway 191 for approximately 14 miles. It then continue northwest for approximately 6 miles toward Reservation Ridge where it traverses the western end of the ridge following the Reservation Ridge Scenic Backway toward Solder Summit for a distance of approximately 12 miles where it integrates back into Alternative COUT-C.

Route Variation COUT-C-5

A localized variation to the Alternative COUT-C is in the Emma Park area approximately 11 miles north of Helper, Utah. This route variation deviates from Alternative COUT-C to avoid sage-grouse habitat associated with comparable links of Alternative COUT-B and to avoid Reservation Ridge associated with comparable links of route variations COUT-C-1 and COUT-C-2. The variation traverses south of Argyle Ridge heading west toward U.S. Highway 191 for approximately 14 miles. It continues west/northwest toward Solder Summit for a distance of approximately 18 miles where it integrates back into Alternative COUT-C.





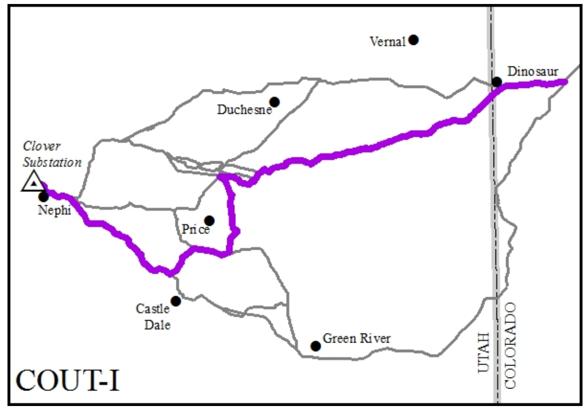
Alternative COUT-H (Applicant Preferred Alternative)

Alternative COUT-H begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route parallels the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado and Utah border.

This alternative route continues following the Bears Ears to Bonanza 345kV transmission line southwest toward the Bonanza Power Plant. The alternative then continues west/southwest following an underground pipeline and crossing the Green River approximately 8 miles north of Sand Wash boat launch, continuing through the Tavaputs Plateau toward the Emma Park area. It continues west following a pipeline corridor over the Wasatch Plateau where it crosses the Energy Loop Scenic Byway as it continues toward Fairview, Utah, north of Cottonwood Canyon continuing west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

Alternative COUT-I

Alternative COUT-I begins at a point northeast of Rangely, Colorado, where the Wyoming to Colorado – Aeolus to U.S. Highway 40 (WYCO) alternative routes terminate. From this point, the alternative route parallels the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado and Utah border.



The alternative continues following the Bears Ears to Bonanza 354kV transmission line southwest toward the Bonanza Power Plant. The alternative route then continues west/southwest following an underground pipeline and crossing the Green River approximately 8 miles north of Sand Wash boat launch, continuing through the Tavaputs Plateau toward the Emma Park area. It continues south/southwest toward Huntington, Utah, where it parallels the Huntington to Mona 345kV transmission line through the Wasatch Plateau northwest toward Mount Pleasant, Utah, continuing toward Fountain Green, Utah where it continues west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

2.5.3 No Action Alternative

If no action is taken, the BLM would not grant a right-of-way and the USFS would not authorize a special-use for the Project to cross federal lands and the transmission line and ancillary facilities would not be constructed.

2.6 Alternatives Reviewed But Eliminated from Further Consideration

In the preparation of this document, an initial evaluation was made of a full range of alternatives. All reasonable alternatives were considered further, including alternatives to the transmission line option, new generation facilities, reliance on the existing transmission system, and alternative transmission technologies. Alternatives that were (1) ineffective (i.e., did not meet the agencies' purpose and need), (2) technically or economically infeasible, (3) inconsistent with the basic policy objectives of the management of an area (e.g., land use plans), (4) remote or speculative (i.e., could not be analyzed), or (5) substantially similar in design or effects to another alternative being analyzed were eliminated from further consideration.

2.6.1 Alternatives to a Transmission Line Option

Alternatives to constructing new transmission lines and substations, which would reduce the electrical load requirements of the system or provide additional capacity to the system, were considered but could not effectively meet the Applicant's interests and objectives for the Project.

2.6.1.1 Electrical Load and Demand Response and Energy Efficiency

Demand response is designed to achieve reductions in loads (i.e., the amount of power needed) to ensure the utility meets its obligation to provide service to retail customers. Demand response generally is categorized as direct if the utility system operator can directly interrupt customers' appliances, equipment or processes through devices installed at the customers' premises or by action of the customers at the direct request of the utility system operator. The following are examples of direct demand response:

- A utility seeks and receives approval from its regulators to offer a program (typically supported by a tariff) where customers receive compensation for volunteering to allow the utility to directly interrupt service to specific equipment such as air conditioning, space heating, pumps, motors etc. for specified periods of time.
- A utility and a specific customer enter into an agreement where the customer, at the direction of the utility, interrupts service for pre-agreed-upon time periods for agreed-upon consideration.

Demand response generally is categorized as indirect if customers are responding to prices that indicate the changing value of energy over time. Examples include price response products such as time-of-use and day rates and critical-peak-pricing.

Energy efficiency (or energy conservation) is achieved through the reduction in overall energy consumption of specific end-user devices, and systems by promoting behavioral changes, high-efficiency equipment, processes, and home and building designs. Energy-efficiency programs typically reduce energy consumption over many hours during the year, depending on the energy profile of the source of the efficiency gain. Examples include energy efficiency education, energy-saving appliances and lighting, high-efficiency heating, ventilating, and air-conditioning systems or control modification, efficient building design, building shell improvements, advanced electric motors and drive systems, and heat recovery systems.

The Applicant has implemented the following energy-efficiency and load-management programs:

- The Applicant directly provides energy efficiency information, services and incentives to its customers in California, Idaho, Utah, Washington and Wyoming with the objective of improving the efficiency of loads served. Energy efficiency information, services and incentives are provided to Oregon customers through the Energy Trust of Oregon, an independent nonprofit organization.
- Since 2003, the Applicant has offered a residential/small commercial air conditioning load control program along the Wasatch Front. Currently, the initiative has approximately 115,000 participating air conditioning units. The system is dispatched during summer peak periods and yields approximately 121 MW of peak load relief. There is no assumed energy savings associated with this initiative.
- Additionally since 2003, the Applicant has offered an irrigation-load-control program to its Idaho and Utah irrigation customers. The system is currently administered through a third-party pay-for-performance agreement. The system can be dispatched during peak periods (2 p.m. to 8 p.m.), and the Applicant projects the program will yield approximately 209 MW of capacity June 15 – August 15 of each year.
- The Applicant currently offers several rate structures to help manage customer usage. These include inverted block structures for residential customers and time-of-day and use structures for residential and commercial and industrial customers.[3] The impact of the Applicant's current

[3]Program offerings vary by state. In some cases, participation is mandatory.

demand-response pricing products was recently assessed[4] to lower on-peak usage from 119 MW to 391 MW on average[5] across the Applicant's six jurisdictions.

Energy-efficiency and demand response are valuable tools that the Applicant is using and will continue to use to manage the demand for and consumption of energy.

2.6.1.2 New Generation Facilities or Other Types of Generation

The Applicant assesses electric generation needs and transmission expansion requirements on a long-term basis. An electrical system model is established to analyze different transmission and generation options geographically to deliver electricity to customers while evaluating electrical generation alternatives (i.e., natural gas, wind, geothermal, etc.) to assess financial requirements and risk. One of the Applicant's models studies various combinations of electrical generation alternatives and/or transmission to determine the mix of generation sources and transmission options and timing that minimizes investment and operating costs. These studies include electrical system reliability constraints, loads, generation/transmission costs and operating characteristics, transmission system configuration, electricity markets, fuel price variations, and emissions.

Electrical system modeling has indicated the optimal portfolio includes a mix of generation alternatives (i.e., base load generation, intermediate generations, and seasonal peaking generation) that can be delivered to the Applicant's customers. Additionally, market purchases from the Desert Southwest are particularly important for supporting northern and southern Utah loads prior to when generating facilities can be acquired and enabled by the Project.

Other types of generation, including distributed (local) generation resources, also were considered. Based on responses to the previous Applicant request for potential new generation resources, none of the currently proposed facilities would meet the load growth demands in southern and central Utah and, therefore, would not meet the Project's purpose and need. Construction of the Project would provide flexibility to match customer load requirements in varying locations.

Distributed-generation resources can be differentiated from centralized-generation resources, primarily in terms of size, multiple units dispersed throughout an area, and they usually are installed at or near customer loads where the generated power is used. Distributed generation generally ranges in size from about 5,000 watts to 10 MW, in contrast to centralized-generation resources that are typically hundreds of megawatts per site. Distributed generation is also more expensive per watt than central generation due to the types of technology used. Distributed-generation resources technologies include solar photovoltaics, energy-storage devices (e.g., batteries), micro turbines, mini wind turbines, and fuel cells. For the reasons described, it is most effective for the Applicant to use a centrally located generation unit, in addition to supporting seasonal or regional energy exchanges.

In addition to these limitations, new and distributed generation resources did not meet the agencies' purpose and need, which is to analyze the Applicant's application for a utility-scale transportation system on federal lands, and therefore were eliminated from further consideration for this Project.

[4]Assessment of Long-Term, System-Wide Potential for Demand-Side and Other Supplemental Resources, 2013-2032, The Cadmus Group Inc., March, 2013.
[5]Range represents uncertainty in measurement and verification of the impact of price response products.

2.6.1.3 Existing Transmission Systems

Additional transmission capacity of the existing transmission paths in the Project area EISs not exist. The planning basis behind the Project is based on reliability of the infrastructure system in the three state areas of Wyoming, Utah, and Idaho which constitutes the Applicant's service area.

2.6.1.4 Alternative Transmission Technologies

Alternative Voltage Levels

To provide the Project's needed capacity in the most cost-effective manner, a 500kV line was chosen to match the Energy Gateway program plans for voltage infrastructure of the local bulk transmission facilities. If a 500kV line is not built, then multiple 345kV lines or a double circuit system would need to be considered. The planning basis of the Energy Gateway system is based on existing voltage infrastructure of local bulk transmission facilities; therefore, any other alternative voltage levels would be outside the planning considerations of the Project and not meet the purpose and need of the Applicant. These alternatives were dismissed due to the incompatibility with the Energy Gateway planned reliability basis.

Direct or Alternating Current Transmission

The main benefit of a direct-current (DC) system is better control of power flows over very long distances (i.e., more than 400 miles); whereas, line-construction-cost savings may be able to offset the high costs of DC terminal substations. To interconnect with an AC system, the DC must be converted to AC. Converter substations require more land than a typical AC substation, and additional costs for one 500kV DC converter station can be up to $200 million (a potential additional total of $400 million for the two new substations) (Rocky Mountain Power 2008). The AC system selected allows for the multiple substation interconnections necessary for load centers and for generation resources while being more economical than DC. A DC system also has limited ability for future expansion where additional future transmission capacity is needed and requires a higher upfront cost. For these reasons, the AC design was chosen over a DC design for the Project.

Underground Transmission

Extra-high-voltage underground lines (345kV and 500kV) have been constructed in some parts of the United States, but only for short distances, and usually where circumstances dictated overhead lines were not feasible (e.g., in the vicinity of airports and urban centers). There are several issues that make underground installation of an extra-high-voltage transmission line impractical for long-distance installations—cost, reliability, reactive power compensation, and environmental.

- **Cost.** High-voltage underground transmission lines have markedly different technological requirements than lower-voltage underground distribution lines. Underground high-voltage transmission lines require extensive cooling systems to dissipate the heat generated by the transmission of bulk energy. Cooling systems are complex and expensive. The extremely high cost of large cooling systems and other special design requirements are prohibitive for long-distance underground transmission and are estimated to be 10 times greater, or more, than the cost of constructing a 500kV overhead transmission line (National Grid 2009; Rocky Mountain Power 2008). The additional costs must be approved by the public utilities commissions and are passed on to all ratepayers.
- **Reliability.** Operational problems are greater and the duration of outages is normally longer for underground transmission lines. When an outage of an underground line occurs, determining the cause and location of the damage, the replacement parts needed to repair the line, and repairing

the line takes much more time than for an overhead line. Repairs to an underground line also are more expensive. If an underground line is damaged during the winter at a high elevation, the presence of snow would increase the length of time required and the degree of difficulty to repair the facility. The potential long-term outages associated with the 500kV transmission line would be unacceptable for a circuit carrying bulk power to a large service area.

- **Reactive Power Compensation.** The capacitive characteristics of the underground-cable insulating material and the proximity of the cables to one another result in the cable system introducing high capacitive-reactive loads onto the electrical system. These capacitive-reactive loads would have to be offset with inductive compensation at above-ground compensation stations located every 7 to 20 miles along the transmission line. Another consideration is that the electrical system as a whole may or may not be capable of reliably accommodating these large reactive power loads, making the integration of long-distance underground AC transmission lines into the power grid questionable or infeasible.
- **Environmental.** The environmental impacts from construction of an underground transmission line would be similar to those for major pipeline construction. Typical construction would require a continuous trench between endpoints, resulting in ground disturbance along an entire right-of-way. By comparison, overhead transmission line construction typically results in partial disturbances of the right-of-way, primarily at individual tower sites, pulling and tensioning sites, staging areas, and in areas providing access to the right-of-way. Furthermore, the potential for fluid leaks creates additional environmental concerns.

Because this alternative was not economically feasible, it was eliminated from further consideration.

New Transmission Technologies

Other technologies considered as alternatives for economical bulk-power transmission of electric energy to load centers included microwave, laser, and superconductors. Current research and development indicate some of these technologies eventually may become viable alternatives to overhead transmission systems; however, none of them are currently available for commercial use. Because they are remote and speculative and not technically feasible at this time, alternatives associated with new transmission technologies were eliminated from further consideration.

2.6.2 Transmission Line Alternative Routes Considered and Eliminated from Detailed Analysis

Transmission line alternative routes and segments considered and eliminated based on results of Level 1, Level 2, and Level 3 screening (Section 2.5.1.5) are shown on Maps 2-3a and 2-3b (alternative routes eliminated from detailed analysis) and are briefly described in the following sections. These alternative routes and segments did not perform as well as other routes and segments in the same general vicinity.

2.6.2.1 Level 1 Screening

- **Links W17 and W18.** These route segments do not comply with the Wyoming Governor's Executive Order 2011-5 regarding greater sage-grouse core area protection. As a result of comparison of alternative routes, eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Links W23 and W24.** These route segments were eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.

- **Links W26, W129, and W127.** These route segments were eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Link W493.** This route segment was eliminated from further consideration because it crossed more of the Red Creek Portion of the Greater Red Creek Area of Critical Environmental Concern (ACEC) than Link W492.
- **Link W119.** This route segment was eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links W112 and W114.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links W122, W123, W311, and C14.** These route segments were eliminated from further consideration because it has substantially greater effects than an alternative that is analyzed.
- **Link W301.** This route segment was eliminated from further consideration because it has substantially greater effects than an alternative that is analyzed.
- **Links C102, C107, C104, C180, and C181.** These route segments were eliminated from further consideration because it has substantially greater effects than an alternative that is analyzed.
- **Links C150 and C151.** These route segments were eliminated from further consideration because it has substantially greater effects than an alternative that is analyzed and is no longer relevant after Link C181 was eliminated.
- **Links C200, C220, and U240.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links U321 and U380.** These route segments were eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Links U260 and U290.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Link U403.** This route segment was eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Link U405.** This route segment was eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Link U422.** This route segment was eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Link U423.** This route segment was eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Links U610 and U620.** These route segments were eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.

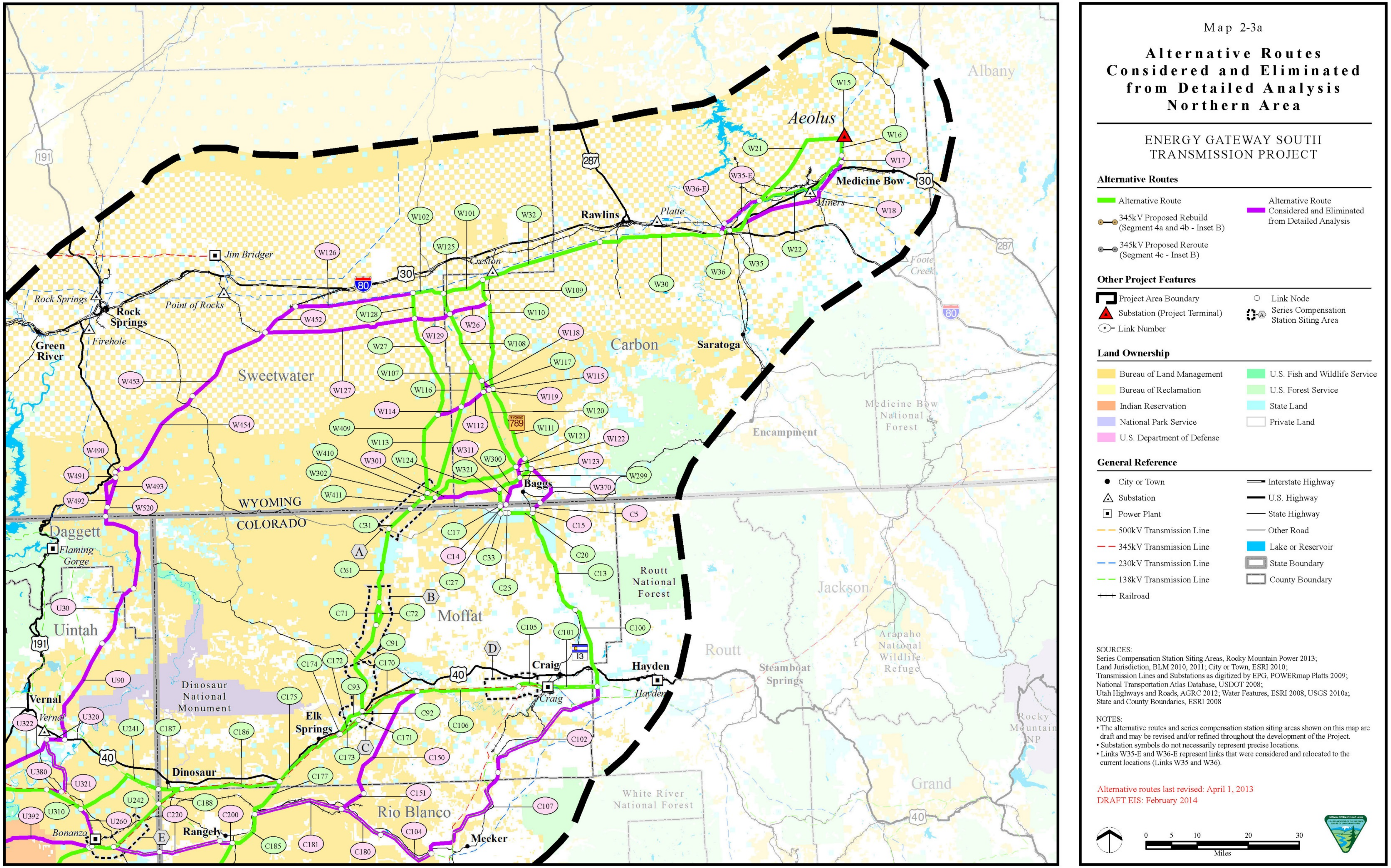
2.6.2.2 Level 2 Screening

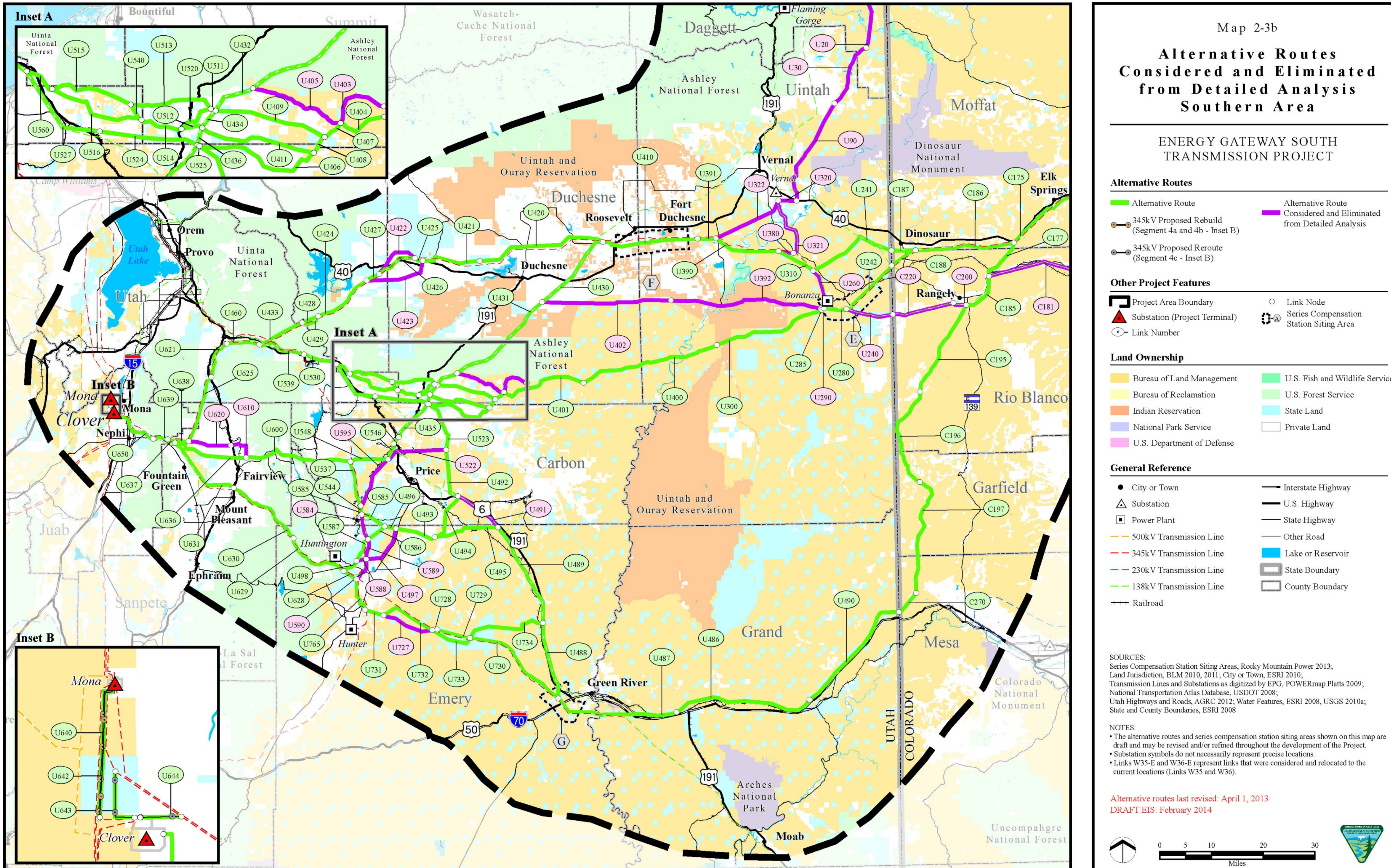
- **Links U392 and U402.** These route segments were eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.
- **Link U595.** This route segment was eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links U584, U589, and U590.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.

- **Link U727.** This route segment was eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links U497 and U588.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.

2.6.2.3 Level 3 Screening

- **Links W118 and W115.** These route segments were eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Links W370, C5, and C15.** These route segments were eliminated from further consideration because it has substantially greater effects than an alternative that is analyzed.
- **Links W126, W452, W453, W454, W490, W491, W492, W520, U20, U30, U90, U320, and U322.** These route segments were eliminated from further consideration because it did not comply with the Wyoming Governor's Executive Order 2011-5 regarding greater sage-grouse core area protections and would have substantially greater effects than an alternative that is analyzed.
- **Link U491.** This route segment was eliminated from further consideration because it would have similar effects as an alternative that is analyzed.
- **Link U522.** This route segment was eliminated from further consideration because it would have substantially greater effects than an alternative that is analyzed.


Map 2-3a
Alternative Routes Considered and Eliminated from Detailed Analysis Northern Area
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT
Alternative Routes
Alternative Route
345kV Proposed Rebuild (Segment 4a and 4b - Inset B)
345kV Proposed Reroute (Segment 4c - Inset B)
Alternative Route Considered and Eliminated from Detailed Analysis
Other Project Features
Project Area Boundary
Substation (Project Terminal)
Link Number
Link Node
Series Compensation Station Siting Area
Land Ownership
Bureau of Land Management
Bureau of Reclamation
Indian Reservation
National Park Service
U.S. Department of Defense
U.S. Fish and Wildlife Service
U.S. Forest Service
State Land
Private Land
General Reference
City or Town
Substation
Power Plant
500kV Transmission Line
345kV Transmission Line
230kV Transmission Line
138kV Transmission Line
Railroad
Interstate Highway
U.S. Highway
State Highway
Other Road
Lake or Reservoir
State Boundary
County Boundary
SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008
NOTES:
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.
• Links W35-E and W36-E represent links that were considered and relocated to the current locations (Links W35 and W36).
Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014
0 5 10 20 30
Miles


Map 2-3b
Alternative Routes Considered and Eliminated from Detailed Analysis Southern Area
ENERGY GATEWAY SOUTH TRANSMISSION PROJECT
Alternative Routes
Alternative Route
Alternative Route Considered and Eliminated from Detailed Analysis
345kV Proposed Rebuild (Segment 4a and 4b - Inset B)
345kV Proposed Reroute (Segment 4c - Inset B)
Other Project Features
Project Area Boundary
Substation (Project Terminal)
Link Number
Link Node
Series Compensation Station Siting Area
Land Ownership
Bureau of Land Management
Bureau of Reclamation
Indian Reservation
National Park Service
U.S. Department of Defense
U.S. Fish and Wildlife Service
U.S. Forest Service
State Land
Private Land
General Reference
City or Town
Substation
Power Plant
500kV Transmission Line
345kV Transmission Line
230kV Transmission Line
138kV Transmission Line
Railroad
Interstate Highway
U.S. Highway
State Highway
Other Road
Lake or Reservoir
State Boundary
County Boundary
SOURCES:
Series Compensation Station Siting Areas, Rocky Mountain Power 2013;
Land Jurisdiction, BLM 2010, 2011; City or Town, ESRI 2010;
Transmission Lines and Substations as digitized by EPG, POWERmap Platts 2009;
National Transportation Atlas Database, USDOT 2008;
Utah Highways and Roads, AGRC 2012; Water Features, ESRI 2008, USGS 2010a;
State and County Boundaries, ESRI 2008
NOTES:
• The alternative routes and series compensation station siting areas shown on this map are draft and may be revised and/or refined throughout the development of the Project.
• Substation symbols do not necessarily represent precise locations.
• Links W35-E and W36-E represent links that were considered and relocated to the current locations (Links W35 and W36).
Alternative routes last revised: April 1, 2013
DRAFT EIS: February 2014
0 5 10 20 30
Miles
Inset A
Inset B
Uintah
Duchesne
Carbon
Emery
Grand
Moffat
Rio Blanco
Garfield
Mesa
Utah
Juab
Sanpete
Daggett
UTAH
COLORADO
Uintah and Ouray Reservation
Ashley National Forest
Uinta National Forest
Dinosaur National Monument
Arches National Park
Colorado National Monument
Uncompahgre National Forest
Vernal
Roosevelt
Fort Duchesne
Price
Green River
Moab
Rangely
Dinosaur
Elk Springs
Mona
Clover
Nephi
Provo
Orem
Fairview
Huntington
Hunter
Ephraim
Bonanza

2.7 Summary Comparison of Alternative Routes

This section summarizes the results of the comparison of alternative routes, including the selection of the Agency Preferred Alternative on federal lands. This section also identifies the Applicant's Preferred Alternative.

Tables S-3a through S-3d provide a detailed comparative analysis of the resources for each alternative route. The tables identify key resource inventories and associated impacts for each resource based on the analysis presented in Chapter 3 and indicates the resource maps included in the Map Volume (MV). Table S-4 is a summary for alternative route comparison of the jurisdiction, engineering information, and cooperating agency comments. A summary of estimated disturbance and miles of access roads associated with each alternative route is presented in Table S-5.

A determination of potential significant impacts remaining after mitigation and cumulative effects (if present) also are identified.

The comparison process informed the Authorized Officers in making the selection of an Agency Preferred Alternative on federal lands (Section 2.7.1)

2.7.1 Agency Preferred Alternative on Federal Lands

The Agency Preferred Alternative on federal lands is the alternative route the BLM, in coordination with the cooperating agencies, believes would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. USDI regulations at 43 CFR 46.20(d) allows the responsible official to render a decision on a proposed action as long as it is within the range of alternatives discussed in the relevant environmental document. The decision of the responsible official(s) may combine alternatives discussed, in the relevant environmental document, if the effects of such combined elements of alternatives are reasonably apparent from the analysis. The Agency Preferred Alternative for this Project is the combination of Alternative WYCO-B-2 (a route variation of WYCO-B) and Alternative COUT-C-3 (a route variation of Alternative COUT-C).

The Alternative WYCO-B-2 portion of the preliminary agency-preferred alternative route exits the Aeolus Substation within the utility corridor designated by the Wyoming Executive Order 2011-5 for protection of sage-grouse, continuing to the southwest where it crosses I-80 approximately 10 miles east of Sinclair, Wyoming. The alternative route continues west on the southern side of I-80 (approximately 3 to 5 miles south) for approximately 57 miles. The alternative route then parallels Wamsutter Road (on the east side of the road) south for approximately 15 miles. At that point, the alternative route continues southwest crossing Flat Top Mountain and continues toward the Wyoming and Colorado border, approximately 20 miles west of Baggs, Wyoming.

The alternative route continues south/southwest through the Sevenmile Ridge area where it crosses the Little Snake River, the western edge of the Godiva Rim, and Colorado State Highway 318 in an area approximately 10 miles northwest of Maybell, Colorado. The alternative route continues south crossing the Yampa River 5 miles northeast of Cross Mountain Gorge to a point near U.S. Highway 40 approximately 12 miles southwest of Maybell. At that point, the alternative route avoids the Tuttle Ranch Conservation Easement by paralleling U.S. Highway 40 on the north and crossing the Deerlodge Road, the eastern entrance to Dinosaur National Monument. The alternative route then crosses the highway and continues southwest paralleling the Bonanza to Bears Ears 345kV and the Hayden to Artesia 138kV transmission lines for approximately 22 miles south of U.S. Highway 40 to approximately 20 miles east of Dinosaur, Colorado.

The Alternative COUT-C-3 portion of the preliminary agency-preferred alternative route begins at a point northeast of Rangely, Colorado, where Alternative WYCO-F-2 ends. From this point, the alternative route continues to parallel the Bears Ears to Bonanza 345kV and the Hayden to Artesia 138kV transmission lines to the west toward the Colorado/Utah border.

This alternative route continues to follow the Bears Ears to Bonanza 345kV transmission line southwest toward the Bonanza Power Plant. The alternative route then continues west/southwest following an underground pipeline through an area where the Uinta Basin hookless cactus and clay reed-mustard occurs (federally listed plant species) and crossing the Green River approximately 8 miles north of Sand Wash boat launch, continuing west towards the western end of the Tavaputs Plateau. Within the plateau, it traverses through Argyle Ridge (an area of summer home development) for approximately 12 miles dropping southwest toward U.S. Highway 191, following the highway through Indian Canyon for approximately 2 miles; it then crosses the highway heading west/northwest into the Emma Park area (approximately 11 miles north of Helper, Utah) toward Solder Summit for a distance of approximately 21 miles avoiding sage-grouse leks/habitat to the south and the Reservation Ridge Scenic Backway (designated by the Forest Service) to the north.

It continues west toward U.S. Highway 6 and parallels the Spanish Fork to Carbon 138kV transmission line northwest for approximately 25 miles through an area where clay phacelia (a federally listed plant species) occurs near Sheep Creek. It continues paralleling the Bonanza to Mona 345kV transmission line toward Thistle, Utah, turning south and crosses U.S. Highway 89 near Birdseye, Utah, continuing south/southwest to a point approximately 5 miles north of Fountain Green, Utah. The alternative continues to parallel the Bonanza to Mona 345kV transmission line west through Salt Creek Canyon, south of Mount Nebo, toward Nephi, Utah, and the Clover Substation.

2.7.2 Applicant's Preferred Alternative

Alternative WYCO-B and Alternative COUT-H represent the Applicant's Preferred Alternative. Alternative WYCO-B and Alternative COUT-H were selected by the Applicant based on a combination of several factors, including system planning and reliability, engineering feasibility and constructability, costs, safety, and landowner concerns. Prior to the BLM's scoping meetings, the Applicant conducted meetings with landowners along the alternative routes, the results of which identified areas of landowner concerns. The Applicant avoided more densely populated areas when possible. Additionally, the Applicant is a public utility and capitalizes costs through its customers' rate base; therefore, the Applicant strives to keep costs and the resultant impacts of new infrastructure as low as practicable for the rate payers. Through system planning and engineering studies, the Applicant considered engineering feasibility and constructability in respect to terrain and geologic hazards, which also is related to costs that would be passed onto the customer base. A criterion for siting the alternative routes was to parallel exiting linear facilities to the extent practicable; however, the Applicant also had to consider the route in relation to other high-voltage transmission lines and the effect it might have on reliability. By choosing a route that has fewer high-voltage transmission lines or lines that do not share common interconnection points on the power grid improves overall reliability.