Attachment O

Associated Facilities
Electrical Transmission Lines

Associated Facilities

Electrical Transmission Lines

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Electrical Transmission Lines

Electrical service requirements for the Project include utilizing existing service lines and the construction of electrical transmission and distribution transmission lines to pump stations and delivery facilities. Because local electrical power providers, not Keystone, will be constructing and operating the electrical transmission lines, the electrical transmission companies will be responsible for obtaining any necessary approvals or authorizations from federal, state, and local governments. While the permitting process for the electrical facilities is an independent process from the pipeline ROW approval process, the construction and operation of these transmission lines are considered connected actions under NEPA and MEPA and, therefore, are evaluated within this application for the Project. Keystone has requested a clarification from Montana DEQ (MDEQ) with regard to the treatment of the transmission lines, but for the current application filing, Keystone is evaluating the preliminary transmission lines along the preferred route and alternative routes as associated facilities. Associated facilities are described in Circular MFSA-2, Section 3.7(12) and Section 3.8 (1)(v). These sections were used to evaluate potential impacts to resources due to construction and maintenance activities.

Electrical Transmission Line Requirements

New electrical transmission lines (i.e., transmission lines with voltage of 69 kilovolts [kV] or greater) will be constructed to service pump stations along the Project route in Montana. Other electric transmission requirements (e.g., at valve sites) will be supplied by distribution service drops from adjacent distribution transmission lines (i.e., transmission lines with voltage below 69 kV). Each of these distribution service drops will require the installation of approximately one or two poles and a transformer. The length of these distribution service drops typically will be less than 200 feet. Permitting and construction of these transmission lines would be performed by the local power providers. Power providers would restore the work area as required upon completion of the new service drops in accordance with local standards and applicable permits.

Table O-1 provides preliminary details for the new electrical transmission lines associated with the Project pump stations. In conjunction with local power providers, Keystone has identified proposed routing for each transmission line along the preferred route (Route B). Additionally, Keystone has identified preliminary routes for transmission lines that would service the pump station locations along the alternative pipeline routes (Route A and A1A). Where feasible, the entire length of each of these proposed or preliminary transmission line routes (Routes) has been placed along existing county roads, section lines, or field edges to minimize interference with adjacent agricultural lands. The Routes that link existing transmission lines to each pump station along the preferred route and alternative Routes are illustrated in **Attachment A, Transmission Line, Figure 1**.

Furthermore, criteria from Circular MFSA-2, Sections 3.2, 3.4, and 3.7 were incorporated into route analysis that would either avoid, or allow means for mitigation of, adverse impacts to resources outlined in Section 3.7(12) and Section 3.8(1)(v). Avoidance areas and land ownership including national wildlife refuges, state wildlife management areas are described in **Attachment A, Transmission Line, Figure 1**.

Table O-1 Approximate Length of the Proposed Transmission Line Routes in Montana

Pump Station Number	County	Kilovolt	Approximate Length (miles)	Typical Pole/Tower Spacing (feet)
Route A				
PS 09	Phillips	115	57.2	500-600
PS 10	Valley	115	56.1	500-600

Table O-1 Approximate Length of the Proposed Transmission Line Routes in Montana

Pump Station Number	County	Kilovolt	Approximate Length (miles)	Typical Pole/Tower Spacing (feet)
PS 11	Roosevelt	115	33.8	500-600
PS 12	Roosevelt	115	6.0	500-600
Route A1A				
PS 09	Phillips	115	57.2	500-600
PS 10	Valley	115	56.1	500-600
PS 11	Daniels, Roosevelt	115	45.6	500-600
PS 12	Sheridan, Roosevelt	115	65.0	500-600
PS 13	Roosevelt	115	9.5	500-600
Route B				
PS 09	Phillips	115	57.0	500-600
PS 10	Valley	115	51.0	500-600
PS 11	McCone	115	11.9	500-600
PS 12	McCone	69	3.3	300-400
PS 13	Prairie	115	9.6	500-600
PS 14	Fallon	115	5.1	500-600
PS 15	Fallon	115	42.1	500-600

Electrical Transmission Line Construction

The construction phase for each electrical transmission line will consist of ROW acquisition, ROW clearing, construction, and site restoration and cleanup. The following is a brief summary of the typical steps associated with transmission line construction. Actual transmission line construction procedures will be developed by each transmission provider to address site-specific conditions.

- ROW easements. The electric utilities will obtain any necessary easements.
- ROW clearing. Limited clearing will be required along existing roads in rangelands, grasslands, and croplands. Some trees may require removal to provide adequate clearance between the conductors and underlying vegetation. Trimming to avoid tree removal may be employed in some locations.
- Transmission line construction. The structures will be delivered on flatbed trucks. A mobile crane or picker truck may be needed to install the poles. Holes will be excavated for structure placement, typically with radial arm diggers. The wooden or steel poles will be directly embedded into the ground and anchors may be required at angles and dead ends. Pulling or reeling areas will be needed for installation of the conductor wires. Conductors (wires) will be attached to the structure using porcelain or fiberglass insulators.
- Restoration. After the transmission line structures are in place and the conductors are strung between the structures, the disturbed areas will be restored. The soil in the disturbed areas will be reshaped

and contoured to its original condition. Reseeding will follow landowner requirements. All litter and other remaining materials will be removed from the construction areas and properly disposed.

Affected Environment and Environmental Consequences

This section addresses the resources affected by the construction, operation, and maintenance of the proposed electrical transmission lines associated with the Project. Impacts associated with the electrical distribution line service drops are expected to be minimal and comparable to those associated with supplying electricity to the average home or farm, and are not further addressed. The following analysis assumes that existing access roads will be utilized for construction and maintenance of the Routes. It is also assumed that further review of potential construction and/or improvement of access roads will be conducted by the local power providers.

The proposed and alternative transmission line Routes were evaluated for potential environmental impacts through aerial photo interpretation. Further environmental review of the Routes will be carried out by the local power providers as required by their respective transmission line permitting processes.

Land Ownership

The linear mileage crossed by the Routes is categorized by surface ownership in **Table O-2**. Land ownership on all of the Routes is primarily private. Routes on Alternatives A and A1A cross Tribal-owned lands, while Routes associated with Alternative B do not cross any Tribal-owned lands. All Routes cross state and federal lands. Land ownership along the Routes is shown in **Attachment A, Transmission Line, Figure 1**.

Table O-2 Ownership of Lands Crossed by Proposed Transmission Line Routes in Montana

Pump Station Number	Ownership (miles)				
	Federal	**State**	**Private**	**Tribal**	**Total**
Route A					
PS 09	23.8	1.5	31.8	0.0	57.0
PS 10	12.4	12.1	31.6	0.0	56.1
PS 11	0.0	0.0	0.0	33.8	33.8
PS 12	1.5	0.0	4.5	0.0	6.0
Total	**37.7**	**13.6**	**67.9**	**33.8**	**152.9**
Route A1A					
PS 09	23.8	1.5	31.8	0.0	57.0
PS 10	12.4	12.1	31.6	0.0	56.1
PS 11	0.0	3.0	4.1	38.5	45.6
PS 12	1.7	2.0	61.2	0.0	65.0
PS 13	0.0	0.0	9.5	0.0	9.5
Total	**38.0**	**18.6**	**138.3**	**38.5**	**233.2**
Route B					
PS 09	23.8	1.5	31.8	0.0	57.0

Table O-2 Ownership of Lands Crossed by Proposed Transmission Line Routes in Montana

Pump Station Number	Ownership (miles)				
	Federal	State	Private	Tribal	Total
PS 10	8.7	11.8	30.5	0.0	51.0
PS 11	5.9	1.3	4.7	0.0	11.9
PS 12	0.0	0.9	2.4	0.0	3.3
PS 13	0.0	0.5	9.2	0.0	9.6
PS 14	1.0	0.7	3.5	0.0	5.1
PS 15	11.2	3.0	27.9	0.0	42.1
Total	**50.6**	**19.7**	**109.5**	**0.0**	**180.0**

[1] Discrepancies in total mileage is due to rounding.

The Tribal land ownership type includes Bureau of Indian Affairs Trust Lands, Turtle Mountain Allotted Lands, as well as private lands on the Fort Peck Indian Reservation. Federal lands are predominantly BLM lands in both the Malta and Miles City Districts, but also include a short crossing of US Fish and Wildlife Service land on Route A1A and a crossing of US Department of Defense/Army Corps of Engineers property on Route B. State-owned land is almost exclusively Montana State Trust Lands.

Land Use

Land use associated with the Routes would be similar in character to those associated with the Project. The following overview of land use types within the proposed Routes represents information gathered from publicly available literature, federal, state, and local agencies, review of current and aerial photography. The information provides a baseline inventory of land usage occurring within the Routes. Land use is classified as the following:

- Developed: lands used for residential areas as well as industrial and commercial areas. Specifically, these areas contain all, but are not limited to houses, structures, roads, railroads, windbreaks, and cleared ROW;
- Agriculture/cropland: land suitable for or used for the cultivation of crops;
- Grassland/rangeland: land that is occupied by native herbaceous or shrubby vegetation which is grazed by domestic or wild herbivores. Grasslands can be native or improved land;
- Forest land: land consisting of wooded upland forests. This land is dominated by trees and shrubs and includes areas planted with trees for the pulp and/or paper industry;
- Water: rivers, streams, creeks, ponds, lakes, etc.; and
- Wetlands: low-lying areas of land that are saturated with moisture, especially when regarded as the natural habitat of wildlife. These lands include emergent wetlands, scrub/shrub wetlands, and forested wetlands.

Table O-3 Land Use Crossed by the Proposed Transmission Line Routes in Montana

Pump Station Number	Agriculture					Grassland/ Rangeland	Waterbody	Forest	Wetland/ Riparian	Developed	Total
	Dryland Cropland	Piviot Irrigated Crop	Sprinkler Irrigated Crop	Flood Irrigated Crop	Fallow Crop						
Route A											
PS 09	0.4	0.0	0.0	2.4	5.5	46.6	1.4	0.1	0.1	0.6	57.2
PS 10	1.6	0.0	0.1	0.8	16.2	31.8	0.4	0.3	0.3	4.6	56.1
PS 11	0.0	0.0	0.0	0.0	9.5	22.7	0.2	0.0	0.0	1.3	33.8
PS 12	0.0	0.0	0.0	0.0	1.0	3.4	0.0	0.0	0.0	1.5	6.0
Total	**2.0**	**0.0**	**0.1**	**3.2**	**32.2**	**104.5**	**2.0**	**0.4**	**0.4**	**8.0**	**153.1**
Route A1A											
PS 09	0.4	0.0	0.0	2.4	5.5	46.6	1.4	0.1	0.1	0.6	57.2
PS 10	1.6	0.0	0.1	0.8	16.2	31.8	0.4	0.3	0.3	4.6	56.1
PS 11	0.0	0.0	0.0	0.0	23.2	21.3	0.3	0.0	0.0	0.8	45.6
PS 12	1.3	0.0	0.0	0.0	15.3	17.9	0.4	0.1	0.0	29.9	65.0
PS 13	0.1	0.0	0.0	0.0	1.8	4.9	0.0	0.0	0.0	2.7	9.5
Total	**3.4**	**0.0**	**0.1**	**3.2**	**62.0**	**122.5**	**2.5**	**0.5**	**0.4**	**38.6**	**233.4**
Route B											
PS 09	0.3	0.0	0.0	2.4	5.5	46.7	1.4	0.1	0.1	0.6	57.1
PS 10	1.7	0.0	0.1	0.8	15.5	27.7	0.3	0.3	0.3	4.4	51.0
PS 11	0.0	0.0	0.0	0.9	0.8	9.4	0.4	0.2	0.0	0.2	11.9
PS 12	0.1	0.0	0.0	0.0	1.9	1.1	0.0	0.0	0.1	0.2	3.3
PS 13	0.0	0.4	0.0	0.0	1.0	0.8	0.0	0.0	0.0	7.5	9.6
PS 14	0.3	0.0	0.0	0.0	0.9	3.9	0.1	0.0	0.0	0.0	5.1
PS 15	1.2	0.0	0.0	0.0	2.1	36.6	0.7	0.0	0.0	1.5	42.1
Total	**3.6**	**0.4**	**0.1**	**4.1**	**27.7**	**126.2**	**2.9**	**0.6**	**0.5**	**14.4**	**180.1**

Land use types crossed by the Routes are detailed in **Table O-3** in miles. The types of land use are categorized by agricultural land, grassland/rangeland, developed, forest land, wetland/riparian, and waterbody. Specific information on the types of agricultural lands also is included in the table. On Routes A, A1A, and B, the predominant land use type crossed is grassland/rangeland with cropland as the second most common type.

Impacts on land uses within the Routes could result from various project-related construction activities including: establishment of construction yards and staging areas; improving access roads; clearing and excavating tower sites and installing towers; removal of obstructions (e.g., vegetation and trees) along Routes; and installing conductors. Long-term impacts would be similar to those described for the Project and include:

- Temporary loss of agricultural productivity during the construction period;
- Visual impacts associated with the construction ROW, which include removal of existing vegetation, exposure of bare soils, and earthwork and grading scars;
- Visual impacts associated with transmission structure contrast and impacts on "natural" landscapes, or scenic quality impacts;
- Increased noise and dust to nearby residential and commercial areas from transmission line construction activities;
- No trees in ROW; and
- No other structures in ROW.

Vegetation

Vegetation communities crossed by the potential transmission line Routes would be similar to those described for the Project and are summarized in **Table O-4**. Because of the nature of transmission lines, minimal impacts to vegetation communities would be expected, with the exception of wooded areas, where trees and shrubs would be trimmed or cleared. Vegetative types were identified and delineated based on review of literature, internet database resources, aerial photography, and general observations made during field reconnaissance activities. The Routes traverse four vegetation types in the State of Montana. Vegetation types include agriculture, grasslands/rangeland, palustrine emergent/scrub-shrub/forested wetlands, and upland forest.

Transmission line construction would involve both the temporary and permanent alteration of vegetation during ROW preparation and excavation, high traffic activity, and the clearing of shrubs and trees. Vegetation recovery rates are estimated to be 1 to 5 years for herbaceous components, 5 to 15 years for low shrubs, and trees would not be allowed to return. After construction, reclamation of affected lands would be performed by the local power providers in accordance with local standards and associated permits.

Table O-4 Vegetation Types Crossed by the Proposed Transmission Line Routes in Montana

Pump Station Number	Agriculture	Forest	Grassland	Wetland	Total
Route A					
PS 09	8.4	0.1	46.6	0.1	55.1
PS 10	18.7	0.3	31.8	0.3	51.1
PS 11	9.5	0.0	22.7	0.0	32.3
PS 12	1.0	0.0	3.4	0.0	4.5
Total	**37.6**	**0.4**	**104.6**	**0.4**	**143.0**

Table O-4 Vegetation Types Crossed by the Proposed Transmission Line Routes in Montana

Pump Station Number	Agriculture	Forest	Grassland	Wetland	Total
Route A1A					
PS 09	8.4	0.1	46.6	0.1	55.1
PS 10	18.7	0.3	31.8	0.3	51.1
PS 11	23.2	0.0	21.3	0.0	44.5
PS 12	16.7	0.1	17.9	0.0	34.7
PS 13	1.8	0.0	4.9	0.0	6.8
Total	**68.7**	**0.6**	**122.6**	**0.4**	**192.3**
Route B					
PS-09	8.2	0.1	46.7	0.1	55.0
PS-10	18.0	0.3	27.7	0.3	46.2
PS-11	1.7	0.2	9.4	0.0	11.4
PS-12	2.0	0.0	1.1	0.1	3.1
PS-13	0.0	0.0	0.8	0.0	0.8
PS-14	1.2	0.0	3.9	0.0	5.1
PS-15	3.3	0.0	36.6	0.0	39.9
Total	**34.4**	**0.5**	**126.2**	**0.4**	**161.5**

Terrestrial and Aquatic Wildlife

Terrestrial and aquatic wildlife potentially impacted by the transmission line Routes would be similar to those described for the Project and are summarized in **Attachment H** (Special Status Species). **Attachment A, Transmission Line, Figure 1**, details the location of sensitive species affected by the routes including sage grouse leks and other sensitive species. **Attachment A, Transmission Line, Figure 2**, describes the big-game, fisheries, and avian resources potentially affected by the proposed Routes.

During construction, impacts to terrestrial and aquatic wildlife resources would be similar to those for the Project. The primary potential adverse impacts include direct mortality, habitat loss and fragmentation, disturbance and displacement of individual animals, interference with behavioral activities, and increased public access. Many impacts to habitat associated with sensitive species can be avoided during construction and operation by spanning these habitats therefore, relatively few permanent disturbances to terrestrial or aquatic wildlife would occur.

Transmission line construction could also include the improvement of access roads that may increase access to remote habitat and, therefore, increase hunting and fishing pressures on public properties. As shown in **Table O-2**, the Routes would cross approximately 70.3 miles of public lands on Alternative B, 51.3 miles on Alternative A, and 56.6 miles on Alternative A1A. These public lands allow access to hunting and fishing. In addition, these associated facilities may provide additional access to the Missouri River, a Class II fishery**.**

Additionally, impacts to avian wildlife would occur related to permanent standing structures and associated facilities. The Routes cross rivers and riparian areas that are likely to attract raptors and migratory birds. The

new transmission line segments will incrementally increase the collision potential for migrating and foraging bird species (e.g., raptors and migratory birds [APLIC 1994]). However, collision potential typically is dependent on variables such as the line location in relation to high use habitat areas (e.g., nesting, foraging, and roosting), line orientation to flight patterns and movement corridors, species composition, visibility, and line design. In addition, distribution lines that are less than 69 kV but greater than 1 kV could pose an electrocution hazard for raptor species attempting to perch on the structure. Configurations less than 1 kV or greater than 69 kV typically do not present an electrocution potential, based on conductor placement and orientation (APLIC 1996).

Spanning wetlands and waterbodies has the potential to increase impacts to raptors and migratory birds that likely utilize these habitat locations. Other prime habitat locations occur in vegetated cover types grassland/rangeland and upland forest.

Potential collision and electrocution impacts to bird species from the Project could be reduced further if electrical service providers agree to implement the following mitigation measures.

- Incorporation of standard, safe designs, as outlined in Suggested Practice for Raptor Protection on Transmission Lines (APLIC 1996), into the design of electrical distribution lines in areas of identified avian concern to prevent electrocution of raptor species attempting to perch on the transmission poles and lines. These measures include, but are not limited to, a 60-inch separation between conductors and/or grounded hardware and recommended use of insulating materials and other applicable measures depending on line configuration (APLIC 1996).
- Incorporation of standard raptor-proofing designs, as outlined in Mitigating Bird Collision with Transmission Lines (APLIC 1994), into the design of the electrical distribution lines to prevent collision to foraging and migrating raptors within the project area, as applicable.

In addition to electrocution and collision impacts, transmission lines may have impacts to grouse species occurring along the route. According to the final management plan and conservation strategies for sage grouse in Montana (MSGWG 2005), “Transmission lines provide additional hunting perches for raptors in otherwise treeless areas. Transmission lines most likely impact grouse near leks, in brood-rearing habitat, and in wintering areas that also support large numbers of wintering raptors.”

Geology

Geologic resources found along the Routes would be similar in character to those associated with the Project. Generally, the geology consists of gently sloping sedimentary rocks of late Cretaceous to early Tertiary age. Stream erosion has formed dendritic drainage patterns producing moderate to steeply incised valleys. Extensive areas of glacial outwash and Quaternary fluvial deposits are exposed throughout each of the alternative Routes.

Potential issues associated with geology would be due to construction of the transmission lines; no additional impacts would be expected during operation. Issues could include potential hazards associated with seismic activities and landslides. Other hazards may result from construction on Cretaceous shales that contain bentonite beds. The high swelling hazard may cause slope instability during periods of precipitation.

Additionally, impacts would occur due to the upgrading of existing roads. Shales of the Bearpaw and Claggett formations are known to be susceptible to mass wasting and slope failure. The high swelling and high plasticity characteristics of these shales, coupled with their high slaking potential, tend to produce slope failure in moderate to steep terrains. Areas of potential slope failure are shown in **Attachment A, Transmission Line, Figure 3**.

Water Resources

Wetlands and waterbodies crossed by the Routes are summarized in **Table O-5**. Wetlands within the Routes were classified into four categories: palustrine emergent wetlands (PEM); palustrine scrub-shrub wetlands (PSS); palustrine forested wetlands (PFO) and riverine/open water. Riverine/open water areas include any ephemeral, intermittent, or perennial stream as well as any ponds, lakes, reservoirs, or stock ponds.

Potential impacts to water resources and wetlands could result from accelerated erosion and sedimentation from the construction and maintenance activities on or adjacent to streams or wetlands. Other potential impacts include water quality degradation, and decreased wetland size, function, or value. In areas where potential impacts to water resources and wetlands are possible, mitigation measures would be expected to be effective in reducing or eliminating potential impacts.

Transmission line construction requires one utility location to be placed approximately 200 feet from the next utility location, therefore avoiding surface features such as streams and wetlands is possible by spanning the feature between two support poles. Therefore, the utility pole locations will be selected to minimize impacts to wetlands. Once transmission lines were in place, impacts would be minimal.

Table O-5 Wetland and Waterbody Types Crossed by Proposed Transmission Line Routes in Montana (miles crossed)

Pump Station Number	Palustrine Emergent	Palustrine Forested	Riverine/ Open Water	Palustrine Scrub-Shrub
NWI Codes	PEM	PFO	ROW	PSS
Route A				
PS 09	0.1	0.0	1.4	0.0
PS 10	0.2	0.0	0.4	0.0
PS 11	0.0	0.0	0.2	0.0
PS 12	0.0	0.0	0.0	0.0
Total Miles	0.3	0.0	2.0	0.0
Route A1A				
PS 09	0.1	0.0	1.4	0.0
PS 10	0.2	0.0	0.4	0.0
PS 11	0.0	0.0	0.3	0.0
PS 12	0.0	0.0	0.4	0.0
PS 13	0.0	0.0	0.0	0.0
Total Miles	0.3	0.0	2.9	0.1
Route B				
PS 09	<0.1	0.0	1.4	0.0
PS 10	0.1	<0.1	0.4	0.1
PS 11	0.0	0.0	0.4	0.0
PS 12	<0.1	0.0	<0.1	0.0
PS 13	0.0	0.0	0.0	0.0

Table O-5 Wetland and Waterbody Types Crossed by Proposed Transmission Line Routes in Montana (miles crossed)

Pump Station Number	Palustrine Emergent	Palustrine Forested	Riverine/ Open Water	Palustrine Scrub-Shrub
PS 14	0.0	0.0	0.1	0.0
PS 15	0.0	0.0	0.7	0.0
Total Miles	0.3	0.1	3.1	0.1

Cumulative Impacts

Cumulative impacts are defined in the CEQ regulations 40 CFR 1508.7 as "…the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency… or person undertakes such other actions." These actions include current and projected area development (e.g., oil and gas); management activities and authorizations on public lands (e.g., rangeland conversion); land use trends; and applicable industrial/infrastructure components (e.g., utility corridors).

The construction of the electrical transmission and distribution transmission lines necessary for the Project will occur during the same timeframe and in the same general area as the Project. Construction activities will be of short duration in any single location. Most transmission lines will be co-located with other ROWs (i.e., roadways, pipeline corridors, and existing transmission lines) or located along field edges or section lines to reduce the overall amount of habitat fragmentation and interference with agricultural operations. The amount of land associated with the transmission line ROWs represents a small fraction of available native vegetation in the region. As a consequence, these transmission lines do not represent a substantial cumulative disturbance to the environment.

Other than the Keystone Pipeline Project, no foreseeable construction projects that overlap in space and time with the transmission lines were identified.

References

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.

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Montana Sage Grouse Work Group (MSGWG). 2005. Management Plan and Conservation Strategies for Sage Grouse in Montana, Section VI. (2005).