

ELECTRICAL POWERLINES

CHAPTER 7

7.0 ELECTRICAL POWERLINES

Electrical service requirements for the proposed project include utilizing existing service lines and constructing electrical transmission and distribution powerlines to pump stations and delivery facilities. Because local electrical power providers, not Keystone, will be constructing and operating the electrical powerlines, the electrical power 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 powerlines are considered connected actions under NEPA and, therefore, are evaluated within this Environmental Report for the Keystone Pipeline Project.

7.1 Electrical Powerline Requirements

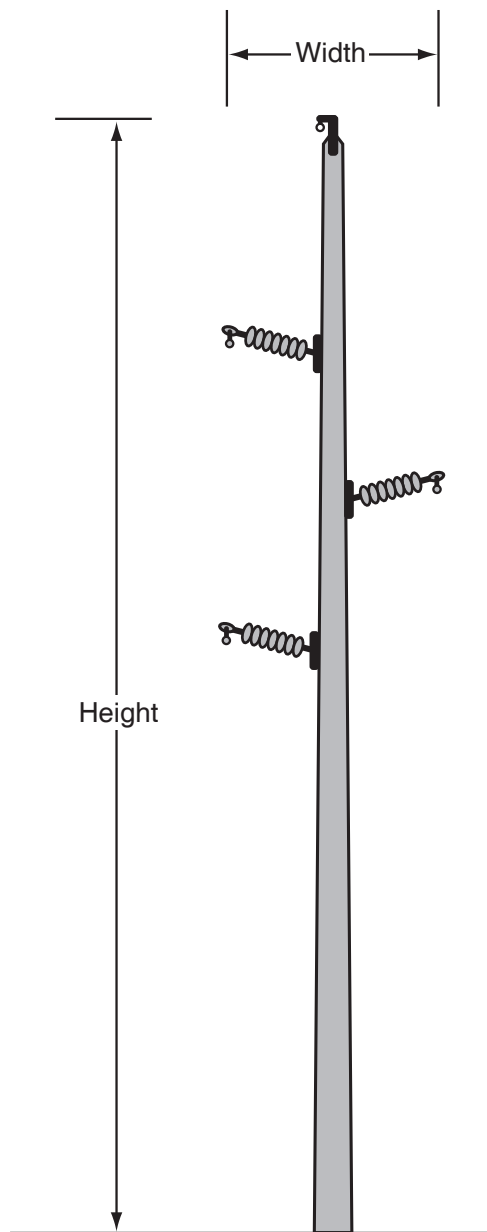
New electrical transmission powerlines (i.e., powerline with voltage of 69 kV or greater) will be constructed to service pump stations along the pipeline route. Other electric power requirements (e.g., valve sites) will be supplied from distribution service drops from adjacent distribution powerlines (i.e., powerline 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. Utilities would restore the work area as required on completion of the new service drop in accordance with local standards. **Figure 7-1** illustrates a typical powerline single pole structure, with size depending on the electrical load the line will carry.

Table 7-1 details the land requirements for the new electrical powerlines associated with the Keystone Pipeline Project pumping stations. Preliminary routing has been identified for each powerline. In general, the entire length of each of these preliminary powerline routes has been placed along an existing county road to minimize interference with adjacent agricultural lands. Alternative routes for all or part of the proposed powerline route were developed. The preliminary powerline proposed and alternative routes that link existing transmission lines to each pump station are illustrated on the Powerline Route Sheets (Appendix C). These routes are subject to change as the pumping station supply requirements are further reviewed with the utilities providing service.

7.2 Electrical Powerline Construction

The construction phases for each electrical powerline 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 powerline construction. Actual powerline construction procedures will be developed by each utility 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 native and tame 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.
- Powerline 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.



Transmission Line Voltage (kV)	Typical Width (Ft)	Typical Height (Ft)
34.5	4 to 5	40 to 50
69	5 to 7	50 to 60
115	9 to 11	55 to 65
230	12 to 15	65 to 80

KEYSTONE PIPELINE
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Figure 7-1
Typical Utility
Transmission Structure

Table 7-1 Estimated Land Requirements for the Proposed Electrical Powerlines

Station	County, State	kV	Approximate Length (miles)	Typical Pole/Tower Spacing (feet)
KEYSTONE MAINLINE				
North Dakota				
Pump Station ML#15	Walsh, ND	69	8.0	330
Pump Station ML#16	Nelson, ND	69	3.2	330
Pump Station ML#17	Steele, ND	69	9.9	330
Pump Station ML#18	Ransom, ND	115	13.7	350
Pump Station ML#19	Sargent, ND	115	26.7	350
South Dakota				
Pump Station ML#20	Day, SD	115	10.7	350
Pump Station ML#21	Clark, SD	69	2.7	330
Pump Station ML#22	Miner, SD	115	4.0	350
Pump Station ML#23	Hutchinson, SD	115	19.4	350
Nebraska				
Pump Station ML#24	Cedar, NE	69	4.0	330
Pump Station ML#25	Stanton, NE	34.5	3.6	300
Pump Station ML#26	Butler, NE	34.5 (Distribution supply)	4.1	300
Pump Station ML#27	Saline, NE	115	1.9	350
Pump Station ML#28	Jefferson, NE	69	8.3	330
Kansas				
Pump Station ML#29	Nemaha, KS	115	5.12	350
Pump Station ML#30	Doniphan, KS	34.5	2.1	300
Missouri				
Pump Station ML#31	Clinton, MO	161	2.1	400
Pump Station ML#32	Carroll, MO	34.5	10.3	300
Pump Station ML#33	Chariton, MO	34.5	0.2	300

Table 7-1 Estimated Land Requirements for the Proposed Electrical Powerlines

Station	County, State	kV	Approximate Length (miles)	Typical Pole/Tower Spacing (feet)
Pump Station ML#34	Audrain, MO	69	0.3	330
Pump Station ML#35	Montgomery, MO	69	8.4	330
Pump Station ML#36	St. Charles, MO	34.5	0.1	300
Illinois				
Pump Station ML#37	Madison, IL	34.5	0.3	300
Pump Station ML#38 (future)	Bond, IL	Not required at this time		
CUSHING EXTENSION				
Kansas				
Pump Station C#30 (CE#4)	Dickinson, KS	230	2.6	550
Pump Station C#32 (CE#3)	Cowley, KS	138	8.3	370
Oklahoma				
Pump Station C#33 (CE#5)	Kay, OK	138	0.6	370

- Restoration. After the powerline 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.

7.3 Affected Environment and Environmental Consequences

This section addresses the natural and human resources potentially affected by the construction, operation, and maintenance of the proposed electrical transmission and distribution powerlines associated with the Keystone Pipeline 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.

The proposed and alternative powerline routes were evaluated for potential environmental impacts visible by aerial photography. The focus of this investigation was residential structures and wetland and waterbody crossings (**Table 7-2**). Further environmental review of the powerline routes will be carried out by the electrical utilities as required by local transmission line permitting processes.

Proposed powerline routes in North and South Dakota are located in proximity to prairie potholes, which are notable waterfowl production areas. Other routes cross rivers and riparian areas that are likely to attract raptors and migratory birds. The new electrical powerline 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

Table 7-2 Natural and Human Resources Potentially Affected by Proposed and Alternative Powerline Routes

Pump Station	kV	Proposed Powerline Route	
		Residences within 500 feet	Other Environmental Resources
KEYSTONE MAINLINE			
North Dakota			
Pump Station ML#15	69	0	The initial portion of the route (1,750 feet) from the source line traverses open lands and is not co-located. Crosses a railroad. A number of narrow wooded areas adjacent to the road including riparian woods associated with the South Branch Park River.
Pump Station ML#16	69	0	Goose River crossing is required.
Pump Station ML#17	69	0	The route crosses four rivers or drainage ditches. A number of narrow wooded areas adjacent to the road.
Pump Station ML#18	115	1	About 2 miles not co-located of the route traverses hills between 54 th and 56 th Streets to cross the Sheyenne River.
Pump Station ML#19	115	0	Passes through wetlands adjacent to existing roads.
South Dakota			
Pump Station ML#20	115	0	The initial portion (1 mile) of the route traverses open land and an existing 345-kV transmission line twice which passes within 2,000 feet of the pump station. Bisepts a number of riparian areas.
Pump Station ML#21	69	0	No notable environmental resources.
Pump Station ML#22	115	0	The initial portion (2,200 feet) of the route traverses open land. The route crosses an existing 69-kV line approximately 1 mile from the pump station. Crosses Rock Creek.
Pump Station ML#23	115	0	The initial portion (1.6 miles) of the route traverses open land. The route crosses the James River.
Nebraska			
Pump Station ML#24	69	1	Crosses edges of narrow woodlands adjacent to the road. The route originates at a new substation and crosses the feed line less than 1,500 feet from the pump station.
Pump Station ML#25	34.5	0	Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#26	34.5	1	Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#27	115	0	The route crosses a pipeline. Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#28	69	0	The route crosses a railroad and a creek.
Kansas			
Pump Station ML#29	115	0	The route crosses a railroad. Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#30	34.5	0	The route crosses a pipeline. Crosses edges of narrow woodlands adjacent to the road.

Table 7-2 Natural and Human Resources Potentially Affected by Proposed and Alternative Powerline Routes

Pump Station	kV	Proposed Powerline Route	
		Residences within 500 feet	Other Environmental Resources
Missouri			
Pump Station ML#31	161	0	The initial portion (1,000 feet) of the route crosses open land. Crosses an abandoned railroad. Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#32	34.5	0	The route crosses a railroad twice, and a number of narrow woodland tracts adjacent to the road.
Pump Station ML#33	34.5	0	Power source is very close to the proposed pump station. No notable environmental resources.
Pump Station ML#34	69	0	The route crosses a wooded area in parallel (adjacent ROW) to the pipeline towards the pump station.
Pump Station ML#35	69	0	The route crosses an abandoned railroad. Crosses edges of narrow woodlands adjacent to the road.
Pump Station ML#36	34.5	0	Power source is very close to the proposed pump station. No notable environmental impacts.
Illinois			
Pump Station ML#37	34.5	1	Power source is very close to the proposed pump station. No notable environmental resources.
Pump Station ML#38 (future)	Not required at this time	TBD	TBD
CUSHING EXTENSION			
Kansas			
Pump Station C#30	230	0	The route crosses a railroad. A number of windbreak ends adjacent to the road and narrow wooded areas.
Pump Station C#32	138	1	The route crosses a railroad.
Oklahoma			
Pump Station C#33	138	2	Power source is very close to the proposed pump station. No notable environmental resources.

composition, visibility, and line design. In addition, distribution lines that are less than 69 kV but greater than one kV could pose an electrocution hazard for raptor species attempting to perch on the structure. Configurations less than one kV or greater than 69 kV typically do not present an electrocution potential, based on conductor placement and orientation (APLIC 1996).

Potential collision and electrocution impacts to bird species from the Keystone Pipeline 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 Power 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 power 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 Power 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.

7.4 Cumulative Impacts

Discussion of cumulative impacts from the powerlines associated with the Keystone Pipeline Project are discussed in Chapter 5.0. Other than the Keystone Pipeline Project, no foreseeable construction projects that overlap in space and time with the powerlines were identified.