

**Plan of Development  
For the Gateway West Transmission Line  
Project**

**Geotechnical Study, Phase I (*Revision*)**

*Submitted to:*

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Bureau of Land Management**

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## ABBREVIATIONS AND ACRONYMS

APE	Area of Potential Effect
BLM	Bureau of Land Management
BMP	Best Management Practices
CPM	Compliance Project Manager
EA	Environmental Assessment
FO	Field Office
FONSI	Finding of No Significant Impact
GIS	Geographic Information System
KV	Kilovolt
MW	Megawatt
NEPA	National Environmental Policy Act
NF	National Forest
ROW	Right-of-way
TUP	Temporary Use Permit
USFS	United States Forest Service
VW	Vibrating wire

## 1.0 INTRODUCTION

The overall Gateway West Transmission Line Project (Project) consists of the construction, operation, and maintenance of approximately 1,148 miles of high voltage, above ground, alternating current power lines with a capacity of approximately 3,000 megawatts (MW), to the service areas of Idaho Power Company and Rocky Mountain Power (Companies). The project consists of 11 transmission line segments that will run between nine existing, proposed, or expanded substations.

Various segments will range from single-circuit 230 kilovolt (kV), single- and double-circuit 500 kV, and combination 230kV/500kV lines. The lines will be supported by steel H-frame structures or steel lattice towers. The distance between H-frames will average approximately 700 feet. The steel lattice structures will be spaced approximately every 1,200 to 1,300 feet.

### 1.1 Purpose of Plan

The Companies are conducting investigation and permitting activities necessary to construct transmission lines from the planned Windstar Substation in Converse County, Wyoming, to the Hemingway Substation in Owyhee County, Idaho. The project overview map (**Figure 1**) shows the proposed project alignment. As part of the ongoing geotechnical investigation process, the Companies plan to drill approximately 64 soil borings in addition to the 124 borings advanced in 2010. The drilling will be conducted using truck or track-mounted drill rigs on public and private lands. The drilling proposed for 2011 includes 25 drill sites on public land managed by the Wyoming BLM. In addition, another drill site is on private land, but requires overland travel through Federal land.

There is considerable uncertainty as to the location of the preferred route for this project. Numerous alternatives to the proposed route have been developed. In those locations where there is more certainty, for example, segments that have no alternatives or small route variations, the Companies have made the decision to move forward with the geotechnical investigations. The purpose of the soil borings is to collect hydrogeologic and geotechnical soil properties for engineering design. The Companies have requested the short term right-of-way (ROW) grant be issued in two phases. Phase I is limited to the soil borings to be completed from Winstar to Populus substations (**Figure 2**) and Phase 2 addresses boring to be completed throughout Idaho. Phase 2 will be addressed at a later date.

Drill rig access will be necessary from the nearest existing road to the actual drill site. No new permanent or temporary roads will be constructed. To minimize disturbance, existing roads will be utilized where possible as access points to the drill sites. In the case of drill sites located near existing roads, these sites will be no more than 100 feet off the road surface, just far enough that traffic is not impeded and drilling site workers are safe from traffic and disturbance is minimized. Where overland travel is necessary, vehicles will avoid concentrations of thick vegetation, drainage bottoms, surface water, wetlands, steep slopes, and other sensitive areas to minimize environmental impacts. Prior to drilling, field crews will receive a series of site maps, showing existing roads and cleared overland travel routes from the existing road to the drill site. **Appendix A** presents site maps, showing the locations of soil borings and overland travel access routes to the drill sites located on BLM lands as well as those drill sites that require overland travel on BLM lands.

The purpose of this Plan of Development (POD) is to describe the drilling procedures to facilitate receipt of temporary ROW permit to drill the borings on Federal land, and to drill the borings on state and private land requiring access over Federal land. The Wyoming State

Office of the BLM is the lead Federal agency for the project. To conduct the drilling, the BLM requires the Companies to submit a permit application. If the application is approved, BLM will issue a short-term ROW grant for boreholes and access on public lands.

## 1.2 Phase 1 Project Description

The proposed drilling is necessary to investigate the soil properties along the proposed routes. The soil properties are an important consideration in design of foundations and support structures for the transmission line, as well as substation and other associated building foundations. Details of the drilling necessary to complete the soil investigation are presented in Section 2.0. **Table 1** summarizes the number of boreholes and the approximate distance (in miles) of overland travel on Federal lands. In one instance, overland travel on federal land will be required to reach a borehole located on non-BLM lands. **Table 2** identifies the borehole and the distance of overland travel on federal lands required to get to the borehole as well as boreholes located on BLM lands. **Table 3** identifies the location of all private and public boreholes and in which BLM field office they occur and **Appendix B** provides the location of the access roads to the boreholes.

The Companies are proposing to modify the existing SF 299 to exclude bore holes SC-01, SC-02, SC-03 and SC-04 from Biological Resource Surveys (**Appendix A**). The Companies determined they needed these additional borings for the proposed expansion of the Stinking Creek Substation (formerly called Difficulty Substation) after the biological survey window. These bore holes are located on BLM lands in a highly disturbed area between the existing substation and a road right-of-way. GIS analysis indicates there are no special status plant species element occurrences within several miles of this location. Due to the disturbed nature of these sites and their location within an established right-of-way, it is highly unlikely threatened or sensitive species exist at the four boring locations. A cultural resource survey in this area did not identify any cultural resources. **Appendix C** presents site photographs of bore holes SC-01, SC-02, SC-03, and SC-04.

**Table 1. Number of Boreholes and Miles of Overland Travel on Public Lands by Field Office for the Gateway West Project**

Office	Number of Boreholes on Federal Land	Approximate Miles of Overland Travel on Federal Lands
Casper BLM Field Office (FO)	6	0.17
Rawlins BLM FO	15	1.19
Rock Springs BLM FO	6	0.88
<b>Total</b>	<b>25</b>	<b>2.24</b>

**Table 2. Non-BLM and BLM boreholes requiring overland travel on BLM lands and the associated distances for the Gateway West Project**

Surface Ownership	Borehole ID	Approximate Miles of Overland Travel on Federal Lands
Non-BLM	03-2024	0.25
BLM	01-2067	0.17
BLM	01-2069; 01-2070	0.18
BLM	01-2099	0.06
BLM	02-48	0.24
BLM	03-148	0.46
BLM	04-2001	0.42

**Table 2. Non-BLM and BLM boreholes requiring overland travel on BLM lands and the associated distances for the Gateway West Project**

Surface Ownership	Borehole ID	Approximate Miles of Overland Travel on Federal Lands
BLM	04-2003	0.35
BLM	03-2028	0.11
<b>Total</b>	<b>10</b>	<b>2.24</b>

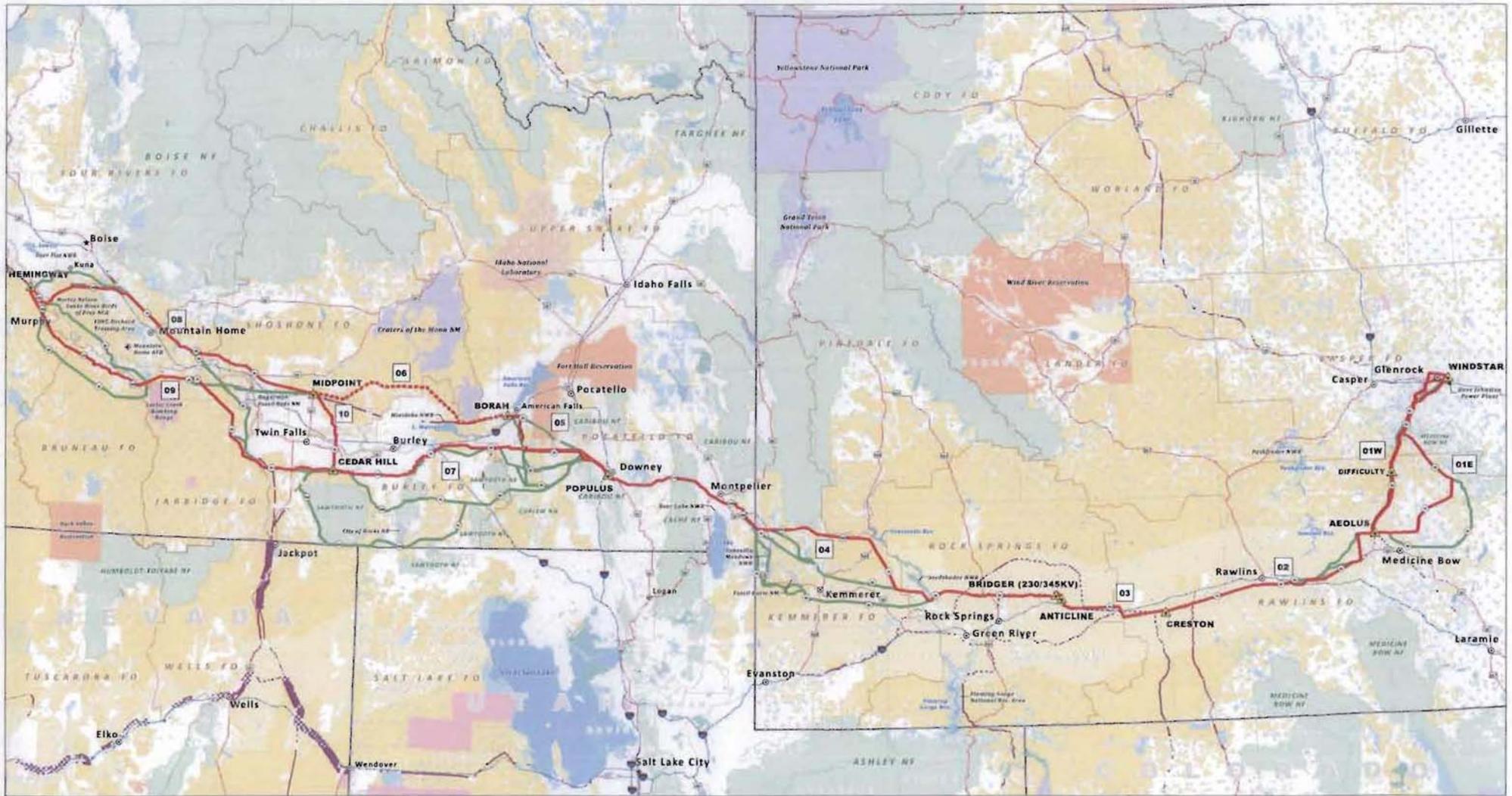
**Table 3. Borehole Locations on Non-BLM and BLM Lands by Field Office**

ID	Borehole Location							
	Longitude	Latitude	Township Range	Sec	Sub	County	State	BLM Field Office
01-2051	105° 56' 21.728" W	42° 49' 58.606" N	T33N R76W	S14	SE¼ NW¼	Converse	WY	Casper
01-2052	105° 57' 23.256" W	42° 49' 31.562" N	T33N R76W	S15	SW¼ SE¼	Converse	WY	Casper
01-2053	105° 57' 26.302" W	42° 47' 55.457" N	T33N R76W	S27	NE¼ SW¼	Converse	WY	Casper
01-2054	105° 59' 47.713" W	42° 46' 57.364" N	T33N R76W	S32	NE¼ SW¼	Converse	WY	Casper
01-2055	106° 1' 57.680" W	42° 46' 3.086" N	T32N R77W	S2	NONE	Converse	WY	Casper
01-2056	106° 2' 49.996" W	42° 43' 42.917" N	T32N R77W	S22	NE¼ SE¼	Converse	WY	Casper
01-2059	106° 10' 15.784" W	42° 29' 45.118" N	T29N R78W	S10	NW¼ SE¼	Natrona	WY	Casper
01-2060	106° 14' 9.676" W	42° 20' 35.632" N	T27N R78W	S6	L 5	Carbon	WY	Rawlins
01-2061	106° 14' 8.207" W	42° 18' 33.149" N	T27N R78W	S18	L 3	Carbon	WY	Rawlins
01-2062	106° 14' 6.875" W	42° 15' 37.894" N	T27N R78W	S31	SE¼ SW¼	Carbon	WY	Rawlins
01-2063	106° 20' 48.415" W	42° 6' 19.768" N	T25N R79W	S30	NW¼ SE¼	Carbon	WY	Rawlins
01-2067	106° 9' 46.631" W	42° 29' 39.368" N	T29N R78W	S11	SW¼ SW¼	Natrona	WY	Casper
01-2068	106° 22' 54.149" W	42° 1' 14.948" N	T24N R80W	S26	NW¼ SW¼	Carbon	WY	Rawlins
01-2069	106° 22' 24.262" W	42° 1' 2.464" N	T24N R80W	S26	SW¼ SE¼	Carbon	WY	Rawlins
01-2070	106° 22' 16.579" W	42° 0' 58.050" N	T24N R80W	S26	SW¼ SE¼	Carbon	WY	Rawlins
01-2071	105° 53' 44.113" W	42° 50' 38.900" N	T33N R75W	S7	NW¼ SE¼	Converse	WY	Casper
01-2072	105° 57' 0.969" W	42° 49' 23.191" N	T33N R76W	S15	SE¼ SE¼	Converse	WY	Casper
01-2073	105° 57' 7.614" W	42° 47' 47.519" N	T33N R76W	S27	SW¼ SE¼	Converse	WY	Casper
01-2074	106° 1' 41.189" W	42° 45' 52.981" N	T32N R77W	S11	NONE	Converse	WY	Casper
01-2085	106° 0' 3.301" W	42° 26' 1.522" N	T29N R76W	S31	SE¼ SW¼	Converse	WY	Casper
01-2093	105° 51' 38.369" W	42° 10' 22.307" N	T25N R75W	S5	L 3	Albany	WY	Rawlins
01-2094	105° 54' 47.686" W	42° 9' 26.604" N	T25N R76W	S11	NW¼ NE¼	Albany	WY	Rawlins
01-2095	105° 56' 34.544" W	42° 8' 55.403" N	T25N R76W	S10	NW¼ SW¼	Albany	WY	Rawlins
01-2096	105° 59' 13.600" W	42° 8' 8.750" N	T25N R76W	S18	NE¼ SE¼	Albany	WY	Rawlins
01-2097	105° 59' 43.174" W	42° 7' 59.851" N	T25N R76W	S18	SW¼ SE¼	Albany	WY	Rawlins
01-2098	106° 0' 15.404" W	42° 7' 34.950" N	T25N R76W	S19	L 2	Albany	WY	Rawlins
01-2099	106° 3' 19.706" W	42° 5' 11.576" N	T24N R77W	S4	L 1	Albany	WY	Rawlins
01-2100	106° 2' 6.022" W	42° 6' 9.040" N	T25N R77W	S26	SW¼ SE¼	Albany	WY	Rawlins
01-2101	106° 4' 1.945" W	42° 2' 5.482" N	T24N R77W	S21	NE¼ SW¼	Albany	WY	Rawlins
01-2102	106° 3' 40.831" W	42° 3' 40.874" N	T24N R77W	S9	SW¼ SE¼	Albany	WY	Rawlins
01-2104	106° 4' 20.852" W	42° 0' 40.626" N	T24N R77W	S33	SW¼ NW¼	Albany	WY	Rawlins

Table 3. Borehole Locations on Non-BLM and BLM Lands by Field Office

ID	Borehole Location							
	Longitude	Latitude	Township Range	Sec	Sub	County	State	BLM Field Office
01-2106	106° 11' 54.802" W	42° 0' 7.693" N	T24N R78W	S32	SW¼ SE¼	Carbon	WY	Rawlins
02-142	107° 54' 12.449" W	41° 37' 43.608" N	T19N R93W	S17	NE¼ NW¼	Carbon	WY	Rawlins
02-2040	107° 20' 5.809" W	41° 44' 30.113" N	T21N R88W	S33	SE¼ SE¼	Carbon	WY	Rawlins
02-2041	107° 49' 42.150" W	41° 37' 55.934" N	T19N R93W	S12	SE¼ SW¼	Carbon	WY	Rawlins
02-48	106° 15' 53.338" W	42° 12' 48.550" N	T26N R79W	S23	NE¼ NE¼	Carbon	WY	Rawlins
02-631	105° 54' 56.257" W	42° 46' 29.413" N	T32N R76W	S2	NONE	Converse	WY	Casper
02-632	105° 57' 10.123" W	42° 45' 58.806" N	T32N R76W	S4	NONE	Converse	WY	Casper
02-634	106° 1' 25.036" W	42° 44' 0.604" N	T32N R77W	S24	NONE	Converse	WY	Casper
02-638	105° 57' 52.229" W	42° 45' 26.615" N	T32N R76W	S9	NONE	Converse	WY	Casper
02-639	105° 56' 38.868" W	42° 46' 14.678" N	T32N R76W	S3	NONE	Converse	WY	Casper
02-643	106° 10' 13.696" W	42° 32' 12.620" N	T30N R78W	S27	SW¼ SE¼	Natrona	WY	Casper
02-669	106° 11' 28.075" W	42° 27' 12.445" N	T29N R78W	S28	NW¼ SE¼	Natrona	WY	Casper
02-677	106° 23' 45.106" W	42° 2' 45.221" N	T24N R80W	S15	SE¼ SW¼	Carbon	WY	Rawlins
02-695	106° 16' 37.258" W	42° 9' 34.063" N	T25N R79W	S2	SW¼ SW¼	Carbon	WY	Rawlins
02-71	106° 5' 11.738" W	42° 39' 31.439" N	T31N R77W	S17	SE¼ NE¼	Natrona	WY	Casper
03-148	107° 58' 2.500" W	41° 36' 58.745" N	T19N R94W	S14	SW¼ SW¼	Sweetwater	WY	Rawlins
03-162	108° 26' 23.899" W	41° 39' 15.358" N	T19N R98W	S3	SE¼ NW¼	Sweetwater	WY	Rock Springs
03-2024	107° 58' 55.207" W	41° 37' 38.978" N	T19N R94W	S15	NE¼ NW¼	Sweetwater	WY	Rawlins
03-2027	108° 46' 48.428" W	41° 44' 53.002" N	T21N R100W	S31	L 3	Sweetwater	WY	Rock Springs
03-2028	108° 47' 39.397" W	41° 44' 46.651" N	T21N R101W	S36	SE¼ SW¼	Sweetwater	WY	Rock Springs
03-2029	108° 47' 33.540" W	41° 44' 5.694" N	T20N R101W	S4	SE¼ SE¼	Sweetwater	WY	Rock Springs
04-177	109° 6' 43.610" W	41° 43' 56.993" N	T20N R104W	S11	NE¼ NW¼	Sweetwater	WY	Rock Springs
04-2001	108° 53' 42.846" W	41° 43' 24.539" N	T20N R102W	S10	NW¼ SE¼	Sweetwater	WY	Rock Springs
04-2003	109° 37' 29.496" W	41° 45' 50.670" N	T21N R108W	S26	NE¼ SW¼	Sweetwater	WY	Rock Springs
04-2004	109° 25' 8.616" W	41° 44' 26.383" N	T20N R106W	S6	NE¼ SW¼	Sweetwater	WY	Rock Springs
04-610	108° 49' 40.152" W	41° 43' 30.036" N	T20N R101W	S8	NW¼ SW¼	Sweetwater	WY	Rock Springs
04-719	109° 48' 54.451" W	41° 46' 13.099" N	T21N R109W	S30	SE¼ NW¼	Sweetwater	WY	Rock Springs
2P-955	106° 30' 33.379" W	41° 57' 56.916" N	T23N R81W	S15	SW¼ NE¼	Carbon	WY	Rawlins
2P-956	106° 30' 22.561" W	41° 56' 30.404" N	T23N R81W	S27	NW¼ NE¼	Carbon	WY	Rawlins
SC-01	106° 13' 50.912" W	42° 20' 57.622" N	T28N R78W	S31	L 18	Carbon	WY	Rawlins
SC-02	106° 13' 50.898" W	42° 20' 55.291" N	T28N R78W	S31	L 18	Carbon	WY	Rawlins
SC-03	106° 13' 50.877" W	42° 20' 53.740" N	T28N R78W	S31	L 18	Carbon	WY	Rawlins
SC-04	106° 13' 52.419" W	42° 20' 55.670" N	T28N R78W	S31	L 18	Carbon	WY	Rawlins

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GATEWAY WEST TRANSMISSION LINE PROJECT  
IDAHO/WYOMING



**Figure 1: ROUTE OVERVIEW**  
PROPOSED AND FEASIBLE ALTERNATIVE ROUTES

**Legend**

- |   |   |  |  |  |
|---|---|--|--|--|
| <ul style="list-style-type: none"> <li><span style="color: red;">—</span> Proposed</li> <li><span style="color: green;">—</span> Alternative</li> <li><span style="color: red;">---</span> Existing, 500 kV</li> <li> Approximate Substation Location</li> <li> Mitapost (25-mile)</li> <li> West Wide Energy Corridor</li> </ul> | <ul style="list-style-type: none"> <li> BLM Field Office</li> <li> National Forest</li> <li> State</li> <li> County</li> <li> State Capital</li> <li> Major City or Town</li> </ul> | <ul style="list-style-type: none"> <li> Interstate Highway</li> <li> US or State Highway</li> <li> River</li> <li> Lake or Other Water Body</li> </ul> | <ul style="list-style-type: none"> <li> Bureau of Land Management</li> <li> Bureau of Reclamation</li> <li> Defense Department</li> <li> National Park Service</li> <li> US National Forest</li> <li> US National Grasslands</li> <li> US Fish and Wildlife Service</li> </ul> | <ul style="list-style-type: none"> <li> Other Federal</li> <li> Indian Reservation</li> <li> Private</li> <li> State or Local</li> <li> State Fish and Game</li> <li> State or Local Park</li> </ul> |
|---|---|--|--|--|



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Gateway West  
Transmission Line Project



**Figure 2: 2011 Wyoming Geotechnical Bore Hole Locations**

**Project Features**

- BLM Bore Hole Location
- Bore Hole Location (Non BLM)
- Proposed Route
- Alternative Route



- Approximate Substation Location
- counties
- Water

**Transportation**

- Interstate Highway
- US or State Highway
- Local Road



Miles



Projection: NAD83 UTM 12N

Project Area



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## 2.0 GEOTECHNICAL ACTIVITIES

This section describes the preconstruction activities that must occur to allow for final detailed engineering design for all structures that will be installed on the Project. It is not necessary to test the soil and subsoil conditions at every structure location—rather, tests are important at each structure that must withstand larger stresses (typically corner structures or those supporting very long spans) and also periodically along the ROW to determine general subsurface conditions and the structural engineering needed to safely construct a transmission line structure in those conditions. Geotechnical site investigations, laboratory testing and engineering analyses will be completed to determine the engineering properties of the soil and bedrock, and will be used to design the foundations for the transmission line towers and associated equipment. Since the transmission line will primarily use four-legged lattice steel towers, the geotechnical data will be used to determine the appropriate depth requirements for the pier foundations at each leg.

The geotechnical site investigations will consist of drilling borings from which soil and/or bedrock samples will be taken for laboratory testing and analysis. The boring depths will typically be 40 feet (deeper where soils with weaker strength properties are encountered). Similarly, depths could be less where bedrock is encountered. The drilling equipment needed to perform the drilling and sampling activities will include a truck mounted, track mounted or all-terrain drill rig, water truck, 4WD support vehicle including an air compressor, and a 4WD vehicle for the field engineer. The type of rig used will depend on accessibility of boring locations, and practicality of using continuous flight hollow-stem auger, mud rotary, or ODEX drilling techniques to advance the borings. The time required per boring averages approximately one-half day per hole. Possible types of drilling equipment are listed below:

Conventional two-ton or larger truck with a drill rig mounted on the chassis (**Figure 3**).

- A 30,000 pound gross vehicle weight (gvw) 6-wheeled truck, about 30 feet long, with or without 4WD capabilities.
- All-terrain vehicle consisting of a similar drilling rig mounted on a lighter framed, shorter vehicle equipped with oversized low-pressure tires. Track mounted drilling rigs place varying sizes of drilling machinery on a tracked vehicle with low (about 10 psi) ground pressure (**Figure 4**).



**Figure 3. Example of drill rig in operation**

The borings will be approximately 6 to 8 inches in diameter and they will be advanced with continuous flight hollow-stem auger, mud rotary, or ODEX drilling techniques. If mud rotary drilling is used, all drill fluids will be temporarily stored in an above ground container, as opposed to excavating a mud pit. The drill fluid will be recycled during drilling to minimize water runoff at the drill site. When the drilling is completed, the stored water will be placed on the ground and allowed to infiltrate. The solids will be spread thinly on the ground.

Where bedrock is encountered, standard rock coring techniques will be used.

Samples will be collected by driving a sampling device into the undisturbed soils just below the augers. Where necessary, rock core samples will also be taken using a rock coring barrel. Upon completion and before leaving each site, the soil boring will be backfilled with the cuttings removed from it during drilling. At the end of a work shift no open holes will be left unattended, and all holes will be fully backfilled before moving to the next boring.

In addition to the drilling rig, typically there will be an auxiliary four wheel drive pickup truck to haul water if needed for drilling and/or rock coring, haul extra drilling supplies, and to transport personnel. A third four wheel drive vehicle may be used by the geotechnical engineer overseeing the drilling program and logging the borings.

Access to each of the drill sites was considered in selecting the drill locations. Locations that could be accessed with existing roads were selected where available, to minimize the length of overland travel. Most of the drill sites are less than one mile off the nearest unimproved road. **Table 1 and 2** summarize the approximate travel distances for overland travel for borings on BLM lands.



Figure 4. Example of track mounted drill rig

The area of disturbance will include crushing of vegetation as the drilling equipment moves overland to and from the drill site. Existing roads will be utilized where possible. In some cases the vehicles make one trip in, and one trip out. At other borings, the water truck or other vehicles may come and go from the drill sites to deliver water or other supplies. At the drill location, the actual boring is only 6 to 8 inches in diameter. However, at each boring location a work area of approximately 40 feet by 40 feet will be established. Within the work area, surface disturbance may occur, due to parked vehicles including the drill rig and support vehicles. Extra foot traffic will

occur at the back of the drill rig as the drill crew moves between the drill and support vehicles during drilling (time required approximately one-half day per hole). During rotary drilling and rock coring, water is used during the drilling process. Some excess drill water may exit the hole. A small ditch (less than 6-inches deep and 12 inches wide, and less than 10 feet long) is sometimes necessary beginning at the borehole to a downhill location to move the excess drill water away from the work area. This ditch will be backfilled when the work is complete. All drill water that exits the boring will be allowed to infiltrate into the ground surface. Although excavated soil is proposed to be returned to the boring following drilling, some excess is typically generated. A shovel will be used to thin-spread excess soil behind the drill truck. The area of thin soil spreading is usually less than 10 feet by 10 feet and just a few inches thick.

In the event high groundwater conditions are found during boring, particularly if they are artesian conditions, vibrating well piezometers would be installed and revisited periodically to collect groundwater depth readings throughout the year, to better understand the fluctuation of the groundwater and the challenges that could pose to foundations for the transmission line. Boring locations having these conditions are presently unknown and would be identified in the field.

Equipment required to monitor groundwater pressure would consist of a vibrating wire (VW) piezometer. It consists of a vibrating wire pressure transducer and signal cables and would be installed in a fully grouted bore hole using bentonite cement slurry. The signal cables would protrude above the ground surface 2 to 5 feet. Cables would be coiled at the soil surface and secured to survey lathe. Depending on site conditions more than one VW piezometer may be installed. Disturbance would be minimal as the VW piezometer is placed in the existing bore hole. Only the survey lathe and cables will be visible at the soil surface.

Monitoring installed piezometers would require site visits once per month for up to two years. Site visits would consist of connecting a data logger to the VW piezometer cables to take readings. After the data is recorded, the data logger would be disconnected and the cables would be secured. At the end of the monitoring program the lathe would be removed, signal cables would be cut below grade, piezometer wires would be abandoned in the hole, and bentonite would be used to fill any visible holes at the surface. Vegetation would be crushed when the 4WD vehicle accesses the site for monitoring. In some instances where overland travel is required the technician may leave the vehicle on an existing road and access the site on foot. Environmental Protection Measures would be followed to minimize ground disturbance when conducting follow-up monitoring (**Table 4**).

### 3.0 NEPA COMPLIANCE

The Environmental Assessment for the Gateway West Geotechnical Drilling Project was completed and the Decision Record was signed August 4, 2010, completing the NEPA requirements. The Environmental Assessment and Biological Assessment identified required environmental protection measures for drilling and overland travel.

Table 4 lists the environmental protection measures that will be included into the 2011 bid package for the geotechnical contractor and enforced during the geotechnical operations. Future drilling may have additional measures based on the location of the boreholes.

**Table 4. Phase 1 Environmental Protection Measures**

Boreholes or overland travel to which measure applies	Environmental Protection Measure Description
All*	Drillers will comply with EPA and DEQ standards for drill rig engines.
All	The drill rig will drive directly over vegetation during overland travel, which may result in temporary crushing damage to plants. The driller will attempt to minimize the temporary plant damage by driving around thick pockets of vegetation. The driller will also avoid driving over drainage bottoms, surface water, steep slopes, prairie dog towns and other sensitive areas.
All	No access will be made through wetlands or other wetted areas.
All	Shrub habitat will be avoided to reduce impacts to nesting raptors and migratory birds.
All	Activities or surface use are not allowed from February 1 to July 31 within one-half mile of a raptor nest (or within one mile of ferruginous hawk nests) for the protection of raptor nesting.
All	Surface disturbing and human activities within one mile of an active bald eagle nest will be restricted from February 1 to August 15.
All	Surface disturbing and disruptive activity will be prohibited within ½ mile of burrowing owl nesting habitat from April 1 through August 15.
All	From March 15 to September 1, if a migratory bird nest is present and active, monitoring will be done until the young have fledged for the protection of migratory bird nests in accordance with the Migratory Bird Treaty Act. A BLM wildlife biologist will be contacted prior to conducting nest surveys.
All	No surface disturbing activities would take place in mountain plover habitat between April 10 and July 10 without prior presence / absence surveys, as required.
All	No access or drilling would occur through or in wetlands or riparian areas, thus eliminating the potential effects to yellow-billed cuckoo, Columbia spotted frog, and Ute ladies'-tresses.
All	To avoid effects on Wyoming pocket gophers, visual surveys will be conducted for gophers and burrow mounds. If present, pocket gopher mounds will be flagged and avoided by 75 meters. If avoidance of burrow mounds is not possible, live capture surveys will be conducted to validate pocket gopher species.
All	To reduce the spread/introduction of noxious and invasive weed species, drill rigs and transport vehicles would be power washed weekly or when moving from one BLM weed management area to another. An air compressor would accompany the drill rig and used daily to remove weed parts and seed from all vehicles.
All	The Spill Prevention, Containment, and Countermeasures Plan would outline spill prevention practices and requirements for refueling and equipment operation near water bodies, procedures for emergency response and incident reporting, and training requirements.

**Table 4. Phase 1 Environmental Protection Measures**

Boreholes or overland travel to which measure applies	Environmental Protection Measure Description
See Appendix A of the EA	Pre-construction surveys of previously identified active raptor nests within ½ miles of proposed borehole locations will be conducted several weeks in advance of drilling to confirm nest activity (see Appendix A of the EA for a list of previously documented active nests within ½ miles of borehole locations). This will allow adequate time for adjustments in the drilling schedule. Surveys will be conducted in the appropriate agency approved survey window for each raptor species. To ensure that surveyors have the best chance of documenting active raptor nesting, surveys will be conducted towards the middle of the survey window to capture any late-nesting birds. If nest activity is documented, agency-approved timing restrictions on drilling activity within specified nest buffers will be implemented to avoid disturbance to nesting raptors. On the day of drilling at cleared boreholes, raptor nests will be checked once more to confirm inactivity.
All	Drilling vehicles traveling overland routes will off-set their travel so as not to create a two-track road.
02-2040 03-2028 03-2029 04-2004 04-610	Vehicles will avoid disturbing areas of large sagebrush to protect pygmy rabbit habitat.
All	To avoid effects on black-footed ferrets, mountain plover, and burrowing owls, surveys for prairie dog towns will be conducted before drilling. Prairie dog towns identified during surveying will be flagged and avoided by at least 50 meters.
All	All seasonal restrictions associated with BLM RMPs would be followed on BLM administered lands. If the Companies desire to operate within areas of seasonal restrictions, the process for requesting and granting exceptions will be followed, as to protocol established by governing BLM field offices.
All But Boreholes #SC01, SC02, SC03, and SC04	In any locations where surveys are required, the Companies will conduct these clearances using qualified professional biologists and botanists, in communication with Field Office BLM biologists and botanists, and using BLM-approved survey protocol or procedures.
All	To minimize disturbance, existing roads will be utilized as access points to the drill sites. In the case of drill sites located near existing roads, these sites will be no more than 100 feet off the road surface, just far enough that traffic is not impeded and drilling site workers are safe from traffic and disturbance is minimized.
All	Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting the holder.
All	All personnel involved in the geotechnical investigations will be instructed on site avoidance and protection measures, including information on the statutes protecting cultural resources. This training will be conducted for all personnel prior to initial site mobilization and will be provided to new geotechnical personnel on their first day of work.
All	In the event that previously unidentified cultural resources are discovered during the geotechnical investigations, the drill crews will immediately cease operations and notify the contract archaeologist and the BLM in accordance with BLM's standard stipulation for cultural resources. The drilling operations will be redirected to the next area that has been cleared for cultural resources. The contract archaeologist will record, evaluate, and determine the effects on the resource due to the drilling operation. A qualified archaeologist will complete a letter report to assess and document a discovery each time the drilling operations are redirected for such a discovery.

Table 4. Phase 1 Environmental Protection Measures

Boreholes or overland travel to which measure applies	Environmental Protection Measure Description
All	Human remains and associated artifacts may be discovered during inventory or drilling operations. If human remains are discovered under any circumstances, all activities will immediately cease, and the remains will be secured and protected until appropriate disposition has been determined, in accordance with applicable local, state, and Federal statutes. If necessary, the Companies will provide 24-hour on-site security for Native American Graves Protection and Repatriation Act (Public Law 101-601; 25 U.S.C. 3001 et seq.) associated discoveries and for other discoveries as determined by the BLM. The BLM, along with the appropriate law enforcement representative and county coroner will be immediately notified by phone by the Companies' representative or their consultant. This will be followed by written notification to the BLM, of any discoveries of human remains, associated and unassociated funerary objects, sacred objects, or objects of cultural patrimony. The BLM will be responsible for compliance with the Native American Graves Protection and Repatriation Act and its implementing regulations (43 CFR 10) for all related inadvertent discoveries and discovery situations.
All	Truck traffic will not occur when wet conditions would result in wheel rutting greater than 2 inches in depth.
All	Vehicles with low ground pressure, such as rubber tracked equipment or balloon tires would be used in areas or conditions where rutting, soils displacement, or compaction could occur.
All	Construction spills will be promptly cleaned up and contaminated materials hauled to a disposal site that meets local jurisdictional requirements.
All	If an upland spill occurs, berms will be constructed with available equipment to physically contain the spill. Absorbent materials will be applied to the spill area. Contaminated materials will be excavated and temporarily placed on and covered by plastic sheeting in a containment area a minimum of 100 feet away from any wetland or waterbody, until proper disposal is arranged (EPA 2006).
All	If a spill occurred beyond the scope of on-site equipment and personnel, an Emergency Response Contractor will be identified and available to further contain and clean up the spill.
All	For spills in standing water, floating booms, skimmer pumps, and holding tanks will be used as appropriate to recover and contain released materials on the surface of the water.
All	If pre-existing contamination is encountered during drilling, work will be suspended in the area of the suspected contamination until the type and extent of the contamination is determined. The type and extent of contamination; the responsible party; and local, state, and federal regulations will determine the appropriate cleanup method(s) for these areas.
All	Materials such as fuels, other petroleum products, chemicals, and hazardous materials including wastes will be located in upland areas at least 500 feet away from streams and/or 200 feet from private wells (400 feet from public wells).
All	All vehicles will be equipped with a working fire extinguisher and a shovel. Drill rigs will be equipped with a filled water tank during periods of high, very high, or extreme fire danger.
All	Smoking will be prohibited.
All	Campfires or uncontained fires of any kind will be prohibited.
All	The crew contingency plan will include a fire communications protocol for contacting fire-fighting personnel.
All	Utility clearances will be conducted on every borehole before entry to the site. Clearances will be conducted by a certified utility locator. It will be up to the discretion of the utility locators as to whether a site visit is necessary for any borehole.
All	Any fences that need to be cut for access will be repaired to their original conditions before the drilling crew leaves the area, or immediately if livestock are present.
All	All vehicles and construction equipment will use working mufflers to minimize equipment-related noise.

**Table 4. Phase 1 Environmental Protection Measures**

Boreholes or overland travel to which measure applies	Environmental Protection Measure Description
All	Drillers will develop a Health and Safety Plan which includes the following information (at a minimum): identification of responsible parties; identification of potential physical, chemical, or environmental hazards and relevant health and safety precautions; required personal protective equipment; emergency evacuation procedures; location and content of warning signs to be posted; local emergency telephone numbers will be posted at drilling locations.
All	All vehicles will travel on existing roads, with the exception of minor off-road traverses (less than 0.7 mile) to access drill site locations.
All	Contractors will avoid driving, drilling, or parking in weedy areas.

\* Indicates all overland travel on BLM lands identified in Appendix B, and all boreholes identified in Table 3.