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1.0 Introduction and Description of the Proposed Facilities

1.1 Introduction

The identity of the applicant is TransCanada Keystone Pipeline, LP (Keystone), a limited partnership, organized under the laws of the State of Delaware, and owned by TransCanada Corporation (TransCanada), a Canadian public company organized under the laws of Canada. Keystone's primary business address is 450 1st Street, S.W., Calgary, Alberta, Canada T2P 5H1.

Keystone is proposing to construct and operate a crude oil pipeline and related facilities from Hardisty, Alberta, Canada, to the Port Arthur and east Houston areas of Texas in the United States (US). The project, known as the Keystone XL Project (Project), will have a nominal capacity to deliver up to 830,000 barrels per day (bpd) of crude oil from an oil supply hub near Hardisty to existing terminals in Nederland near Port Arthur, and the Houston Ship Channel in Houston, Texas.

TransCanada PipeLines Ltd. (TransCanada PipeLines) will be the operator of the Project. TransCanada, the parent company of TransCanada PipeLines, has more than 50 years experience in the responsible development and reliable and safe operation of North American energy infrastructure including natural gas pipelines, power generation, gas storage facilities, and projects related to oil pipelines and liquefied natural gas facilities. TransCanada owns and operates a natural gas pipeline network of more than 36,500 miles, which taps into virtually all major natural gas supply basins in North America. TransCanada transports the majority of western Canada's natural gas production across the North American continent to markets in the US and Canada.

Further, Keystone is in the execution phase of the $5.2 billion Keystone Pipeline project, a major international crude oil pipeline project. The Mainline Segment of the Keystone Pipeline project, which extends from the North Dakota-Canada border to Wood River and Patoka, Illinois; commenced commercial operations in June 30, 2010. The Keystone Cushing Extension, which extends from Steele City, Nebraska, to Cushing, Oklahoma, is on schedule for completion in 2010. In addition, TransCanada Corporation permitted and constructed the Express Oil Pipeline through Montana and Wyoming in the 1990s.

TransCanada has total assets of approximately US $30 billion. For the year ending December 31, 2007, TransCanada had a net income from continuing operations of approximately US $1.2 billion and a cash flow of approximately US $2.8 billion.

The Project will require the issuance of a Presidential Permit by the US Department of State (DOS) to cross the US/Canada border. Issuance of the Presidential Permit is subject to environmental review pursuant to the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.). The Bureau of Land Management (BLM) will be responsible for issuing right-of-way (ROW) Grants and Temporary Use Permits for Project activities on federal lands. In Montana, the Project requires a certificate under the Montana Major Facilities Siting Act (MFSA), which includes environmental review under the Montana Environmental Policy Act (MEPA). The Montana Department of Environmental Quality (Montana DEQ) has indicated that it also will use the federal Environmental Impact Statement (EIS) and process to satisfy its own process.

This application provides the Montana DEQ with adequate information to satisfy the requirements of the MFSA. This application includes an objective disclosure of environmental impacts, beneficial and adverse, resulting from the Project, as well as a set of reasonable alternatives.

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Deleted: ConocoPhillips is the third-largest integrated energy company in the US, based on market capitalization, as well as reserves of oil and natural gas. Worldwide, of non-government-controlled companies, ConocoPhillips is the sixth-largest holder of proved reserves and the fifth-largest refiner. Headquartered in Houston, Texas, ConocoPhillips operates in nearly 40 countries, has approximately 33,100 employees worldwide and operates more than 11,000 miles of pipelines and more than 60 storage terminals in the US. ConocoPhillips transports both raw and finished petroleum products, including crude oil, propane and refined products such as gasoline, diesel and jet fuel. The company has assets of $190 billion.

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1.2 Description of the Proposed Facilities

The Project will consist of three new pipeline segments plus two new pump stations on the Cushing Extension of the Keystone Pipeline Project. The Steele City Segment of the Project extends from Hardisty, Alberta, southeast through Montana and South Dakota to Steele City, Nebraska. The Gulf Coast Segment extends from Cushing, Oklahoma, south to Nederland, Texas. The Houston Lateral extends from the Gulf Coast Segment in Liberty County, Texas, southwest to Moore Junction, Harris County, Texas, near the Houston Ship Channel (**Figure 1-1**). In total, the Project will consist of approximately 1,711 miles of new, 36-inch-diameter pipeline, consisting of about 327 miles in Canada and 1,384 miles within the US. It will interconnect with the northern and southern termini of the 298-mile-long, 36-inch-diameter Keystone Cushing Extension. The Montana portion of the Steele City Segment will be approximately 282 miles in length. The Project is planned to be placed into service in phases. The Gulf Coast Segment is planned to be in service in 2011 and the Steele City and Houston Lateral Segments are planned to be in service in 2012.

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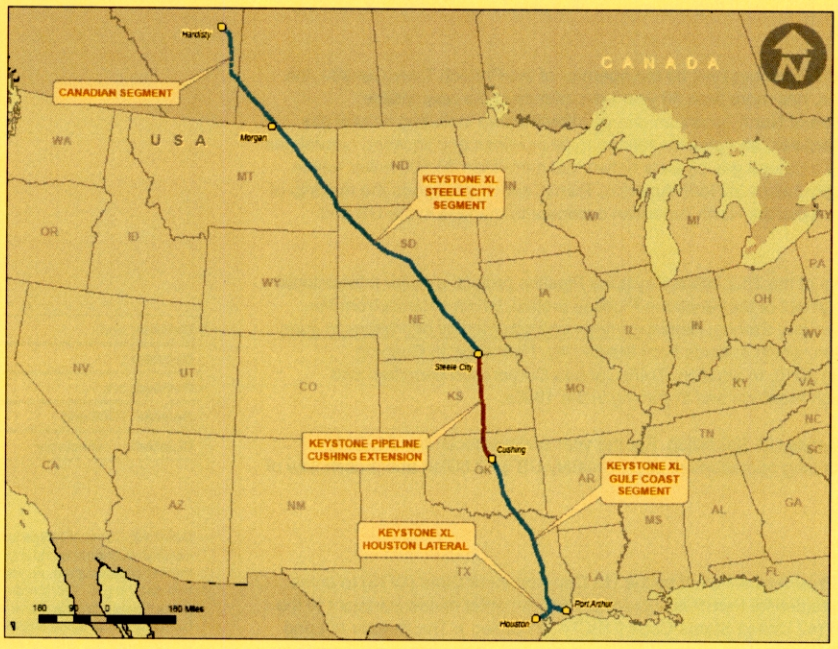

Figure 1-1 **Proposed Project Route**

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In the US, the Project will be constructed as follows:

36-inch-diameter Steele City Segment, approximately 852 miles in length, from the US/Canada border at Morgan, Montana, to Steele City, Nebraska, which will be constructed with up to 10 mainline spreads, approximately 80 to 120 miles each, in 2011 and 2012.

36-inch-diameter Gulf Coast Segment, approximately 484 miles in length, from Lincoln County, Oklahoma, to Nederland, Texas, which will be constructed with five mainline spreads, varying in lengths from 65 to 122 miles each in 2010 and 2011.

36-inch-diameter Houston Lateral, approximately 47 miles in length, from Liberty County, Texas, to Harris County, Texas, which will be constructed with one main spread, in 2012.

Final spread configuration and construction schedule may result in additional, shorter spreads.

A total of 30 new pump stations, each located on an approximate 5 to 20-acre site, will be constructed in the US; 18 on the Steele City Segment, 10 on the Gulf Coast Segment, and 2 along the Keystone Cushing Extension in Kansas. Six of the 18 Steele City Segment pump stations are proposed for construction in Montana.

A tank farm will be located on an approximate 74-acre site near Cushing, Oklahoma. Three tanks, each with a design capacity of 350,000 barrels, will be constructed for the purpose of managing oil movements during operations.

Valves will be installed and located as dictated by the hydraulic profile of the pipeline, as required by federal regulations, and with the intent to enhance public safety and protect the environment as part of Keystone's integrity management practices. The spatial extent of each valve site will be contained within the permanent ROW and other aboveground facility sites (e.g., pump stations) along the Project route. Permanent access to each of these intermediate sites will be acquired.

Densitometer sites for detection of crude oil batch interfaces will be co-located at the last valve upstream of each delivery location as well as at each delivery location. There are no densitometer sites in Montana.

Delivery metering and proving facilities at Nederland, Texas, and Moore Junction, Texas, will measure the amount of product transported and delivered to terminals. There are no delivery metering facilities in Montana.

Temporary use access roads to the construction ROW and temporary use contractor yards or stockpile sites will be required during construction of the Project. Access roads will vary in length and will be required every 5 to 10 miles along the pipeline route and will be about 20 to 30 feet wide. Temporary construction pipe stockpile sites and contractor yards will be up to 30 acres in size. Pipe stockpile sites will be located at 30- to 80-mile intervals along the proposed route. Contractor yards are expected to be needed every 60 miles.

Electric power lines will be constructed, as required, by local power providers to provide power for the new pump stations and to power remotely operated valves and densitometers located along the pipeline route.

Power line and associated facility upgrades will be required in multiple locations along the route. Keystone will not construct nor be responsible for the permitting of new power lines and related facility construction. Local power providers will be responsible for obtaining any necessary approvals or authorizations from federal, state, and local governments for such facilities (subject to the exception noted below). Although the permitting process for the electrical facilities is an independent process, construction and operation of these facilities are considered connected actions under NEPA and MEPA. Moreover, these facilities are associated facilities under the MFSA and are evaluated within this application. Power providers will file a separate ROW Grant Application with BLM for power lines that cross BLM lands along the Steele City Segment. This is required by the BLM in order to ensure those ROWs are processed in parallel with the EIS.

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1.3 Design Characteristics (ARM 17.20.1509)

The Project has been designed to transport crude oil from Canada to the US Gulf Coast. The pipeline will have a nominal capacity to deliver up to 830,000 bpd. The pipeline route and associated pump stations are shown in **Figure 1-2**. The pipeline system will be designed, constructed, and operated to meet or exceed all applicable regulatory requirements. Additional information with regard to specific elements of the Project design is provided in subsequent sections.

The 36-inch-diameter pipeline will be buried and placed in a 50-foot-wide permanent easement. During construction, an additional 60-foot-wide temporary easement generally will be required for the safe installation of the pipeline. As described later, under certain site-specific circumstances, additional or reduced temporary work space may be required.

Six pump stations will be located in Montana. The pump station requirements to support this system capacity is shown in **Table 1-1**. Each pump will be driven by an air-cooled electric motor. Pig launchers and receivers, typically 200 miles apart, will be installed in Montana at Pump Stations 9 and 13. A typical plot plan of a pump station with a pig launcher and receiver is shown in **Figure 1-3**. Mainline valves will be installed at each pump station.

Table 1-1 Pump Stations in Montana

Pump Station Number	Milepost	County	Legal	Acres	Total Number of Pumps
PS 09	1.25	Phillips	4-37N – 32E	11.99	5
PS 10	49.46	Valley	1-31N – 36E	7.63	5
PS 11	98.39	McCone	1-25N – 42E	8.04	5
PS 12	149.07	McCone	18-19N – 49E	8.61	5
PS 13	199.64	Prairie	30-13N – 54E	7.01	5
PS 14	237.06	Fallon	11-8N – 58E	6.83	5

Intermediate mainline valve sites located between the pump stations will be fenced and have a locked gate and be accessible by a permanent access road. On the downstream side of major river crossings, there will be a combination of a manually operated mainline valve and a check valve. This will prevent backflow from the downstream pipe section in the event of abnormal conditions. All other intermediate valves and those located at the pump stations will be remotely operated. Plot plans of the intermediate mainline valves are shown in **Figure 1-4**.

The exterior of the pipe will be coated with fusion-bonded epoxy (FBE) to protect the pipe from external corrosion. In addition to a FBE external coating system, an impressed current cathodic protection system will be installed.

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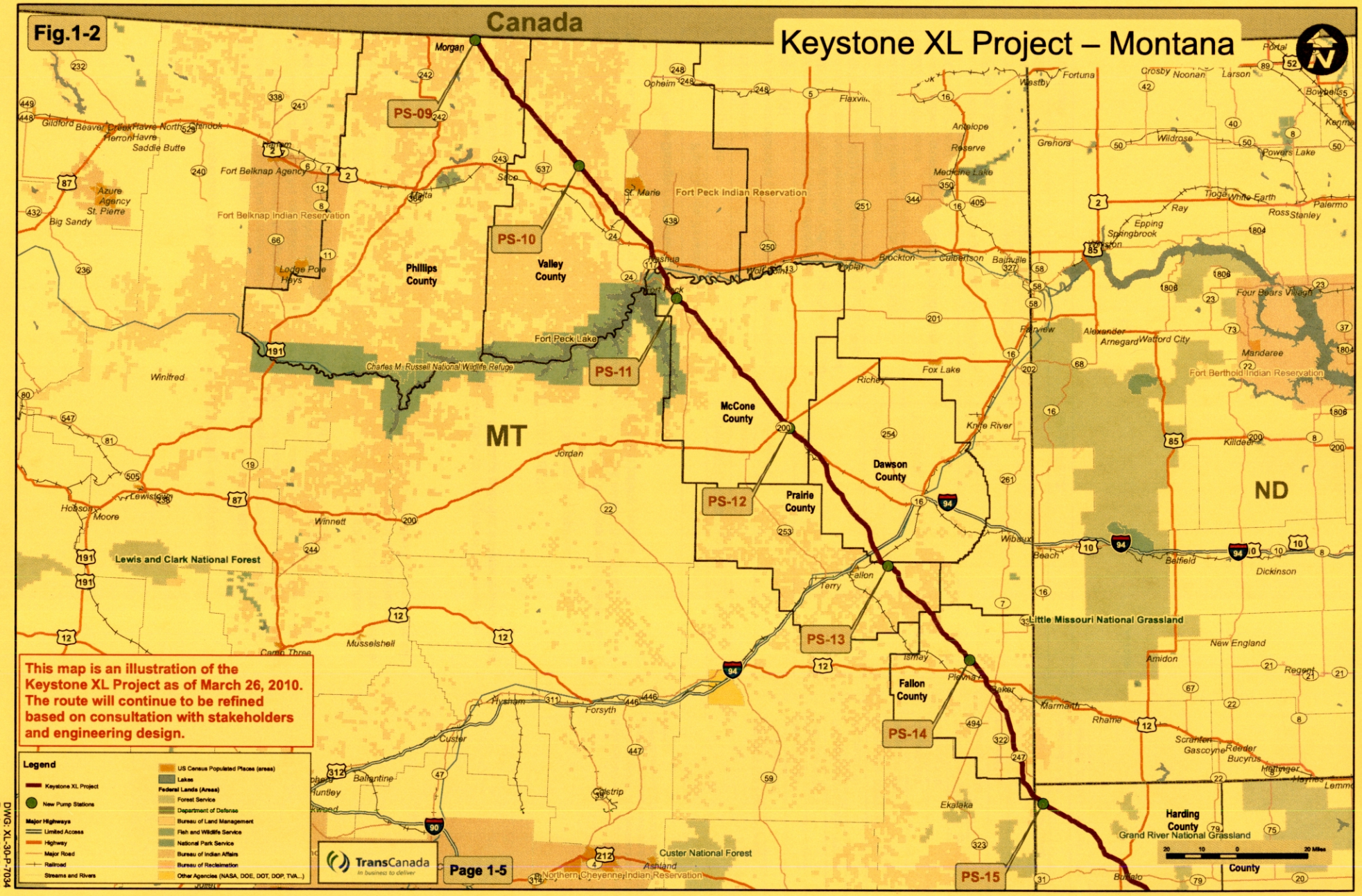

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Initially, valves were placed in locations as required by federal regulations (49 CFR Part 195), including placement on either side of large rivers and in areas to protect drinking water reservoirs. After initial valve locations were identified based on engineering considerations, Keystone conducted a preliminary evaluation of PHMSA-defined HCAs. This evaluation identified HCAs that potentially could be affected by a pipeline spill. Based on the HCA evaluation, valve locations were re-assessed to determine where relocation (while still complying with federal regulations) or the addition of new valves could mitigate potential risk to HCAs.

These revised locations were then compared to the location of shallow groundwater aquifers, source water protection areas, and wellhead protection areas. Valve locations were again re-assessed to determine where relocation or the addition of new valves could mitigate potential risk to potentially sensitive groundwater resources (while still complying with federal regulations and providing protection of HCAs). Finally, additional valves were added to reduce the length of pipe between isolating valves.

Leak Detection

Keystone will implement a number of complimentary leak detection methods and systems, which will be overlapping in nature and will progress in leak detection thresholds to reduce potential adverse environmental impacts. For more information, see Section 1.5.6.

1.3.3 Engineering Description of the Facilities (ARM 17.20.1509(8))

Table 1-2 provides various selected design parameters applicable to the proposed pipeline.

New steel pipe for the mainline will be mill inspected by an authorized owner's inspector and mill tested to Canadian Standard Association or API/ASTM specification requirements, at a minimum. Refer to Section 1.4.1.5, Pipe Stringing, Bending and Welding, for description of the joining process.

Table 1-2 Pipe Design Parameters and Specifications

Pipe/Design Parameters	Specification
Pipeline design code	ASME B31.4-2006; 49 CFR Part 195
Outside diameter	36-inch
Line pipe wall thickness (1,300 pounds per square inch gauge [psig])	0.465-inch
Line pipe wall thickness (0.72 design factor) PHMSA Special Permit areas, including highly populated area HCAs, and commercially navigable waterways (per 49 CFR Part 195.450) and station valving (1,300 psig)	0.515-inch
Heavy wall thickness Bore road, cased railway crossings (1,300 psig)	0.618-inch
Heavy wall thickness Uncased railway crossings, horizontal directional drillings (HDDs) (1,300 psig)	0.748-inch
Line pipe wall thickness (0.72 design factor) (1,600 psig, MOP as per 49 CFR 195.106) (Directly downstream of pump stations at lower elevations as determined by stedy steady state and transient hydraulic analysis)	0.572 inch
Material code	API 5L-PSL2

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Table 1-2 Pipe Design Parameters and Specifications

Pipe/Design Parameters	Specification
Material grade thousand pounds of pressure per square inch (yield strength)[1]	Grade X70
Maximum pump station discharge	1,300 psig
Maximum Operating Pressure (MOP)	1,300 psig, 1,600 psig[2]
Minimum field test pressure	1.25 x MOP
Charpy impact test temperature (Joules at °C) Below grade = 5°C (41°F) Above grade = 45°C (-113°F)	85 percent (average) 75 percent minimum single specimen Charpy energy = 33 feet-lb (any heat); 74 feet-lb (all-heat) (average)
Corrosion allowance	None
Minimum average joint length (feet)	Nominal 80-foot (double-joint)
Field production welding processes	Mechanized – gas metal; arc welding (GMAW) Manual-shielded metal arc welding (SMAW)

[1] Yield strength of the pipe is provided as yield strength, which is used primarily for design rather than tensile strength.

[2] The design of the proposed Project pipeline system is based on a maximum 1,300 pounds per square inch gauge (psig) discharge pressure at each pump station. The pump station discharge pressure would be a maximum of 1,300 psig. There would be situations where, due to elevation changes, the hydraulic head created would result in a MOP up to and including 1,600 psig. Suction pressure at the pump stations is generally on the order of 200 psig.

[1] Milepost 0 is at the US/Canadian border.

1.3.3.1 Pipe Burial Depths

Pipe burial depths are shown in **Table 1-3**. Additional depths of cover may be required subject to crossing agreements (e.g., with highways, counties, or other parties) and subject to permits.

Table 1-3 Minimum Pipeline Cover

Location	Cover, Normal Excavation (inches)	Cover, Rock Excavation (inches)
All waterbodies	60	36
Dry creeks, ditches, drains, washes, gullies, etc.	60	36
Drainage ditches at public roads and railroads	60	48
All other land	48	36

Montana pump station location and size information is provided in **Table 1-1** in Section 1-3. Intermediate project valve location information is provided in **Table 1-4**, each pump station also contains a mainline valve.

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The design of the KXL pipeline system is based on a maximum 1,440 psig discharge pressure at each pump station. The result is that the MOP of the pipeline between pump stations is generally 1,440 psig. In liquid pipelines, some sections at lower elevations relative to the pump station discharge may be exposed to slightly higher pressures due to the combined station discharge pressure and hydrostatic head. This can occur during both normal and abnormal operating conditions. The design of the pipeline is based on a steady state and transient analysis to identify MOPs under normal and abnormal operating conditions.¶
For location-specific, low elevation segments downstream of pump stations, the MOP will be 1,600 psig as identified in **Table 1-3**. This allows a consistent maximum discharge pressure for all pump stations, optimized for efficiency at nominal flow capacity. All other segments in Montana will have a MOP of 1,440 psig.¶
Table 1-3 Pipe Segments with MOP of 1,600 psig ...

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Table 1-4 Intermediate Project Valve Locations in Montana

Number	Milepost
1	20.27
2	28.07
3	63.69
4	71.84
5	81.37
6	84.06
7	91.06
8	123.14
9	178.09
10	194.41
11	199.64
12	227.67
13	244.95
14	265.24

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1.3.3.2 Cathodic Protection

The components of a cathodic protection system include:

- Rectifiers;
- Anode ground beds;
- Conductive material; and
- Test leads.

Cathodic protection uses a rectifier to convert alternating current power to direct current power. The rectifier output is electrically connected to the pipe on one side and, on the other side, to anodes (metal rods). The rectifier is usually sited adjacent to existing power lines in the area. Anodes are buried in groups (referred to as ground beds) along the pipeline and are backfilled with a carbon-based conductive material to improve their effectiveness. As the electric current follows from the pipeline through the rectifier to the anode bed, exposed pipe-metal is protected from corrosion.

The distance between rectifier units depends on the current requirements of the system. Current requirements are based on different soil types. Typically, a rectifier and anode ground bed can protect 40 or more miles of pipeline from a single location. Efforts are made to co-locate the equipment at other facility sites, such as pump stations or valve sites.

The effectiveness of the cathodic protection system is measured using test leads. Test leads attached to the pipe allow the cathode protection system to be checked on a regular basis. These test leads are located at approximately 2-mile intervals, brought to the surface via wires, and attached to a supporting post.

- Keystone will have qualified inspectors to ensure quality standards are maintained during pipe transportation, stringing, welding, bending, coating, lowering-in, and backfilling.
- Keystone will non-destructively inspect 100 percent of the welds using radiographic, ultrasonic, or other USDOT-approved method. Welds that do not meet established specifications will be repaired or removed.
- The pipeline will be hydrostatically tested in sections to ensure the system is capable of withstanding the operating pressure for which it is designed. The hydrostatic test will be conducted in accordance with Subpart E of 49 CFR Part 195. See Section 1.4.1.7 for further details on hydrostatic testing.

1.3.4.4 As Built Quality Control

As built records of the completed facilities will be documented in accordance with Section 195.266 of 49 CFR Part 195 for the life of the facility.

1.3.5 Source of Power for Pump Stations (ARM 17.20.1509(10))

Table 1-5 details the location and size of new electrical power lines associated with the Project pump stations in Montana. Preliminary routing has been identified for each power line. Maps at a scale of 1:350,000 depicting the preliminary routing identified for the transmission lines that will supply the pump stations along the routes are included in **Attachment A.** Where feasible, the entire length of each of these preliminary power line routes has been placed along existing county roads, section lines, or field edges to minimize interference with adjacent agricultural lands. Additional information on power lines can be found in **Attachment O**.

Table 1-5 Location and Size of Proposed Electrical Power Lines in Montana

Pump Station Number	County	Kilovolt	Approximate Length (miles)	Typical Pole/Tower Spacing (feet)
PS 09	Phillips	115	61.8	500 to 600
PS 10	Valley	115	49.1	500 to 600
PS 11	McCone		none*	
PS 12	McCone	69	3.2	300 to 400
PS 13	Prairie	115	15.2	500 to 600
PS 14	Fallon	115	6.3	500 to 600

*WAPA has a powerline adjacent to the pump station property and will provide service via a substation

1.3.6 Communication Facilities (ARM 17.20.1509(11))

Keystone will use satellite as the primary form of communication and hard telephone line (telco) and microwave radio as back-up. Where feasible, microwave radio communication towers may be located at pump stations and valve sites. Location of these facilities will be determined during detailed design. All remotely operated valve sites and pump stations will have SCADA, which uses the above primary and back-up communication methods. The Project will not install fiberoptic cable.

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provides the sequence of construction operations, approximate quantities of the typical construction equipment to be used per spread, and an estimate of the total equipment needs.

1.4.1.1 General Pipeline Construction Procedures

Before starting construction, Keystone will finalize engineering surveys of the ROW centerline and extra workspaces and substantially complete the acquisition of ROW easements and any necessary acquisitions of property in fee.

Overland pipeline construction generally proceeds as a moving assembly line as summarized below. Separate crews will be used for construction of the aboveground facilities.

Standard pipeline construction is composed of specific activities, including survey and staking of the ROW, clearing and grading, trenching, pipe stringing, bending, welding, lowering in, backfilling, hydrostatic testing, and cleanup. In addition to standard pipeline construction methods, Keystone will use special construction techniques where warranted by site-specific conditions. These special techniques will be used when constructing across rugged terrain, waterbodies, wetlands, paved roads, highways, and railways.

1.4.1.2 Survey and Staking

The first step of construction involves marking the limits of the approved work area (i.e., the construction ROW boundaries and any additional temporary workspace areas) and flagging the location of approved access roads and existing utility lines. Wetland boundaries and other environmentally sensitive areas also will be marked or fenced for protection at this time. Before the pipeline trench is excavated, a survey crew will stake the centerline of the proposed trench.

1.4.1.3 Clearing and Grading

Before clearing and grading activities commence, landowner fences will be braced, cut, and temporary gates and fences will be installed to contain livestock, if present. A clearing crew will follow the fence crew and will clear the work area of vegetation (including crops) and obstacles (e.g., trees, logs, brush, rocks). Temporary erosion control measures, such as silt fence or straw bales, will be installed prior to or immediately following vegetation removal down slopes into wetlands and riparian areas. Grading will be conducted where necessary to provide a reasonably level work surface. Where the ground is relatively flat and does not require grading, rootstock will be left in the ground. More extensive grading will be required on steep side slopes or vertical areas and, where necessary, to avoid excessive bending of the pipeline.

The minimum clearing and grading equipment per spread is as follows: six D8 dozers; one 330 backhoe (thumb and hoe pack); two 345 backhoes; two D8 ripper dozers; and one 140 motor grader. Two environmental crews will be required per spread installing silt fence and hay bale structures, as required.

1.4.1.4 Trenching

The trench will be excavated to a depth that provides sufficient cover over the pipeline after backfilling. Typically, the trench will be 7 to 8 feet deep and 4 to 5 feet wide in stable soils. In most locations, the depth of cover over the pipeline will be a minimum of 48 inches (see **Table 1-3**). Trenching may precede bending and welding or may follow, depending upon several factors, including soil characteristics, water table, presence of drain tiles, and weather conditions at the time of construction.

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When rock or rocky formations are encountered, tractor-mounted mechanical rippers, or rock trenchers, will be used to fracture the rock prior to excavation. In areas where mechanical equipment cannot break up or loosen the bedrock, blasting (use of explosives) will be required (see Section 1.4.1.10). Excavated rock will be used to backfill the trench to the top of the existing bedrock profile. Topsoil will be separated from subsoil over the

Keystone plans to use the HDD method of construction to cross three waterbodies in Montana (**Table 1-6**). The HDD method involves drilling a pilot hole under the waterbody and banks, then enlarging the hole through successive reamings until the hole is large enough to accommodate a prefabricated segment of pipe. Throughout the process of drilling and enlarging the hole, slurry consisting mainly of water and bentonite clay will be circulated to power and lubricate the drilling tools, remove drill cuttings, and provide stability to the drilled holes. Pipe sections long enough to span the entire crossing will be staged and welded along the construction work area on the opposite side of the waterbody and then pulled through the drilled hole. Ideally, use of the HDD method results in no impact on the banks, bed, or water quality of the waterbody being crossed (CMRP Detail 15). Keystone has prepared a plan to address an inadvertent release of drilling mud (see **Attachment P**).

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Table 1-6 Waterbodies Crossed in Montana using the HDD Method

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Waterbody	Number of Crossings	Approximate Milepost(s)
Milk River	1	82.9
Missouri River	1	89.2
Yellowstone River	1	196.4

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Wetland Crossings

Data from wetland delineation field surveys, aerial photography, and National Wetland Inventory mapping were used to identify wetlands crossed by the proposed pipeline. Pipeline construction across wetlands will be similar to typical conventional upland cross-country construction procedures, with several modifications where necessary to reduce the potential for pipeline construction to affect wetland hydrology and soil structure.

The wetland crossing method used will depend largely on the stability of the soils at the time of construction. If wetland soils are not excessively saturated at the time of construction and can support construction equipment without equipment mats, construction will occur in a manner similar to conventional upland cross-country construction techniques (CMRP Detail 8). Topsoil will be segregated over the trench line. In most saturated soils, topsoil segregation will not be possible. Additional temporary workspace areas will be required on both sides of particularly wide saturated wetlands to stage construction, fabricate the pipeline, and store materials. These additional temporary workspace areas will be located in upland areas a minimum of 10 feet from the wetland edge.

Construction equipment working in saturated wetlands will be limited to that area essential for clearing the ROW, excavating the trench, fabricating and installing the pipeline, backfilling the trench, and restoring the ROW. In areas where there is no reasonable access to the ROW except through wetlands, non-essential equipment will be allowed to travel through wetlands only if the ground is firm enough or has been stabilized to avoid rutting.

Clearing of vegetation in wetlands will be limited to trees and shrubs, which will be cut flush with the surface of the ground and removed from the wetland. To avoid excessive disruption of wetland soils and the native seed and rootstock within the wetland soils, stump removal, grading, topsoil segregation, and excavation will be limited to the area immediately over the trench line. During clearing, sediment barriers, such as silt fence and staked straw bales, will be installed and maintained on down slopes adjacent to saturated wetlands and within additional temporary workspace areas as necessary to minimize the potential for sediment runoff.

Where wetlands are located at the base of slopes, permanent slope breakers will be constructed across the ROW in upland areas adjacent to the wetland boundary. Temporary sediment barriers will be installed where

necessary until revegetation of adjacent upland areas is successful. Once revegetation is successful, sediment barriers will be removed from the ROW and disposed of properly.

In wetlands where no standing water is present, the construction ROW will be seeded in accordance with the recommendations of the local soil conservation authorities or land management agency.

Blasting through Rock

Blasting may be required in areas where consolidated shallow bedrock or boulders cannot be removed by conventional excavation methods. If blasting is required to clear the ROW and to fracture rock within the ditch, strict safety precautions will be followed. Keystone will exercise extreme care to avoid damage to underground structures, cables, conduits, pipelines, and underground watercourses or springs. To protect residents, property, and livestock, Keystone will provide adequate notice to adjacent landowners or tenants in advance of blasting. Blasting activity will be performed during daylight hours and in compliance with federal, state, and local codes and ordinances and manufacturers' prescribed safety procedures and industry practices.

1.4.1.11 Preliminary Construction Schedule and Estimated Duration of Construction Activities

An industry rule-of-thumb for pipeline construction progress is a rate of approximately 20 completed miles per calendar month, which could be used for scheduling purposes. The construction schedule is estimated as follows per spread:

- 3 weeks (21 calendar days) of work on the ROW prior to the start of production welding. These activities would include clearing, grading, stringing, and ditching.
- Production welding, based on an average of 1.25 miles per working day and a 6-day work week (7 calendar days), will be completed at 7.5 miles per week, on average.
- 7 weeks (49 calendar days) of work after completion of production welding. These activities would include NDT of welds, field joint coating, lowering-in, tie-ins, backfill, ROW cleanup, hydrostatic testing, reseeding, and other ROW reclamation work.

Using this as a basis for determining the duration of construction activities on the ROW would yield the time requirements shown below for various spread lengths (**Table 1-7**).

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Table 1-73 Resulting Construction Times Based on Estimates of Schedule (calendar days)

Spread Length	Pre-welding	Welding Time	Post-welding and Cleanup	Duration
80 miles	21 days	75 days	49 days	145 days (21 weeks)
90 miles	21 days	84 days	49 days	154 days (22 weeks)
100 miles	21 days	94 days	49 days	164 days (24 weeks)
120 miles	21 days	112 days	49 days	182 days (26 weeks)

In addition, about 1 month for contractor mobilization before the work is started and 1 month after the work is finished for contractor demobilization should be added to the overall construction schedule.

Staging areas are designated at the start of each construction spread (located at public road crossings) where access may be gained without necessitating use of private roads, wherever possible.

areas and staging areas to prevent heavily silt-laden water from entering a waterbody. Excavated material will not be stockpiled within 10 feet of the watercourse and will be contained with berms and secondary silt fence containment. For HDD crossings, there will be entry and exit workspaces required in excess of the construction ROW. Entry workspaces are typically 250 feet x 40 feet, and exit workspaces are typically 150 feet x 40 feet.

1.4.8 Overhead Stream Crossings (ARM 17.20.1511(8))

No overhead stream crossings are planned.

1.4.9 Construction Camps (ARM 17.20.1511(9))

Construction camps are planned for 2 locations in Montana. Keystone provided this information in the Blue filing made in September 2009. Depending on final spread configuration and construction schedule, larger camps could be required.

Deleted: No construction camps are planned

1.4.10 Reclamation Methods (ARM 17.20.1511(10))

A detailed description of the reclamation methods can be found in the CMRP (**Attachment C**). After construction, Keystone will monitor ROW reclamation and erosion control using aerial and visual surveillance. Any post-construction subsidence will be repaired and monitored. Sideslope reclamation is described here. In areas where the proposed pipeline route crosses laterally along the side of a slope, cut and fill grading will be required to obtain a gentler, flat work terrace for safe operation of construction equipment and to accommodate pipe bending limitations. Topsoil will be stripped from the entire ROW and stockpiled prior to cut and fill grading on the side slope. During construction, topsoil piles will be protected from erosion through matting, mulching, watering, or tackifying as deemed practicable, based on site-specific conditions.

After the pipeline is installed, the soil will be returned to the slope's approximate contours as close as possible to the original pre-construction state. After construction, stabilization of the side slopes will utilize temporary and permanent erosion control features as follows:

- Installation of temporary erosion controls on slopes greater than 5% on all disturbed lands at the recommended spacing or wherever soils are highly erodible immediately after initial disturbance.
- Trench breakers to limit the potential for trench line erosion along the slope
- Permanent slope breakers to limit erosion and divert surface runoff to adjacent stable vegetated areas. In the absence of a stable area, energy-dissipating devices shall be constructed at the end of the slope breaker and beyond the area disturbed by construction.
- Mulch or tackifier application on areas with high erosion potential and on slopes greater than 8 percent unless otherwise approved, based on site-specific conditions.
- Erosion control matting may be applied based on site-specific conditions. The erosion control matting shall be made of biodegradable, natural fiber such as straw or coconut fiber.
- Seed mixes will be developed with input from local soil conservation offices and through collaboration with regional experts. In addition, other measures may be utilized to reestablish vegetation based on site-specific conditions.

Fencing the ROW from livestock, or alternatively, providing compensation to rest a pasture until vegetation can become established. Management concerns such as livestock access to water or movement within a pasture will be incorporated as necessary.

- Maintain reliability and adhere to regulatory requirements.

1.5.1.2 Operations Control Center

Facilities within Keystone's OCC will be utilized to accommodate the operation and control of the Project pipeline. The OCC will be staffed by operators on a 24-hour-per-day, 7-day-per-week basis and will use a comprehensive SCADA system to remotely monitor and control the pipeline system.

OCC Procedures

OCC emergency procedures and other necessary work instructions will be developed for the Project. TransCanada policies and procedures will be utilized and enhanced where necessary, to incorporate Project operations. Both the emergency procedures and work instructions will be completed in advance of the pipeline in-service date to allow the training of personnel in accordance with processes, procedures, and other requirements outlined.

TransCanada's Electronic Document Management System (EDMS), which Keystone will implement, will be used to manage these emergency procedures and work instructions. Use of the EDMS and associated internal web page links will ensure the relevant versions of applicable documents are available to OCC operators at all points of use. Key areas to be covered within the work instructions will include pipeline start up, shutdown, swing procedures, and response to local pumping station alarms, including fire and flammable vapor detection. Areas to be covered within the emergency procedures will include responses to leak detection system alarms; other observed suspected leak conditions; emergency conditions including bomb threats, civil disturbances, fires, explosions, and other natural disasters. These systems will ensure all events are managed consistently within the OCC and also ensure compliance with TransCanada Emergency Management System and Incident Management Process.

1.5.2 Ability to Withstand Natural Disaster and Human Caused Incidents (ARM 17.20.1512(2))

1.5.2.1 Natural Disasters

The National Pipeline Mapping System, maintained by the USDOT, categorizes potential natural disaster hazards to pipelines on a regional scale. **Table 1-8** quantifies these hazards for the Project in Montana.

Table 1-8 Quantification of Regional Natural Hazards in Montana

Hazard Category[1]			
Natural Hazard	Low	Medium	High
Hurricane	282.7 miles	0	0
Earthquake	282.7 miles	0	0
Flood	206.3 miles	55.1 miles	21.3 miles
Landslide	175.1 miles	5.6 miles	102.1 miles

[1] PHMSA categories: 0 to 69 = low; 78 to 84 = medium; 85 to 100 = high.

While ground movement (earthquakes, landslides) can result in pipeline releases, research indicates that pipelines are robust to ground movement (O'Rourke and Palmer 1996) and ground movement is not a major cause of pipeline failures (PHMSA 2008). Federal regulations (49 CFR Part 195) require that an internal inspection be conducted to detect potential pipeline damage if an earthquake, landslide, or other ground motion is suspected of having caused abnormal movement of the pipeline.

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Table 1-8 illustrates that the likelihood of earthquake or hurricane damage to the Project is low, since the entire project falls outside of the USDOT-defined high earthquake and hurricane hazard areas. Keystone also conducted a route-specific review of earthquake hazards, which confirms the low hazard.

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Keystone has evaluated flooding and landslide hazards and has mitigated the risk posed by these hazards through routing and design. Keystone will avoid locating any aboveground facilities, such as valves and pump stations, in floodplains or areas of high landslide potential in Montana. Keystone also will construct all new aboveground facilities to current Uniform Building Code standards. When facilities are located in potential hazard areas, appropriate engineering methods will be implemented to minimize risk. Additionally, as part of Keystone's integrity management program, geotechnical slope monitoring programs would be implemented as necessary to minimize risk.

Landslides are discussed further in the geologic hazards portions of Section 4.3.6, Chapter 4.0. Both the baseline data deviation and impacts discussion give additional information.

Ice and high wind hazards are not applicable threats to the pipeline facilities. However, these may pose threats to associated powerlines and will be addressed separately by the electrical service providers.

1.5.2.2 Accidents

A major cause of pipeline incidents has historically been accidental third-party excavation damage, resulting from direct hits to the pipeline with sufficient force to puncture the pipe's wall or from damage to the pipe that results in delayed pipe failure. To reduce the probability of excavation damage, Keystone will implement the following mitigation measures:

- Burial depth of the pipeline to a minimum of 4 feet in most locations, which exceeds federal requirements per 49 CFR Part 195.248;
- An Integrated Public Awareness (IPA) program and encroachment management process;
- Participation in one call, Common Ground Alliance, and local damage prevention programs;
- Regular aerial patrols of the pipeline ROW that meet or exceed federal safety code requirements;
- The use of warning tape buried above the pipeline in select locations; and
- The use of closely spaced, visible signage in select locations; and

1.5.2.3 Integrated Public Awareness Program

Keystone will implement and utilize an IPA program. The IPA program will:

- Inform affected landowners and communities of the location of the facilities, the nature of the crude oil transported, contact information for the company, and what steps to take in the event of an emergency;
- Ensure emergency service agencies fully understand Keystone's emergency response procedures and responsibilities of each party during an emergency;
- Inform contractors of requirements for working on or near Keystone facilities; and
- Maintain contact with landowners, community groups, contractors, and emergency service agencies that are directly impacted by the Project facilities or operations.

The objectives of the program are to: protect the public from injury; prevent or minimize effects on the environment; protect Keystone facilities from damage from the public; and provide an opportunity for on-going