
TITLE	DCR Application for a Type A Water Licence
SECTION	5: Pipeline Right-of-Way Travel Lane
SUBJECT	1: Travel Lane Water Requirements

INTRODUCTION

This section supports an application for approval to obtain the water required to construct and maintain a pipeline right-of-way travel lane within the Deh Cho Region. It contains right-of-way alignment maps, describes the proposed undertaking, provides an estimate of the quantities of water involved, and addresses water deposits. A summary of the schedule of activities is also provided.

LOCATION OF UNDERTAKING (PART 3)

The proposed travel lane will be installed within the 40 m wide pipeline right-of-way. These are shown on the following alignment maps:

- Figure 5-1: DCR Map 1 of 52 (KP-686 to KP-696)
- Figure 5-2: DCR Map 2 of 52 (KP-694 to KP-708)
- Figure 5-3: DCR Map 3 of 52 (KP-708 to KP-720)
- Figure 5-4: DCR Map 4 of 52 (KP-720 to KP-734)
- Figure 5-5: DCR Map 5 of 52 (KP-734 to KP-744)
- Figure 5-6: DCR Map 6 of 52 (KP-742 to KP-752)
- Figure 5-7: DCR Map 7 of 52 (KP-752 to KP-762)
- Figure 5-8: DCR Map 8 of 52 (KP-763 to KP-775)
- Figure 5-9: DCR Map 9 of 52 (KP-775 to KP-785)
- Figure 5-10: DCR Map 10 of 52 (KP-783 to KP-790)
- Figure 5-11: DCR Map 11 of 52 (KP-791 to KP-803)
- Figure 5-12: DCR Map 12 of 52 (KP-803 to KP-814)
- Figure 5-13: DCR Map 13 of 52 (KP-814 to KP-824)
- Figure 5-14: DCR Map 14 of 52 (KP-824 to KP-834)
- Figure 5-15: DCR Map 15 of 52 (KP-834 to KP-844)
- Figure 5-16: DCR Map 16 of 52 (KP-844 to KP-854)
- Figure 5-17: DCR Map 17 of 52 (KP-855 to KP-865)
- Figure 5-18: DCR Map 18 of 52 (KP-864 to KP-876)
- Figure 5-19: DCR Map 19 of 52 (KP-873 to KP-889)
- Figure 5-20: DCR Map 20 of 52 (KP-885 to KP-901)
- Figure 5-21: DCR Map 21 of 52 (KP-901 to KP-909)
- Figure 5-22: DCR Map 22 of 52 (KP-909 to KP-918)
- Figure 5-23: DCR Map 23 of 52 (KP-918 to KP-927)
- Figure 5-24: DCR Map 24 of 52 (KP-927 to KP-936)
- Figure 5-25: DCR Map 25 of 52 (KP-936 to KP-944)
- Figure 5-26: DCR Map 26 of 52 (KP-943 to KP-951)

- Figure 5-27: DCR Map 27 of 52 (KP-951 to KP-965)
- Figure 5-28: DCR Map 28 of 52 (KP-964 to KP-974)
- Figure 5-29: DCR Map 29 of 52 (KP-974 to KP-986)
- Figure 5-30: DCR Map 30 of 52 (KP-985 to KP-993)
- Figure 5-31: DCR Map 31 of 52 (KP-993 to KP-1007)
- Figure 5-32: DCR Map 32 of 52 (KP-1007 to KP-1017)
- Figure 5-33: DCR Map 33 of 52 (KP-1017 to KP-1027)
- Figure 5-34: DCR Map 34 of 52 (KP-1027 to KP-1038)
- Figure 5-35: DCR Map 35 of 52 (KP-1038 to KP-1049)
- Figure 5-36: DCR Map 36 of 52 (KP-1049 to KP-1060)
- Figure 5-37: DCR Map 37 of 52 (KP-1060 to KP-1071)
- Figure 5-38: DCR Map 38 of 52 (KP-1070 to KP-1081)
- Figure 5-39: DCR Map 39 of 52 (KP-1081 to KP-1092)
- Figure 5-40: DCR Map 40 of 52 (KP-1092 to KP-1102)
- Figure 5-41: DCR Map 41 of 52 (KP-1102 to KP-1112)
- Figure 5-42: DCR Map 42 of 52 (KP-1112 to KP-1122)
- Figure 5-43: DCR Map 43 of 52 (KP-1122 to KP-1132)
- Figure 5-44: DCR Map 44 of 52 (KP-1132 to KP-1143)
- Figure 5-45: DCR Map 45 of 52 (KP-1143 to KP-1154)
- Figure 5-46: DCR Map 46 of 52 (KP-1154 to KP-1165)
- Figure 5-47: DCR Map 47 of 52 (KP-1165 to KP-1175)
- Figure 5-48: DCR Map 48 of 52 (KP-1175 to KP-1186)
- Figure 5-49: DCR Map 49 of 52 (KP-1187 to KP-1197)
- Figure 5-50: DCR Map 50 of 52 (KP-1197 to KP-1207)
- Figure 5-51: DCR Map 51 of 52 (KP-1207 to KP-1217)
- Figure 5-52: DCR Map 52 of 52 (KP-1216 to KP-1220.1)

The location of the water sources that might be used to develop and maintain the right-of-way travel lane are shown, by their centroid coordinates, in [Table 5-1](#).

Table 5-1: Proposed Water Source Centroid Coordinates

Water Source Name	Kilometre Post (KP)	Latitude (DD)	Longitude (DD)	Easting (m)	Northing (m)	UTM Zone
Mackenzie River	688.8	-	-	-	-	-
Blackwater River	698.7	-	-	-	-	-
Mackenzie River	702.1	-	-	-	-	-
Mackenzie River	704.1	-	-	-	-	-
Mackenzie River	709.9	-	-	-	-	-
Mackenzie River	712.1	-	-	-	-	-
Mackenzie River	728.0	-	-	-	-	-
DCN2	750.2	63.5643	-123.6829	466078	7048649	10

Table 5-1: Proposed Water Source Centroid Coordinates (cont'd)

Water Source Name	Kilometre Post (KP)	Latitude (DD)	Longitude (DD)	Easting (m)	Northing (m)	UTM Zone
White Sand Creek	750.9	-	-	-	-	-
165	754.6	63.5230	-123.6304	468641	7044012	10
Mackenzie River	757.2	-	-	-	-	-
Ochre River	758.8	-	-	-	-	-
I-12	766.4	63.4206	-123.6007	470012	7032594	10
Hodgson River	777.5	-	-	-	-	-
166	790.3	63.2038	-123.3907	480346	7008354	10
Mackenzie River	790.4	-	-	-	-	-
Mackenzie River	798.1	-	-	-	-	-
DCN5	798.1	63.1705	-123.3075	484515	7004621	10
Mackenzie River	803.0	-	-	-	-	-
DCN6	804.9	63.1364	-123.2273	488541	7000811	10
River Between Two Mountains	827.4	-	-	-	-	-
Mackenzie River	830.2	-	-	-	-	-
DCN7	839.8	62.8337	-123.1221	493782	6967069	10
Willowlake River	853.9	-	-	-	-	-
167	885.9	62.4723	-122.7792	511385	6926813	10
Mackenzie River	895.5	-	-	-	-	-
DCN7A	880.0	62.4046	-122.9183	504222	6919254	10
168	901.4	62.3564	-122.6215	519595	6913937	10
Mackenzie River	928.3	-	-	-	-	-
Trail River	935.0	-	-	-	-	-
169	943.4	62.1758	-121.8918	557707	6894254	10
170	947.9	62.0930	-121.9109	556870	6885018	10
Mackenzie River	948.0	-	-	-	-	-
Mackenzie River	954.2	-	-	-	-	-
Mackenzie River	982.9	-	-	-	-	-
Mackenzie River	1000.0	-	-	-	-	-
Liard River	1010.3	-	-	-	-	-
Manners Creek #1	1018.9	-	-	-	-	-
171	1039.4	61.5384	-120.9585	608532	6824461	10

Table 5-1: Proposed Water Source Centroid Coordinates (cont'd)

Water Source Name	Kilometre Post (KP)	Latitude (DD)	Longitude (DD)	Easting (m)	Northing (m)	UTM Zone
Jean Marie Creek #1	1047.6	-	-	-	-	-
171A	1056.1	61.3400	-120.9624	609011	6802365	10
Jean Marie Creek #2	1082.1	-	-	-	-	-
Trout River	1104.9	-	-	-	-	-
173	1168.2	60.4159	-120.2963	648881	6700786	10

DESCRIPTION OF UNDERTAKING (PART 4)

Pipeline Travel Lane Construction

The total length of the pipeline travel lane will be about 521.9 km in the DCR. This right-of-way will be about 40 m long and will accommodate the gas pipeline and related pipeline appurtenances.

The travel lane will provide access for trucks, buses and construction equipment. It will be about 17 m wide inside the right-of-way, and will be used to accommodate construction traffic.

Construction Methodology

The travel lane will be installed in the right-of-way to enable the construction activities required for pipeline installation. These include clearing the right-of-way and temporary workspace, preparing the right-of-way, installing the pipeline, construction cleanup, pipeline testing, commissioning and reclamation. Any given point along the travel lane will generally be in use for three of the four years over which construction, clean up and remediation activities will occur in the DCR.

The right-of-way will be prepared as described in [Section 3](#). Travel lane preparation will start as soon as the ground is frozen and is able to support the weight of construction equipment. In locations where the ground is partially frozen, the snow along the right-of-way will be compacted with light tracked equipment to accelerate frost penetration.

Once the ground is frozen, a bulldozer will push the excess snow to each side of the right-of-way, to create a level, hard surface. The hard, frozen surface organic layer will be left intact, to the extent practical, except for localized high points that will be graded to create a level surface.

In graded areas, loose surface materials will also be pushed to the side. Snow will be compacted and water might be applied to the travel lane, if necessary, to create a smooth, hard-wearing working surface. Work areas will be prepared at locations, such as watercourse crossings, where a larger working area is required.

Maintenance will be required throughout the construction season due to the high axle loads of the vehicles and equipment and to high traffic volumes. A maintenance crew will be assigned to grade the travel lane and apply water, as necessary. A series of photographs and diagrams showing standard travel lanes along the pipeline right-of-way are shown in [Section 3](#).

QUANTITY OF WATER INVOLVED (PART 7)

The quantity of water required for the construction of the travel lane on sections of the 521.9 km of pipeline right-of-way in the DCR will depend on the available snowfall. Estimates of water requirements have been calculated and are based on the following assumptions:

- normal snowfall during the winter construction season
- travel surface width along the pipeline right-of-way of 17 m

Water will be used during the winter construction season, which normally begins in late November or early December and continues until late March or early April. The heaviest water use will occur early in each construction season in order to build a road base. A reduced level of water use will be required later in the winter construction season as water is applied to maintain travel surface conditions.

An estimate of the water required for the pipeline travel lane, based on the assumptions presented above, is shown in [Table 5-2](#). This estimate is based on a three-year program, with clearing in the first year, pipeline construction in the second year, and clean up and remediation in the third year. Although pipeline construction across the region has been scheduled to occur over a four-year period, it will generally be limited to three years at any particular location. Individual access roads will generally be in use for three years.

Table 5-2: Pipeline Right-of-Way Travel Lane Water Requirements

Description	Approximate Water Requirements	
	Total Annual Volume	Average Daily Volume
Right-of-way travel lane water requirements	354,000 m ³ /year	5,900 m ³ /day
Total water requirements over three years	1,062,000 m ³	-
NOTE: Average daily volume is total annual volume averaged over a 60-day winter construction period.		

WASTE DEPOSITED (PART 8)

No water treatment or wastewater deposit activities are associated with this work. Water will be trucked to the required locations and applied, where needed, to help freeze and form the road base. In spring, the ice and snow on the travel lane will melt and flow into the surrounding natural drainage system.

SCHEDULE (PART 13)

The right-of-way travel lane in the DCR will be developed and maintained during the winters of 2006-2007 through 2009-2010 (see [Section 3](#)).

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TITLE	DCR Application for a Type A Water Licence
SECTION	5: Pipeline Right-of-Way Travel Lane
SUBJECT	2: HDD Water Requirements

INTRODUCTION

This section supports an application for approval to obtain and use water required to install certain pipeline watercourse crossings using horizontal directional drilling (HDD) methods within the Dehcho Region. It describes the proposed undertaking, provides an estimate of the quantities of water involved, outlines the plan for handling waste, and summarizes the schedule of activities.

LOCATION OF UNDERTAKING (PART 3)

The pipeline will cross an estimated 159 watercourses along the right-of-way in the DCR. All but four will be crossed by a conventional open cut method, including, in some cases, an isolated crossing method. The locations where HDD methods are being considered for the installation of the pipelines are shown in [Table 5-3](#).

Table 5-3: Proposed Pipeline HDD Watercourse Crossing Coordinates – DCR

Crossing Name	Crossing ID	Kilometre Post (KP)	Latitude (DD)	Longitude (DD)	Easting (m)	Northing (m)	UTM Zone
Blackwater River	RPR-377	698.7	63.9	-124.1417	443789	7091650	10
Ochre River	RPR-391-A	758.7	63.4864	-123.6239	468926	7039933	10
Willowlake River	RPR-428-A	853.9	62.7115	-123.0822	495794	6953449	10
Mackenzie River	RPR-470	1001.4	61.8397	-121.0922	600442	6857793	10

The location of the pipeline watercourse crossings that are being considered in the DCR using HDD crossing methods are also shown on the following alignment maps:

- [Figure 5-2: DCR Map 2 of 52 \(KP-694 to KP-708\)](#)
- [Figure 5-7: DCR Map 7 of 52 \(KP-752 to KP-762\)](#)
- [Figure 5-16: DCR Map 16 of 52 \(KP-844 to KP-854\)](#)
- [Figure 5-31: DCR Map 31 of 52 \(KP-993 to KP-1007\)](#)

DESCRIPTION OF UNDERTAKING (PART 4)

Pipeline HDD Watercourse Crossing

The feasibility of undertaking pipeline watercourse crossings using HDD methods at the locations indicated depends on an analysis of results from geotechnical and hydrological investigations. If the soil conditions at a crossing site are found to be unsuitable for HDD, an open cut crossing at the same location might be used as an alternative.

Water is required to prepare a bentonite-based mud to be used for drilling the subterranean hole for the pipe. The drill mud aids in the removal of the soil cuttings from the HDD bore, helps to maintain stability of the bore, and can decrease the loss of fluid from the bore.

Depending on the soil conditions, polymers might be added to aid in drilling and the solids removal process and to also reduce fluid losses. Additives to depress the freeze point of the mud might also be required. All additives will meet environmental standards, and material safety data sheets will be provided.

A description of the HDD method of performing a pipeline watercourse crossing, including a schematic drawing, is provided in [Section 3](#).

QUANTITY OF WATER INVOLVED (PART 7)

The quantity of water required for performing a pipeline watercourse crossing using an HDD method depends on the crossing width and the success realized during the drilling operation. Estimates of water requirements have been calculated and are based on the following assumptions:

- normal hole progress
- loss of drilling fluid within estimated values during the drilling

Water used during an HDD operation to prepare the bentonite-based drilling mud will likely be sourced from the watercourse being crossed. However, this will depend on the quality of the water.

An estimate of the water required for the HDD operations in the DCR, based on the assumptions above, is shown in [Table 5-4](#).

Table 5-4: Pipeline HDD Watercourse Crossing Water Requirements

Watercourse Name	Kilometre Post (KP)	Water Requirement (m³)
Blackwater River	698.7	1,800
Ochre River	758.7	3,800
Willowlake River	853.9	3,100
Mackenzie River	1001.4	7,000
Total		15,700

WASTE DEPOSITED (PART 8)

Upon completion of each crossing, the mud will be disposed in an appropriate area. Disposal options currently being considered for the fluids and solids from HDD watercourse crossings include distribution along the pipeline right-of-way and disposal to borrow sites (see the WMP outlined in [Section 11](#)). Disposal procedures and locations will be selected to reduce any potential impacts from the HDD materials on local water supply and quality, or future use of borrow sites.

Any incidental spills during construction will be immediately and properly handled in accordance with the project SCP. Collected materials will be managed in compliance with the applicable regulatory requirements (see the Emergency Response Plan framework in [Section 11](#)).

SCHEDULE (PART 13)

The pipeline watercourse crossings in the DCR will be performed during the winters of 2006-2007 through 2008-2009.

