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TITLE	<b>ISR Application for a Type A Water Licence</b>
SECTION	5: Water Use for Gathering Pipeline Right-of-Way Travel Lane
SUBJECT	1: Gathering Pipeline Right-of-Way Travel Lane Water Requirements

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## INTRODUCTION

This section supports an application for approval to obtain the water required to construct and maintain gathering pipeline right-of-way travel lanes within the Inuvialuit Settlement Region. It contains right-of-way alignment maps ([Figure 5-1](#) to [Figure 5-17](#)), 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 lanes will be installed within the 30 m and 40 m wide gathering pipeline rights-of-way. These are shown on the following alignment maps:

- [Figure 5-1: ISR Map 1 of 17 \(KP-N0 to KP-N7\)](#)
- [Figure 5-2: ISR Map 2 of 17 \(KP-N7 to KP-N15.7, KP-T0 to KP-T1\)](#)
- [Figure 5-3: ISR Map 3 of 17 \(KP-T1 to KP-T10\)](#)
- [Figure 5-4: ISR Map 4 of 17 \(KP-T10 to KP-T21\)](#)
- [Figure 5-5: ISR Map 5 of 17 \(KP-T21 to KP-T32\)](#)
- [Figure 5-6: ISR Map 6 of 17 \(KP-T31 to KP-T44\)](#)
- [Figure 5-7: ISR Map 7 of 17 \(KP-T44 to KP-T56\)](#)
- [Figure 5-8: ISR Map 8 of 17 \(KP-T55 to KP-T68\)](#)
- [Figure 5-9: ISR Map 9 of 17 \(KP-T67 to KP-T79\)](#)
- [Figure 5-10: ISR Map 10 of 17 \(KP-T76 to KP-T81.4, KP-S0 to KP-S6\)](#)
- [Figure 5-11: ISR Map 11 of 17 \(KP-P0 to KP-P10\)](#)
- [Figure 5-12: ISR Map 12 of 17 \(KP-P6 to KP-P19\)](#)
- [Figure 5-13: ISR Map 13 of 17 \(KP-P19 to KP-P26.5\)](#)
- [Figure 5-14: ISR Map 14 of 17 \(KP-S6 to KP-S17\)](#)
- [Figure 5-15: ISR Map 15 of 17 \(KP-S17 to KP-S29\)](#)
- [Figure 5-16: ISR Map 16 of 17 \(KP-S29 to KP-S42\)](#)
- [Figure 5-17: ISR Map 17 of 17 \(KP-S42 to KP-S51.6\)](#)

The location of the water sources that might be used to develop and maintain the right-of-way travel lanes 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	N0.5	-	-	-	-	-
46B	N4.8	69.3033	-135.1966	492244	7688198	8
46C	N7	69.3653	-135.1294	494912	7695103	8
46F	T0.6	69.4079	-134.9404	502339	7699845	8
Mackenzie River	T1.5	-	-	-	-	-
2	T5.5	69.3574	-134.8194	507107	7694220	8
3	T7.7	69.3335	-134.7925	508174	7691562	8
4	T11.1	69.3181	-134.7381	510322	7689853	8
7	T16.8	69.2493	-134.6994	511887	7682192	8
9	T21.7	69.2644	-134.5527	517673	7683909	8
10	T23.4	69.1787	-134.6544	513709	7674324	8
9BC	T23.4	69.0810	-134.7337	510613	7663420	8
10A	T23.4	69.0858	-133.2521	569625	7664926	8
Mackenzie River	T39	-	-	-	-	-
14	T45.4	69.0888	-134.2582	529549	7664443	8
15	T45.9	69.0790	-134.2793	528720	7663345	8
16	T47.9	69.0753	-134.1885	532344	7662967	8
18	T51.5	69.0336	-134.2270	530869	7658308	8
20	T55.7	69.0128	-134.1451	534171	7656030	8
22	T59.2	68.9859	-134.1201	535213	7653047	8
24	T65.6	68.9397	-133.9860	540664	7647972	8
25	T74	68.8609	-133.9347	542872	7639226	8
10A	T23.4	69.0858	-133.2521	569625	7664926	8
10BC	T80.2	68.7723	-134.1494	534371	7629206	8
33	S5.7	68.7718	-133.7324	551220	7629449	8
35	S17.8	68.6792	-133.6152	556185	7619227	8
38	S24.2	68.6363	-133.5326	559653	7614516	8
41	S34.4	68.5271	-133.5661	558572	7602318	8
43	S40.7	68.5038	-133.3821	566155	7599902	8

**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
45	S42.8	68.4833	-133.3757	566477	7597621	8
31	P11.5	68.9527	-133.6488	554154	7649684	8
30	P22.2	68.8212	-133.7468	550525	7634936	8
29	P23.9	68.8174	-133.7736	549453	7634494	8
28	P24.4	68.8177	-133.8028	548275	7634500	8
Mackenzie River	0.0	-	-	-	-	-

## DESCRIPTION OF UNDERTAKING (PART 4)

### Gathering Pipeline Travel Lanes Construction

The total length of the gathering pipeline travel lanes will be about 175.2 km in the ISR. This includes 42.2 km of 30 m wide right-of-way and 133.0 km of 40 m wide right-of-way for the single gathering pipeline laterals.

The travel lane will provide access for trucks, buses and construction equipment. The travel lanes will be about 14 m wide inside the 30 m right-of-way, 17 m wide inside the 40 m rights-of-way, and will be used to accommodate construction traffic. See [Figure 3-13](#) and [Figure 3-14](#) in [Section 3](#). Potential water sources for the gathering pipeline travel lanes and temporary workspace are shown in [Table 5-1](#).

### Construction Methodology

All or portions of the travel lane will be installed in the rights-of-way during the four winter construction seasons to enable the construction activities required for gathering pipeline installation. These include clearing rights-of-way and temporary workspace, preparing the rights-of-way, installing the gathering pipelines, construction cleanup, pipeline testing, commissioning and reclamation.

The rights-of-way will be prepared as described in [Section 3.6](#). 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 rights-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 into windrows on 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. Snow will be compacted

and water might be applied to the travel lanes, if necessary to create a smooth, hard-wearing working surface. Work areas will be similarly prepared at locations, such as stream crossings, where a larger working area is required.

Maintenance will be required throughout each construction season due to the high axle loads of the vehicles and equipment and traffic volumes. A maintenance crew will be assigned to grade each 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 temporary workspace in the ISR and the 175.2 km of gathering pipeline right-of-way travel lanes 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 gathering pipeline rights-of-way of 14 m and 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 gathering pipeline travel lanes, based on the assumptions presented above, is shown in [Table 5-2](#).

**Table 5-2: Gathering Pipeline Right-of-Way Travel Lanes Water Requirements**

Description	Approximate Water Requirements	
	Total Annual Volume	Average Daily Volume <sup>a</sup>
Right-of-way travel lanes water requirements	780,000 m <sup>3</sup> /year	13,000 m <sup>3</sup> /day
Total water requirements over 3 years	2,340,000 m <sup>3</sup>	
NOTE: <sup>a</sup> Average daily volume is total annual volume averaged over a 60-day winter construction period.		

### WASTE DEPOSITED (PART 8)

No water treatment or waste 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 and temporary workspace. In spring, the ice and

snow on the travel lane and work areas will melt and flow into the surrounding natural drainage system.

**SCHEDULE (PART 13)**

The gathering pipeline right-of-way travel lanes in the ISR will be developed and maintained during the winters of 2006-2007 through 2009-2010. Any one gathering pipeline right-of-way travel lane will be required for three years, but gathering pipeline construction will not start on all laterals in the same year.

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<b>TITLE</b>	<b>ISR Application for a Type A Water Licence</b>
<b>SECTION</b>	<b>5: Water Use for Gathering Pipeline Right-of-Way Travel Lane</b>
<b>SUBJECT</b>	<b>2: Gathering Pipeline Watercourse Crossings, HDD Water Required</b>

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## INTRODUCTION

This section supports an application for approval to obtain and use water required to install certain gathering pipeline watercourse crossings using horizontal directional drilling (HDD) methods within the Inuvialuit Settlement 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 gathering pipelines will cross numerous watercourses inside the ISR and will generally be installed by open cut and isolated crossing methods. The locations where HDD methods are being considered for the installation of gathering pipelines are shown in [Table 5-3](#).

**Table 5-3: Proposed Gathering Pipeline HDD Watercourse Crossing Coordinates - ISR**

Crossing Name	Crossing ID	Kilometre Post (KP)	Latitude (DD)	Longitude (DD)	Easting (m)	Northing (m)	UTM Zone
Aklak Channel	RNT-002	N2.2	69.3203	-135.2421	490459	7690098	8
Kanguk Channel	RNT-004	N13.2	69.3604	-135.0132	499482	7694552	8
Kuluarpak Channel	RNT-006	N14.5	69.3666	-134.9861	500545	7695237	8
Unnamed Delta Channel	RPR-001	T1.5	69.3699	-134.9296	502769	7695608	8
Harry Channel	RPR-002	T1.7	69.3691	-134.9261	502905	7695525	8
Unnamed Delta Channel	RPR-005	T5.1	69.3534	-134.8535	505767	7693774	8
Unnamed, Floodplain Channel of East Channel	RPR-011	T35.4	69.1639	-134.3746	524826	7672759	8
East Channel	RPR-013	T39.1	69.1354	-134.3234	526894	7669614	8

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

- Figure 5-18: ISR Map 1 of 4 (KP-N0 to KP-N7)
- Figure 5-19: ISR Map 2 of 4 (KP-N7 to KP-N15.7, KP-T0 to KP-T1)
- Figure 5-20: ISR Map 3 of 4 (KP-T1 to KP-T10)
- Figure 5-21: ISR Map 4 of 4 (KP-T31 to KP-T44)

## DESCRIPTION OF UNDERTAKING (PART 4)

### Gathering Pipeline HDD Watercourse Crossings

The feasibility of undertaking gathering pipeline watercourse crossings using horizontal directional drilling 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 (MSDSs) will be provided.

A description of the HDD method of performing a pipeline watercourse crossing and a schematic drawing of this crossing method are shown in [Section 3](#).

## QUANTITY OF WATER INVOLVED (PART 7)

The quantity of water required for performing a pipeline watercourse crossing using the 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 process

Water used during an HDD operations in the ISR 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. For example, water with an excessive salt content may not be suitable as it causes flocculation (settling) of the bentonite within the drilling fluid. This greatly reduces the ability of the drill mud to remove the soil cuttings from the HDD bore.

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

**Table 5-4: Gathering Pipeline HDD Watercourse Crossing Water Requirements – ISR**

Watercourse Name	Kilometre Post (KP)	Water Requirement (m <sup>3</sup> )
Aklak Channel	N2.2	700
Kanguk Channel	N13.2	800
Kuluarpak Channel	N14.5	1,100
Unnamed Delta Channel and Harry Channel	T1.5 T1.7 <sup>a</sup>	1,400
Unnamed Channel	T5.0	1,000
Unnamed Channel	T35.4	1,000
East Channel	T39.1	4,900
Total		10,900
NOTE: <sup>a</sup> The two channels at T1.5 and T1.7, will be crossed at the same time, using one directional drill.		

### WASTE DEPOSITED (PART 8)

Upon completion of each crossing, the used drilling fluids might be spread along the gathering pipeline right-of-way, or where there is permafrost, buried within a lined pit and allowed to freeze, subject to the approval of the appropriate regulatory authorities.

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

### SCHEDULE (PART 13)

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

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