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2018 09 13

Siobhan Burland Ross
A/Director - Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, MB R3H 0W4

Dear Ms. Burland Ross:

**RE: KEYYASK GENERATION PROJECT – ALTERATION REQUEST,
REQUEST TO INSTALL A TEMPORARY CREEK CROSSING ON WINTER ROAD TO ELLIS ESKER
ENVIRONMENT ACT LICENCE NO. 3107, CLIENT FILE 5550.00**

Manitoba Hydro, in its delegated authority to manage construction of the Keeyask Generation Project on behalf of the Keeyask Hydropower Limited Partnership, is requesting to install a temporary creek crossing on the winter road to the Ellis Esker in the winter of 2018/2019 and potentially in 2019/2020.

The temporary creek crossing will be similar to the one constructed in February 2018. It will consist of rig mats placed on the creek bottom, four (4) 750 mm steel culverts, 14 m long and rockfill. It will be installed once access to the site is available which is anticipated to be by mid-December or early January when access along the winter road is established. The crossing will be removed prior to April 15.

Please refer to the attached description for details. To note, the information on the crossing is also being sent to Fisheries and Oceans Canada for review.

If additional information is required, please contact Jodine MacDuff at 204-360-5539.

Yours truly,


A handwritten signature in blue ink that reads 'Dave Bowen'.

Dave Bowen, P. Eng, M.Sc
Director, Keeyask Project
Generation & Wholesale

Att.

Notice of Alteration Form



Client File No. : 5500.00	Environment Act Licence No. : 3107
Legal name of the Licensee: Keyeask Hydropower Limited Partnership	
Name of the development: Keyeask Generation Project	
Category and Type of development per Classes of Development Regulation: Energy Production and Waste Conversion Electrical generating facilities >100 MW	
Licensee Contact Person: Dave Bowen Mailing address of the Licensee: 360 Portage Avenue, 17th Floor City: Winnipeg Province: Manitoba Postal Code: R3C 0G8 Phone Number: (204) 360-4773 Fax: Email: dbowen@hydro.mb.ca	
Name of proponent contact person for purposes of the environmental assessment (e.g. consultant): Jodine MacDuff	
Phone: (204) 360-5539	Mailing address: 360 Portage Avenue, 17th Floor
Fax:	Winnipeg, MB R3C 0G8
Email address: jmacduff@hydro.mb.ca	
Short Description of Alteration (max 90 characters): Install temporary creek crossing on the winter road to the Ellis Esker.	
Alteration fee attached: Yes: <input type="checkbox"/> No: <input checked="" type="checkbox"/>	
If No, please explain: Previous conversations indicated fee was not required, will submit if requested.	
Date: 09/13/2018	Signature:  Printed name: Dave Bowen
A complete Notice of Alteration (NoA) consists of the following components: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Cover letter <input checked="" type="checkbox"/> Notice of Alteration Form <input type="checkbox"/> 4 hard copies and 1 electronic copy of the NOA detailed report (see "Information Bulletin - Alteration to Developments with Environment Act Licences") <input type="checkbox"/> \$500 Application fee, if applicable (Cheque, payable to the Minister of Finance) 	
Submit the complete NOA to: <ul style="list-style-type: none"> Director Environmental Approvals Branch Manitoba Sustainable Development Suite 160, 123 Main Street Winnipeg, Manitoba R3C 1A5 	
Formore information: Phone: (204) 945-8321 Fax: (204) 945-5229 http://www.gov.mb.ca/conservation/eal	

Keeyask Generation Project
Temporary Creek Crossing on the Winter Road to the Ellis Esker
Description of Crossing – Winter 2018/2019 and Winter 2019/2020

Background

The Ellis Esker quarry (E-1) is a granular borrow source for construction of the South Dyke of the Keeyask Generation Project. It is located on the south side of the Nelson River and is accessible by a winter road located within a 300 m corridor, Figure 1. Hauling of material can only occur in the winter months so the material is stockpiled in borrow area S2A that can be accessed during the summer.

There is one creek crossing along the winter road to the Ellis Esker (Lat: 56.272652 Long: 95.134797). The original plan was to utilize a temporary ice crossing in the years that the Ellis Esker borrow was required. In mid-January 2018, an ice bridge was constructed at the creek. On February 3 2018, cracking along the downstream slope of the ice crossing was noticed. Reconstruction was attempted but with limited success as any new ice created was quickly eroded when additional layers were added. It was determined that a temporary rockfill crossing would provide a safe reliable means of crossing the creek.

Information on the temporary crossing to be constructed in February 2018 was submitted to Fisheries and Oceans Canada. It was noted in a Letter of Advice issued on February 14, 2018, File: 18-HCAA-00099, that no formal approval was required to proceed.

A Notice of Alteration to Environment Act Licence No. 3107 was submitted to Environmental Approvals Branch, Manitoba Sustainable Development (MSD). Approval of the alteration was received on February 14, 2018.

It is proposed to install a similar crossing for the 2018/2019 winter season and potentially the 2019/2020 winter season. Details on the crossing are below.

Description of Crossing

Description of Crossing Previously Constructed

A temporary rockfill crossing was constructed February 15-16, 2018. The crossing utilized four (4) 750mm steel culverts, 14 m long installed on top of rig mats. See Photo 1 for a picture of the completed crossing. A summary of activities and monitoring that occurred during construction can be found in Appendix 1, this information was included in the Environmental Protection Plan Annual Report (<https://keeyask.com/wp-content/uploads/2018/06/EnvPP-2018-01-Environmental-Protection-Plan-Annual-Report.pdf>).

The crossing was removed April 10 -11, 2018, refer to Appendix 2 for a summary of activities associated with the removal of the crossing. See Photo 2 for a picture of removal of the crossing and Photo 3 for a picture of the creek once the crossing was removed. Photo 4 and 5 are pictures of the creek taken in August 2018.



Photo 1. Temporary creek crossing on winter road to Ellis Esker, April 7, 2018



Photo 2. Removal of temporary creek crossing on winter road to Ellis Esker, April 10, 2018



Photo 3. Creek after temporary crossing removed, April 11, 2018.



Photo 4. Creek crossing along the winter road to the Ellis Esker with Joslin Lake in the background, August 25, 2018.



Photo 4. Material stored along winter road to the Ellis Esker, August 25, 2018.

Description of Crossing in Winter 2018/19 and Potentially 2019/20

The proposed crossing will again utilize four (4) 750mm steel culverts, 14 m long. Prior to the placement of any material, rig mats will be placed on the bottom of the creek. Refer to Figure 2 for details of the temporary rockfill crossing. The crossing will be installed once access to the site is available which is anticipated to be by mid-December or early January when access along the winter road is established. The temporary crossing will be removed prior to April 15 of the following year. The footprint of the rockfill crossing is approximately 240 m².

The crossing will be required to access the Ellis Esker in the winter 2018/2019 and potentially in the winter 2019/2020.

Sequence of Construction for Rockfill Creek Crossing

1. Construction of rockfill crossing will occur in the wet – duration is approximately 3 days
 - a. Place rig mats on the bottom of creek bottom.
 - i. Equipment: Loader and excavator
 - b. Place layer of rockfill on top of rig mats. Start construction on the north shore and advance to the south shore.
 - i. Equipment: Excavator or dozer to advance rockfill onto rig mats.
 - c. Install culverts
 - i. Equipment: Excavator to place the culverts on the rig mats

- d. Place rockfill around the culverts, continue to advance the rockfill to the south shore
 - i. Equipment: Excavator to place rockfill around the culverts and excavator or dozer to place rockfill to the south shore.
- e. Continue with additional lifts of rockfill to achieve desired crest elevation.
 - i. Equipment: Excavator or dozer to complete additional lifts.
- 2. Removal of rockfill crossing (prior to April 15) – duration is approximately 2 days
 - a. Remove rockfill, culverts and rig mats.
 - i. Equipment: Excavator to remove the rockfill and culverts and loader to assist with piling and loading out of the materials into a truck.

To limit sedimentation from installation and removal, a coarser class 7 rockfill will be utilized. For structural support of the culverts a clean 150mm rock material will be utilized around the culverts and above the water line a class 6 rockfill. Fines and impervious material will not be used. See Table 1 for gradations of class 6 and class 7 rockfill.

The Keeyask Generation Project, Generating Station Construction Environmental Protection Plan will be followed, refer to the link below for the most recent version.

<http://keeyask.com/wp-content/uploads/2014/08/Keeyask-Generation-Station-Construction-Environmental-Protection-Plan.pdf>

Table 1. Gradations of class 6 and class 7 rockfill.

		Rockfills & Ripraps										
		Sieve Size	5	6	7	8	C1	C2	C3	C4	Sieve Size	
Boulders		1800								100	1800	
		1650							100	0-100	1650	
		1350				100					1350	
		1300							0-100	0	1300	
		1000			100	40-70	100	100	0-100		1000	
		900			90-100						900	
		800			70-95	20-50		50-100	0-10		800	
		700				12-38					700	
		515			0-20	0-18					515	
		500	100	100				0-100			500	
Cobbles		400			0-10						400	
		300	63-100	50-100			35-95	0-50			300	
		250	54-100								250	
		200	43-91	30-100							200	
		100	26-65	22-80			0-80				100	
		75.0	19-59					0-10			75.0	
	Gravel		19.0	3-33	2-35			0-35				19.0
			9.50	0-20								9.50
			4.75	0-10	0-10			0-10				4.75

Description of Environment

The crossing is of an un-named tributary to the Butnau River, approximately 15 m wide and 1.5 m deep. The watercourse is fed by Joslin Lake which is approximately 700 m upstream.

Hydrologic Analysis

Hydrologic analysis was conducted to determine the design winter flows. This was calculated three different ways:

- 1.5x the maximum daily flow expected for the period of November – March (using a Monthly Water Balance Approach) – 0.86 m³/s
- 1.5x the 95th percentile flow for the Period of November 15th – April 15th (using a regional FDC approach) – 0.84 m³/s
- 1.5x the Mean Winter peak flow for the period of November 15th – April 15th (using a regional flood frequency analysis approach) - 0.91 m³/s

All methods resulted in similar winter flows, the largest of which was selected as the design flow (provided by the regional flood frequency analysis approach) at 0.91 m³/s. In a very high flow scenario (1:100 year), it could be possible to see flows of ~2.5 m³/s. Both cases were reviewed using HEC-RAS 1D hydraulic modeling software and found to be adequate to pass the design flows without risk of overtopping. This is a temporary crossing and will be removed before fish migration periods.

Aquatic Habitat

A fish habitat assessment was conducted on this watercourse as part of the Keeyask Transmission Project. The following is an excerpt from the *Keeyask Transmission, Aquatic Environment Technical Report* (North/South Consultants Inc. 2012). Site 15 is approximately 4 km downstream from the proposed crossing.

Site 15

At Site 15, the ROW crosses an unnamed tributary to the Butnau River. The watercourse is fed by Joslin Lake approximately 2.5 km upstream, and flows east to an unnamed lake approximately 4.5 km downstream (Map 4-1). The confluence with the Butnau River is located 16.5 km downstream.

The surveyed reach had a regular meander channel pattern that was approximately 10 m wide and consisted of flat/slow run habitat. At the time of the survey, the channel was flooded, creating large off-current pool habitat. Maximum water depths were estimated at 1.5 m deep, but most of the surveyed area was shallower. Instream fish cover was abundant, provided mainly by instream vegetation and LWD. Aquatic vegetation identified from the aerial survey included water arum, water lilies, and grasses. The

floodplain was also saturated, containing large pools of standing water. Beyond the floodplain, vegetation consisted primarily of black spruce and willows.

Due to the high levels of instream vegetation, the watercourse might be suitable for spawning and rearing of northern pike. Presence of northern pike has not been confirmed for this watercourse or Joslin Lake; however, northern pike have been confirmed downstream in the Butnau River (Johnson and Barth 2007).

As the seasons progress during the year, it is anticipated that water levels would decrease and that deep pool areas would become limited in the surveyed area. However, water flow conditions would likely be sufficient to maintain adequate DO concentrations for fish utilization of the area year-round. Based on this, the overwintering potential of this reach was rated moderate for small-bodied fish (e.g., cyprinids) and low for large-bodied fish.

Potential Environmental Effects, Mitigation and Monitoring

Potential environmental effects associated with the proposed temporary crossing include:

- Access to upstream habitat will be limited if culvert velocity exceeds swimming capability;
- Modification to the creek bottom;
- Increase in sediment concentrations during construction and removal; and
- Deposit of hazardous materials in water from equipment.

The following design/construction methodologies and monitoring will be implemented to reduce the potential effects of the project:

- In-stream work will be completed during winter and be completed prior to April 15, therefore avoiding the time that is sensitive to spawning fish and developing eggs and fry;
- The duration of in-stream work will be minimized, approximately 3 days to install and 2 days to remove.
- All material used to construct the temporary crossing will be removed from the creek prior to April 15;
- Rig mats will be placed on the bottom of the creek prior to placement of any material to limit impacts to the creek bottom;
- To limit minimize the amount of sediment entering the creek:
 - A coarser class 7 rockfill will be utilized within the creek channel, except the class 6 rockfill which will be utilized around the culverts to provide structural support;
 - Above the water line class 6 rockfill will be utilized;
 - Material placed below the high water mark will be clean and free of fines;

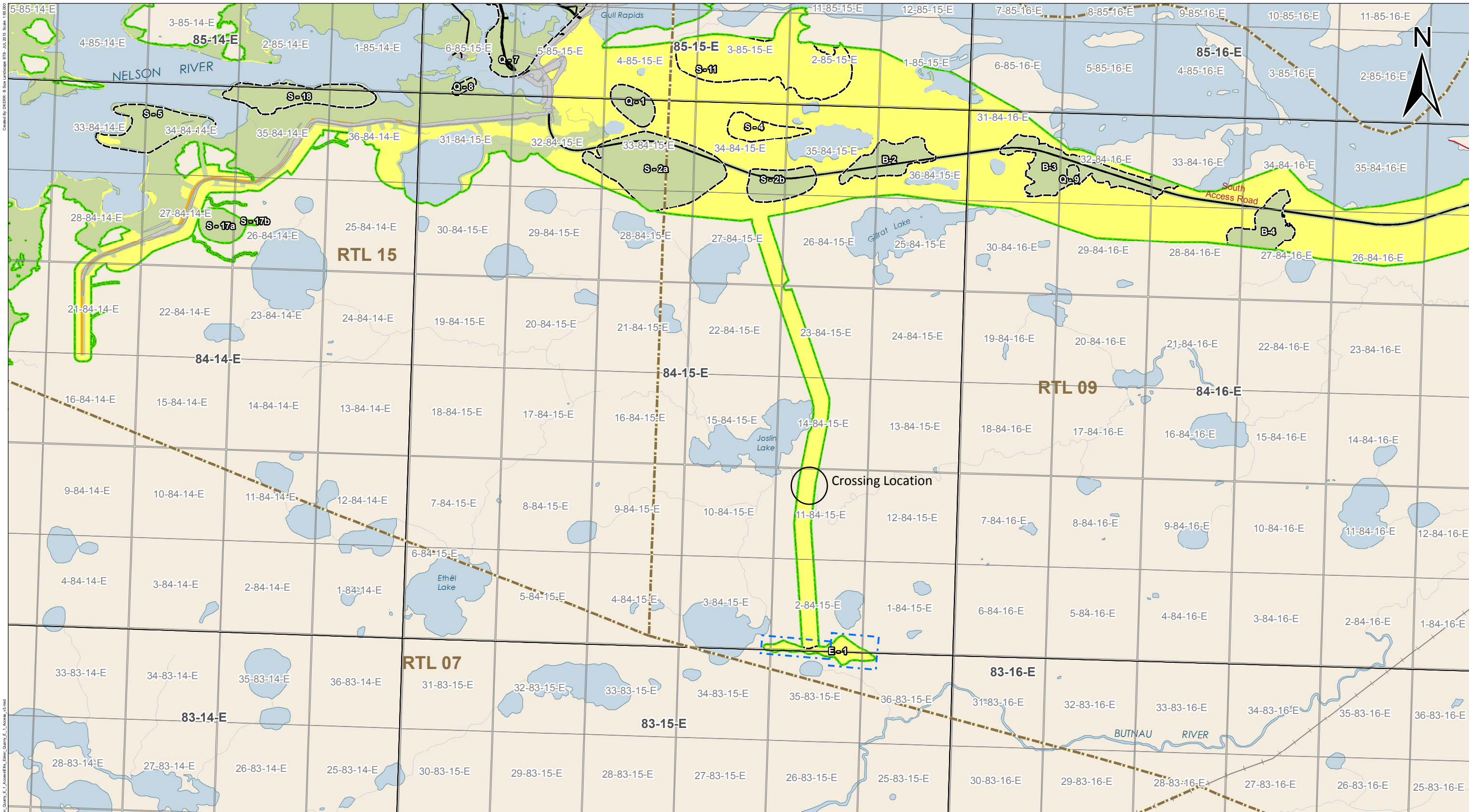
- The ice surface in the vicinity of the crossing location will be scraped of any tracked on dirt or other debris prior to ice-off;
- Banks will be inspected after removal of the temporary rockfill and if required will be stabilized to minimize the potential for erosion
- Removed materials and/or spoil will be stored/disposed of above the high water mark and located and stabilized so that they do not re-enter the creek.
- Culverts installed will allow flow through the crossing. In addition to the culverts, the coarse class 7 rockfill will allow some flow of water through the crossing.
- A Spill Response Plan will be developed that outlines actions to take in the event of a spill. An emergency spill kit will be kept on-site at all times in case of fluid spills.
- Machinery, vehicles and equipment will arrive on-site in a clean condition, in good working order and maintained as such and be free of fluid leaks.
- All machinery, vehicles and equipment will be stored 100 metres away from any watercourse/body. Where not practicable, machinery, vehicles and equipment, will be stored in a fashion that prevents fluid leaks from entering any watercourse/body. They will not be stored at the top or on the side of steep slopes, adjacent to water.
- All machinery, vehicles and equipment working within 100 metres of any watercourse/body will be visually checked for fluid leaks prior to work commencing.
- Any parts of equipment entering the water to place/remove material will be cleaned of existing dust/clay/sand/soil, etc. prior to work commencing.
- There will be no refueling of machinery, vehicles and equipment within 100 metres of a watercourse/body. If 100 metres cannot be attained, machinery, vehicles and equipment will be refueled in an approved fuelling area, in a contained manner, as approved by the Site Environmental Lead.
- Turbidity Monitoring during installation:
 - A relationship between TSS and turbidity at this location has not been established. Therefore, the general turbidity correlation of 3 to 1 noted in the CCME guidance will be utilized. As noted, induced turbidity should not exceed a change of 8 NTUs for short-term exposure;
 - Prior to installation, turbidity measurements will occur downstream of the crossing location. The sampling location will be on stable ice cover to ensure safe collection of the sample and will be 50-100 m from the crossing location; and
 - During installation, turbidity measurements will be taken. If turbidity is > 8 NTU from background, the rate of material placement will be reduced.
- Based on experience from April 2018, it is likely that ice conditions at and downstream of the rockfill crossing will not be safe to conduct turbidity monitoring. It is anticipated that the rockfill will be fairly clean of sediments as it is removed from the creek. Possible sources of sediment may come from the removal of the rig mats. In lieu of downstream sediment monitoring, visual inspection of the open water will occur as rockfill and rig mats are removed. If an increased amount of sediments is noticed, removal will be suspended while sediments dissipate.

Summary

A temporary rock crossing was installed in February 2018 and removed in April 2018, all mitigation measures stated and recommended were implemented, Photos 3 and 4 show the condition of the water body in August 2018. Based on past experience of the construction and removal methods as described above, adverse environmental effects to install a temporary rockfill crossing for the 2018/2019 winter season and potentially the 2019/2020 winter season are not expected.

References

North/South Consultants Inc.. 2012. Keeyask Transmission, Aquatic Environment Technical Report. A report prepared for Manitoba Hydro by North/South Consultants Inc.



Created by: DCEBR, S. Bala, Landusec BTR, JUL 2015 Scale: 1:50,000
 File Location: I:\geospatial\GIS_projects\GIS\MapServer\html\BorrowSourceArea_Quarry_E-1_AccessRoad.mxd, E:\Data\BTR\BTR_Quarry_E-1_AccessRoad.mxd



DATA SOURCE: Manitoba Hydro; Government of Manitoba; Government of Canada		
CREATED BY: Manitoba Hydro - GIS Studies		
COORDINATE SYSTEM: UTM NAD 1983 Z15N	DATE CREATED: 09-AUG-17	REVISION DATE:
VERSION NO.: 1.0	QA/QC:	

- Legend**
- Registered Traplines
 - Borrow Source Area
 - Quarry Lease E-1 Boundary
 - Project Footprint Boundary

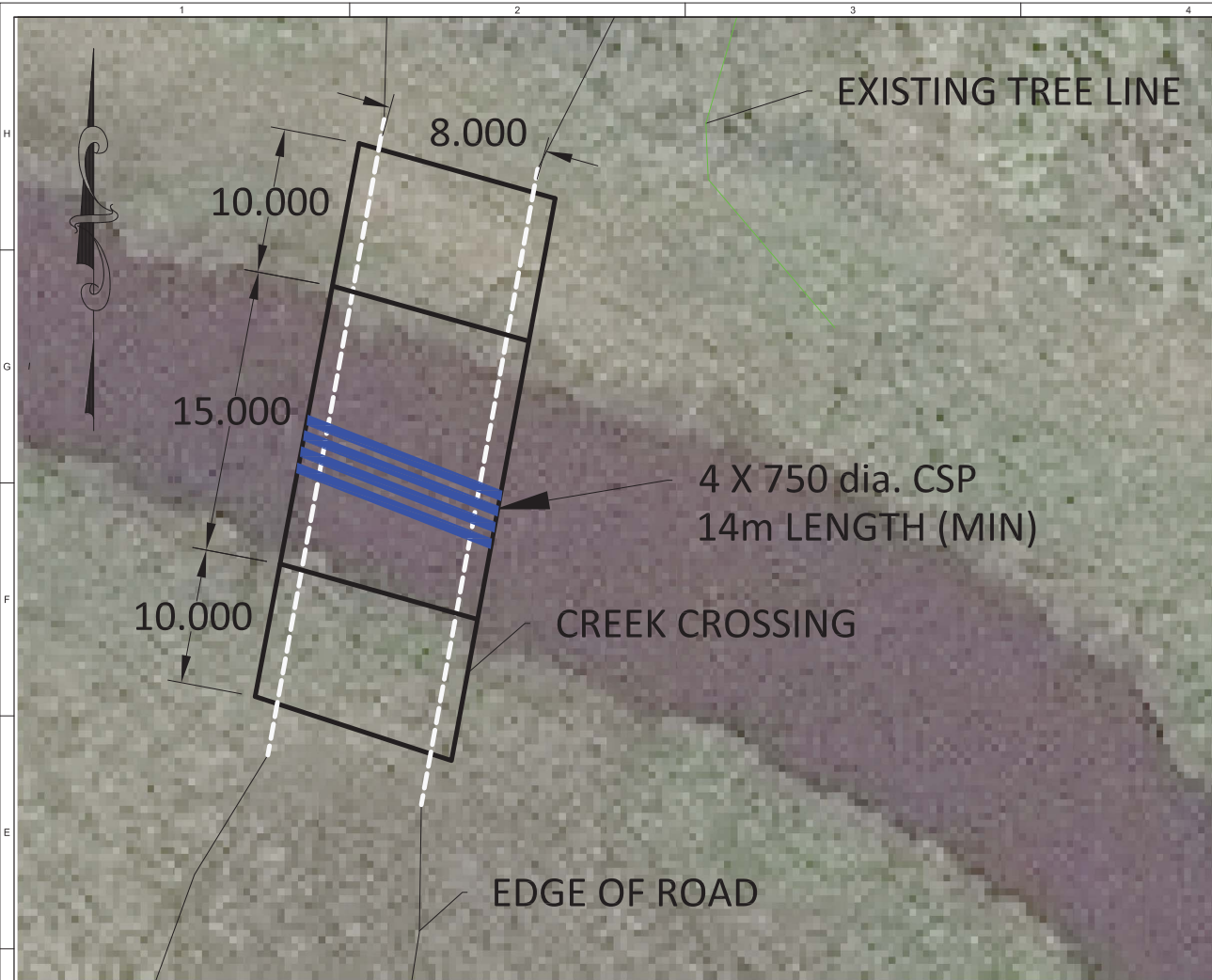
- Possibly Disturbed Footprint Area
- Planned Disturbed Footprint Area

NOTE: A winter road is proposed to be developed to access Quarry E-1. A ROW of approximately 30 m will be required within the possibly disturbed footprint area

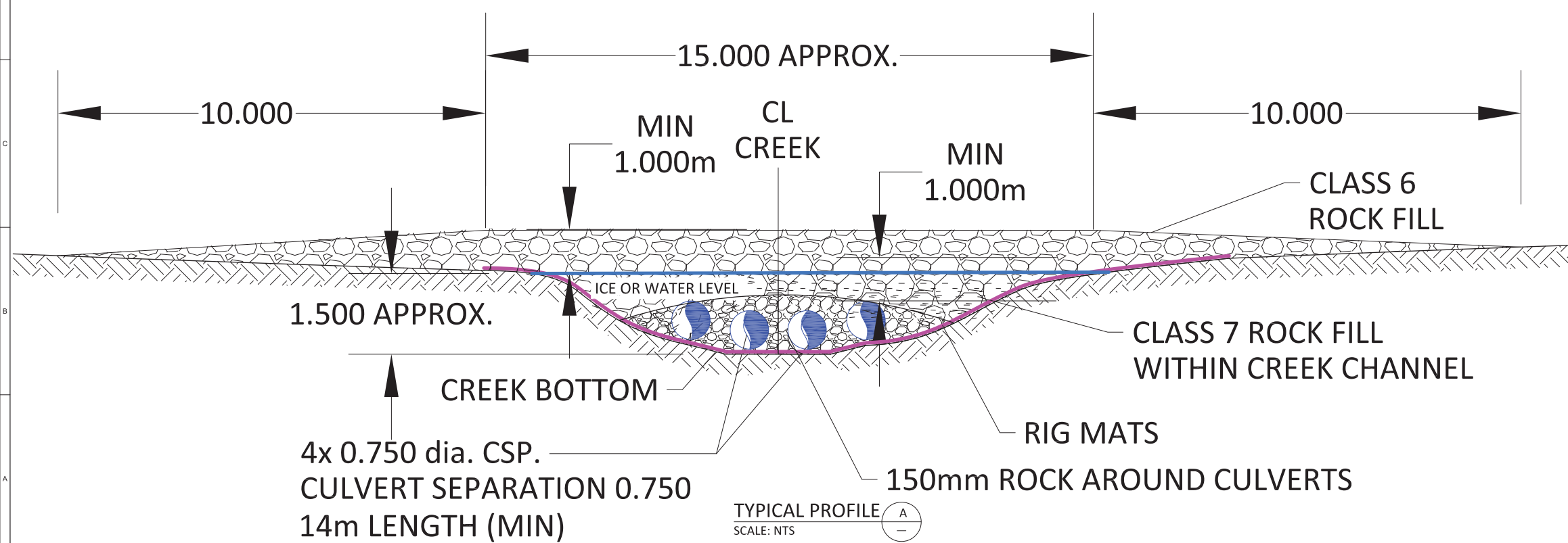
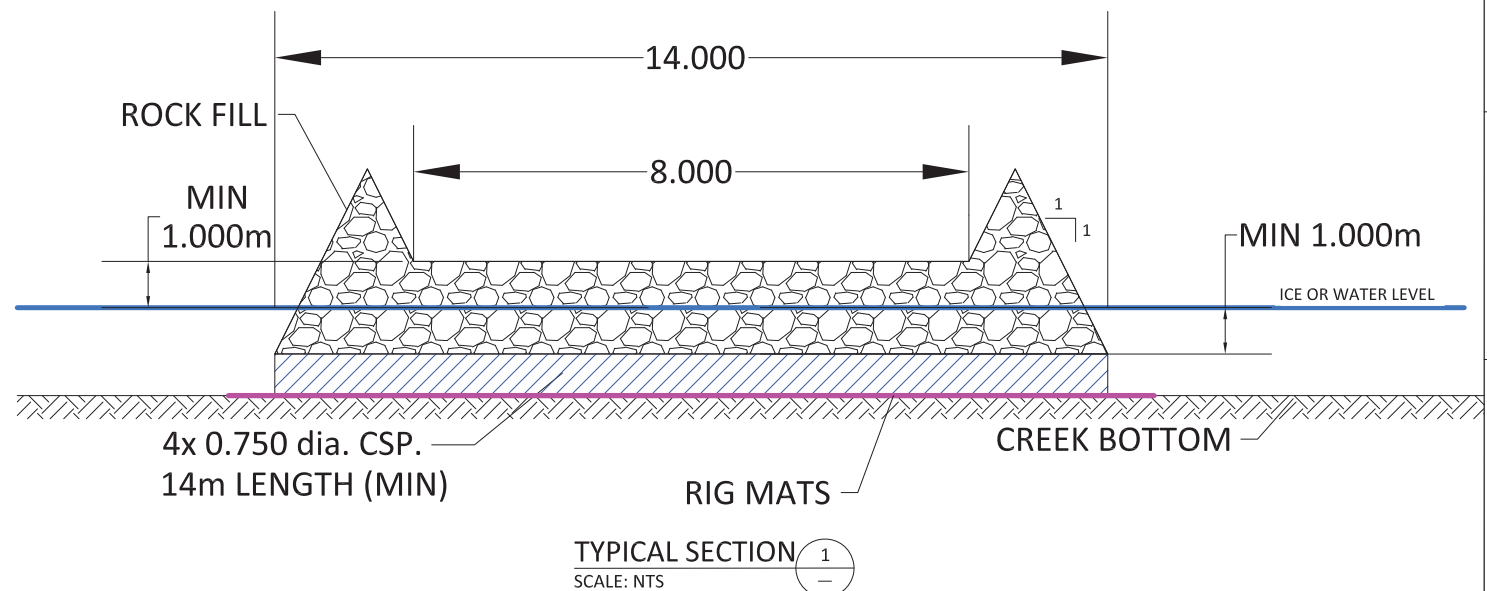
Keeyask Generation Project

Quarry E-1 and Access

Figure 1



PLAN
SCALE: NTS



- NOTE:
- Crossing installed winter 2018.
 - Crossing installed and removed in the wet.

REV.	DATE	DESCRIPTION	CHECKED:	BY	CRD.	APP.
DRAWN:		CHECKED:		SCALE: AS NOTED		
DESIGNED:		DATE: February 10, 2018				
KEYYASK GENERATION PROJECT						
CREEK CROSSING DETAILS						
DRAWING NUMBER				SHEET		REVISION
KS-364				01		00

Keyask Transmission Project

Project Infrastructure

- Route Alternative Option A
- Route Alternative Option B
- Route Alternative Option C
- Route Alternative Option D
- Construction Power Line (KN36) Option 1 and 2
- - - Construction Power Line (Temporary)
- Unit Lines
- 3 Construction Power Station
- 3 Switching Station
- Project Study Area

Infrastructure

- X Converter Station
- Generating Station (Proposed)
- Generating Station
- Bipole I and II (Existing 500 kV DC Line)
- Transmission Line
- North Access Road
- - - Proposed Access Road

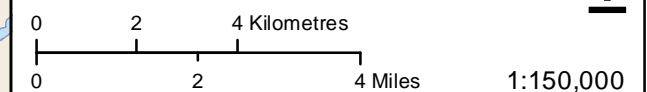
Aquatics

- X Watercourse Crossings

Landbase

- ⌋ Community
- Provincial Road
- Municipal Road
- Active Railway
- - - Abandoned Railway
- Watercourse
- Waterbody

Coordinate System: UTM Zone 15N NAD83
 Data Source: MBHydro, ProvMB, NRCAN
 Date Created: Monday, September 24, 2012



Stream Crossing Locations

