



February 9, 2011

Amanda Joynt  
Fish Habitat Biologist  
Department of Fisheries and Oceans (DFO)  
P.O. Box 1871  
Inuvik, NT  
X0E 0T0

Dear Ms. Joynt:

**RE: Application for Fisheries Act Authorization for The Use of Frozen River Sediment as a Source of Backfill for the Unipkat I-22 Sump Remediation on Arvoknar Channel**  
**DFO file No.: 10-HCAA-CA6-00097**

This letter is has been sent in conjunction with a completed *Application for Fisheries Act Authorization* form and is intended to provide DFO with additional information regarding the application. The Description of Proposed Development and Description of Potential Impacts to Fish and Fish Habitat are discussed in the spaces provided on the application form. Details of the overall project can be found in Shell Canada's Project Description for the remediation of the drilling sump located at Unipkat I-22 submitted to the Environmental Impact Screening Committee (EISC) on November 12, 2010.

This application follows our letter sent to you on January 25, 2011 which proposed the use of frozen river sediment in Arvoknar Channel as a borrow source and outlined our rationale for its use.

We believe that the proposed work will not negatively impact fish or fish habitat and will not diminish fish habitat.

**1. PROPOSED WORKS**

As described in our Project Description submitted to the EISC on November 12, 2010, Unipkat I-22 is a former drilling site on Arvoknar Channel in the Mackenzie Delta (Figure 1).

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File: A04025A02

During the Unipkat I-22 sump remediation program we propose to remove approximately 3000 m<sup>3</sup> of sediment from the surface of an exposed, frozen sandbar in Arvoknar Channel for use as backfill in the riverside remedial excavation (Figure 2).

The idea of using channel bars as a source of backfill was suggested to Shell Canada during community consultations with the Inuvik Hunters and Trappers Committee and has been discussed with the EISC, DFO, Environment Canada, Indian and Northern Affairs Canada, the Northwest Territories Water Board and Transport Canada.

- The point bar excavation will be no more than 320 m long and 75 m wide (see Figure 3).
- The excavation will follow natural contours on the point bar and be no more than 0.3 m deep.
- The work will take place during winter on a frozen sand bar that is above water level. No open water will be encountered. In the unlikely event that open water is encountered, work will cease and DFO will be notified.
- The excavation of material from the point bar is expected to take approximately seven days in mid March 2011.
- Vegetation on the bar is limited to sparse grasses.

The work will have a small footprint on the available channel bars and is will be a short duration. Each bend in Arvoknar and other lower Mackenzie Delta channels tends to have extensive point bar formation. Backfilling/restoration of the point bar excavation by sedimentation from the river is expected to be relatively rapid given the natural sediment loads in the river.

The selected site is likely frequently subject to similar scale natural disturbances of sediment in the delta environment (as described in our letter of January 25); is subject to freezing in winter; and, is above water and unavailable as fish habitat for the majority of the year. Local species are unlikely to be sensitive to the proposed minor changes in this abundant, intermittently available habitat.

## **2. IDENTIFICATION OF STRESSORS AND MITIGATION MEASURES**

The identified potential habitat stressors, effects, mitigation measures and residual effects of the proposed work are shown in Table 1 and, where warranted, discussed in more detail in the following sections.

**Table 1: Potential Stressors and Mitigation Measures**

<b>Stressor</b>	<b>Cause and Effect</b>	<b>Mitigation Measure</b>	<b>Residual Effects</b>
Removal of sediment from a bar	Loss of habitat, sedimentation	Site selected is above water level and is frozen. Design: Sedimentation from residual loose soil in the excavation will be controlled by using a clean-up bucket to reduce the amount of material and by adding water to the finished excavation, allowing it to freeze the sediment in place and slowing the rate of dispersal during thaw.	The area is only available as fish habitat intermittently. The lowered elevation may increase the availability of habitat but insignificantly. Loose sediment will be available for transport as it thaws.
Bank stability	Increased erosion or alteration of flows.	Site selection: Point bars are natural depositional environments and the channel is known to have high erosion rates along cut banks and therefore a significant supply of new sediment for point bars. Design: The depth of excavation will kept to 0.3 m deep at maximum, allowing for more normal flows over the bar and deposition of new sediment. The bar selected is large. Less than 1/3 of the surface area of the bar will be affected and the overall shape will be maintained.	A shallow depression in the bar will remain until natural sedimentation replaces the material. No loss of fish habitat.
Fish entrapment	The shallow depression in the bar may fill with water during flood events and strand fish from the channel as the water level drops.	Design: The excavation will follow the natural contours of the bar but will slope to allow water and fish to exit to the river channel as water levels fall. Excavation walls along the water side will have lower elevation notches to allow fish passage.	The notched or sloped portions of the excavation may accumulate sediment at a more rapid rate than up-gradient areas.
Loose sediment on the ice road	Sediment dropped on the ice between the point bar and Unipkat I-22 may cause siltation in the channel during break up.	Practice: Trucks moving sediment from the point bar to Unipkat I-22 will not be overloaded. Design: At the conclusion of operations, any sediment dropped on the ice will be picked up and used on the Unipkat site.	None.

## 2.1 Site selection

On February 6, 2011 Ryan Lennie of IEG selected a channel bar near the Unipkat I-22 site that is exposed and frozen (Photograph 1). The point bar is approximately 1000 m long and is generally greater than 120 m wide between vegetated land and the observed water's edge. The location of the bar is shown on Figures 2 and 3.

The bar has no ice cover, indicating that it was above water level during freeze up and historic aerial photographs consistently show that the area is above water level in August (Photographs 2, 3 and 4). Sparse grass cover was observed under the snowpack during the February 6 site visit and little to no vegetation is apparent in aerial photographs or was observed during site visits in the summer of 2010.

It is likely that the selected area is below water only during periods of high water level during the spring freshet, spring break up or storm surge events. The hydraulic disturbance to the sediments on the bar appears to be frequent enough to limit the growth of vegetation other than grasses. Stable adjacent banks developed from point bars support significant willow growth.

## 2.2 Design

The proposed excavation will be shallow and contoured to the existing point bar. These measures will aid the excavation in blending into the natural surrounding and decreasing the amount of time required for new sediment to be deposited in the excavation.

The excavation will be designed to slope towards the channel and in the event that excavation walls may entrap fish during periods of falling water level, will incorporate notches from the point bar excavation to the main channel.

## 3. ALTERNATIVE DESIGN OPTIONS

Several alternate sources of backfill have been considered and determined to be inappropriate for this project. The primary reasons for using point bar sediment for the back fill of the remedial excavation at Unipkat I-22 are:

- Suitable backfill material is a valuable (and costly) resource in the Inuvialuit Settlement Region. Granular material is limited in supply and maybe better used for community or industrial infrastructure. The generally high quality of granular material at the Ya-Ya source is rare in the region. Placement of this material in the excavation could alter the natural erosion rates and pattern

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around the site. Furthermore, the use of material from Ya-Ya would involve acquiring additional permits and construction of additional roads. These additional work elements would delay or jeopardize the project.

- Placement of coarser backfill material than natural surrounding soils may alter and affect erosion rates.
- The area that is to be excavated is predicted to erode into the river over the next 30 or so years which makes the need for the backfill temporary and of limited aesthetic and ecological value.
- Leaving the remedial excavation open has the potential to degrade permafrost and cut bank stability near the Unipkat I-22 lease. This destabilization may also increase the chances of constituents of concern remaining at the site being mobilized into the ecosystem. INAC, the EISC and the local hunter's and trapper's committees have indicated a preference for backfilling the remedial excavation.

#### 4. CLOSURE

We welcome any further input from DFO on additional mitigation measures and, would welcome DFO supervision of the operation.

If you have any questions please feel free to contact me at (403) 990-1382 or at [sbird@ieg.ca](mailto:sbird@ieg.ca).

Yours truly,  
**IEG CONSULTANTS LTD.**



(secured pdf version signed)

Sam Bird B.Sc.  
Environmental Scientist

Attachments  
Photographs

(Attachments continued)

- Figure 1: Site Location
- Figure 2: Potential Point Bar Borrow Source
- Figure 3: Area of Proposed Point Bar Borrow Source

- c.c. Randall Warren – Shell Canada Energy
- Randy Ambler – Shell Canada Energy
- Don Arey – Indian and Northern Affairs Canada
- Mike Harlow – Northwest Territories Water Board
- Stacey Lambert – Environment Canada
- Christine Inglangasuk – Environmental Impact Screening Committee
- Gerald Enns – GNWT Department of Environment and Natural Resources
- Kevin Erickson – Hazco Environmental Services

A copy of this application will also be supplied to Transport Canada as a supporting document during the application process under the Navigable Waters Protection Act.



**Photograph 1:** Photo of point bar looking west at area to be excavated. Note the lack of ice cover and grass evident through the snow.



**Photograph 2:** Air photo of point bar taken August 24, 1950 showing low summer water level and prominence of point bar near the centre of the photograph.



**Photograph 3:** Air photo of point bar taken July 10, 1972 showing higher summer water level and partially submerged point bar.

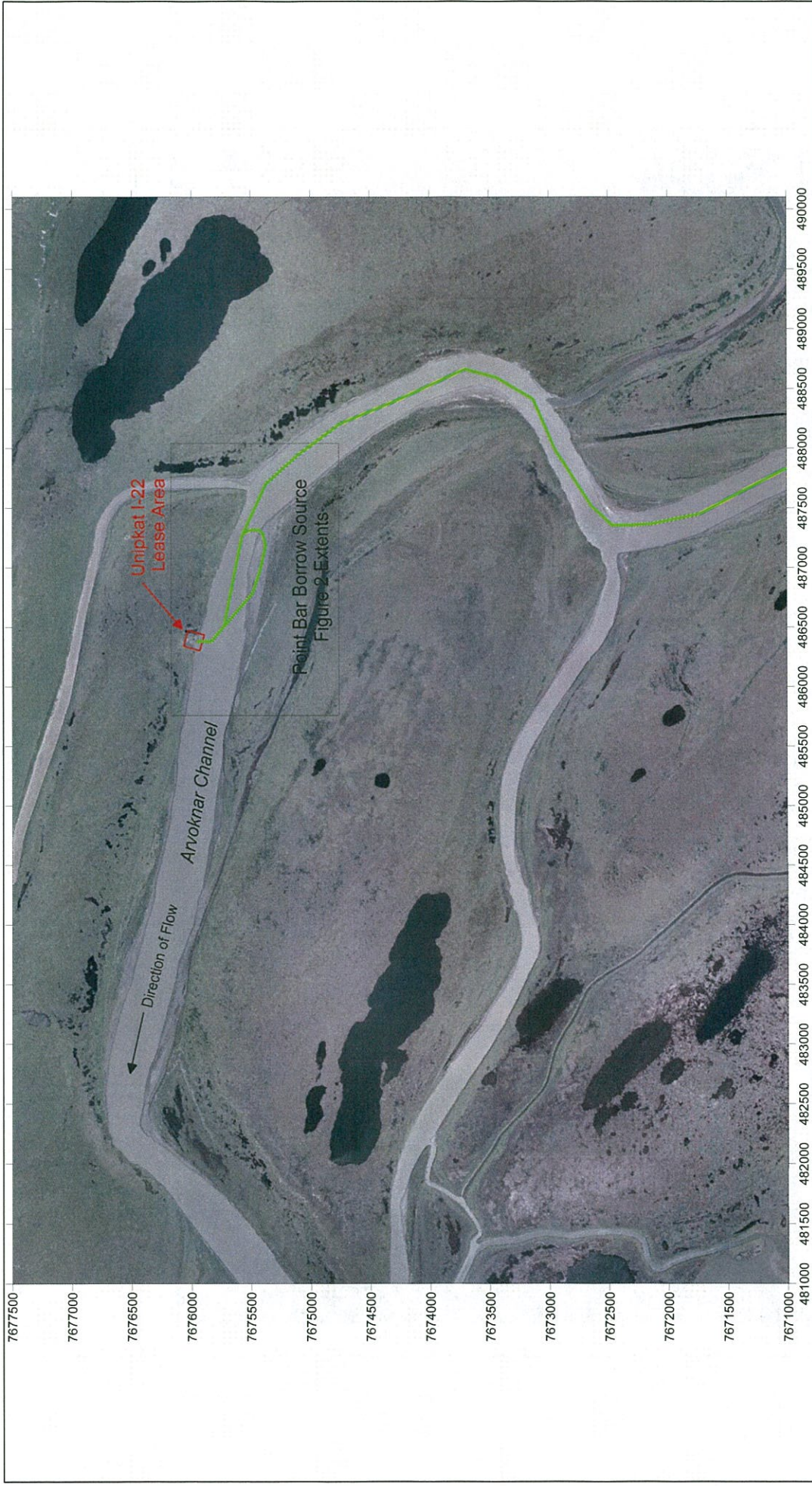


**Photograph 4:** Air photo of point bar taken August 3, 1985 showing low summer water level and exposed point bar.

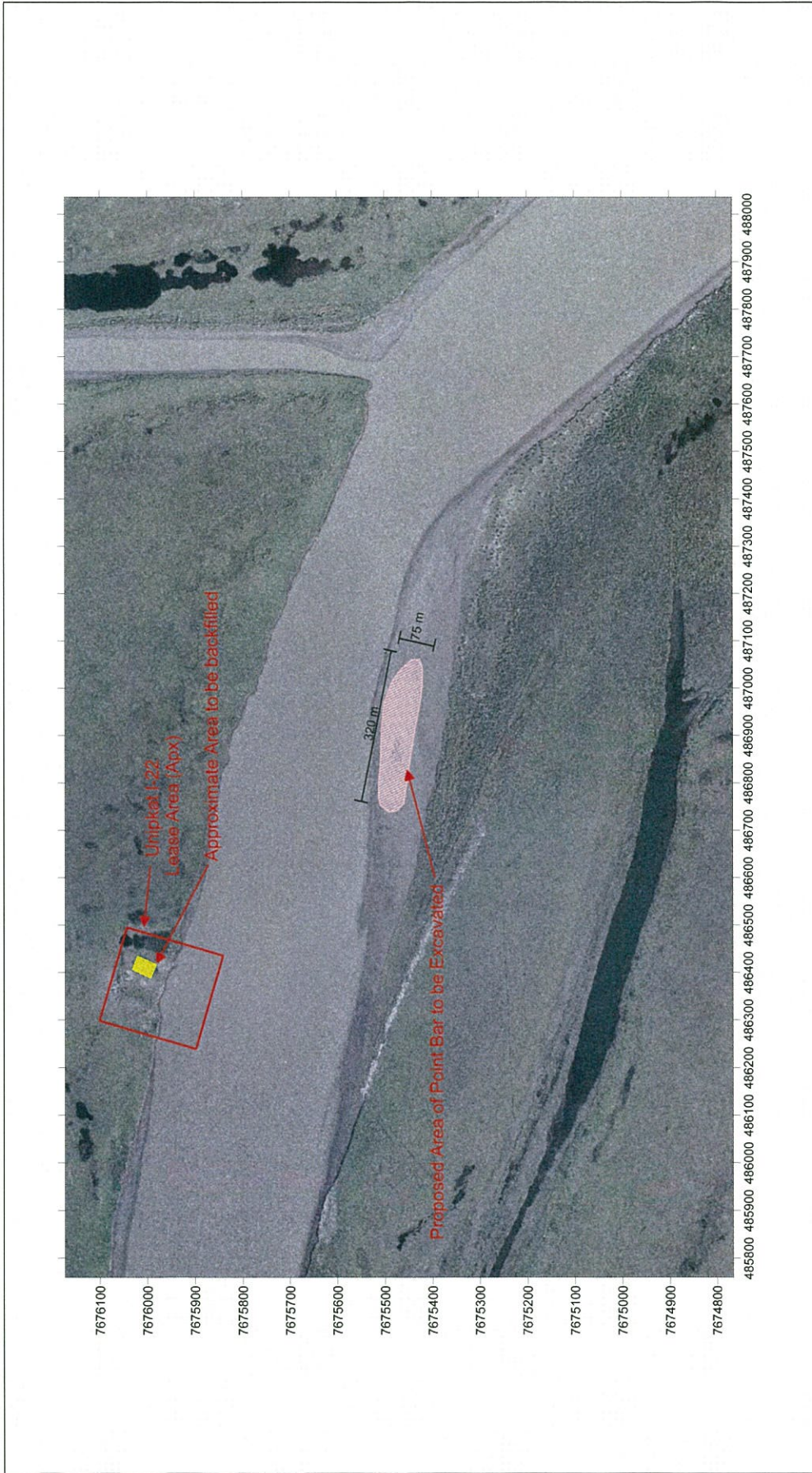




Source: Background - Landsat TM Panchromatic Imagery Acquired - August 31, 2000			<b>Shell Canada Limited</b>		Unipkat I-22 Sump Remediation	
	SCALE 1:500,000	DATE 08/11/2010		TITLE <b>SITE LOCATION</b>		PROJECT No. A04025A02
DATUM UTM, NAD 83	DRAWN SB, CL	CHECK SB, JW	Map Number Figure 1		Rev. 0	



<p><b>CLIENT</b></p> <p>SHELL CANADA LTD.</p>		<p><b>TITLE</b></p> <p>UNIPKAT I-22 POTENTIAL POINT BAR BORROW SOURCE</p>	
<p>CHECKED: JW</p>	<p>DRAWN: SB</p>	<p>DATE February 7, 2011</p>	<p>AREA</p>
<p>APPROVED:</p>	<p>APPROVED:</p>	<p>SCALE</p>	<p>DEPT</p>
<p><b>LEGEND</b></p> <p>Ice Road Route</p>		<p><b>FIGURE 2</b></p>	
<p>0 1000 2000 3000 4000 5000</p>		<p>REV 1</p>	



CLIENT		SHELL CANADA LTD.		TITLE		UNIPKAT I-22 AREA OF PROPOSED POINT BAR BORROW SOURCE	
CHECKED: JW	DRAWN: SB	DATE February 7, 2011		AREA		REV 1	
APPROVED:		SCALE		DEPT		FIGURE 3	

1. 2

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**APPLICATION FOR FISHERIES ACT AUTHORIZATION**

**Applicant**

I, the undersigned, hereby request authorization for the harmful alteration, disruption or destruction of fish habitat and/or the destruction of fish by means other than fishing that will likely result from the works, undertakings, activities or operations related to the proposed development described on this application form. I understand that the *Fisheries Act* Authorization, if granted, is from the Minister of Fisheries and Oceans standpoint only and does not release me from my obligation to obtain permission from other concerned regulatory agencies. If an authorization is granted as a result of this application, I hereby agree to carry out all activities relating to the project within the designated time frames and conditions specified in the Authorization.

Applicants Name: Shell Canada Energy  
 Contact Person, Title: Randall Warren, Manager, DAR & Drilling Waste  
 Applicant's Address: 400 - 4 Ave SW Calgary AB  
 Applicant's Telephone No.: 403-691-2521  
 Applicant's Fax No.: 403-269-7948  
 Applicant's Email: randall.warren@shell.com

**Location of Proposed Development**

Nearest community (city, town, village): Tuktoyaktuk, NT  
 Municipality, district, township, county: Mackenzie delta, Inuvialuit Settlement Region  
 Name of watercourse, waterbody: Arvoknar Channel, Mackenzie River  
 Longitude and latitude, UTM Coordinates: 69.188229° N, 135.325584° W. UTM: 487090 E, 7675385 N

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### Description of Proposed Development

The proposed development impacting on fish and fish habitat involves:

little to no impact on fish or fish habitat. The work will involve Excavating approximately 3000 m3 of sediment from the upper surface of an exposed, frozen point bar using an Iron Wolf excavator. The maximum depth of excavation below the original surface of the point bar is 0.3 m. The sediment would be used as backfill in a remediation excavation across the Channel. A frozen, ice free bar above winter water level of approximately 2.4 ha has been selected as the proposed source (See attached photo and Figures 2 and 3). The sides of the excavation will be sloped and the low point of the excavation will on the channel side to promote drainage and avoid possible fish entrapment during high water events.

### Description of Potential Impacts to Fish and Fish Habitat

Impacts to fish and fish habitat resulting from the works, undertakings, operations or activities associated with proposed development described above include:

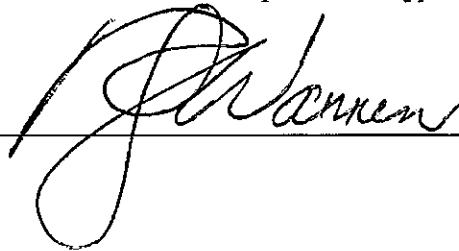
Impacts to fish and fish habitat from the works are expected to be minimal or non-existent. No fish will be impacted during excavation as the bar is frozen and above water level. The profile, shape and elevation of the bar will be altered from the existing conditions but is expected to :1) resemble existing surrounding conditions to such a degree that habitat for fish will not be down-graded; 2) be above water level for the majority of the year and not be accessible to fish; and, 3) return to a similar state as the currently existing conditions with the addition of natural sediment loads during periods of high water. If sediment from the excavation is mobilized during high water events, the volume of increase is expected to be inconsequential in comparison to natural sediment loads in the channel. Mitigation measures to be used at the site are described in the attached pages.

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### Applicant Declaration

I solemnly declare that the information provided for the review and assessment of my proposed development for impacts on fish and fish habitat are true, complete and correct, and I make this declaration conscientiously believing it to be true knowing that it is of the same force and effect as if made under oath. This declaration applies to all material submitted as part of this application for *Fisheries Act* Authorization.

Applicant's Signature (and corporate seal):



Date:

February 9, 2011

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