



**Stantec**

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August 12, 2013  
File: 144901612

**Attention: Karen Kharatyan – Technical Advisor**  
Nunavut Water Board  
PO Box 119  
Gjoa Haven, NU X0B 1J0

**Reference: Licence No 3AM-GRA1015 – Amendment Application Denial**

Dear Karen,

I write to you on behalf of the Government of Nunavut – Community and Government Services (GN-CGS) to continue discussions regarding the Amendment Application for Licence No 3AM-GRA1015. Thank you for your response letter dated November 27, 2012; from the letter, we understand the following issues remain:

- 1) The recommendations presented in previous studies for Rankin Inlet water consumption are required as they form an integral part of the GN's and the Hamlet of Rankin Inlet's comprehensive resource management approach. Have any of the recommendations been completed? Is there a schedule for implementation of remaining items?
- 2) No flow data or water balance is provided for the source river (Char River). Can Char River support the water withdrawal?
- 3) What are the downstream water bodies of the Char River and what is the effect on them from the water withdrawal? A map should be provided to clarify.

On behalf of the GN-CGS, we have reviewed your letter and offer the following comments in regards to the deficiencies summarized above:

- 1) We understand the NWB's concern in regards to the volume of water consumed by the Hamlet and the contradiction it appears to express with resource management. However, the GN and the Hamlet have been working to address much of the water consumption issues in Rankin Inlet. The following recommendations have already been implemented:
  - a. Installation of District & Zone Water Meters – this first step in addressing water use in Rankin allows for proper water use recording and identification of losses for leakage reduction.

Further, the GN and the Hamlet is committed to continue addressing the water consumption in Rankin Inlet and offers the following tasks currently being implemented:

- a. Monitor the newly installed District & Zone Water Meters;

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- b. Identify where losses are occurring; and
  - c. Address the losses and repair.
- 2) Information on Char River has been reviewed and the following information has been developed evaluating the impacts on Char River and its surrounding environments in regards to capacity.

- a. The theoretical velocity and resulting flow rate for Char River is based on *Manning's Formula for Uniform Flow*<sup>1</sup> as follows:

$$V = (1/n)(R_h)^{2/3}(S_e)^{1/2} \text{ where: } n = \text{Manning's value for a natural channel not maintained}$$

$R_h$  = Hydraulic radius  
 $S_e$  = Channel slope

$$= (1/.1)(4 \times .5/5)^{2/3}(10/1543)^{1/2}$$

$$V = \underline{0.4 \text{ m/s}}$$

For this exercise a more stringent velocity, 1/2 the theoretical flow rate for Char River, will be used. Therefore, further calculations will use  $V = \underline{0.2 \text{ m/s}}$

Char River is on average measured to be 4m across with a 0.5m depth which corresponds to an approximate flow area of  $\underline{2 \text{ m}^3}$

Therefore, the estimated flow rate is  $0.4 \text{ m}^3/\text{s} = 24 \text{ m}^3/\text{min} = \underline{1440 \text{ m}^3/\text{hr}}$

- b. Maximum pump withdrawal rate from Char River = 700 USGPM =  $2.65 \text{ m}^3/\text{min} = \underline{159 \text{ m}^3/\text{hr}}$
  - c. Therefore, the withdrawal rate is approximately only 10% of the flow rate of Char River
- 3) Char River flows directly to Hudson Bay and therefore will have no impacts to other water bodies. Further, as discussed above, the withdrawal rate is only a fraction of that of the flow rate and should not have any major impacts to Char River or Hudson Bay. A map of the area (C101) has been appended to this letter to clarify the source river (Char River) and associated water bodies.

<sup>1</sup> Robert Manning, "On the Flow of Water in Open Channels and Pipes," *Transactions, Institution of Civil Engineering of Ireland*, 10 (1891), 161-207; 24 (1895), 179-207.

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We anticipate information in this letter will address the Boards remaining concerns such that the previously submitted Amendment Application can advance to a full technical review. As stated in your latest letter, we will address concerns and questions that arise from other agencies during the review stage of the Water Licence Application. We look forward to continuing positive discussions with the NWB, and thank you for your time and effort in resolving this matter.

Regards,

**STANTEC ARCHITECTURE LTD.**



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Attachment: Area Map – C101

c. Brian Duguay, GN-CGS, Acting Regional Projects Manager

<sup>1</sup> Robert Manning, "On the Flow of Water in Open Channels and Pipes," *Transactions, Institution of Civil Engineering of Ireland*, 10 (1891), 161-207; 24 (1895), 179-207.



ORIGINAL SHEET - ANSI A



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Client/Project  
 GOVERNMENT OF NUNAVUT

WATER LICENCE AMENDMENT

Rankin Inlet, Nunavut

Title

AREA MAP

|                          |                 |               |
|--------------------------|-----------------|---------------|
| Project No.<br>144901612 | Scale<br>1:200  |               |
| Drawing No.<br>C-101     | Sheet<br>1 of 1 | Revision<br>0 |

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