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October 20, 2023

File: MV2023L8-0007

Dustin Dewar  
Manager Highway Operations  
Government of the Northwest Territories  
Department of Infrastructure  
Box 1320  
Yellowknife NT X1A 2L9

Sent by e-mail

Dear Dustin Dewar,

**Re: GNWT-INF – Mackenzie Valley Winter Road - Type A Water Licence Application Incomplete – Miscellaneous Water Withdrawal – Wrigley to Colville Lake NWT**

On July 14, 2023 the Mackenzie Valley Land and Water Board (MVLWB) received an Application for Transboundary Water Licence (Licence) MV2023L8-0007<sup>1</sup> for the winter construction, operation and maintenance of the Mackenzie Valley Winter Road (MVWR) for the entire length connecting Wrigley to Tuli't'a (Zone 1), Déljñę Junction to km 99 (Zone 2), Tuli't'a to Norman Wells (Zone 3), Norman Wells to Fort Good Hope (Zone 4), and FGH to Colville Lake (Zone 5).

On August 11, 2023, MLWB received Final maps of the winter road alignment and the proposed water sources.

MLWB staff have thoroughly reviewed the application and associated documents to determine that all information has been received from the GNWT Department of Infrastructure (GNWT-INF) to proceed with the regulatory process. The Application has been found to be generally complete as required under section 5(1) and section 5 (2)(c) of the Waters Regulations. However, to be considered complete for public review, Staff have identified several items that require attention, as follows and in Table attached to this letter:

- items to clarify,
- items where information submitted needs to be added to or revised,

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<sup>1</sup> See MVLWB Online Registry for [MV2023L8-007](#)

- additional impact-mitigation assessment to satisfy preliminary screening requirements,
- the submitted Traditional Knowledge has not been considered alongside scientific knowledge, and
- additional assessment of ecological flow requirements.

Staff do not anticipate that GNWT-INF will need to collect new information, rather to make better use of the extensive information submitted with the application. To assist the GNWT-INF with completing these items staff have also prepared detailed notes with examples, if possible, of the requirements and methods for completing these within 90 days of the date of this letter. If additional time is required, please send a request to the Board in writing.

Please contact Tyree Mullaney at (867) 766-7464 or by email [tyree@mvlwb.com](mailto:tyree@mvlwb.com) or Bonnie Bergsma at (867) 496-2778 or by email [bonnie.bergsma@slwb.com](mailto:bonnie.bergsma@slwb.com) with any questions or concerns regarding this letter.

Yours sincerely,



Bonnie Bergsma, M.Sc.  
Regulatory Coordinator-Specialist  
Sahtú Land and Water Board



Tyree Mullaney, EP  
Regulatory Specialist  
Mackenzie Land and Water Board

Copied to: Alexis Campbell, GNWT-INF  
Wendy Bidwell Inspector, GNWT-ECC-Dehcho  
Rick Walbourne, Manager Water Resources, GNWT-ECC  
Jeffery Walker, Regional Superintendent, GNWT-ECC-Sahtu  
Danielle Rogers, Manager Land Resources, GNWT-ECC-Dehcho  
Trevor Bremner, Manager Land Resources, GNWT-ECC-Sahtu

Attached: Board Staff Additional Summary Notes and Comments

Application Form Section	Topic	Additional Information Required (see Board Staff Additional Summary Notes and Comments for details)
2.	GIS data	1) <b>Clarify</b> with Benjamin Roy at SLWB office in FGH to confirm GIS data requirements and if data submitted is sufficient.
	Land Type(s)	2) Based on information provided in the Application, the proposed activities appear to be located within the public road allowance and therefore fully on Commissioner’s/Territorial Lands.  <b>Clarify</b> if any activities fall on Free Hold/Private lands as there were some indications in TK reports that some points of access to water sources may be located on Sahtu Private Lands.
3.	Project Description	3) <b>Add</b> information about the method of water withdrawal at bridge approaches using pumps to operate snow-making machines, as per:  To construct the bridge approaches, the contractor installs pumps in the stream, if sufficient flows are present, and runs a snowmaking machine to build up the snow and ice surface. In this instance, the pump could be run continuously and therefore potentially impact upstream and downstream habitat.  4) The Application section and Table of proposed water sources confirm that the sources have either: <ul style="list-style-type: none"> <li>• been previously approved in previous licenses S04L8-013 and S04L8-014, or</li> <li>• approved as per DFO 10% water withdrawal limits, and/or</li> <li>• deemed viable through the various [scientific] studies as noted.</li> </ul> a) <b>Add</b> to these tables all relevant information from the Traditional Knowledge Reports submitted with the Application (see item 15) below).  b) <b>Re-submit</b> the five <u>Water Licence Source Information Tables</u> for each of the five zones that were submitted with the initial application. <a href="#">Example</a> of one. The information in these tables’ format is more useful and clearer for reviewers.  c) <b>Include</b> a final column for documenting the TK recommendations in the tables referred to above in 4)b).
5.	Quantity of Water Involved / Water Sources and Ecological Flow Requirements	5) <b>Revise</b> the Application Form to include the following information: <ul style="list-style-type: none"> <li>a) Proposed volume and rate of withdrawal for each water source;</li> <li>b) Ecological Flow Requirements of each water source based on a Hydrological Examination.</li> </ul> 6) <b>Clarify</b> if the Licensee is looking to implement the DFO 10% of available under-ice volume in a lake or waterbody OR maximum 10% of the instantaneous flow rate of any watercourse requirement for water

Application Form Section	Topic	Additional Information Required (see Board Staff Additional Summary Notes and Comments for details)
		extraction; OR the maximum 5% of these rates as per previous Licence conditions. "In order to establish a winter water withdrawal limit for a given watercourse, the total water withdrawal is not to exceed 5% of the instantaneous flow rate of a single water course at the time of withdrawal."
6.	Erosion and Sedimentation Management Plan	<p>7) <b>Prepare or Propose as a draft condition</b> to be prepared, submitted and approved prior to Project commencement, an erosion and sedimentation plan for any equipment operating within 100 m of a watercourse or waterbody (i.e., the access locations for the water trucks), with a description or categorization of each of the access points based on the slope, nearby hazards, substrate (moss, gravel, etc.) and with specific mitigation techniques recommended for the various types of approaches.</p> <p>This requirement is based on the TK Reports requesting proper waste and spill management to ensure water sources are kept clean. There is a potential for watercourses and waterbodies to be affected by erosion and sedimentation if there are any bank failures at the access locations, or permafrost slumps.</p>
8.	Impacts and Mitigation Measures – Preliminary Screening	<p>8) <b>Assess</b> the potential for direct or indirect impacts and potential short-term and near effects on each watercourse immediately downstream of the point of water intake during water truck fills (e.g., is there a basin or fish refuge pool immediately downstream of the intake that is at risk).</p> <p>9) <b>Assess</b> the potential direct, indirect, or cumulative impacts and effects on lakes upstream of the watercourse from which the water is being withdrawn during operation of the snow-making machine.</p> <p>10) <b>Assess</b> the potential for cumulative withdrawal from watercourses or lakes to cause effects (e.g., drawdown over the course of the winter road season can cause catastrophic water level drops and expose beavers – see Environmental Monitor report 2005).</p> <p>11) <b>Assess</b> the potential climate change effects that have been noted through the TK Reports, where the general observation has been that the land is becoming drier – lakes are shallower and drying up, watercourses are freezing to the bottom in winter and creating more overflow conditions, etc..</p>
12.	Land Use Planning	12) <b>Prepare and Submit</b> a Land Use Plan Conformity Table in the Application Package, demonstrating how the proposed project meeting the requirement of the Land Use Plan. (See attached and Table).
	Traditional (Ecological) Knowledge	<p>13) The MLWB is <u>satisfied that adequate Traditional Knowledge has been collected for this Project.</u></p> <p>14) See item in item 4.a), b), c), above.</p>

**ATTACHMENT for MV2023L8-0007**  
**BOARD STAFF SUMMARY AND REVIEW OF APPLICATION FOR MVWR**

Brief Project Summary as understood by Board Staff

- The Department of Infrastructure undertakes construction and maintenance of the public winter road system to the various communities throughout the Sahtú Settlement Area on an annual basis since the 1970's.
- The department uses community based private contractors throughout the Sahtú and Dehcho regions to construct and maintain these winter roads. Therefore, any wastes from sleigh camp use will be disposed of in the community from the which the business operates is allowable under the Municipal Water Licence.
- Each contractor is responsible for a section of the road between the five communities. The contracts are thus divided into 5 zones. Each contractor will usually have 2 water trucks available for use.
- Water extraction occurs from waterbodies and watercourses that have enough flow and recharge rate to allow for the water extraction. Extraction occurs via trucks equipped with vacuum pumps with an in-line rotary flow measuring device. It can take from 15 minutes to over half hour to fill the truck with a maximum capacity of 6 to 9 m<sup>3</sup> water.
- Up to 10 to 12 truckfills may occur in one day (approx. 100 m<sup>3</sup>) with an average of one to one and a half hours between fills.
- From a spatial perspective, the water taken at source is used on the road nearest the source it was obtained from. When the winter road thaws in the spring, the meltwater re-enters the water cycle from which it was taken and eventually returns to the Mackenzie River system.
- From a temporal perspective, the greatest water withdrawals occur in November and December while building the road base to a minimum 100 mm depth of snow and ice.

**Details on Requirements for Application Completeness**

**12. SAHTU LAND USE PLAN CONFORMITY**

The MVRMA section 61(1) requires that all applications made to the Gwich'in and Sahtu Boards must conform with the applicable land use plan.

61 (1) The Gwich'in Land and Water Board and the Sahtu Land and Water Board may not issue, amend or renew a licence, permit or authorization except in accordance with an applicable land use plan under Part 2.

The Application documents included a brief statement about conformity with the SLUP:

The operations of the Mackenzie Valley Winter Road comply and conform with the Sahtú Land Use Plan. Any sources that are not approved by the Land Use Plan, such as Lac Belot, have been removed from the potential water source list.

This summary is insufficient for meeting the requirements of the Sahtu Land Use Plan (SLUP or Plan). As this Transboundary Project is mostly located in the Sahtu Settlement Area, the project must be in conformity with the Plan. Although the Project would have met the definition of a legacy land use because it was originally authorized prior to August 8, 2013, the date the Plan came into effect, expiration of the Licence removes the Legacy exemptions except for the conformity with CR#1 – Zoning. The application must demonstrate conformity with CRs #2-13 and #14 and #19.

The MVWR is located within the Mackenzie River (Dehcho) Special Management Zone (SMZ). It is recognized in the Plan as an important Regional and Territorial transportation corridor (for barge traffic, landing sites, winter road), heritage place, and traditional use location. The Plan provides guidance on the values to be protected, values to be respected, and values to take into account when undertaking approved activities within this zone.

The Licensee must submit the following information in the Table provided to demonstrate how the Project meets the intent of the applicable SLUP Conformity Requirements (CRs), and/or how Project activities can be modified or adjusted to better meet the intent of the CRs.

**Sahtu Land Use Plan (SLUP) Conformity Requirements Table for Applicants**

Guidance on completing the Conformity Requirements can be found in the Sahtu Land Use Plan<sup>1</sup> with more detailed guidance in the Implementation Guide<sup>2</sup>

Conformity Requirement	Application Section(s)	Supporting Evidence
CR#1 – Land Use Zoning		Legacy Use and allowed in SMZ
CR#2 – Community Engagement and Traditional Knowledge		
CR#3 – Community Benefits		
CR#4 – Archaeological Sites and Burial Sites		
CR#5 – Watershed Management		
CR#6 – Drinking Water		
CR#7 – Fish and Wildlife		
CR#8 – Species Introductions		
CR#9 – Sensitive Species and Features		
CR#10 – Permafrost		
CR#11 – Project-Specific Monitoring		
CR#12 – Financial Security		
CR#13 – Closure and Remediation		

<sup>1</sup> [Sahtu Land Use Plan](#)

<sup>2</sup> Sahtu Land Use Plan [Implementation Guide](#)

CR#14 – Protection of Special Values		
<b>Conformity Requirements 15-19 have limited application and apply to Projects in the Great Bear Lake Watershed (15, 16, 17, 18) and certain lakes in the Colville Lake area (19)</b>		
CR#15 – The Great Bear Lake Watershed	N/A	
CR#16 Fish Farming and Aquaculture	N/A	
CR#17 – Disturbance of Lakebed	N/A	
CR#18 – Uses of Du K’ets’Edi Conservation Zone (Sentinel Islands)	N/A	
CR#19 – Water Withdrawal		No water will be withdrawn from Lac Belot as per SLUP

## 12. TRADITIONAL KNOWLEDGE

In the LWB Standard Conditions Template Part B: General Conditions, there are two Conditions that implement the considerations in MVRMA section 60.1 (b).

60.1 In exercising its powers, a board shall consider (a) the importance of conservation to the well-being and way of life of the aboriginal peoples of Canada to whom section 35 of the Constitution Act, 1982 applies and who use an area of the Mackenzie Valley; and (b) any traditional knowledge and scientific information that is made available to it.  
2005, c. 1, s. 35.

**INCORPORATE SCIENTIFIC INFORMATION AND TRADITIONAL KNOWLEDGE** In conducting its activities under this Licence, the Licensee shall make every reasonable effort to consider and incorporate any scientific information and Traditional Knowledge that is made available to the Licensee.

**IDENTIFY TRADITIONAL KNOWLEDGE** In each submission required by this Licence or by any directive from the Board, the Licensee shall identify all recommendations based on Traditional Knowledge received, describe how the recommendations were incorporated into the submission, and provide justification for any recommendation not adopted.

The MLWB is satisfied that adequate Traditional Knowledge has been collected for this Project and the records from 2004 and 2008 are as relevant to consider as those from 2023, especially instances where similar concerns have been expressed over the 6-to-10-year time between TK Studies.

### TRADITIONAL KNOWLEDGE RECOMMENDATIONS FOR PROPOSED WATER SOURCES

**The following is a summary of some of the observations, comments and recommendations contained in the 2004, 2008 and 2023 TK records submitted with the application that Board Staff believe are relevant to specific water sources proposed as winter water withdrawal sources.**

Billy Creek – runs steady and doesn’t freeze to bottom; Jackfish Lake source; beavers

Oscar Creek - runs steady and doesn't freeze to bottom; grayling nursery area; suckers, jackfish, whitefish; spawning at the mouth in low water years may be difficult to get water

Elliot Creek – similar to Oscar Creek

Hanna Creek – a beaver creek with jackfish and grayling; water freezes in winter

Donnelly River– fast moving with consistent water that doesn't freeze or freezes later due to sulphur

Snafu River (Denise) – similar to Donnelly River; doesn't freeze hard

Tsintu River – a beaver creek similar to Donnelly River

Big Smith Creek – *a-dop-a-nee*; lots of beaver; jackfish; moose, diving ducks, geese; flowing water, overflows

Blackwater River – large fast moving, no beaver dams, grayling at mouth

Gotcha Creek – no fish, shallow

Little Smith Creek - no fish, little water

Saline River – natural salt; attracts moose, river freezes and gets overflow; no fish; grayling spawn at mouth;

Steep Creek – near outlet traditional fishing (grayling) and hunting area; traditional trails to blackwater lake; no fish; doesn't freeze

Vermillion Creek North – creek freezes in winter with overflow, no fish

Cristina Creek – small creek with rock bottom, shallow so freezes to bottom, and gets overflow, sulphur, no fish

Hare Indian River – large flow but shallow; fish bearing, and if too much water is taken out it could freeze to bottom

Large Creek km 70 – do not take water from this creek

Tchaneta River - do not take water from the river only the lake

Lac Belot – no water taking as per SLUP

Colville Lake – fish lake, community drinking water; do not take water

## 8. PRELIMINARY SCREENING

### A. WATERCOURSE/WATERBODY SITE-SPECIFIC IMPACTS AND EFFECTS

In the PDR it was stated: *It is not anticipated that there will be any significant change in water availability within a watercourse catchment area, as water withdrawn from one source is always used on the road nearest the source it was obtained from. The water will re-enter the same catchment area once the winter road thaws and eventually reach the Mackenzie River.*

Board staff agree in the very simplistic model there will be no net loss of water from individual catchments. However, there are spatial (near and far) and time (short-term and longer-term) considerations that need to be considered, especially when it has been demonstrated that watercourse flows can vary annually.

- For watercourse sources, the withdrawal of water for filling water trucks may have immediate and catastrophic near downstream effects on wildlife due to the short time-specific drop in the total flow passing by the stream at the point of uptake during filling. However, there should be no effects or “alteration” to the flow upstream as the water taking is a diversion of downstream flow, not upstream flow. Important potential impacts to consider and mitigate are:



- the water truck access to the water withdrawal location including considerations for multiple trips, and the potential for erosion and sedimentation from bank slumping.
- The presence of or indicators of wildlife habitat immediately downstream of the water intake location that could be affected by the water diversion.
- Rate of truck fill should be calibrated to be less than the instantaneous flow rate of the watercourse<sup>3</sup>.

**Evidence:** For National Capital Region Ecological Flow Requirements to Support Fisheries in Canadian [perennial or continuous flowing] rivers and streams, the expert consensus is that cumulative flow alterations of less than +/- 10% of the magnitude of actual (instantaneous) flow in the river relative to a “natural flow regime” have a low probability of detectable negative impacts to ecosystems. The assessment of alterations to the flow regime should be considered in a cumulative rather than a project-by-project basis<sup>4</sup>.

- The longer time and continuous withdrawal of water to supply the ice/snow-making machine at bridge approaches may have immediate and longer-term effects both upstream (depleting the source through continuous withdrawal) and downstream (longer time-specific reduction in the total flow passing by the stream at the point of uptake while the pump is operational).

**Evidence:** In the TK Reports there were noted concerns that water sources with bridges already keep harm in the waters and therefore no water should be taken from a watercourse with a bridge to safekeep the resource.

- The withdrawal of water from waterbodies, especially if they are fish lakes or beaver lakes, has a greater potential for direct and cumulative effects from repeated water takings over the course of a winter season.

**Evidence: Environmental Monitor Report<sup>5</sup> and pictures<sup>6</sup>**

Types of impacts noted in Environmental Monitoring Reports prepared in winter 2005 by Wilfred Jackson of FGH included:

- No fish screens on hose taking water.
- Fuel leaks.
- Location of camp too close to waterbody.
- Water level drops of 1.5 feet and 2.5 feet in Long Detour Lake which will affect beaver (see reproduced figure below).
- Litter and garbage.

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<sup>3</sup> In the 2010-2011 Winter Road season there were only two occasions when the upcharge (extraction/withdraw rate) exceeded the instantaneous flow rate at streams (other than the Mackenzie) being used.

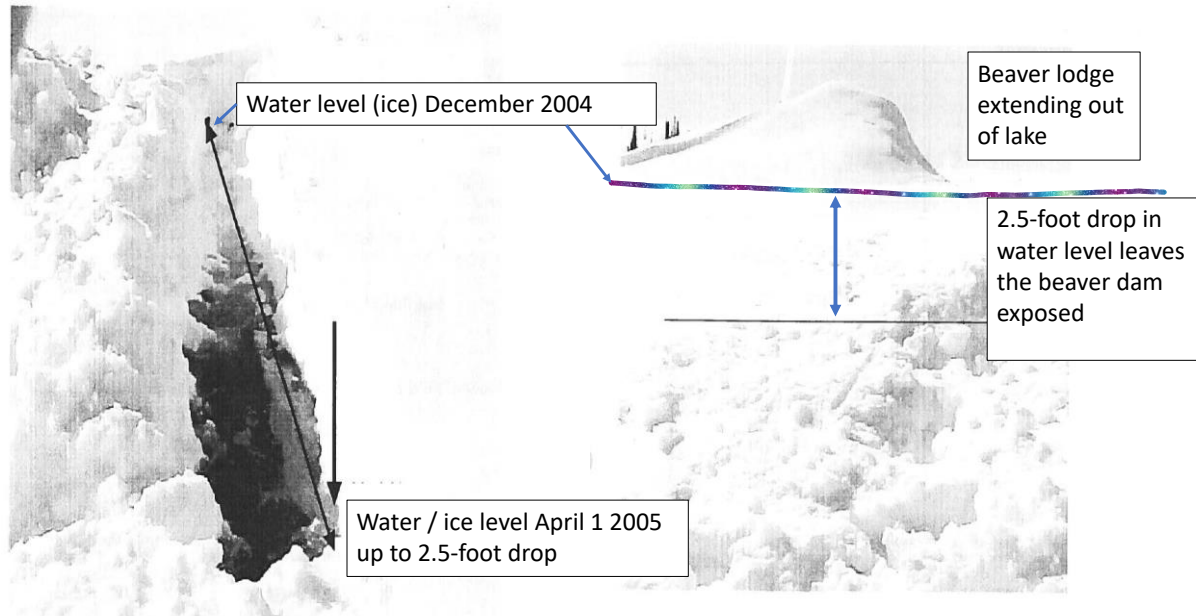
<sup>4</sup> DFO. 2013. Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/017.

<sup>5</sup> See SLWB.com registry for [S04L8-014 – Environmental Monitoring Reports – April 25 2005](#)

<sup>6</sup> IBID - [Environmental Monitoring Reports – Part 2 Pictures – April 21 2005](#)

From TK Reports there is a genuine concern that when water is being taken out of beaver lakes, beaver lodges and fish lakes are being harmed because “Taking water affects all surrounding living species” and “effects on beaver and fish must be considered”.

#### Lake at Long Detour (W. Jackson)



Pictures from April 1, 2005 Wilfred Jackson

- Cumulative impacts from water withdrawal would be greater if water is being extracted from both a watercourse and the upstream lake that supplies the watercourse.

**Evidence:** The MVLWB 2021 Method for Determining Winter Water Source Capacity Guidelines do not explicitly consider impacts to downstream flows from upstream waterbody withdrawals. This may be more important to assess in winter at sites with large upstream lakes or with large watersheds, where flow continues over winter. It is possible in some cases, and at some times, that this environmental value may not be limiting to littoral habitat or under-ice oxygen for aquatic life in a river or stream as it would be in a lake.

#### B. CLIMATE CHANGE EFFECTS

The PDR states: It is not anticipated that there will or have been any cumulative impacts or impacts due to or accelerated by climate change from this project. Many of the same water sources have been used continuously for over 40 years without any noticeable negative impacts.

**EVIDENCE IN SUPPORT:** the 2012 Sahtu Winter Stream Habitat Investigations documented that Big Smith Creek was shallow at the sampling sites near the winter road bridge; however, these water depths

were within the range of those reported in 1981 (McCart and McCart 1982), thus showing consistent pattern over 30 years.

The 2023 Tuli't'a Renewable Resource Traditional Knowledge Questionnaire with 36 respondents from Tuli't'a noting that streams are getting drier and water levels lower. More overflows have been observed on the Winter Road. These observations are like those noted in 2004.

**EVIDENCE AGAINST:** The 2004 Traditional Knowledge Study was done in a year of very low water levels. Respondents noted that global warming has had a noticeable effect on season changes. It is making overland access much shorter than it used to be. There are later freeze-ups and earlier thaws. The seasons are also unpredictable from year to year. This year water levels are shallow everywhere. This could be because the permafrost is melting. Water used to stay on the surface but over the last three years, the rainwater just goes into the ground right away. All the creeks are drying out. All summer long most all the creeks can be driven up with a quad. Most creeks in the area overflow in the wintertime. Overflow occurs when creeks have frozen all the way to the ground.

There is a large body of evidence that supports the TK observations over the past 40 years that the land is drying out, lake water levels are lower or have dried out, there are fewer beavers, and streams that used to flow continuously are now freezing to the bottom resulting in more overflow events.

It is acknowledged that the impact of water withdrawal from flowing streams and large lakes and/or isolated lakes that are non-fish and beaver bearing, to construct the winter road, results in a minor offset or diversion of the water cycle within each individual catchment areas.

The effects of water-taking are perhaps more considerable in a lake than in a flowing stream. If the stream doesn't have flow, or the depth is too shallow, it is not feasible to take water. Whereas in a lake, there is much more room for error to determine:

- a. if the lake has sufficient water,
- b. if the lake is recharging at a rate that is equal to or greater than the water being taken, especially if taken multiple times,
- c. if the lake is fish-bearing,
- d. if the lake supports habitat for wildlife such as beaver and muskrat that need a consistent water level to ensure the entrance to their dens (in lodges or banks) remain below the water (ice) level.

The observations of lower water and a drier landscape in the NWT have been validated by the extent of wildfire and the extremely low water levels of the Mackenzie River in 2023.

The climate change impact considerations are, therefore, in the opinion of Board staff, considerable.

There must be ways to ensure that the annual taking of water from all waterbodies and watercourses, whether previously approved for taking or not, can support the annual water-taking requirements in any given year. What will be the methods used to determine these limits? They should include, but not be limited to:

- a) Traditional Knowledge.
- b) Use of Local RRC appointed Environmental Monitors who know what a fish lake, a beaver lake and other types of wildlife habitat are present within, around, immediately upstream, and downstream of the water source for extraction.

- c) Validate the assumption made in the Environmental Impact Study (Dillon 2004) that the impact of water withdrawal in a stream known to be a major tributary to the Mackenzie (e.g., Hare Indian River) or fed by a lake (e.g., Oscar Creek), would not result in significant impacts to the water quality of that stream.

**EVIDENCE:** The GNWT-INF clearly state that “Water extraction occurs from waterbodies and watercourses that can have enough flow and recharge rate to allow for the water extraction”.

However, in the 2013 Annual Report<sup>7</sup>, GNWT-INF reiterated their concern with their ability to comply with the condition as Contractors are not equipped to take instantaneous stream flow measurements. They stated that DoT (GNWT-INF) has been unable to obtain instantaneous flow measurements (for watercourses) and dissolved oxygen profiles (for lakes) in 2007, 2008, 2009, 2010, 2011, and in 2012/2013 during truck fill-ups.

Instead, they submitted that the maximum instantaneous flow rate was established by the average of data assembled from previous years. The upcharge rate from the truck pump was established based on truck volume divided by the total seconds that was reported to fill the truck (as per the contractor water extraction logs).

As part of the DoT compliance program, an under-ice Dissolved Oxygen and temperature profile and stream flow program were undertaken in 2009 by Dillon Consulting Ltd.<sup>8</sup>

### C. CUMULATIVE EFFECTS

Cumulative effects are also a big concern because even with a conservative Water License Condition that stipulates only 5% of under-ice water volume can be taken from a lake, if there are four contractors with four different water licenses, where all of them can take water from the same lake, a lot of water is being taken out. There is a need to monitor the amount of water coming out of lakes/streams.

These cumulative impacts would be greater if water is being extracted from both a watercourse and the upstream lake that supplies the watercourse.

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<sup>7</sup> See SLWB.com registry for [S04L8-014 – 2013 Annual Report – March 30 2014](#)

<sup>8</sup> Water Withdrawal Site Assessments Along the MVWR, Dillon, 2009

## 5. WATER SOURCES FOR APPROVAL

### A. APPROVED VS. UNAPPROVED WATER SOURCES (based on records from previous 2004 Licence Annual Water Licence Reports)

In 2007, 25,850 m<sup>3</sup> water was taken from all sources, over half of these sources were not approved.

Approved Water Sources	Km marker	volume taken m <sup>3</sup>
Blackwater Creek	784	440
Beaver Creek/Rosie's Cabin	900	5380
No Name Creek	1088	930
Jackfish Creek	unknown	3320
Lynn Creek	unknown	530
WR 48	10.7	630
WR 49	11 .5	330
WR 51	39.9	430
Lake, next to island	98	230
<b>Total</b>		<b>12,220</b>
<b>Unauthorized Water Sources</b>		<b>13,630</b>
<b>Total water from all sources</b>		<b>25,850</b>

- When requested to provide rationale for the taking of water from unauthorized sources, the GNWT responded that contractors are instructed to use approved water sources only; however, contractors must use their best judgement to consider all factors at the time of operation including safety, access conditions, potential for environmental damage, and for watercourses, if the "approved" source hasn't enough flow and another nearby "unapproved" source has flow , the contractor will use the closet flowing watercourse to the roadbed to be constructed to avoid damaging the road and the environment form travelling a greater distance to access flowing water. The contractors don't generally use non-licensed sources without good reason. As stated:

*There is only so far a water truck can travel between fill ups and if access to water is not at hand, they risk damaging the ice road and that will inevitably require more water. To avoid this situation, they seek viable water sources easily accessible and close to the road. The "approved" water sources are not always accessible each year, so the contractors make reasonable adjustments to the best of their understanding of the licence conditions. If a source is not authorized but deemed to be viable (i.e., sufficient water flowing), the contractors will withdraw much less than 100m<sup>3</sup> on any given day<sup>9</sup>.*

- A daily maximum limit of 100 m<sup>3</sup> was placed on each watercourse or waterbody approved for water use. Additionally, the truck discharges water on to the winter road at an application rate that must

<sup>9</sup> Supplemental info for 2010 2011 Annual Report

not exceed 100m<sup>3</sup> of water per linear kilometer during each operation season. The rationale for the 100 m<sup>3</sup> limit is not apparent to Board staff. This value is only a trigger for licensing and has no relationship to the amount of water that could be theoretically removed from any waterbody or watercourse without negative impacts.

**Evidence:** Application rates will vary seasonally depending on additional traffic to support development projects. For example, application rates were 50 m<sup>3</sup>/km in 2004/2005 and dropped to 14 m<sup>3</sup>/km in 2005/2006.

## B. ECOLOGICAL FLOW REQUIREMENTS

- The 2013 Department of Fisheries and Oceans Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada<sup>10</sup> were reviewed to determine the most appropriate method for determining the ecological flow requirements for the MVWR proposed water sources. The method that best fit the dataset and objectives of the project was the **Hydrological Examination**. This assessment method is recommended for the following reasons:
  - Can make use of existing (or proxy) and historic flow data to find flow levels that naturally occur and can be considered "safe" thresholds or within the range of natural variability patterns for flow alteration using a simple, quick, and relatively inexpensive way to display information on threshold flow levels.
  - May not require any additional fieldwork, although taking flow measurements over winter of watercourses that have year-round flow would help define the timing and magnitudes of flows.
  - Can be applied to whole rivers and is applicable for regional-scale assessments.
  - Useful for situations where the potential risk of impact to aquatic resources is low. (e.g. project is located upstream of fish bearing waters, or where the perceived risk of negatively impacting habitat or species appears low).
  - To provide a statically robust basis of assessment, the use of a minimum of 20 years of river flow data is recommended to establish the "natural flow regime". The GNWT-INF has been constructing the winter road using water sources along the length for over 40 years. This can be considered a significant amount of cumulative water use or flow alteration, in which case the river flows should already be "naturalized" to establish the "natural flow regime" for assessment purposes.
- Science supports the view that natural flow regimes are essential for sustaining fisheries and the ecosystem structure and function which supports them. The probability of effects to riverine ecosystems, and subsequently the fisheries that depend on these ecosystems, increases with increasing alteration to the natural flow regime.
- Ecological/environmental flow frameworks are typically designed with the assumption that some flow remains in the river at any given time, i.e., the frameworks are not directly applicable to intermittent, seasonal, or ephemeral streams and rivers, which would have more site-specific ecological characteristics for provision of ecosystem structures and functions to support fisheries.

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<sup>10</sup> DFO. 2013. Framework for Assessing the Ecological Flow Requirements to Support Fisheries in Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/017.

- Ecological flow requirements for fisheries are defined as: “the flow regimes and water levels required to maintain the ecological functions that sustain fisheries associated with that water body and its habitat”.

## REPORT RECOMMENDATIONS FOR POTENTIAL DRAFT CONDITIONS

### 2004 Dillon EIS Recommendations

1. Restrict refueling activities to areas located at least 100m away from any watercourse.
2. Ensure that machinery is leak-free before use near a watercourse.
3. Develop a **Spill Contingency Plan** for hazardous materials spills, including details of the spill containment and clean-up procedures that will be in place, availability of equipment and supplies.
4. Where highly erodible materials are present at lake or stream approaches, consider installing bank protection and silt fencing or relocation of crossing.
5. Where possible, restrict water removal to isolated waterbodies. Where possible, restrict water removal to non-fish-bearing watercourses.
6. Determine winter volumes and depths of lakes and winter instantaneous stream flows before extraction of water.
7. For lakes, extract water only if water depth is 1.5m greater than ice thickness, and with draw water at a depth greater than 1 m below the ice surface to ensure oxygenated surface water is not removed from lake. Extract no more than 5% of lake volume during any one season.
8. For streams, ensure that only up to 5% of instantaneous flow is removed at any given time.
9. Use of snow fill containing minimal amounts of dirt and debris.
10. Ensure appropriate vehicle maintenance and operational methods (e.g., mufflers, backup alarms, etc.).
11. Post flagging to warn transport drivers of dangerous conditions ahead, which may precipitate accidental spills.
12. Ensure proper signage to educate drivers (e.g., adherence to speed limits) and reduce incidence of collisions.
13. Monitor winter road conditions to ensure that soil is sufficiently frozen and snow is of adequate depth to prevent rutting, compaction, or admixing.
14. Install seasonal culverts at sites with winter flow.

### Recommendations from the TK Reports:

- a. All crossings should be with Traditional names.
- b. Create openings in the snowbanks along the road where traditional trails cross and sign these trails.
- c. No water should be taken from a watercourse with a bridge to safekeep the resource.
- d. Do not take water from Great Bear River, or Jackfish Lake or Creek, Big Smith Creek, Little Smith, Celine (Saline) River, Black Water, Four Mile Creek, Trout Lake due to sacredness.
- e. Local Indigenous Environmental Monitors should be employed to ensure water withdrawals do not affect resources.
- f. Identify beaver lakes and do not take water from them.
- g. No water should be taken from fish lakes.

- h. No heavy equipment should be travelling between Fort Good Hope and Colville Lake until after Christmas. This is the time of the Bluenose West caribou migration in the area and it is important that it not be disrupted. Prior to the winter road to Colville being built three years ago, there was always caribou within thirty kilometres of Fort Good Hope. Now, they do not come in the area. The Elders have been suggesting this at various meetings.
- i. Water should be extracted from muskeg lakes- they have no trees around them and hence, there are no beavers in these lakes.
- j. Along the winter road, there is a need for a wildlife path. Animal crossings or wind rows to be created every five to ten kilometres.
- k. In terms of perspective, every five white miles is equivalent to one Dene mile. If English signs are put along the road, use Dene mileage to show respect for the traditional people of the area.

#### Recommendations from Desktop Assessment of Water Volumes – 2022 for the WVR EA.

##### Recommendations for watercourses:

- Licensing of withdrawal from a watercourse should include a requirement for measurements of instantaneous flow at the time of withdrawal. These flow measurements should be compared to mean annual discharge for each creek to ensure flows are >30%MAD at the time of withdrawal and that withdrawals are <10% of instantaneous flow.
- Pertinent supplemental information for winter MVH withdrawals would be defined by DFO and/or MVLWB. Where not already available, this could take the form of a fish periodicity table, baseline hydrological data, detailed fish habitat modelling, reconnaissance-level fish and fish habitat impact assessment, withdrawal rate limits, limited licence terms, and/or requirements to monitor water use (FLNRORD and ENV 2022).

##### Recommendations for waterbodies:

- In ice covered periods, volumes must meet the minimum of criteria designed to protect littoral habitat (MVLWB 2021a; MVLWB 2021b) and oxygen levels under ice (DFO 2010).
- Candidate lakes where bathymetric data are not available but may have maximum depths greater than 3.0 m were selected based on their surface areas and long axis lengths. The list could be refined by statistically relating surface area, maximum length, and other morphology indicators to maximum depth and lake volume using regional datasets of lakes where bathymetry is known (AEP 2019; Islam et al. 2018).
- In the winter period watercourses that are downstream of large waterbodies continue to flow through winter.

##### Recommendation from Application Document PDR:

- It is not anticipated that there will be potential impacts to the uses of the water sources with the following mitigation measures:
  - using sources that can have enough flow and recharge rate to allow for the water extraction.
  - Following the DFO protocol for winter water withdrawal from ice-covered waterbodies in the NWT and Nunavut.
  - Using an appropriate fish screen on the end of the intake pipe.
  - Following the Spill Contingency Plan and Waste Management Plan.