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To:	Hamlet of Aklavik	**Date:**	July 11, 2017
c:		**Memo No.:**	1
From:	Richard Hoos, M.Sc., R.P. Bio.	**File:**	704-TRN.VHWY03039-01
Subject:	Proposed Aklavik Bridge Project – DFO Self-Assessment		

1.0 INTRODUCTION

In November, 2013 significant changes to the federal *Fisheries Act* (the Act) came into force. In particular, the Act now prohibits works, undertakings or activities that result in serious harm to fish that are part of or could support a commercial, recreational or Aboriginal (CRA) fishery, unless authorized by the Minister of Fisheries and Oceans Canada (DFO 2017).

For the Act to apply there must be a CRA fishery, or a connection to a CRA fishery, in the watershed. The fishery may consist of sport fish, or there may only be forage fish such as minnows present that serve as food for larger-sized fish in the watershed.

As discussed in this Self-Assessment, the creek to be crossed by the proposed Aklavik Bridge is known to be fish-bearing, with sport and forage fish species present for most of the year. The DFO Self-Assessment process allows a qualified Professional Biologist to make a determination on whether or not:

- *Fish are present in the waterbody that are part of or could support a CRA fishery; and*
- *"Serious harm" to fish can be avoided with implementation of mitigation measures.*

DFO provides further interpretation of "serious harm" to fish in their Fisheries Protection Policy Statement:

- *A **permanent alteration** to fish habitat of a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery rearing or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes.*
- *The **destruction of fish habitat** at a spatial scale, duration, or intensity that fish can no longer rely upon such habitats for use as a migration corridor, or any other area in order to carry out one or more of their life processes.*

The Self-Assessment presented in this document was developed for the Hamlet of Aklavik by Mr. Richard Hoos, M.Sc. R.Bio., Principle Consultant, Nehtruh-EBA Consulting Inc., a subsidiary of Tetra Tech Canada.

2.0 FISH AND FISH HABITAT CONSIDERATIONS

The following description of fish and fish habitat considerations for the creek to be crossed by the proposed Aklavik Bridge was drawn directly from the Project Description Report for the Design and Construction of the Proposed Aklavik Bridge – Revision 2, prepared by Nehtruh-EBA Consulting Inc. (Nehtruh-EBA 2014).

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The residents of Aklavik subsistence needs and cultural identity have always been dependent on the availability of fish year-round, along with other sources of nutrition such as caribou and other wildlife. Fish typically occur in any suitable lake, pond, river, and stream throughout the Aklavik traditional use area. The Mackenzie Delta is composed of intermittent to permanent streams, rivers and lakes and which have the potential to be fish bearing during high water events, while others likely supports fish year round.

The Inuvialuit Traditional Knowledge report indicates that many species of fish spawn throughout the Mackenzie Delta, in rivers, creeks, and lakes (Aklavik Community Conservation Plan 2008). Harvesters from Aklavik reported catching enough fish to meet their needs during the 2006-2007 season, but few or no char, herring, or suckers were caught (Arctic Borderlands Ecological Knowledge Society 2008). McLeod (personal communications, January 24, 2013; I. McLeod, R.Kors-Olthof) indicated that residents fish in the lakes for subsistence and bait fish; however, they generally do not fish at the proposed clear-span bridge site.

McLeod (2000) conducted fish and fish habitat assessments in several streams and lakes at and around the site of the proposed creek crossing from 1996 to 1997. A fisheries study was conducted during spring, summer, fall and winter months, using a variety of collection methods, including gill nets, minnow traps, hoop nets, jigging and dip netting. The creek was unsuitable for seine netting during the summer survey, as the water was too deep, and the bottom substrate was too soft and littered with submerged vegetation. Broad whitefish (*Coregonus nasus*), least cisco (*Coregonus sardinella*), northern pike (*Esox lucius*), burbot ("Loche") (*Lota lota*), and ninespine stickleback (*Pungitius pungitius*) species were detected during this time (Table 1).

The majority of the fish caught were juveniles, although, larger adults were observed in the creek through visual surveys. McLeod (2000) indicated the area may provide important fish feeding and rearing habitat. Similarly, this permanent stream likely supports over-wintering northern pike, and evidence from their stomach contents suggests that burbot are available to over-wintering northern pike elsewhere. Results from trapping and netting suggest burbot and broad whitefish likely reside in this permanent creek in the summer, and migrate out prior to winter (McLeod 2000).

The species identified by McLeod (2000) are listed as Secure in the NWT (NTENR 2012). None of the species collected are listed under COSEWIC and/or SARA (COSEWIC 2014) (Government of Canada, 2014). Based on the aquatic habitat available at the proposed bridge location and species ranges, other potentially occurring species may include the dolly varden (*Salvelinus malma*), walleye ("Pickerel") (*Sander vitreus*) and Arctic grayling (*Thymallus arcticus)* (Scott and Crossman 1973) (Table 1). Dolly varden, anadromous and freshwater forms are listed as Sensitive species in the NWT (Special Concern by COSEWIC), and have the potential to occur in the local area in the spring and summer to feed (no spawning or overwintering expected due to lack of spring-fed pools to maintain open water conditions through the winter). Arctic grayling are common in the Mackenzie River and its tributaries and may be found within the proposed project area. Both walleye and Arctic grayling are listed as Sensitive species in the NWT (NTENR 2012).

Inconnu (Coney) (*Stenodus leucichthys*), listed as Sensitive species in the NWT, and occur in the delta; however, they are unlikely to occur in the area of the proposed creek crossing site. Similarly, Shortjaw Cisco (*Coregonus zenithicus*), listed as threatened by COSEWIC (since 2003) and as at risk in the NWT, is found in deep, cold, well-oxygenated lakes, typically occur at depths ranging from 18 to 183 m and are very unlikely to occur within the proposed project area (COSEWIC 2014) (NTENR 2012) (Scott and Crossman 1973).

Table 1: Summary of Fish Species Potentially Occurring in the Aklavik Bridged Creek

Common Name	1996-1997 Fish Survey Results (McLeod 2000)	Spawning Periods (Scott and Crossman 1973)
Broad Whitefish	▪ Captured in the fall at the Aklavik Bridged Creek. ▪ Captured in the summer, fall, and winter from lakes in the local area. ▪ All juveniles captured.	▪ Summer to fall (between July and October)
Least Cisco	▪ None caught at the Aklavik Bridged Creek. ▪ 13 captured from the local area.	▪ Fall (September or October) in sand or gravel bottoms of shallow rivers and lakeshores
Northern Pike	▪ Detected at the Aklavik Bridged Creek and in the local area in summer, fall, and winter. ▪ Most fish aged approximately 2-3 years; however, few additional fish could have been 5 years or older.	▪ Spring, during and immediately after ice-out in heavily vegetated floodplains and bays of watercourses and lakes.
Burbot	▪ Captured at the Aklavik Bridged Creek and in the local area in the fall. ▪ Ages ranged from one to five years. ▪ Total of 216 captured; the most abundant fish species.	▪ Winter, from January to March under the ice. ▪ Primarily spawn in portions of lakes over sand and gravel bottom bays with water up to 3 m deep.
Ninespine Stickleback	▪ 110 fish captured in the fall and winter periods. ▪ Only detected at the Aklavik Bridged Creek.	▪ Summer.
Dolly Varden	▪ None captured	▪ Fall from late August to late October.
Walleye	▪ None captured	▪ Early summer.
Arctic Grayling	▪ None captured	▪ Spring, during ice-out in small streams with small gravel or rocky bottoms.

McLeod (2000) also described the aquatic habitat at the Bridged Creek and downstream lake in the fall of 1996. The water chemistry at the Bridged Creek and the downstream lake were similar, and had low electrical conductivity (ranging from 0.291 to 0.210 (no units provided), low turbidity (ranging from 2-3 NTU), moderate dissolved oxygen levels (ranging from 4.45 to 12.70 milligrams per litre), and cold water temperatures (ranging from 0.1 to 1.6 degrees Celsius). Water velocity measured from the thalwag (point of greatest flow) of the Bridged Creek was 0.1029 m per second (S.E. estimate 0.0036 m per second) (McLeod 2000).

3.0 PROPOSED AKLAVIK BRIDGE PROJECT

The proposed Aklavik Bridge Project was authorized to proceed by the Environmental Impact Screening Committee (EISC) in November 2014. Specifically, the EISC Screening Panel appointed for this project decided that:

> *"The development, if authorized subject to environmental terms and conditions recommended by the Screening Committee, will have no such significant negative environmental impact, and may proceed without environmental impact assessment and review under the Inuvialuit Final Agreement". [IFA s. 11. (17)(b)].*

A copy of this EISC decision is attached.

The following description of the design and proposed construction of the Aklavik Bridge was drawn directly from the Project Description Report for the Design and Construction of the Proposed Aklavik Bridge – Revision 2, prepared by Nehtruh-EBA (2014).

To avoid or minimize potential impacts to fish and fish habitat, the proposed bridge structure is a single-lane, steel girder bridge approximately 33.5 m in length, with a timber deck and timber railings (Nehtruh-EBA 2014). The structure will be supported on ad-freeze (frozen-in) pipe piles at either end, without any part of the structure in the stream. The drilled ad-freeze piling arrangement will be combined with thermo-syphons to mitigate creep of the warm permafrost under the bridge abutments and approaches, as well as mitigating climate-change risks.

Backfill material will be used to create the short trail approaches to get up onto the structure and to cross the stream. The backfill material will be held back with steel bin-walls to reduce the footprint of the fill. Riprap will be placed on the exposed fill and along the toes of the bin-walls, parallel to the stream and extending back along the approaches to protect against erosion. Geotextile will be used under the fill and the riprap as a material separator. Geogrid is proposed to help provide additional strength in the fill structure and reduce creep in the permafrost beneath.

The immediate proposed function of the bridge is to provide a continuous and reliable crossing for the current users of the traditional trail. It is anticipated that ATV and snowmobile use of the proposed bridge will continue during its service life. A minor amount of inspection and maintenance activities would be anticipated during this part of the operational phase of the proposed clear-span bridge. However, the bridge structure and the pile foundation are designed and constructed to support highway loads. The designation under the Canadian Highway Bridge Design Code is CL 800. If, at some time in the future, the traditional trail is upgraded into a public roadway, for example, to access the Willow River Gravel Source, only the railing of the bridge and approaches will require minor upgrades. During use for this purpose, it is expected that plowing of the road and bridge would be needed.

The bridge will be constructed in the winter when the ground is frozen. A winter access will be constructed along the existing winter trail using typical winter trail construction techniques of packed snow and water as needed to support the loads of the construction equipment without damage to the existing ground or stream crossings enroute to the bridge site. Some clearing along the curves of the existing trail alignment will be required to provide for access by larger construction equipment and the vehicles transporting the bridge girders. A few short sections of trail have been identified as having curves that are possibly slightly too tight for some of the bridge girders and/or equipment. The exact lengths and widths of tight areas and associated brushing are to be confirmed by the upcoming topography survey.

It is anticipated that pit-run granular material for backfill and coarse rock for riprap will be supplied and delivered to the Hamlet of Aklavik by local and regional contractors. The material will then be hauled from Aklavik to site along the traditional trail, along the same prepared route as for the bridge materials and equipment.

The construction of the proposed bridge will include the installation of piles and the provision and installation of backfill and riprap materials, followed by the installation/construction of the bridge superstructure. No in-stream work is anticipated. The proposed fill configurations for the abutments and approaches would partly restore some of the terrain disturbed or excavated during previous stream crossing efforts, and would maintain or restore positive drainage on the approaches to preserve or improve fish passage.

4.0 POTENTIAL ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION

The design and construction of the proposed single-lane clear-span bridge and approach works is intended to restore and/or maintain unimpeded fish passage. In addition, construction activities will be restricted to timing windows (winter) identified by DFO for Northwest Territories lakes, rivers and streams to protect fish during spawning and incubation periods for species expected to occur at the proposed creek crossing location.

Based on the McLeod (2000) results from trapping and netting, it is likely that fish present in the creek during the summer migrate out (to deeper waters) prior to winter, when all construction activities are expected to occur. Burbot, the only winter-spawning species known to occur in the local study area, were considered by McLeod (2000) to move out of the creek during winter months. Similarly, burbot prefer to spawn in lakes.

As previously indicated, to avoid and/or minimize potential environmental impacts (harm) to fish and fish habitat, the bridge will be constructed in the winter when the ground is frozen and the creek is ice-covered. In addition, no in-stream work is anticipated to be needed and the proposed fill configurations for the abutments and approaches are designed to maintain or improve fish passage.

Other mitigation measures that will be implemented to avoid/minimize potential impacts (harm) to fish and fish habitat include:

- Effective implementation of the Project Erosion and Sediment Control Plan
- Effective implementation of the Project Spill Contingency Plan
- Effective implementation of the Project Waste Management Plan
- Removal of existing historical creek crossing structures (debris) when the creek is frozen.

In general terms, all work needs to be conducted and completed in such a manner as to prevent the release of silt, sediment or sediment-laden water, construction wastes or other deleterious substances into the waterway or surrounding water bodies. Disturbed areas on and adjacent to the bridge approaches will be re-graded and stabilized by seeding or revegetation with native riparian vegetation and/or the placement of riprap upon completion of the work to prevent surface erosion and/or siltation of the waterway.

As a result, with the implementation of the proposed mitigation measures, it is anticipated that potential effects (harm) to fish and fish habitat related to the construction and future operation of the proposed clear-span bridge can be avoided or minimized and the fishery of this creek can and will be protected.

5.0 CLOSURE

If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

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Attachments:

Decision Letter on the Proposed Aklavik Bridge Project prepared by the Environmental Impact Screening Committee date November 14, 2014, to the Hamlet of Aklavik

REFERENCES

Arctic Borderlands Ecological Knowledge Society. 2008. Arctic Borderlands Ecological Knowledge Co-op Community Reports, 2006 – 2007. Arctic Borderlands Ecological Knowledge Society. Whitehorse, Yukon. 58 pp.

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Water Survey of Canada (WSC), 2014a. Info Notes on Ice Conditions and Data Spikes/Dips. http://www.wateroffice.ec.gc.ca/ice_conditions_e.html. [Accessed August 2014].

WSC, 2014b. Mackenzie River (Peel Channel) Above Aklavik (10MC003), Daily Water Level (m), 1974-2013. http://www.wsc.ec.gc.ca/applications/H2O/graph-eng.cfm?yearb=&yeare=&station=10MC003&report=daily&data=level&year=2013. [Accessed August 2014].

ENVIRONMENTAL IMPACT SCREENING COMMITTEE

November 14, 2014 **Submission Number: [09-14-01]**

Fred Behrens, SAO
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RE: Project Description Report for the proposed Aklavik Bridge

Dear Mr. Behrens,

During a meeting held November 12-14, 2014, the Environmental Impact Screening Committee (EISC) discussed your project proposal, and the state of the Screening Record (Record) as compiled over the screening comment period. The EISC resolved that the Record was complete for the purpose of making an EIS decision, and to close the Record.

After closing the record, the EISC Chair appointed a Screening Panel (Panel) as per the Inuvialuit Final Agreement (IFA) Section 11. (19). The Panel then met to determine if the proposed development could have a significant negative environmental impact, or whether the development, if likely to cause an impact, could have a significant negative impact on present or future wildlife harvesting. After deliberation, the Panel delivered an **11(17)(b)** decision:

> "The development, if authorized subject to environmental terms and conditions recommended by the Screening Committee, will have no such significant negative impact and may proceed without environmental impact assessment and review under the Inuvialuit Final Agreement." [IFA s. 11. (17)(b)]

In reaching this 11(17)(b) decision, the Panel recommends the following:

1 The bridge is to be constructed at the existing crossing site given that the natural habitat has already been disturbed and to reduce disturbance to currently pristine stream banks upstream and downstream.

2 Prior to commencement of physical activities, the Proponent shall develop an Erosion and Sedimentation Control Plan. This plan should include measures to prevent erosion during construction of, and throughout, the lifetime of the bridge.

3 Prior to commencement of physical activities, the Proponent should review all aspects of the Project works, undertakings and activities, and develop a Fish and Fish Habitat Protection Plan that will implement applicable avoidance and mitigation measures as identified in the Fisheries and Oceans Canada document "Measures to Avoid Causing Harm to Fish and Fish Habitat". This document is available on the Fisheries and Oceans Canada website at: http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/index-eng.html

4 Prior to commencement of physical activities, a Fuel/Spill Contingency Plan is to be developed, and should be made available, together with emergency spill kits, at both the

construction and fuel storage sites. It is recommended that fuel be stored in secondary containment to reduce the likelihood of a spill.

5 There is potential for the Proponent to encounter Species at Risk as described in the Species at Risk Act. The Proponent should avoid contact with or disturbance to each species; it's habitat and / or residence, during the construction or maintenance of the proposed bridge.

6 Should delays occur in the Project schedule and construction become likely to continue into the spring and summer when migratory birds may be nesting, the proponent should consult the fact sheet "Planning Ahead to Reduce Risks to Migratory Bird Nests" for advice on avoidance of negative impact to nesting activity. A copy of this fact sheet is provided with this decision letter and is available on the Environment Canada website at: http://ec.gc.ca/Publications/default.asp?lang=En&xml=50C4FE11-801E-4FE3-8019-B2D8537D76C

7 Prior to commencement of physical activities, the Proponent must contact the Aklavik Hunters and Trappers Committee, to update them on the projects goals and how they will be achieved, and to seek their advice on avoiding disturbance of any traditional harvest activities that may be occurring in the project areas.

8 The Proponent must develop a consolidated list of all commitments and associated implementation timelines for the development, including all mitigations measures committed to and/or recommended in this EISC decision letter and provide the same to regulators in support of permit applications.

9 The Proponent must make all representatives (including contractors) conducting operations in the field aware of any mitigation measures associated with the project. All field operations staff should be made aware of the Proponents commitments to these mitigation measures and provided with appropriate advice/training on how to implement these measures.

A copy of the decision form for this file is attached.

If you have any questions on the above decision, please do not hesitate to contact the EISC Coordinator.

Sincerely,

Darrell Christie - EISC Coordinator

Attachments:
1) EISC Decision Form
2) Environment Canada Comment Letter
3) GNWT Department of Environment and Natural Resources Comment Letter
4) Fisheries and Oceans Canada Comment Letter
5) Aklavik Hunters and Trappers Committee Comment Letter/email

cc: EISC Distribution List

EISC Distribution List

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