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SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

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Title - Sujet Strengthening Bridge Design	
Solicitation No. - N° de l'invitation EZ899-210470/A	**Amendment No. - N° modif.** 004
Client Reference No. - N° de référence du client	**Date** 2020-09-16
GETS Reference No. - N° de référence de SEAG PW-$PWY-019-8812	
File No. - N° de dossier PWY-0-43047 (019)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à** 02:00 PM **on - le** 2020-09-18	**Time Zone** **Fuseau horaire** Pacific Daylight Saving Time PDT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☑ **Other-Autre:** ☐	
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Telephone No. - N° de téléphone (604) 671-0219 ( )	**FAX No. - N° de FAX** (604) 775-6633
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:** PWGSC - Lower Liard River Bridge, km 763.3 – Alaska Highway, BC	

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Les documents français seront disponibles sur demande.

This Solicitation Amendment 004 is raised to incorporate Addendum 004, and to incorporate the associated Appendix G – Environmental Overview Assessment.

Please find following Addendum 004, and the associated Appendix G – Environmental Overview Assessment.

All other terms and conditions remain unchanged.

The following changes in the tender documents are effective immediately. This addendum will form part of the Contract documents.

Question numbering is a continuation from previous Addendum(s).

Additional Clarifications for Bidders

Clarification 1: Full-time Qualified Environmental Monitor is required for all on-site activities.

Clarification 2: Contractor must not mobilize to site until a minimum of 45 days after contract award.

Questions from Bidders and Responses

Question 76: Addendum #2, Section 09 97 19, .7 .3 #.1,.2.3.4 shows areas to be stripe coated. Will this be the specification referring to shop coatings or the field coatings?

Answer 76: The specification is for shop-coatings.

Question 77: Will the Contractor be expected to strip paint over alternative galvanized bolts?

Answer 77: The use of hot-dip galvanized bolts is acceptable and shall be in accordance with ASTM F2329 to an average thickness of 50µm. Rotational capacity testing shall be performed in accordance with ASTM F3125 Annex A2. Supplementary nut lubrication to ASTM A563 (S1) is required for hot-dip galvanized bolts. Coating the galvanized bolts is not required. Field coating without strip paint is required on non-galvanized bolts.

Question 78: Will the Client require stripe painting over caulking applied to the new strengthening members?

Answer 78: Stripe painting over caulking is not required.

Question 79: As these are smaller areas that require paint repair, 100mmx200mm, will the Client accept paint coatings to be applied via roller and brush?

Answer 79: Means and methods shall be determined by the Contractor to meet the project requirements and paint specifications.

Question 80: Will the contractor be required to extend paint repairs to the edge of plane on existing steel members?

Answer 80: This is not intended to be a coating contract; however, The drawings indicate that an allowance of 2m2 is required for field coating of areas with local corrosion on contact surfaces. In addition to this 2m2,any areas of coating that is damaged during the strengthening work will require repair and will be considered incidental to the work. The edge of plane shall be included if damaged or if required for the field coating of the damaged plate surface.

Question 81: Will the Client accept tool prepping of paint repairs rather than abrasive blasting?

Answer 81: Surface prepping shall be done in accordance with the contract specifications.

LIST OF REVISED SPECIFICATIONS

LIST OF REVISED DRAWINGS

Drawing Number	Drawing Title	Revision

LIST OF REVISED APPENDICES

G. Environmental Overview Assessment

END OF SECTION

Appendix G - Environmental Overview Assessment

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

LOWER LIARD RIVER BRIDGE, ALASKA HIGHWAY, BRITISH COLUMBIA

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WSP PROJECT NO. 19M-01601-00

SIGNATURES

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PREPARED FOR:
Public Works and Government Services Canada

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APPENDICES

1 INTRODUCTION

1.1 Project Description

The Lower Liard River Suspension Bridge is located at km 763.3 Alaska Highway, BC. The structure was constructed in 1943. The bridge is a two-lane, three-span suspension structure, carrying the Alaska Highway southbound and northbound traffic.

The bridge was first constructed in 1943 with wooden deck. The deck was replaced with concrete in 1975 and stiffening trusses were strengthened in 1976 to increase the load capacity of the bridge. It is also recorded in Structural Evaluation Report dated September 2007 that during the replacement of the deck, cable hangers were not adjusted to reset the deck profile as per the original plans.

During a previous assignment, WSP has evaluated the Lower Liard Suspension Bridge, in accordance with Section 14 of the Canadian Highway Bridge Design Code S6-14 (CHBDC). Several bridge members of the stiffening truss were found to have insufficient capacity to carry the BC Legal Vehicle Load represented by the CLI-625 design load. The results of this evaluation, and WSP's posting recommendations were summarized in the Lower Liard Suspension Bridge, Alaska Highway, km 763.3, Load Rating Report, dated October 19, 2018.

Furthermore, the bridge falls under importance category of "Lifeline Bridge", thus, it is likely that the bridge may be classified as seismic performance category 2 and above. The suspension bridge structure can be classified as an "irregular" bridge. For this bridge classification, the CHBDC recommends a wide range of complex analysis ranging from linear Response Spectrum Analysis (RSA) to Non-linear Time History Analysis (NTHA).

Figures 1 and 2 show the project area overview and site location, respectively.

The proposed work includes strengthening of truss members within the Lower Liard Suspension Bridge by connecting new structural steel sections to existing steel members. To facilitate the structural steel strengthening, there will be some on-site coating (painting). It is anticipated that all work will be carried out from the bridge deck level using suspended access platforms, except for possible works at the ends of the bridge which may be accessible from the ground. There will not be any in-water works. Project laydown areas will be limited to the public works yard that is close to the bridge site. It is anticipated that the shoulders of the highway at approach to the bridge will be used for Contractor parking.

1.2 Objectives

The objectives of the environmental overview report are to conduct a desktop review of fisheries, wildlife and vegetation resources in the vicinity of the project site. The following tasks are were completed and included in this report:

- Summarize results of the desktop information review;
- Assess potential project effects on identified environmental resources;
- Confirm potential permits and approvals required; and
- Describe best management practices and example mitigation measures.

2 METHODOLOGY

2.1 Study Area

The Project study area for the fisheries, wildlife and vegetation desktop information review, shown in Figures 1 and 2, was defined as the area directly affected by the Project (Project footprint) plus a 150 m buffer (300 m diameter) around the Project (Project area). The fisheries review includes the Liard River, which is spanned by the Liard River Suspension Bridge. The wildlife and vegetation review includes a summary of the rare and sensitive species and habitat identified adjacent to the 150 m buffer to ensure environmental resources potentially affected by Project activities, associated with construction and operations, where addressed.

The Project area (150 m on either side of the Liard River Suspension Bridge) falls outside the Liard River Hot Springs Provincial Park, which is located on the north side of the bridge on both sides of the Alaska Highway (Figure 2).

2.2 Desktop Review

The desktop information review focused on describing fish, vegetation and wildlife species that have the potential to occur in the Project area. A variety of literature sources were reviewed including the following websites:

- iMapBC (DataBC, 2020) https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc;
- TRIM mapping at 1:20,000 scale (Geo BC 2020) Map Tile 094M050 http://apps.gov.bc.ca/pub/dmf-viewer/?siteid=5628311639164388216;
- Biogeoclimatic Ecosystem Classification (BEC) Web (BC Ministry of Forests and Range, 2020) https://www.for.gov.bc.ca/hre/becweb/resources/maps/FieldMaps.html;
- Conservation Data Centre (Government of BC 2020) https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre
- Habitat Wizard (Government of BC 2020) https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/habitatwizard
- Aquatic Species at Risk Map (Fisheries and Oceans Canada [DFO] 2020) https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html
- E-Flora (E-Flora BC, 2020) https://ibis.geog.ubc.ca/biodiversity/eflora/;
- Important Bird Areas Canada (Bird Studies Canada, 2020) https://www.ibacanada.org/explore_how.jsp?lang=en
- Provincial Priority Invasive Plant List (Province of British Columbia 2020) https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/priority-species/priority-plants/plants-table;
- Species-specific COSEWIC and *SARA* documents:

- Committee on the Status of Endangered Wildlife in Canada Status Reports (COSEWIC, 2020) http://www.cosewic.ca/index.php/en-ca/;
- *Species at Risk Act* reports (*SARA*, 2020) https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html;

2.3 Definitions used to Describe Species of Conservation Interest

The potential occurrence of fish, vegetation and wildlife species within the Project area identified as being of conservation interest (i.e. rare and sensitive) are identified using the COSEWIC and British Columbia's Red, Blue and Yellow rating status defined below.

COSEWIC ratings for species have been defined in the following ways:

- Extinct - A species that no longer exists.
- Extirpated - A species that no longer exists in the wild in Canada, but occurring elsewhere (for example, in captivity or in the wild in the United States).
- Endangered - A species facing imminent extirpation or extinction.
- Threatened - A species likely to become endangered if limiting factors are not reversed.
- Special Concern - A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.

Red, Blue and Yellow status as defined by the B.C. Conservation Data Centre's are as follows (BC Ministry of Sustainable Resource Management, 2002):

- Red list - Includes any indigenous species or subspecies (taxa) considered to be Extirpated, Endangered, or Threatened in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Red-listed taxa include those that have been, or are being, evaluated for these designations.
- Blue List - Includes any indigenous species or subspecies (taxa) considered to be Vulnerable in British Columbia. Vulnerable taxa are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened.
- Yellow list - This comprises any indigenous species or subspecies (taxa) which is not at risk in British Columbia. The CDC tracks some Yellow listed taxa which are vulnerable during times of seasonal concentration (e.g. breeding colonies).

The Conservation Data Centre (CDC) maintains tracking lists of rare vertebrates, for each Forest District in British Columbia. Species, subspecies, populations, or communities at high risk of extinction or extirpation are placed on the red list, while those considered vulnerable are placed on the blue list.

3 EXISTING CONDITIONS

3.1 Fish and Fish Habitat

The fisheries information collected through literature review was compiled to document known or potential fish species presence and their distribution within the Project area. WSP understands that the proposed Project is limited to the existing bridge structure and will not directly affect the Liard River or adjacent riparian environment.

As this is a high-level environmental overview, Table 1 and Figure 3 summarizes fish species observed within the general Liard River system as well as observations recorded for fish species within the Project area (150 m buffer) and surrounding environment. The definitions used to describe species of conservation interest including provincial status, BC listings and COSEWIC is provided above in Section 2.3.

Table 1 Fish Species Present in the Liard River and Associated Conservation Interest

Common Name	Scientific Name	BC Listing	COSEWIC	Date Observed	Project Area (150 m Buffer)	1 km Buffer	Liard River
Arctic grayling	*Thymallus arcticus*	Yellow	na	2013-07-10	Yes	Yes	Yes
Artic cisco	*Coregonus autumnalis*	na	na	1998-04-01	-	-	Yes
Artic lamprey	*Lethenteron camtschaticum*	na	na	1998-04-01	-	-	Yes
Bull trout	*Salvelinus confluentus*	Blue	SC (2012)	1981-01-01	Yes	Yes	Yes
Burbot	*Lota lota*	Yellow	na	2013-07-10	-	Yes	Yes
Carp	*Cyrinus carpio*	na	na	1982-04-01	-	-	Yes
Char, general	*Salvelinus sp.*	na	na	2013-07-10	-	-	Yes
Chinook salmon	*Oncorhynchus tshawytscha*	na	T/SC (2018)	1983-01-01	-	-	Yes
Chum salmon	*Oncorhynchus keta*	na	na	1998-04-01	-	-	Yes
Dolly varden	*Salvelinus malma*	Yellow	na	1998-03-01	Yes	Yes	Yes
Finescale dace	*Chrosomus neogaeus*	Yellow	na	2013-07-10	-	Yes	Yes
Flathead chub	*Platygobio gracilis*	Yellow	na	2002-03-01	-	-	Yes
Goldeye	*Hiodon alosoides*	Blue	na	2002-03-01	-	-	Yes
Inconnu	*Stenodus leucichthys*	Blue	na	2002-03-01	-	-	Yes

Common Name	Scientific Name	BC Listing	COSEWIC	Date Observed	Project Area (150 m Buffer)	1 km Buffer	Liard River
Lake chub - Liard Hot Springs Populations	*Couesius plumbeus pop. 2*	Red	T (2018)	2013-07-10	Sub species na	Sub species na	Yes
Lake chub	*Couesius plumbeus*	Yellow	DD	2013-07-10	Sub species na	Sub species na	
Lake whitefish	*Coregonus clupeaformis*	Yellow	na	2002-03-01	-	Yes	Yes
Largescale sucker	*Catostomus macrocheilus*	Yellow	na	2002-03-01	-	-	Yes
Longnose dace	*Rhinichthys cataractae*	Yellow	na	1998-03-01	-	Yes	Yes
Longnose sucker	*Catostomus catostomus*	Yellow	na	2013-07-10	Yes	Yes	Yes
Mountain whitefish	*Prosopium williamsoni*	Yellow	na	2013-07-10	Yes	Yes	Yes
Northern pearl dace	*Margariscus margaritai*	na	na	1980-03-01	-	-	Yes
Northern pike	*Esox lucius*	Yellow	na	2013-07-10	-	Yes	Yes
Pygmy whitefish	*Prosopium coulteri*	Yellow	NAR (2016)	2013-07-10	-	-	Yes
Rainbow trout, general	*Oncorhynchus mykiss*	Yellow	na	1998-04-01	-	-	Yes
Round whitefish	*Prosopium cylindraceum*	Yellow	na	1998-04-01	-	-	Yes
Slimy sculpin	*Cottus cognatus*	Yellow	na	2013-07-10	Yes	Yes	Yes
Spoonhead sculpin	*Cottus ricei*	Yellow	na	2002-03-01	-	-	Yes
Trout-perch	*Percopsis omiscomaycus*	Yellow	na	2002-03-01	-	-	Yes
Walleye	*Sander vitreus*	Yellow	na	2002-03-01	-	-	Yes

Notes: na – not applicable; "-" not observed

One red listed species, Lake chub - Liard Hot Springs Populations, was identified within 1 km of the Project area. Three blue listed fish species, Bull trout, Goldeye and Inconnu, are known to inhabit the Liard River, but only Bull trout have been observed in the Project area. There are nineteen yellow listed species with ten observed within 1 km of the Project area. Four species are also listed federally by COSEWIC including Lake chub - Liard Hot Springs Populations, Chinook salmon, Bull trout and Pygmy whitefish. Detailed research and a field survey would be required to determine with more certainty the potential presence of fish species within the Project area.

3.2 Vegetation

The Project is located in the Boreal White and Black Spruce Moist Cool (BWBSmk) biogeoclimatic zone. The BWBS zone is the largest forested zone in BC covering 16.3% of the province. It occurs on the Alberta plateau in northeastern BC and in the main valleys west of the Rocky Mountains. The BWBSmk extends over approximately 9 million ha and covers the undulating terrain and lowlands of the Alberta Plateau from near the northern extent of the Beatton River in the south, to the Northwest Territories and Yukon borders in the north (BC Ministry of Forests and Range, 2011). It also extends along the flat to gently rolling landscape of the Liard Plateau, Liard Plain, and Dease Plateau from the northern edge of the Rocky Mountains northwest to the Yukon border.

The Project area is located in the Liard Plain, an extensive area of low relief west of the Liard Plateau within the drainage of the Liard River ranging in elevations largely between 750 and 1050 m. Wetlands dominate the western portion of the Liard Plain while the eastern portion is dominated by upland forests intersected by rich alluvial forests along the major rivers (BC Ministry of Forests and Range, 2011). Upland forests are typically mixtures of trembling aspen and white spruce. Forested wetlands are dominated by black spruce or (less commonly) tamarack, while the non-forested wetlands are often typified by scrub birch or sedges. River terraces are dominated by balsam poplar on the lower benches and white spruce on the higher benches. Localized stands of paper birch occur on moist rich sites. In older stands, lodgepole pine occasionally occurs in pure stands on dry fluvial ridges or in combination with black spruce on poorer upland sites. Lodgepole pine also occurs extensively in seral stands in the eastern portion of the BWBSmk (BC Ministry of Forests and Range, 2011). A summary of the vegetation that occurs in the BWBSmk subzone and may occur in the Project area is summarized in Table 2.

Table 2 Vegetation Typically Occurring within the Boreal White and Black Spruce Moist Cool (BWBSmk)

Common Name	Scientific Name
Trees	
Lodgepole pine	*inus contorta*
Black spruce	*Picea mariana*
White spruce	*Picea glauca*
Shrubs	
Soopolallie	*Shepherdia canadensis*
Labrador tea	*Ledum groenlandicum*
White spruce	*Picea glauca*
Prickly rose	*Rosa acicularis*
Highbush-cranberry	*Viburnum edule*
Mountain alder	*Alnus incana*
Herbs and Dwarf Shrubs	
Kinnikinnick	*Arctostaphylos*
Fuzzy-spiked wildrye	*Leymus innovatus*
Lingonberry	*Vaccinium vitis-idaea*
False toad-flax	*Geocaulon lividum*
Twinflower	*Linnaea borealis*
Bunchberry	*Cornus canadensis*
Tall bluebells	*Mertensia paniculata*
Common mitrewort	*Mitella nuda*

Common Name	Scientific Name
Horsetails	*Equisetum spp.*
Pink wintergreen	*Pyrola asarifolia*
Trailing rasberry	*Rubus pubescens*
Mosses and Lichens	
Reindeer lichens	*ladina spp.*
Clad lichens	*Cladonia spp.*
Freckle pelt	*Peltigera aphthosa*
Red-stemmed feathermoss	*Pleurozium schreberi*
Step moss	*Hylocomium splendens*
Knight's plume	*Ptilium crista-castrensis*

3.2.1 Rare/Sensitive Vegetation and Ecological Communities

A summary of the rare / sensitive plant species, as documented by the BC Ministry of Sustainable Resource Management, is provided in Table 3 below and shown in Figure 4. The three records referenced in Table 3 are rated as historical observations.

Table 3 Vegetation Species Considered "at Risk" under Provincial and / or Federal Legislation that may Inhabit the Project Area

Common Name	Scientific Name	BC Listing	COSEWIC	Last Date Observed	Project Area (150 m Buffer)	1 km Buffer
Taimyr campion	*Silene ostenfeldii*	Yellow	na	1960-06-26	-	Yes
Yukon lupine	*Lupinus kuschei*	Yellow	na	1971-08-18	-	Yes
Davis' locoweed	*Oxytropis campestris var. davisii*	Blue	na	1960-07-28	-	Yes

Notes: na – not applicable; "-" not observed

No vegetation species considered rare or sensitive have been documented within the Project area (150 m buffer). One yellow (Yukon lupine), and one blue (Davis'locoweed) listed vegetation species are located within 1 km east of the Project area, while one yellow listed species (Taimyr campion) is located more than 4 km to the northeast.

3.2.2 Invasive Plant Species

Between 2006 and 2019 several invasive plant species have been observed and reported to the BC Invasive Alien Plant Program (IAPP) along the Alaska Highway near the Project area including Oxeye daisy (*Leucanthemum vulgare*), Canada thistle (*Cirsium arvense*), Scentless chamomile (*Matricaria perforate*) and Common tansy (*Tanacetum vulgare*).

3.3 Wildlife

The Fort Nelson Lowland, located within the BWBSmk biogeoclimatic zone, provides habitat for wintering populations of caribou, black bear, and furbearers, especially lynx, marten, beaver, and muskrat (BC

Ministry of Forests and Range, 2011). Moose are more commonly found along the riparian areas. The numerous wetlands support large populations of waterfowl, such as Mallard, Northern Pintail, Blue-winged Teal, and Northern Shoveler; and shorebirds, such as Yellowlegs, Common Snipe, Semipalmated Plover, and Wilson's Phalarope. The riparian habitats and southerly facing aspen forests adjacent to the Rocky Mountain foothills in the Muskwa River drainage provide year-round habitat for Rocky Mountain elk, moose, mule deer, white-tailed deer, grizzly bear, and gray wolf (BC Ministry of Forests and Range, 2011). A summary of the wildlife that occurs in the BWBSmk subzone and may occur in the Project area is summarized in Table 4.

Table 4 Wildlife Species Considered "at Risk" under Provincial and / or Federal Legislation that may Inhabit the Project Area

Common Name	Scientific Name
Mammals	
Grizzly bear	*Ursus arctos horribilis*
Black bear	*Ursus americanus*
Gray wolf	*Canis lupus*
Caribou	*Rangifer tarandus*
Wood bison	*Bison bison athabascae*
Moose	*Alces alces*
Rocky Mountain elk	*Cervus canadensis nelsoni*
Lynx	*Lynx canadensis*
Marten	*Martes americana*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*Odocoileus virginianus*
Beaver	*Castor canadensis*
Porcupine	*Erethizon dorsatum*
Muskrat	*Ondatra zibethicus*
Northern long-eared myotis	*Myotis septentrionalis*
Meadow jumping mouse	*Zapus hudsonius*
Western jumping mouse	*Zapus princeps*
Meadow vole	*Microtus pennsylvanicus*
Arctic shrew	*Sorex arcticus*
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Black-throated green warbler	*Setophaga virens*
Canada warbler	*Cardellina canadensis*
Canada goose	*Branta canadensis*
Ruffed grouse	*Bonasa umbellus*
Eastern phoebe	*Sayornis phoebe*
Northern waterthrush	*Parkesia noveboracensis*
American redstart	*Setophaga ruticilla*
Reptiles and Amphibians	
Common garter snake	*Thamnophis sirtalis*
Western garter snake	*Thamnophis elegans*
Western toad	*Anaxyrus boreas*
Long-toed salamander	*Ambystoma macrodactylum*

3.3.1 Rare/Sensitive Wildlife and Associated Wildlife Habitat

Table 5 and Figure 4 summarizes the Conservation Data Center species at risk map results, which identified four wildlife species considered "at risk".

Table 5 Wildlife Species Considered "at Risk" under Provincial and / or Federal Legislation that may Inhabit the Project Area

Common Name	Scientific Name	BC Listing	COSEWIC	Last Date Observed	Project Area (150 m Buffer)	1 km Buffer
Caribou	*Rangifer tarandus* pop. 15	Blue	SC (2014)	Rabbit: 2007 Muskwa: 2004	Yes No	Yes Yes
Wood Bison	*Bos bison athabascae*	Red	SC (NOV 2013)	2004	Yes	Yes
Northern myotis	*Myotis septentrionalis*	Blue	E (2013)	1995-06-18	-	Yes
Plains forktail	*Ischnura damula*	Red	na	2001-11-27	-	Yes

Notes: na – not applicable; "-"not observed

Two populations of Caribou (Northern Mountain Population) inhabit the Project area. The Rabbit herd was last observed in 2007 south of the Liard River, west of the Kechika River and east of Muncho Lake. The Muskwa herd was last observed in 2004 west of Fort Nelson, south of Liard River and east of Muncho Lake. Northern Woodland Caribou live in west-central and northern British Columbia. During winter, these caribou use low elevation forests or windswept alpine ridges where they crater for terrestrial lichens. They also feed on arboreal lichens during winter but to a lesser extent than on terrestrial lichens. (BC CDC 2020)

The provincially red listed insect, plains forktail, was observed / collected between 1957-2001 from an area associated with the hot springs within the Liard Hot Springs Provincial Park and the Northern myotis bat was observed more than 4 km east of the Project area within the Provincial Park.

According to the DFO Aquatic Species at Risk Map, one red listed species at risk and it's associated Critical Habitat has been documented greater than 1 km north of the Project area (Figure 2). The small snail Hotwater Physa (*Physella wrighti*) is an endemic species living only within the hot springs complex located in Liard River Hot Springs Provincial Park (Species at Risk Public Registry 2020).

3.3.2 Important Bird Areas

The closest important bird area is Kotcho Lake, located more than 200 km east of the Project.

4 POTENTIAL PROJECT INTERACTIONS

4.1 Potential Effects

High-level potential project interactions are summarized in Table 6 below and may include:

- Direct and indirect effects to birds;
- Indirect effects to wildlife;
- Indirect effects to fish and fish habitat; and
- Effects to water quality (discharge of deleterious substances)

Table 6 Project Activities and Potential Effects

Project Activities	Potential Effect
– strengthening of truss members from the bridge deck and on-site painting	– direct mortality, physical injury or behavioral change to birds due to habitat disturbance or removal of nests – direct / indirect effects to listed rare / sensitive wildlife species due to Project noise
– accidental spills	– degradation in aquatic habitat due to release of deleterious substance into the Liard River

For the purpose of this environmental overview assessment it has been assumed that Project activities will not cause erosion or the release of sediment to the Liard River.

4.2 Permits and Approvals

As the scope of the Project is limited to strengthening the truss members from the bridge deck and on-site painting, potential direct effects to the environment during planned Project activities are considered negligible with the implementation of appropriate mitigation measures. Consequently, it is recommended that the appropriate regulatory agencies be contacted, and the scope of work discussed in detail to determine if any permits are required.

Table 7 summarizes potential permitting requirements that may be required in the event the scope changes and Project activities expand to include any activities that directly disturb or adversely affect the adjacent terrestrial, riparian or aquatic environments.

Table 7 Potential Permits and Approvals

Potential Project Activity	Potential Permits and Approvals	Timing Constraints and Considerations
– Removal or degradation of sensitive vegetation / wildlife habitat	– Discuss with regulators permitting requirements based on Project scope and results of field studies	– Detailed field surveys for environmental assessment of rare / sensitive species identified as potentially located within Project footprint – Federal and provincial notifications both take at least 3 months from date application is submitted to issue the approval
– Riparian area / instream works	– DFO Request for Review, potentially a Letter of Authorization under paragraph 35(2) of the *Fisheries Act* – BC *Water Sustainability Act* Section 11 Notification – Fish Salvage Permit – *Canadian Navigable Waters Act* Notification / Permit may be required depending on proposed changes to any water crossings.	– DFO - 60-day time limit to review an application to determine whether the required information has been submitted, and a 90-day time limit form the date of notification that the application is complete to issue the authorization (additional time would be required if Habitat Offsetting is required) – *Water Sustainability Act* notification estimated to be 140 days however this can be longer in the Lower Mainland – Confirm the reduced risk work window for the Project area depending on the fish species present, ranges between July 15 and August 15 for the Northeast Region (BC Ministry of Environment 2016) – The target time for issuing a fish salvage permit is 30 days however processing time may be considerably longer if there is a required consultation process

4.3 Mitigation Measures

Mitigation will be required that protects the environment and satisfies permit and approval requirements. Mitigation measures will need to address the potential effects of all stages of the construction, as well as on-going operations. A Construction Environmental Management Plan (CEMP) and various other environmental protection plans will need to be developed, the level of detail for which will be determined by the contractor based on specific Project activities. Table 8 provides a summary of example Protection Plans that may be required. Construction activities should be monitored full-time during the project start-up. The environmental monitor should be an appropriately trained Qualified Environmental Professional (QEP) and be provided with written authority to modify and/or halt any construction activity if deemed necessary to protect fish and wildlife. Subsequent visits will be based on the site conditions and project activities and the level of risk identified by the QEP. A pre-construction meeting is recommended between the environmental monitor and the contractor to ensure an understanding of the environmental protection plan.

Table 8 Protection Plans that may be Required

Project Activity	Environmental Protection Plans that may be Required
– Vehicle and equipment movement and maintenance – Bridge rehabilitation activities	– CEMP which includes best management practices for construction / rehabilitation activities and specifically outlines protection measures for avoiding effects to the Liard River and adjacent riparian / forest environments. – Spill Response Plan (specifically outlining protection measures that limit the use and discharge of deleterious substances used for bridge rehabilitation / construction activities) – Contractor Environmental Protection Plan (EPP)

Protection of Migratory Birds

Due to the proximity of the Liard River there is the potential for various bird species to visit the Project area. There is the potential for rare or sensitive bird species to inhabit the Liard River Suspension Bridge and adjacent habitat. The Provincial *Wildlife Act* provides protection for the eggs and active nests of all birds during breeding season. Section 34 of the *Act* states "A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:

(a) a bird or its egg;
(b) the nest of eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl; or
(c) the nest of a bird not referred to in paragraph(b) when the nest is occupied by a bird or its egg."

By default, protection of nests includes the protection of the trees containing them. Subsections 34(a) and (c) have generally been interpreted to protect the active nests of all birds during breeding season, which can begin in February and continue through August 15. The nests of the six birds listed in subsection (b) of the Provincial *Wildlife Act* are protected regardless of the time of year, or whether or not they are active. The general provincial breeding bird window for the Project area is from mid April to mid August (Birds Canada. 2020). At the Federal level the *Migratory Birds Convention Act* (1994) provides similar protection for all migratory birds. The general migratory bird breeding bird season for the Project area, which is located within the arctic plains and mountains nesting zone, is mid-May to mid-August (Government of Canada 2020). These nesting windows, which are provided for information purposes, must be confirmed with the local regulators and taken into consideration when scheduling Project activities.

Protection of Wildlife

The proximity of the Project to the natural range of the Northern Woodland Caribou, there is potential for construction noise to have a negative effect on either the Rabbit Herd, or the Muskwa herd, depending on the time of year. Prior to development of the EPP, local regulators and wildlife officers should be consulted to confirm appropriate timing windows and mitigation strategies.

Invasive Plant Species Management

The Project area contains several invasive plant species, the spread of which should be mitigated to the extent possible. An invasive plant management plan will be required that includes:

- Limiting the introduction of invasive plant via seed or runners
- Early detection and eradication of small patches of invasive plants
- Maintaining desired plant communities through good management
- Revegetating disturbed sites with desired plants

- Evaluating the effectiveness of prevention efforts and adapting plans for the following year.

Spill Prevention

A Project specific Spill Prevention Plan will be required that consists of the following elements:

- Activities that carry a risk of materials' spills should take place within a bermed staging area. These activities include mixing concrete or other materials, any vehicle fuelling, and other maintenance of equipment that is done on site;
- Any areas where vehicle fuels or other potentially deleterious substances are stored should be equipped with impervious containment berms. If fuel tanks larger than 250 L are present within a berm, the bermed area should have a holding capacity equal to 125% of the capacity of the largest tank;
- Storage and maintenance facilities should have spill clean-up and disposal equipment. They also should have Medical Safety Data Sheets (MSDS) for any hazardous substances, a list of emergency contact names and telephone numbers, and a written list of emergency response and spill-reporting procedures;
- Mobile construction equipment should be fuelled, lubricated and serviced only at these approved locations;
- If a spill does occur, it should immediately be reported to the environmental monitor and to the Provincial Emergency Program (1-800-663-3456). Written notification should follow within two weeks of the verbal report;
- If a spill does occur, site personnel should immediately take steps to stop the discharge (if possible). As quickly as possible, they should contain the spill, clean up the affected area and dispose of waste materials at an approved disposal site;
- All hydraulic systems, fuel systems and lubricating systems should be in good repair;
- Equipment should be inspected before commencing work. Equipment with fuel or fluid leaks should not be permitted to work within or above any watercourse. Any equipment that develops a leak should immediately be removed from the watercourse and repaired;
- Before commencing work, all equipment should be steam-cleaned to remove oil, grease and other substances deleterious to aquatic life; and,
- Equipment should use only biodegradable hydraulic fluid.

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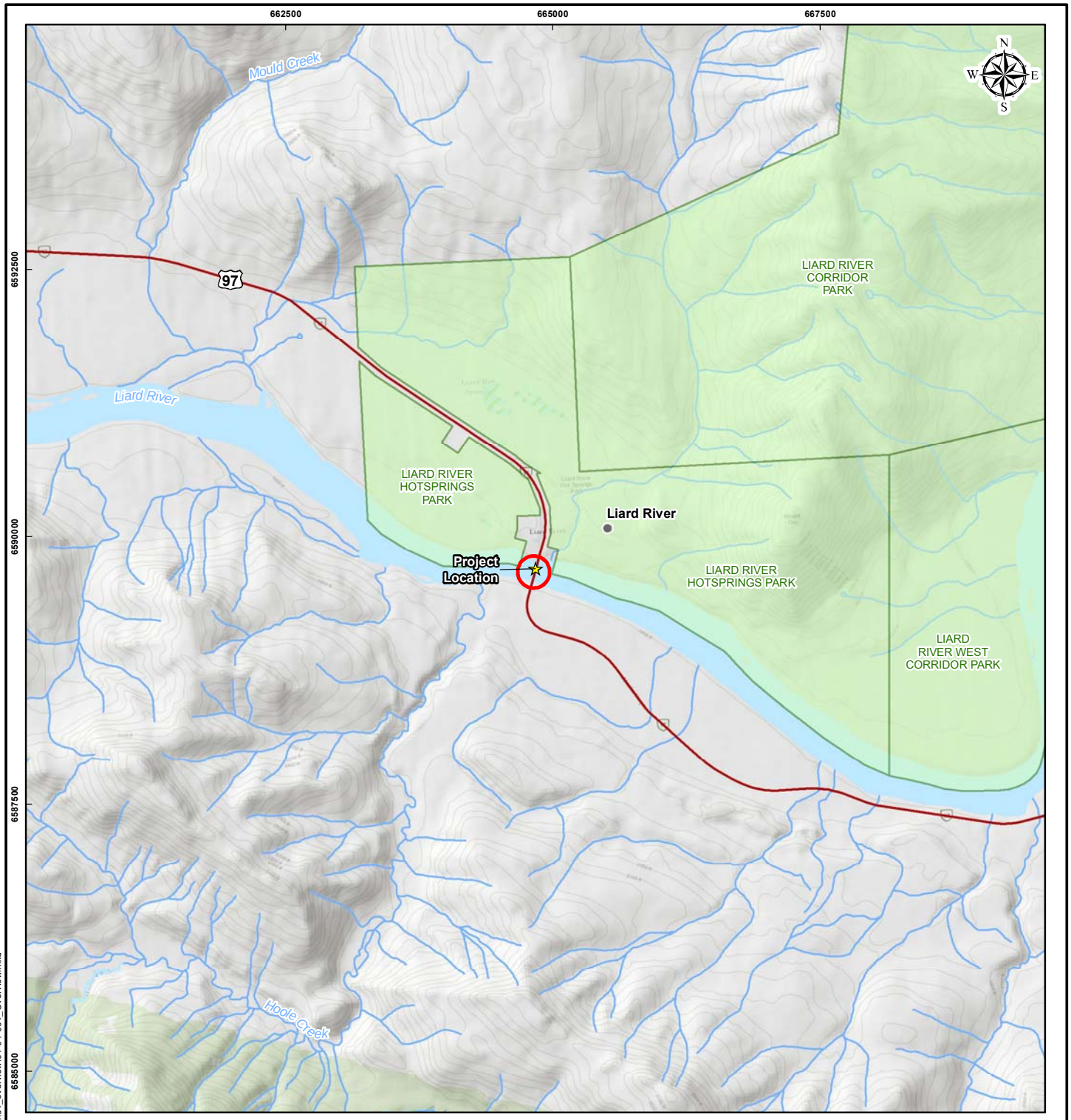
APPENDIX

FIGURES



Legend

- Project Location
- Populated Place
- Watercourse
- Waterbody
- Wetland
- Provincial Park
- Study Area

0 0.5 1 Kilometers

Scale: 1:50,000

References:
Data BC - BC Catalogue
Open Government License
(http://www.data.gov.bc.ca/)
NRCAN Geogratis
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(http://geogratis.cgdi.gc.ca/)

CLIENT: Public Services and Procurement Canada		
PROJECT: Lower Liard Environmental Overview Report		
TITLE: Overview Map		
DATE: August 28, 2020	PROJECT NO: 19M-01601-00	**Figure 1**
GIS FILE: 01-01-001_Overview.mxd		
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N	ANALYST: MY	REVIEWED: SB

Y:\GIS\Projects\2019\19M-01601-00_Lower_Liard\Mapping\01_general\01_overview\01-01-001_Overview.mxd

Legend

- Watercourse
- Waterbody
- Provincial Park
- Study Area

0 50 100 Meters

Scale: 1:2,500

References:
Data BC - BC Catalogue
Open Government License
(http://www.data.gov.bc.ca/)
NRCAN Geogratis
Open Government License
(http://geogratis.cgdi.gc.ca/)

CLIENT: Public Services and Procurement Canada		
PROJECT: Lower Liard Environmental Overview Report		
TITLE: Site Location		
DATE: August 28, 2020	PROJECT NO: 19M-01601-00	**Figure 2**
GIS FILE: 01-01-002_Site_Location.mxd		
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N	ANALYST: MY	REVIEWED: SB

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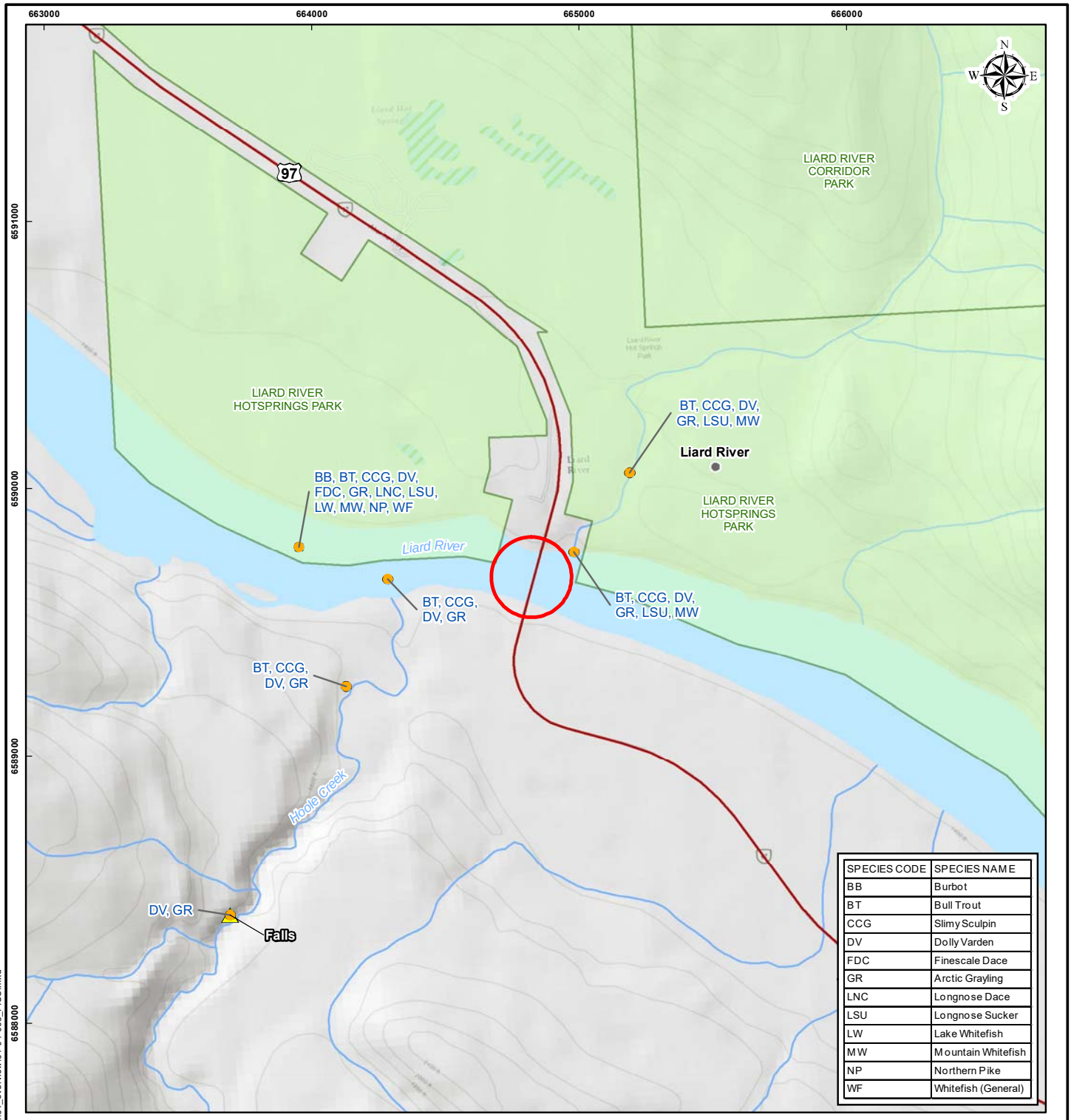

SPECIES CODE	SPECIES NAME
BB	Burbot
BT	Bull Trout
CCG	Slimy Sculpin
DV	Dolly Varden
FDC	Finescale Dace
GR	Arctic Grayling
LNC	Longnose Dace
LSU	Longnose Sucker
LW	Lake Whitefish
MW	Mountain Whitefish
NP	Northern Pike
WF	Whitefish (General)

Legend

- FISS Point
- FISS Obstacle
- Watercourse
- Waterbody
- Wetland
- Provincial Park
- Study Area

0 100 200 300 400 500 Meters

Scale: 1:20,000

References:
Data BC - BC Catalogue
Open Government License
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NRCAN Geogratis
Open Government License
(http://geogratis.cgdi.gc.ca/)

CLIENT:
Public Services and Procurement Canada

PROJECT:
Lower Liard Environmental Overview Report

TITLE:
FISS
(Fisheries Information Summary System)

DATE:	PROJECT NO:	
August 28, 2020	19M-01601-00	**Figure 3**

GIS FILE: 01-01-003_FISS.mxd

COORDINATE SYSTEM:	ANALYST:	REVIEWED:
NAD 1983 UTM Zone 9N	MY	SB

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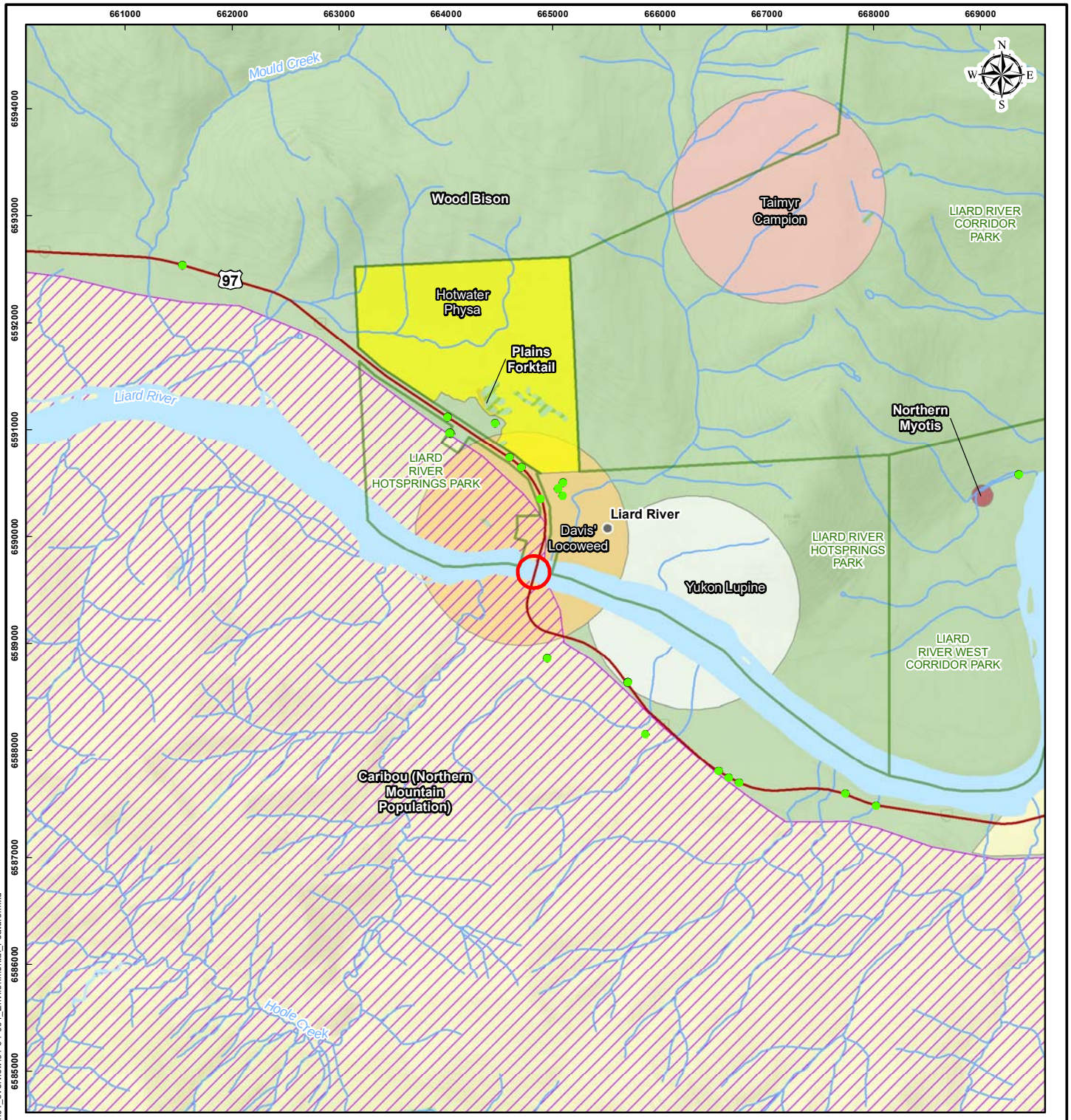

Legend

- IAPP Invasive Plant Observation
- Watercourse
- Waterbody
- Wetland
- Provincial Park
- Study Area
- Caribou Herd (Rabbit)
- Hotwater Physa (Endangered)

CDC Non Sensitive (Plant)
- Davis' Locoweed
- Taimyr Campion
- Yukon Lupine

CDC Non Sensitive (Animal)
- Northern Myotis
- Plains Forktail
- Wood Bison
- Caribou (Northern Mountain Population)

0 0.5 1
Kilometers
Scale: 1:50,000

References:
Data BC - BC Catalogue
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(http://www.data.gov.bc.ca/)
NRCAN Geogratis
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(http://geogratis.cgdi.gc.ca/)

CLIENT:	Public Services and Procurement Canada
PROJECT:	Lower Liard Environmental Overview Report
TITLE:	Environmental Features
DATE: September 03, 2020	PROJECT NO: 19M-01601-00
Figure 4	
GIS FILE: 01-01-004_Environmental_Feature.mxd	
COORDINATE SYSTEM: NAD 1983 UTM Zone 9N	ANALYST: MY / REVIEWED: SB

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