Highway 95 Kicking Horse River Bridges 1 & 2

Preliminary Environmental Impact Assessment Report

Ministry of Transportation and Infrastructure

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Disclaimer

This report is rendered solely for the use of the Ministry of Transportation and Infrastructure (MOTI) in connection with the Highway 95 Kicking Horse River Bridges 1 & 2 project (the Project), and no person may rely on it for any other purpose without Triton Environmental Consultants Ltd.'s (Triton) prior written approval. Should a third party use this report without Triton's approval, they may not rely upon it. Triton accepts no responsibility for loss or damages suffered by any third party as a result of decisions made or actions taken based on this report.

- The objective of this report is to address the following scope requirements:
    - Provide an Environmental Impact Assessment for the Project;
    - Provide design recommendations to minimize impacts to aquatic and terrestrial resources within the study area; and
    - Provide mitigation strategies that focus on adhering to relevant best management practices.
- This report is based on facts and opinions contained within the referenced documents and facts. We have attempted to identify and consider relevant facts and documents pertaining to the scope of work, as of the time period during which we conducted this analysis. However, our opinions may change if new information is available or if information we have relied on is altered.
- We applied accepted professional practices and standards in developing and interpreting data obtained by our field measurement, sampling, and observation. While we used accepted professional practices in interpreting data provided by Associated Engineering or third party sources we did not verify the accuracy of data provided by Associated Engineering or third party sources.
- This report should be considered as a whole and selecting only portions of the report for reliance may create a misleading view of our opinions.

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1.0 Introduction

1.1 Project Purpose and Overview

Triton Environmental Consultants Ltd. (Triton) was retained by the BC Ministry of Transportation and Infrastructure (MOTI) to complete a Preliminary Environmental Impact Assessment (EIA) of the Highway 95 Kicking Horse River Bridges 1 & 2 project (the Project). The Project involves construction of a new two span bridge with a pier on Gould Island and a new single span bridge to allow access for patrons to the Island Restaurant and demolition of the two existing bridge structures. This bridge has been identified as a priority project within the corridor as this is the only road crossing of the Kicking Horse River in Golden, BC. The low clearance of the bridge has caused ice and debris jams resulting in bridge closures in the past and ongoing maintenance concerns. The proposed alignment of the new Kicking Horse River crossing is located approximately 40 m east (upstream) of the existing bridge. Proposed activities include the following:

- Construction of a new two span bridge with higher vertical clearance for clear water at peak flows, debris and ice flow passage; inclusion of multi-use pedestrian/cyclist path on the bridge deck; and inclusion of a pathway beneath the new bridge;
- Construction of an additional two-lane bridge to provide access to a restaurant and homes on Gould Island;
- Demolition of the existing bridges over the Kicking Horse River and side channel; and
- Reclamation of the site of the existing bridge following demolition.

Completion of this EIA included a background literature review, as well as field assessments of the proposed Project Area to review existing environmental conditions. This EIA report builds upon existing assessment work and historical information available for the Kicking Horse River system. Field assessments completed for this EIA report focused on completing seasonal inventories of the vegetation resources and substrate characterization in the Project Area footprint.

2.0 Environmental Assessment Methodology

2.1 Desktop Environmental Constraints Analysis

A desktop background review of environmental resources and potential constraints within the Project Area was performed for aquatic and terrestrial resources using provincial and federal government databases and mapping tools. Further review was completed using relevant literature, previous studies and assessments of the Project Area, and other data pertaining to environmentally sensitive features that may be present in the Project Area. The background review included searches for known occurrences of rare and/or endangered species and ecosystems within the Project Area, designated critical wildlife habitat, and a search of ecosystems, plants, and wildlife species-at-risk that have the potential to occur. Existing resources containing fisheries and aquatic habitat information were also reviewed as part of the desktop analysis. Databases and reports utilized in the background review and constraints analysis included the following:

- DataBC iMapBC mapping tool (Province of British Columbia, 2023);
- BC Ministry of Environment (MOE) Habitat Wizard and Fisheries Information Data Queries (FIDQ) (MOE, 2020);
- BC Conservation Data Centre's (CDC) BC Species and Ecosystems Explorer and CDC iMap mapping tool (BC CDC, 2023);
- Draft Business Case Highway 95 Golden Kicking Horse River Bridge #1 and #2, 9th Street South to 6th Street North. Prepared for Associated Engineering Ltd. by Apex Engineering Limited (Apex Engineering Limited, 2016);
- Reports summarizing results of fish habitat assessments and aquatic species inventories completed in the Kicking Horse River system including:
    - Kicking Horse Canyon Project Phase 4: West Portal to Yoho Bridge. Environmental Synopsis Report. Prepared for MOTI (Chris Morley and Craig Barlow, 2016);
    - Cache Creek to Rockies Highway Improvement Program, Donald to Roth Creek Fish Collection Reports and Photographs. Prepared for MOTI by Coast Environmental Services Ltd. (Coast River Environmental Services Ltd., 2000); and
    - Fisheries assessment of the Kicking Horse River and Tributaries: Golden to Yoho National Park. Prepared for MOTI by Enkon Environmental Ltd. (Enkon Environmental Ltd., 1998).
    - Overview Fisheries Assessment of the Kicking Horse River Through the Town of Golden. Prepared for The Golden and District Economic Development Society and the Golden Kayak Club by Carolla Environmental Consulting (Carolla, 2004).
    - Lower Kicking Horse River Fisheries Assessment. Prepared for the Town of Golden by Carolla Environmental Consulting (Carolla, 2007).

- Town of golden Year 10 Post Gravel Extraction Monitoring Report and Summary of Ten Years of Kokanee Spawning Surveys in the Lower Kicking Horse River. Prepared for the Town of Golden by JRC Consulting Ltd. (JRC, 2018).

- MOTI site plans and layouts of proposed highway, bridges, and crossing structures.

2.2 Field Assessment

2.2.1 Terrestrial Assessment

Seasonal terrestrial assessments were conducted by a biologist in May and November 2019. The biologist assessed the Project Area footprint and completed an inventory of vegetation species. The crew also assessed the Project Area for the presence of wildlife or wildlife features (i.e. mammals, birds, bird nests, and amphibians).

2.2.2 Aquatic Assessment

Aquatic assessments were conducted by a biologist in May and November 2019. The field surveys focused on substrate conditions and existing riparian vegetation within the Project Area footprint.

3.0 Desktop Constraints Analysis Results

3.1 Project Area

The Project is located in the Town of Golden, BC on Highway 95, approximately two km south of the Trans-Canada Highway 1 (TCH1) and two km upstream of the confluence of the Kicking Horse River and the Columbia River (Figure 1 and 2). The Project Area is located in the Kootenay-Boundary Natural Resource District and the Kootenay/Boundary Natural Resource Region, and is situated within the Montane Spruce – dry cool (MSdk) biogeoclimatic ecosystem classification (BEC) zone and subzone (Meidinger and Pojar, 1991) (Table 1).

Table 1. Project Area administrative and physiographic setting

Classification	*Description*
Administrative Boundary	
Natural Resource Region	Kootenay-Boundary
Natural Resource District	Selkirk
MOE Region	Kootenay
Major Watershed	Columbia River
Watershed Group	Columbia Reach
Regional District	Columbia-Shuswap
Nearest Municipality	Golden
UTM	Golden Town Bridge: 11U 502518 E 5683033 N
Ecosystem Classification	
Ecodomain	Humid Temperate
Ecodivision	Humid Continental Highlands
Ecoprovince	Southern Interior Mountains
Ecoregion	Southern Rocky Mountain Trench
Ecosection	Upper Columbia Valley
Biogeoclimatic Zone Subzone Variant	Montane Spruce (MS) Dry cool (dk) N/A
Elevation (m)	~1040 - 1155 m

Source: Province of British Columbia, 2023.

3.1.1 Biogeoclimatic Zone

The Montane Spruce (MS) BEC zone occurs at mid elevations in the south and central interior of British Columbia. It is characterized as having short warm summers and cold winters. Representative tree species of the zone include Douglas fir (*Pseudotsuga menziesii*), lodgepole pine (*Pinus contorta*), trembling aspen (*Populus tremuloides*), and hybrid spruce (*Picea glauca* x *engelmannii*) with subalpine fir (*Abies lasiocarpa*) found in wetter areas. Common shrub species in the understory include soopolallie (*Sheperdia canadensis*), birch leaved spirea (*Spirea betulifolia*), kinnikinnik (*Arctostaphlos uva-ursi*), falsebox (*Paxistima myrsinites*), common juniper (*Juniperus commonunis*), black gooseberry (*Ribes lacustre),* and Sitka alder (*Alnus crispa spp. Sinuate*). Common herbs include pinegrass (*Calamagrostis rubescens*), grouseberry (*Vaccinium scoparium*), twin

Figure 1. Project Area map

Figure 2. Aerial view of existing Kicking Horse River Bridges 1 and 2

flower (*Linnaea borealis*), and clasping-leafed twisted stalk (*Streptopus amplexifolius*) (Meidinger, D. and Pojar, J., 1991).

Due to anthropogenic influences and the urban setting of the town site, manipulation of the dike system, and park landscaping, low numbers of climax tree species and vegetation occur within the Project footprint.

3.2 Aquatic Resources

The following sections summarize the results of the background information review of aquatic resources including watercourses and fish and fish habitat completed for the Project Area.

3.2.1 Kicking Horse River

The Kicking Horse River (WC: 300-90613) flows in an east to west direction through the Project Area (DataBC, 2023). The Kicking Horse River is a seventh order fish-bearing stream. It is a glacial-fed river which originates in the Wapta Icefield. It flows from Wapta Lake southwest and receives the Yoho River upstream from Field, BC. It then flows northwest downstream of Wapta Falls and joins the Columbia River in Golden, BC (Morley and Barlow, 2016). The Kicking Horse River has been diked through Golden to provide flood protection. The river is dredged on a regular basis between the bridge and the confluence with the Columbia River to the west to remove excess gravel build-up (Apex Engineering Ltd., 2016).

3.2.2 Fish and Fish Habitat

Enkon Environmental Ltd. (1998) and Coast River Environmental Services Ltd. (2000) conducted fisheries assessments and fish collection programs at stream crossings along the existing TCH1 for MOTI between 1998 and 2000 as part of the Cache Creek to Rockies Highway Improvement Program. These reports described the Kicking Horse River as a fisheries-sensitive system with high seasonal turbidity and low water temperature and nutrients which limit fish habitat capability and production (Morley and Barlow, 2016). In addition to previous assessments, a desktop search of the Ministry of Environment's (MOE) Fish Inventory Data Query (FIDQ) was conducted to identify fish species documented within the Kicking Horse River. Fish species in the MOE Stream Reports and additional assessment reports which have been observed in the Kicking Horse River system are provided in Table 2.

Table 2. Fish species present within the Kicking Horse River system

Species	***Scientific Name***	***Species Abbreviation***	***Provincial Listing****
Bull Trout	*Salvelinus confluentus*	BT	Blue
Eastern Brook Trout	*Salvelinus fontinalis*	EB	Exotic
Kokanee	*Oncorhynchus nerka*	KO	Yellow
Longnose Dace	*Rhinichthys cataractae*	LNC	Yellow
Mountain Whitefish	*Prosopium williamsoni*	MW	Yellow
Mottled Sculpin	*Cottus bairdii*	CBA	-
Pygmy Whitefish	*Prosopium coulterii*	PW	Yellow
Rainbow Trout	*Oncorhynchus mykiss*	RB	Yellow
Sculpin (general)	*Cottus* sp.	CC	-
Slimy Sculpin	*Cottus cognatus*	CCG	Yellow
Torrent Sculpin	*Cottus rhotheus*	CRH	Yellow
Whitefish (general)	*Prosopium* sp.	WF	-

*Yellow-listed: species not at risk; Red-listed: extirpated, endangered or threatened species; Blue-listed: species of special-concern

Carolla Environmental Consulting completed a habitat assessment of the Kicking Horse River through the Town of Golden (2004) and a fisheries assessment of the Lower Kicking Horse River for the Town of Golden prior to gravel removal from instream gravel bars to alleviate potential floods risks (2007). The Town of Golden completed gravel removal operations during low flow conditions in 2008. The section of the Kicking Horse River that runs through Golden has been gradually confined through construction of flood-protection dikes on the north and south banks. Gravel removal from the mainstem of the river was a regular occurrence up until the mid-1980s (Carolla, 2004).

Overall, the Kicking Horse River channel between the Canadian Pacific Railway (CPR) bridge and the Highway 95 bridge is relatively straight and has high flows in spring freshet. This results in limited cover for fish and areas of refuge in the mainstem of the Kicking Horse River channel from the Highway 95 bridge upstream to the CPR bridge are limited at

peak run-off. Submerged riprap along the shore margins provide cover and some areas of deeper thalwag may have lower velocities (Carolla, 2007).

The Lower Kicking Horse River is utilized by Pygmy or Mountain Whitefish, Torrent and Slimy Sculpin, Longnose Dace, Redside Shiners, and spawning or migrating Kokanee. Bull Trout, Rainbow Trout, and Brook Trout have been identified in the Lower Kicking Horse River; however, rearing habitat for these species is considered low (Carolla, 2004). No spawning habitat was observed in this area during snorkel surveys completed by Carolla in 2004. Bed material between the pedestrian bridge and the Highway 95 bridge was 0% fines, 15% gravel, 25% small cobble, 30% large cobble, and 30% boulders. Based on snorkel observations, the most productive Kokanee spawning area is at the confluence with the Columbia River due to an abundance of gravel substrate (Carolla, 2004).

Visual Kokanee spawning surveys were conducted annually for ten years in the Kicking Horse River following the gravel removal in 2008. The survey area began at the confluence with the Columbia River and extended upstream for approximately 2.5 km to the side channel at the College of the Rockies. Kokanee spawning numbers (abundance) fluctuated over the ten-year monitoring period. Two main areas where spawning Kokanee were observed consistently in relatively high numbers were at the confluence with the Columbia River and the north channel immediately downstream of the CPR Bridge (JRC, 2018). The Highway 95 bridge is approximately 1 km upstream of the north channel spawning area and no Kokanee spawning was observed at the Highway 95 bridge during the ten-year survey period. Elevated gravel bars in the lower 1 km of river have resulted in an incised and deep channel which is not optimal for Kokanee spawning due to larger substrate size and increased compaction (Carolla, 2007).

The Gould Island side channel is only wetted during peak flows for approximately one to two months of the year. It is not considered high quality fish habitat due to rapidly fluctuating flow rates and dry conditions. It has no spawning value for fall spawning species since the channel is dry during the fall. Bed material is mainly large and small cobble with no pockets of spawning gravel (Carolla, 2004).

3.3 Terrestrial Resources

The following sections summarize the results of the background information review of terrestrial resources including wildlife and vegetation resources in the Project Area.

3.3.1 Species-at-Risk

Federal and Provincial Government Agencies are working to identify and ensure the protection of Species-at-Risk in Canada. Federally, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the *Species at Risk Act* (SARA) assess and designate Species-at-Risk in Canada. Provincially, the Wildlife Act and the BC CDC protects and collects information on plants, animals, and ecosystems-at-risk in BC.

The BC Species and Ecosystems Explorer was used to perform a CDC background search for wildlife and vegetation species, including species-at-risk, with potential to occur in and around the Project Area (CDC, 2023). The BC CDC collects and manages information on plants, animals, and ecosystems-at-risk in BC. Data BC's iMapBC Mapping Tool was used to search for known occurrences of species-at-risk within the Project Area, as well as designated critical habitat for species-at-risk (Province of BC, 2023).

3.3.2 Wildlife Species-at-Risk with Potential to Occur in the Project Area

The BC Species and Ecosystem Explorer database was searched to determine at-risk wildlife species with the potential to occur in and around the Project Area. The search was queried to include the MS BEC zone and the types of habitat present within the Project Area. Species-at-risk were found that have the potential to be present in the Project Area (Table 3). Species with a higher likelihood of being present in the Project Area are discussed in more detail in the following sections.

3.3.2.1 Barn Swallow

The barn swallow (*Hirundo rustica*) is a provincially Blue-listed species that is listed as Threatened by COSEWIC and SARA. The barn swallow constructs nests on vertical surfaces under eaves in barns or other buildings, under bridges, or in caves or cliff crevices. The barn swallow commonly refurbishes old nests from year to year and returns to the same nesting areas in successive years. They adapt well to and utilize urban landscapes such as parking lots, warehouses, and residential structures (SCPP, 2020). No barn swallows were encountered onsite during the field assessments.

3.3.2.2 Little Brown Myotis

The little brown myotis (*Myotis lucifugus*) is a provincially Yellow-listed species that is listed as Endangered by COSEWIC and SARA. The little brown myotis uses a wide range of habitats including caves and hollow tree cavities and often uses man-made structures for resting and maternity sites. Foraging occurs in wooded areas near water including margins of lakes and streams (CDC, 2023). No occurrences of little brown myotis are noted within the vicinity of the Project Area. However, bridges and structures are present in the Project Area and could potentially be used for day roosts or maternity roosts. Due to ambient noise, light, and disturbance of Project Area, there is a low likelihood of bats occurring in the Project Area. No evidence of bats during field assessments or during routine maintenance inspections of the bridge.

Table 3. Wildlife Species-at-risk with potential to occur in and around the Project Area[1, 2]

Common Name	***Scientific Name***	***BC Status***	***SARA Status***	***COSEWIC Status***	***Potential to Occur in the Project Area***	***Rationale***	***Mitigations/Follow-up***
Birds							
American bittern	*Botauraus lentiginosus*	Blue	Not listed	Not listed	Low	Prefer marshes and wetlands for nesting and foraging.	No follow-up required.
American White Pelican	*Pelecanus erythrorhynchos*	Red	Not listed	Not at risk	Low	Poor nesting habitat within the project area. Strong fidelity to breeding sites, the project location is not a known breeding location.	No follow-up required.
Band-tailed Pigeon	*Patagioenas fasciata*	Blue	Special Concern	Special Concern	Low	No suitable nesting habitat.	No follow-up required.
Barn Swallow	*Hirundo rustica*	Blue	Threatened	Threatened	Moderate	Nest in old structures, including bridges.	Bird nest survey prior to clearing any vegetation or demolition of bridge structures.
Bay-breasted Warbler	*Setophaga castanea*	Red	Not listed	Not listed	Low	No suitable nesting habitat.	No follow-up required
Black Swift	*Cypseloides niger*	Blue	Endangered	Endangered	Low	No suitable nesting habitat.	Bird nest survey prior to clearing any vegetation.
California Gull	*Larus californicus*	Red	Not listed	Not listed	Low	No suitable nesting habitat.	No follow-up required.
Cape May Warbler	*Setophaga tigrina*	Blue	Not listed	Not listed	Low	No suitable nesting habitat.	No follow-up required.
Common nighthawk	*Chordeiles minor*	Yellow	Special Concern	Threatened	Moderate	Possible where bare ground/gravel is	Survey for common

Common Name	***Scientific Name***	***BC Status***	***SARA Status***	***COSEWIC Status***	***Potential to Occur in the Project Area***	***Rationale***	***Mitigations/Follow -up***
						present within Project Area.	nighthawk nests in clearings, fields, open areas prior to construction/vegetation clearing.
Evening grosbeak	*Coccothraustes vespertinus*	Yellow	Special Concern	Special Concern	Moderate	Occur in mixed coniferous-deciduous woodland.	Bird nest survey prior to clearing any vegetation.
Great Blue Heron, *herodias* subspecies	*Ardea Herodias*	Blue	Not Listed	Not listed	Low	Possibly foraging in river pools.	Bird nest survey prior to clearing any vegetation.
Hudosian Godwit	*Limosa haemastica*	Red	Not Listed	Threatened	Moderate	Nests on the ground near rivers.	Bird nest survey prior to clearing any vegetation.
Olive-sided Flycatcher	*Contopus cooperi*	Yellow	Special Concern	Threatened	Low	Nests in forest and woodland especial burn areas.	No follow-up required.
Rusty blackbird	*Euphagus carolinus*	Blue	Special Concern	Special concern	Moderate	May be present in riparian coniferous stands.	Bird nest survey prior to clearing any vegetation.
Sandhill crane	*Antigone canadensis*	Yellow	Not listed	Not at Risk	Low	Possibly foraging in river pools.	Bird nest survey prior to clearing any vegetation.
Olive-sided flycatcher	*Contopus cooperi*	Yellow	Threatened	Special Concern	Low	Breeding and nesting occurs in forest and woodland areas.	No follow-up required.

Common Name	***Scientific Name***	***BC Status***	***SARA Status***	***COSEWIC Status***	***Potential to Occur in the Project Area***	***Rationale***	***Mitigations/Follow-up***
Peregrine Falcon, *anatum* spp.	*Falco perefrinus anatum*	Red	Not at risk	Special Concern	Low	Nest on rock cliffs near lakes and river valleys.	No follow-up required.
Rough-legged hawk	*Buteo lagopus*	Blue	Not listed	Not at risk	Low	Occasionally nests on islands.	Bird nest survey prior to clearing any vegetation.
Short-eared owl	*Asio flammeus*	Blue	Special Concern	Special Concern	Low	Typically breeds in the Fraser River delta and in the Thompson and Chilcotin-Cariboo basins. Uncommon migrant throughout the Province.	No follow-up required.
Surf Scoter	*Melanitta perspicillata*	Blue	Not listed	Not listed	Low	Nests in riparian areas with denser vegetative cover than Project Area.	No follow-up required.
Swainson's Hawk	*Buteo swainsoni*	Red	Not listed	Not listed	Low	Does not typically nest in riparian areas.	No follow-up required.
White-throated swift	*Aeronautes saxatalis*	Blue	Not listed	Not listed	Low	Nests in rock crevices.	No follow-up required.
Williamson's Sapsucker	*Sphrapicus thyroideys*	Blue	Endangered	Endangered	Low	Nests in older growth forests.	No follow-up required.
Mammals							
Grizzly Bear	*Ursus arctos*	Blue	Special Concern	Special Concern	Moderate	Potential to move through Project Area but unlikely in urban area.	No follow-up required.

Common Name	***Scientific Name***	***BC Status***	***SARA Status***	***COSEWIC Status***	***Potential to Occur in the Project Area***	***Rationale***	***Mitigations/Follow -up***
Hoary Bat	*Lasiurus cinereus*	Blue	Not listed	Not listed	Low	Roosting sites include woodland areas. Individuals may forage in lights of nearby urban area.	No follow-up required.
Little Brown Myotis	*Myotis lucifugus*	Yellow	Endangered	Endangered	Moderate	Bridges and large diameter snags may be used for day roosts or maternity roosts.	Conduct bat surveys prior to bridge removal; avoid clearing forested habitat during bat maternity season;
Wolverine, *luscus* ssp.	*Gulo gulo luscus*	Blue	Special Concern	Special Concern	Low	Unlikely to be in Project Area due to urban conditions.	No follow-up required.

[1]Source: CDC, 2023.

[2]Search Criteria: Search Type: Animals AND Species Groups: Animals AND BC Conservation Status: Red (Extirpated, Endangered, or Threatened) OR Blue (Special Concern) OR Yellow (secure and not at risk of extinction) AND Area of Interest: User Defined Polygon (Restricted to Red, Blue, and Legally designated species) AND Habitat Types: Riparian, Stream/River (restricted to Red, Blue, and Legally designated species) AND BGC Zone: MS.

3.3.2.1 Known Occurrences of wildlife Species-at-Risk

The CDC mapping tool was accessed to identify known occurrences of wildlife species-at-risk within and in the vicinity of the Project Area. The CDC was queried for occurrences of Red-, Blue-, and Yellow-listed species and ecosystems and designated critical habitat within a 2 km radius of the Project Area. Lack of occurrences in this database does not necessarily indicate no species are present; only that none have been recorded in the database. Two occurrences of wildlife species were within the 2 km search radius, but outside of the Project limits (Table 4).

Table 4. Known CDC wildlife occurrences within 2 km of Project Area

Common Name	*Scientific Name*	*Occurrence ID*	*Shape ID*	*Provincial Status*	*Comments*
Painted turtle – Rocky Mountain population	*Chrysemys picta* pop. 2	12184	96578	Blue	A small population of western painted turtles were observed in a herbaceous wetland pond northeast of Highway 95 in 2009. The pond is south of Golden and approximately 1.7 km south of the Project Area. Not expected to be impacted by Project activities.
Gypsy cuckoo bumble bee	*Bombus bohemicus*	15919	126401	Red	One specimen collected in 1915. Full extent of occurrence unknown. Not expected to be impacted by Project activities.

3.3.2.2 Vegetation Species-at-Risk with Potential to Occur in the Project Area

The BC Species and Ecosystems database was searched to determine at-risk plant species with the potential to occur in and around the Project Area. The search was queried to include the MS biogeoclimatic zone and the types of habitat present within the Project Area. No plant species-at-risk were identified with the potential to occur within the Project Area.

3.3.2.3 Known Occurrences of Vegetation Species-at-Risk

The CDC mapping tool was accessed to identify known occurrences of vegetation species-at-risk within and in the vicinity of the Project Area. The CDC was queried for occurrences of Red-, Blue-, and Yellow-listed species and ecosystems and designated critical habitat within a 2 km radius of the Project Area. Lack of occurrences in this database does not necessarily indicate no species are present; only that none have

been recorded in the database. Three occurrences of wildlife species were within the 2 km search radius, but outside of the Project limits (Table 5). No vegetation species-at-risk were observed during vegetation surveys completed in 2019.

Table 5. Known CDC vegetation occurrences within 2 km of Project Area

Common Name	*Scientific Name*	*Occurrence ID*	*Shape ID*	*Provincial Status*	*Comments*
Dark lamb's quarter	*Chenopodium atrovirens*	44	1982	Unknown	Dark lamb's quarter (*Chenopodium atrovirens*) were observed along a dry roadside on the outskirts of Golden in 1958. The full extent of the occurrence is unknown.
Yellow wide-lip orchid	*Liparis loeselii*	8025	46828	Blue	Occurrence consists of several subpopulations, most located north of the Kicking Horse River and north of the log yard road. In 2009, a group of plants was observed 100 m southeast of Kicking Horse Road and 100 m north of the Kicking Horse River.
Limber pine	*Pinus flexilis*	9550	68247	Blue	Occurrence recorded along the Kicking Horse River, 1.2 km east of Golden. Observed in a stand of *Pseudotsuga menziesii* on a steep, warm aspect.

3.3.3 Ecological Communities at-Risk

The BC Species and Ecosystems database was searched to determine at-risk ecological communities with the potential to occur in and around the Project Area. The search was queried to include the geographic location of the Project Area, the MSdk BEC zone, and the types of habitat present within the Project Area. A query of the BC CDC database identified 12 ecological communities listed at-risk with the potential to occur within the Project Area (CDC, 2023; Table 6). There are no known records of occurrences of red- or blue-listed ecological communities within the Project Area (CDC, 2023).

Table 6. Ecological Communities at-Risk with potential to occur in and around the Project Area[1, 2]

Common Name	*Scientific Name*	*BC Status*	*Potential to Occur in Project Area*	*Rationale*	*Mitigation/ Follow-up*
Drummond's willow / bluejoint wheatgrass	*Salix drummondiana / Calamagrostis canadensis*	Blue	Moderate	No Drummond willow observed during initial field visit.	No follow-up required.
hard-stemmed bulrush Deep marsh	*Schoenoplectus acutus* Deep Marsh	Blue	Low	Typically occurs in wetland ecosystems.	No follow-up required.
Idaho fescue – sulphur buckwheat – thread-leaved sandwort	*Festuca idahoensis - Eriogonum umbellatum - Eremogone capillaris*	Red	Moderate	Typically occurs in dry in elevations higher than the site	No follow-up required.
rough fescue - (bluebunch wheatgrass) - yarrow - clad lichens	*Festuca campestris - (Pseudoroegneria spicata) - Achillea borealis - Cladonia spp.*	Red	Low	Typically occurs in grassland habitats.	No follow-up required.
saskatoon - soopolallie - common juniper	*Amelanchier alnifolia - Shepherdia canadensis - Juniperus communis*	Blue	Moderated	Not observed during surveys.	No follow-up required.
scrub birch / water sedge	*Betula nana / Carex aquatilis*	Yellow	Low	Typically occurs in fen ecosystems.	No follow-up required.
slender sedge / common hook-moss	*Carex lasiocarpa / Drepanocladus aduncus*	Blue	Low	Typically occurs in fen ecosystems.	No follow-up required.

[1]Source: CDC, 2023.

[2]Search Criteria: Search Type: Ecological Communities Ecosystem Realm-Groups: Flood Group (F) OR Forest OR Grassland (G), OR Hydrogenic Group (H) OR Mineral Wetland Group OR Peatland Group OR Beach Group (B) AND BC Conservation Status: Red (Extirpated, Endangered, or Threatened) OR Blue (Special Concern) OR Yellow (secure and not at risk of extinction) AND Area of Interest: User Defined Polygon AND BGC Zone, Subzone (Phase: MSdk).

4.0 Field Assessment

4.1 Methodology

Field assessments were completed by a technician from JRC Environmental Consulting Ltd. in May and November, 2019. The Project involves building a new bridge approximately 40 m east (upstream) of the existing bridge and building a bridge over the side channel of the Kicking Horse River to provide access to businesses on Gould Island. The Project Area footprint was divided into Sections (S1 – S8) based on the current Project design and expected impacts of construction to determine existing conditions of vegetation and aquatic resources. Descriptions of the locations and length of the survey sections are provided in Table 7 and a map showing the locations is provided in Figure 3.

Table 7. Summary of survey sections

Section	*Section Length (m)*	*Location Description*
S1	63	North of the Kicking Horse River on the east side of Highway 95 (within the footprint of the approach to the proposed Highway 95 bridge)
S2	90	North bank of the Kicking Horse River east of the existing bridge (within the footprint of the proposed Highway 95 bridge)
S3	20	North bank of the side channel west of the existing bridge (within the footprint of the proposed bridge to Gould Island)
S4	20	South bank of the side channel west of the existing bridge (within the footprint of the proposed bridge to Gould Island)
S5	70	Kumsheen Park – northeast of Highway 95 (within the footprint of the approach to the proposed Highway 95 bridge)
S6	88	South bank of the side channel east of the existing bridge (within the footprint of the proposed Highway 95 bridge)
S7	120	Portion of Gould Island east of the existing bridge (within the footprint of the proposed Highway 95 bridge)
S8	20	Median west of 10th Avenue and south of the side channel

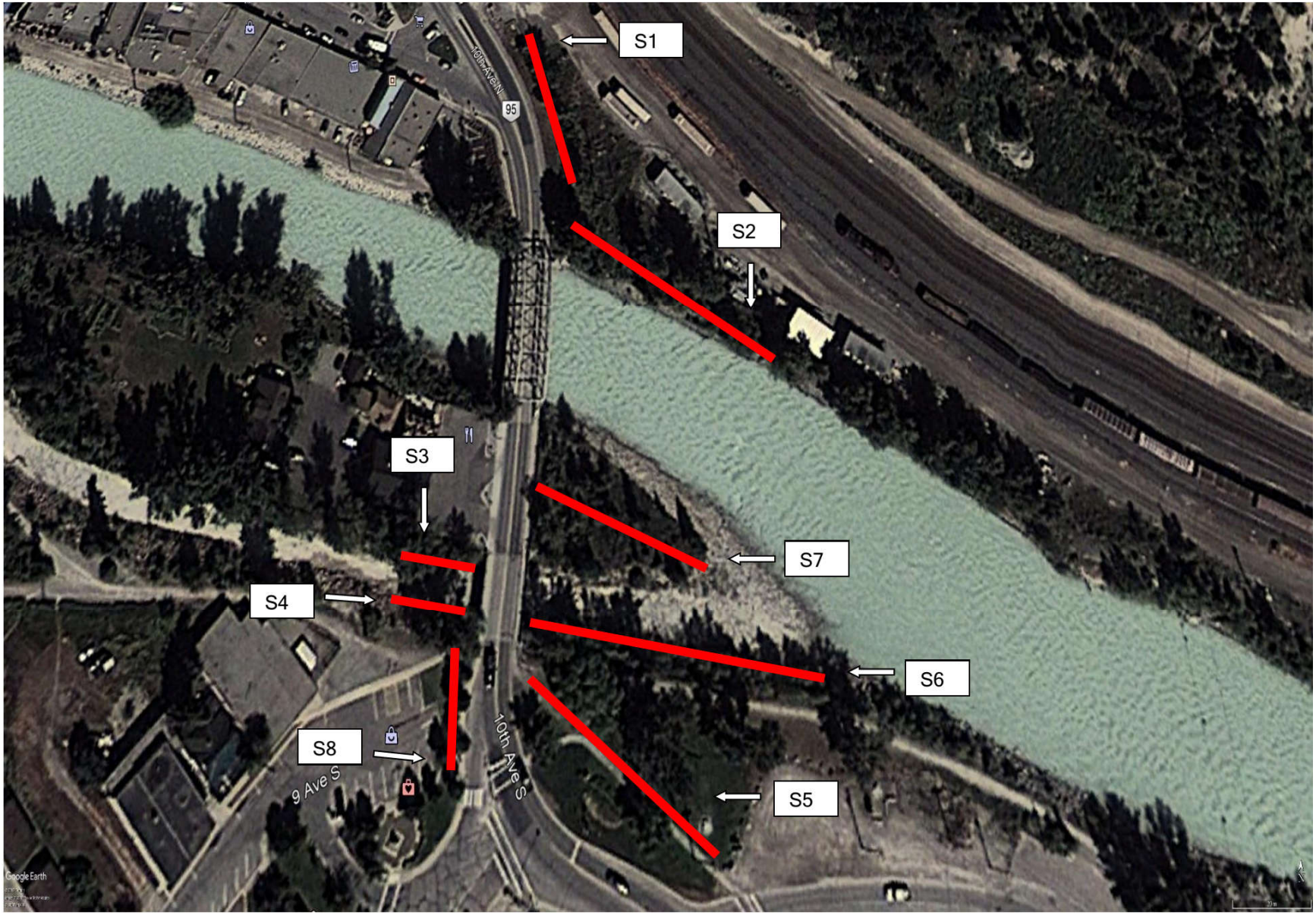

Figure 3. Location of field survey Sections S1 – S8

4.2 Vegetation Assessment

The Project Area includes a mix of native riparian vegetation composed primarily of black cottonwood and native shrubs on the banks of the Kicking Horse River, the banks of the side channel, and Gould Island. Sections adjacent to the existing bridge footprint and Highway 95 and in Kumsheen Park are dominated by ornamental plantings maintained by the Town of Golden and manicured grass (Table 8). The Town of Golden performs ongoing dike vegetation maintenance which involves removal of mature trees and prunes and clears vegetation around overhead utility lines. A detailed vegetation inventory list is provided in Appendix 1 and photographs of existing conditions of each section are provided in Appendix 2.

Table 8. Summary of dominant vegetation by section

Section	*Vegetation Description*
S1	Native vegetation includes cottonwood, red-osier dogwood, and snowberry; Town of Golden landscape including maple, birch, snowberry, red-osier dogwood, snowberry, rose, potentilla, lilac, and other species.
S2	90% of section covered by grass. Native species found in lower numbers include cottonwood, mountain ash, red-osier dogwood.
S3	Cottonwood, mountain ash, willows, red-osier dogwood, rose, Saskatoon, and huckleberry.
S4	Cottonwood and minimal fir, spruce, and paper birch. Red-osier dogwood, snowberry, huckleberry, and spirea.
S5	95% of section covered by grass. Cottonwood with two willow and two linden trees.
S6	Native vegetation includes cottonwood and spruce, water birch, alder, and mountain ash. Willow, red-osier dogwood
S7	Densely vegetated with cottonwood, Douglas fir, and spruce. Water birch, alder, mountain ash, common juniper, Saskatoon, and buffalo berry. Herbaceous plants include grass, moss, and avens.
S8	20% of section is covered by grass. Low vegetation cover overall with four pine trees and three linden trees.

4.3 Aquatic Assessment

Existing conditions of fish and fish habitat resources of the Kicking Horse River system have been previously assessed in detail. No additional fish sampling was completed given existing historical information on species present within the system and expected impacts of the Project. The objectives of the aquatic assessments were to determine existing conditions of substrate in the Project Area footprint. A summary of substrate conditions is provided in Table 9. The results of the field surveys and representative photographs of the Project Area are provided in Appendix 2.

Similar to previous assessment of substrate conditions in the Kicking Horse River in the immediate vicinity of the Highway 95 bridge (Carolla, 2004 and 2007), dominant substrate types in the survey sections were boulders (large and small) and cobble with lower percentages of gravel and sand. Due to lack of gravel substrate, this section of the Kicking Horse River provides low quality habitat for Kokanee spawning. This section could provide potential spawning habitat for Whitefish or Sculpins which prefer boulder and cobble substrates.

Table 9. Summary of dominant and sub-dominant substrate by section

Section	*Substrate Description*	
	Dominant	*Sub-Dominant*
May 2019		
S1	N/A	N/A
S2	large boulders (60%)	small boulders (35%) cobble (5%)
S3	cobble (75%)	sand (15%); gravel (5%); and small boulders (5%)
S4	cobble (65%)	sand (20%), gravel (10%); small boulders (5%)
S5	N/A	N/A
S6	small boulders (30%)	large boulders (25%); cobble (20%); gravel (5%); sand (10%); silt (10%)
S7	small boulders (50%)	cobble (30%); sand (10%); large boulders (5%); large boulders (5%); gravel (5%)
S8	small boulders (60%)	cobble (15%); large boulders (10%); sand (10%); gravel (5%)
November 2019		
S1	N/A	N/A
S2	large boulders (60%)	small boulders (35%) cobble (5%)
S3	cobble (75%)	sand (15%); gravel (5%); and small boulders (5%)
S4	cobble (75%)	gravel (15%); sand (5%), small boulders (5%)
S5	N/A	N/A
S6	cobble (50%)	small boulders (25%); gravel (15%); large boulders (5%) ; sand (5%)
S7	cobble (40%)	small boulders (30%); gravel (15%); large boulders (10%); sand (5%)
S8	small boulders (30%) and cobble (30%)	large boulders (20%); gravel (15%); sand (5%)

5.0 Effects Assessment and Mitigation Measures

5.1 General Mitigation Measures

This section provides measures to avoid, minimize, and mitigate for potential effects of the Project on the resources identified in the Project Area. In addition to the general and site-specific recommendations and mitigation measures outlined in the following sections, the successful bidder (Contractor) will be required to prepare a Construction Environmental Management Plan (CEMP) for the Project prior to commencement of construction. The CEMP will provide detailed site-specific, mitigation measures and BMPs which are beyond the scope of this EIA that are identified once construction activities commence. In addition to measures outlined below, and those to be provided in the CEMP, measures to protect the environment during construction which are outlined in *Section 165 of the Ministry of Transportation and Infrastructure's 2016 Standard Specifications for Highway Construction* (MOTI, 2016) will be adhered to during construction.

5.1.1 Aquatic Resources

Project activities have the potential to cause direct impacts to fish habitat including habitat loss or alteration of habitat through widening of the right-of-way into aquatic habitat or altering connectivity to upstream or downstream habitat. Indirect impacts such as sensory disturbance during construction are also possible. Construction works have the potential to impact water quality from sedimentation or other deleterious substances being released into watercourses during construction activities. All necessary approvals and/or authorizations for works in and around watercourses are required to be obtained and activities will comply with the terms and conditions of approvals. This could potentially include, but is not limited to, the following:

- WSA Section 10 Water Use Approval for the Project
- WSA Section 11 authorization or approval
- Department of Fisheries and Oceans Fisheries Act Project Review

Project design and timing are expected to mitigate potential impacts to aquatic resources including fish and fish habitat. Demolition of the existing bridge is expected to be low impact. Construction activities are planned to occur when the side channel is dry (August – April) which will minimize the risk of potential fish mortality or impacts to water quality. No mid-channel piers in the mainstem of the Kicking Horse River are proposed and the new bridge pier will be constructed on Gould Island and can be completed with minimal instream works. Instream works will be limited to rip rap placement along the channel margins and as part of the restoration of the demolished abutment areas. Rip rap will provide a smooth hydraulic transition to the natural features of the upstream and downstream areas. Best management practices (BMPs) for protection of the aquatic environment will be adhered to during work in and around water. This will include *Standards and Best Practices for Instream Works* (MOE, 2004). Site specific erosion and

sediment control plans as well as a plan to manage and protect water quality during construction will need to be developed as part of the project CEMP.

Other mitigation measures will be employed to protect water quality and prevent the introduction of deleterious substances to instream habitats, including spills of hydrocarbons. BMPs outlined in *A Field Guide to Fuel Handling, Transportation, and Storage 3rd Edition* (MWLAP and MOF, 2002) and in *Section 165 of the Ministry of Transportation and Infrastructure's 2016 Standard Specifications for Highway Construction* (MoTI, 2016) will be followed to ensure adequate fuel handling and spill response during Project activities. Further, the CEMP shall have a section dedicated to proper fuel handling and emergency spill response.

5.1.2 Birds

Shrubs and trees in the Project Area provide nesting and foraging habitat for birds. The proposed works will result in the clearing of vegetation to allow for the new bridge footprint and Highway 95 approaches and there will be the potential for loss of foraging and nesting habitat. In order to reduce the potential effects, vegetation clearing will be minimized and completed outside of the breeding bird period for the region. Clearing and grubbing limits will be clearly flagged in the field to ensure there is no additional encroachment on surrounding areas. The destruction of active bird nests is prohibited under the *Migratory Birds Convention Act* and the *Wildlife Act*. Prior to any vegetation clearing activities that may take place during the breeding window for birds (Zone A3 - Forested, approximately April 14 – August 19) (ECCC, 2019), a bird nest survey is required to identify any active nests and establish appropriate setback distances before clearing any vegetation. The existing bridge structure or any other structures that could potentially be impacted by project activities will also be searched for nests prior to disturbance or demolition.

In addition, the stick-nests of certain species (eagle, peregrine falcon, gyrfalcon, osprey, and heron) as well as burrows of the burrowing owl are protected even when unoccupied under the *Wildlife Act*. Stick nests or nests of species-at-risk with the potential to occur in the Project Area (i.e., northern goshawk or barn swallows) are also protected year round. Given the proximity to the Kicking Horse and Columbia Rivers a dedicated stick-nest survey prior to construction is recommended. If active stick nests are present during construction, an appropriate setback distance will be established by a Qualified Environmental Professional (QEP) and an Environmental Monitor (EM) will be required during construction activities to ensure that the birds are not disturbed. Activities such as blasting have the potential to disturb active nests within a 1 km radius (Province of British Columbia, 2013). As a result, behavioral monitoring and acoustic monitoring during blasting may also be required. Where possible, the removal of vegetation, especially large trees and snags must be minimized as these provide important nesting habitats.

5.1.3 Species-at-Risk

Due to the anthropogenic disturbance in the Project footprint there is low potential for species-at-risk to be present in the Project Area. In the event that site personnel encounter a species-at-risk within the construction footprint, the following general procedures will be implemented:

- Flag the location and notify the EM or Construction Supervisor.
- Cease operations until directed by the EM or Construction Supervisor.
- Additional mitigation measures or a new construction approach (e.g., relocation of certain activities) may be necessary, and will be developed in consultation with the EM, Ministry Representative and Construction Supervisor.
- Observations of species-at-risk within the Project area will be reported to the Environmental Monitor, and the Construction Supervisor, and will be reported to the BC Conservation Data Centre.

5.1.3.1 Barn Swallow

Barn swallows have the potential to use the bridge for nesting. No nesting activity has been detected during field surveys or routine bridge inspections. A bird nest survey should be completed prior to clearing any vegetation or demolition of the bridge structures.

5.1.3.2 Little Brown Myotis

The little brown myotis and other bat species have the potential to use the bridge for roosting or a maternity site. No activity has been detected during field surveys or routine bridge inspections. Appropriate mitigation measures could be required within the Project Area during construction. *Best Management Practices for Bats in British Columbia* (MOE, 2016) outlines general phases involved in BMP implementations: assessment, planning, avoidance, and mitigation. BMPs include:

- Inspection: When removing bridge infrastructure during maternity season (June 1 to September 1), inspect for bat colonies.
- Ensure proper drainage in areas to be cleared so wetted areas of pooled water do not form which could increase insect populations and attract bats.

5.2 Site-Specific Mitigation Measures

5.2.1 Vegetation Clearing

Clearing and grubbing is expected to occur on both banks of the Kicking Horse River and in the footprint of the new bridge approaches. This will result in the loss of vegetation. The Town of Golden conducts routine vegetation maintenance along the Kicking Horse River dike system including removal of mature cottonwood trees vegetation pruning and clearing for overhead utility lines. The following mitigation strategies will be applied to clearing and grubbing activities during and after development to mitigate potential effects to wildlife:

- Clearing and grubbing limits will need to be clearly flagged in the field to ensure there is no encroachment outside of project boundaries.
- Clearing and grubbing will employ "close cut" methods to help retain vegetation where possible. This will leave roots an short stems in the area for immediate regrowth.
- Vegetation clearing must occur outside of the breeding bird window (Zone A3 - Forested, approximately April 14 – August 19) (ECCC, 2019). If clearing is to happen within the window, a nest survey will be completed by a QEP proficient in bird breeding surveys prior to all clearing works.
- Any wildlife trees (particularly black cottonwood) and snags outside of the Project Area footprint will be retained as these provide valuable habitat for cavity nesting birds, bats, and small mammals.
- A re-vegetation plan has been developed and included re-vegetation of rip rap areas and Gould Island. Replacement of trees and bushes removed (# of stems) will be at 2:1.

5.2.2 Bridge Construction

The Project includes construction of a new bridge across the Kicking Horse River construction of a second bridge across a side channel to create access to Gould Island. Project design has included a number of mitigations that will help reduce the environmental impact and include:

- Increase in height above water of the new bridges to reduce potential for ice jam formation and subsequent removal and maintenance issues.
- While minimal, instream works will coincide with the lowest water levels in the Kicking Horse – September to April.
- All works to be completed in the dry – again, during the lowest water level period (September to April) to facilitate working in the dry.
- Sediment fences should be installed below abutment installation to capture sediments.
- Concrete pours should be done as quickly as possible. Contingencies for spills into the river should be taken and include:
    - Environmental monitor should be on site for all concrete pours.
    - Provision to have CO2 on site in case of a spill into water.
    - Sediment fences or other secondary containment devices are recommended to be installed between the structure being poured and the river.
    - Concrete surplus and wash water/waste water should be disposed of at a designated disposal site. Washing of equipment should be done at minimum, 30 m from the water (preferably more)and in an area where the water cannot enter the stream.
- Concrete cutting areas should be tarped under the area or other capture methods installed to capture any debris or water used in the cutting. Use of wet-vacs or hydrovacs is recommended to remove lubrication water from the work

area to avoid it entering the river. All waste should be disposed of at a designated disposal area.
- Bridge decks should be swept/vacuumed clean before removal from the site to prevent debris from entering the river.
- Tarps or similar catchment should be installed under areas where concrete, metal or wood are cut over water to capture falling debris.
- Abutment demolition should be done in a manner to prevent debris from spreading out. Use of tarps, plywood or other catchment devices should be used around the demolition site. All concrete (and rebar/metal) debris should be removed from the demolition site and disposed of in a designated area.

5.2.3 Fuel Storage and Handling

- Ensure proper fuel handling and storage methods are employed and follow BMPs and guidelines set forth in the site-specific CEMP and *A Field Guide to Fuel Handling, Transportation, and Storage 3rd Edition* (MWLAP and MOF, 2002), and *Section 165 of the Ministry of Transportation and Infrastructure's 2016 Standard Specifications for Highway Construction* (MoTI, 2016).
- Ensure all refuelling and fuel storage occurs at least 30 m from watercourses and wetted areas.

5.2.4 Invasive Plant Species

To reduce the spread of noxious weeds and other invasive species within the Project footprint, the following mitigation strategies will be employed:

- A QEP will perform a site sweep prior to any construction to identify any noxious or invasive plants which may be present.
- Undercarriages, tracks, and blades of equipment will be visually inspected prior to entry onto the construction site and when vehicles are leaving the site, and all weed matter must be removed and disposed of appropriately.
- Invasive plant species will be contained separately from other vegetative refuse, and placed in containment which is identified as invasive species prior to off-site disposal at an approved facility.
- Disturbed soils will be re-vegetated where required and as soon as possible, with appropriate seed mixes.

6.0 Conclusion

This EIA should be considered preliminary and will be updated as Project design progresses. The proposed Project footprint includes an area that is largely disturbed and is classified as a "maintained corridor", and consisting largely of existing Highway right-of-way. Potential harmful effects to the environment due to Project development can be mitigated through Project design and timing and the use of BMPs and site-specific mitigation measures developed for specific Project activities, some of which are outlined in previous sections. Development and implementation of a project-specific CEMP which addresses all environmental concerns that apply to the scope of the Project is critical. A QEP will be available throughout the duration of the Project to aid in the development of such mitigation strategies for the protection of wildlife and aquatic resources, and to address specific situations as they arise. Overall, potential construction related impacts can be readily mitigated using standards BMPs and no long-term impacts are expected to arise from the Project.

7.0 References

Apex Engineering Ltd. 2016. Draft Business Case Highway 95 Golden Kicking Horse River Bridge #1 and #2 9th Street South to 6th Street North.

Carolla Environmental Consulting. 2004. Overview Fisheries Assessment of the Kicking Horse River Through the Town of Golden. Report prepared for the Golden and District Economic Development Society and the Golden Kayak Club.

Carolla Environmental Consulting. 2007. Lower Kicking Horse River Fisheries Assessment. Prepared for the Town of Golden.

[CDC] BC Conservation Data Centre. 2023. BC Species and Ecosystems Explorer. Accessed January 2023. Available at: https://a100.gov.bc.ca/pub/eswp/

[CDC] BC Conservation Data Centre. Accessed January 2023. Species Summary: *Myotis septentrionalis*. BC Ministry of Environment. Available at: https://a100.gov.bc.ca/pub/eswp/speciesSummary.do;jsessionid=8a931e8a5007149a1da6e238d9db3b1c8ec97349f9bfa5f65625cf3be04bbe48.e3uMah8KbhmLe34NaN4KaNyTaNj0n6jAmljGr5XDqQLvpAe?id=16442

Coast River Environmental Services Ltd. 2000. Cache Creek to Rockies Highway Improvement Program, Donald to Roth Creek Fish Collection Reports and Photographs. 1999 Field Program. Prepared for MOTI, Victoria, BC.

[ECCC] Environment and Climate Change Canada. 2020. General Nesting Periods of Migratory Birds in Canada. Available at: https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_fig02_1.

Enkon Environmental Ltd. 1998. Fisheries Assessment of the Kicking Horse River and Tributaries: Golden to Yoho National Park. Report prepared for MOTI.

JRC Consulting Ltd. 2018. Post-Gravel Extraction Monitoring Report and Summary of Ten Years of Kokanee Spawning Surveys in the Lower Kicking Horse River. Prepared for the Town of Golden.

Meidinger, Del and Pojar, Jim. 1991. Ecosystems of British Columbia. B.C. Ministry of Forests.

[MOE] Ministry of Environment. 2004. Standards and Best Practices for Instream Works. Available at: http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf.

[MOE] BC Ministry of Environment. Accessed January 2023. HabitatWizard Fisheries Information Data Queries (FIDQ). Available at: http://maps.gov.bc.ca/ess/hm/habwiz/.

[MOE] BC Ministry of Environment. 2016. Best Management Practices for Bats in British Columbia. Available at: http://a100.gov.bc.ca/pub/eirs/viewDocumentDetail.do?fromStatic=true&repository=BDP&documentId=12460

[MOF] BC Ministry of Forests. 2002. A Field Guide for Site Identification and Interpretation in the Nelson Forest Regions, Ministry of Forest, Forest Science Program, Victoria, BC. Available at: http://best-practices.ltabc.ca/media/resources/baseline-documentation/BC_GOV_Field_Guide_Book_Nelson_Forest_Region.pdf

[MoTI] Ministry of Transportation and Infrastructure and Infrastructure. 2016 Standard Specifications for Highway Construction. Volume 1. Section 165 - Protection of the Environment.

[MWLAP and MOF] British Columbia Ministry of Water, Land, and Air Protection and Ministry of Forests. 2002. A Field Guide to Fuel Handling, Transportation, and Storage 3rd Edition. Victoria, BC.

Morley, Chris and Craig Barlow. 2016. Kicking Horse Canyon Project Phase 4: West Portal to Yoho Bridge. Environmental Synopsis Report. Revision 4. Prepared for KHCP. Available at: https://www2.gov.bc.ca/assets/gov/driving-and-transportation/reports-and-reference/reports-and-studies/rocky-mountains/kicking-horse/corridor-management/2016-khc-p4-environmental-synopsis.pdf.

Province of British Columbia. 2013. Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (2013). Available at: http://www.env.gov.bc.ca/wld/BMP/bm-intro.html#second_

Province of British Columbia, 2023. iMapBC. Accessed January 2023. Available at: https://maps.gov.bc.ca/ess/hm/imap4m/

[SCPP] South Coast Conservation Program. 2020. Species-at-Risk Barn Swallow *Hirundo Rustica*. Available at: http://www.sccp.ca/species-habitat/barn-swallow

APPENDIX 1

FIELD SURVEY RESULTS

Plant inventory by section on the Kicking Horse River Highway 95 Bridge Replacement (May 2 -16, 2020)								
Plant Species	Section S1 - North Side HWY 95	Section S2 - North Side River	Section S3 - Side Channel North Bank	Section S4 - Side Channel South Bank	Section S5 - Kumsheen Park	Section S6 * - Side Channel East Bridge South Bank	Section S7 - Median (West)	Section S8 - Median Park Ave Side Channel (South)
Cottonwood<2	28	16	42	10		186	113	
Cottonwood>2	21	46	12	11	11	98	29	
Fir/balsam <2		2					278	
Fir/balsam >2				1		1	27	
Spruce <2						23	2	
Spruce >2				3		3	2	
Pine <2								
Pine >2								4
Paper birch				1			3	
Manitoba maple	2							
Willow tree					2			
Linden tree					2			3
Water birch						24	40	
Alder						47	13	
Mt. Ash	8	25	30	1		10	4	
Common Juniper							40	
Rocky Mtn Juniper							9	
Apple Tree			3				15	
May tree								
Willow shrub			8			26		
Red osier dogwood	5	12	8	22		109	10	
Snowberry	3	5	5	30		2	40	
Raspberry								
Rose		10	20					
Trembling aspen								
Saskatoon			20			2	264	
Huckleberry		6	30	23			27	
Blueberry				4			6	
Buffalo Berry			5	10		5	106	
Cherry Tree							2	
Spirea				25				
Oregon grape			2				20	
Vetch			2	2		10	170	
% Coverage								
Mullen		1						
Burdock		3						
Grass		90			95		10	20
Moss							20	
Avens							40	
Knick Knick							15	
Wild strawberry							5	

Plant inventory by section on the Kicking Horse River Highway 95 Bridge Replacement (May 2 -15, 2020)								
Plant Species	Section S1 - North Side HWY 95	Section S2 - North Side River	Section S3 - Side Channel North Bank	Section S4 - Side Channel South Bank	Section S5 - Kumsheen Park	Section S6 * - Side Channel East Bridge South Bank	Section S7 - Median (West)	Section S8 - Median Park Ave Side Channel (South)
TOG Flower % coverage of beds								
Lilac	50							
Snowberry	10							
Juniper	2							
Potentilla	10							
Maple	3							
Rose	10							
Dogwood	10							
Birch	5							
Total	167	216	187	143	110	546	1310	27
Section Length	63	90	20	20	70	88	120	20
Total plant density	2.7	2.4	9.4	7.2	1.6	6.2	10.9	1.4

Substrate	**N/A**				**N/A**		**South side Median**	**North side Median**
Large Boulders		60				25	5	10
Small Boulders		35	5	5		30	50	60
Cobble		5	75	65		20	30	15
Gravel			5	10		5	5	5
Sand			15	20		10	10	10
Silt						10		
		100	100	100		100	100	100

*** 40-45 m east end of section 6, larger diameter vegetation cut at top of bank**

Plant inventory by section on the Kicking Horse River Highway 95 Bridge Replacement								
Plant Species	Section S1 - North Side HWY 95	Section S2 - North Side River	Section S3 - Side Channel North Bank	Section S4 - Side Channel South Bank	Section S5 - Kumsheen Park	Section S6 - Side Channel East Bridge South Bank	Section S7 - Median (West)	Section S8 - Median Park Ave Side Channel (South)
Cottonwood<2	5	20	25	10		204	60	
Cottonwood>2	7	30	1	11	9	61	49	
Fir/balsm <2							248	
Fir/balsm >2				1		3	20	
Spruce				3		20	12	
Ponderosa Pine								4
Water birch				1			3	
Alder						2	13	
Mt. Ash	8	5		1		6	7	
Common Juniper							39	
Rocky Mtn Juniper							9	
White birch								
maple								
apple			1				3	
May tree								
willow			3			26		
red osier dogwood	3	8	10	25		66	10	
snowberry	5	5					40	
raspberry								
rose	4	10						
Trembling aspen								
saskatoon								
Huckleberry							3	
Buffalo Berry							3	
Cherry				1			6	
TOG Flower Beds								
Lilac	20							
Snowberry	20							
Juniper	5							
Rose	20							
Total	97	78	40	53	9	388	525	4
Section Length	63	90	20	20	70	88	120	20
total plant density	1.5	0.9	2.0	2.7	0.1	4.4	4.4	0.2

Substrate	**N/A**				**N/A**		**Southside Median**	**Northside Median**
Large Boulders		60				5	10	20
Small Boulders		35	5	5		25	30	30
Cobble		5	75	75		50	40	30
Gravel			15	15		15	15	15
Sand			5	5		5	5	5
Silt								
		100	100	100		100	100	100

APPENDIX 2

PHOTOGRAPHS

Photograph 1: Looking south, north side of Highway 95 Bridge, Section 1 vegetation - TOG flower beds and minor other vegetation.

Photograph 2: Looking south, Section 1 to Section 2 vegetation, east of TOG flower beds.

Photograph 3: Looking east, Section 2 riparian vegetation and substrate.

Photograph 4: Looking north, Section 2, Kicking Horse River north bank substrate.

Photograph 5: Section 3 Vegetation – Kicking Horse River Side Channel North Bank.

Photograph 6: Section 4 Vegetation – Kicking Horse River Side Channel South Bank.

Photograph 7: Section 3 and 4 – Looking west, downstream at Substrate of side channel.

Photograph 8: : Section 3 and 4 – Looking east, upstream at Substrate of side channel.

Photograph 9: Section 5 – Looking southeast, vegetation in Kumsheen Park.

Photograph 10: : Section 6 – Looking east, upstream at Substrate of side channel along Section 6 and 7 from highway 95 bridge.

Photograph 11: Section 6 – Looking east, upstream at vegetation of side channel riparian and substrate.

Photograph 12: : Section 6 – Looking east, upstream at Substrate of side channel.

Photograph 13: Section 6 – Looking northwest, recently cut larger diameter vegetation along Kicking Horse River South bank side channel.

Photograph 14: Section 7 – Looking northwest, overview of Median vegetation between Kicking Horse River main and side channel.

Photograph 15: Section 7 – Looking south, vegetation of median.

Photograph 16: Section 7 – Looking north, vegetation of median.

Photograph 17: Section 7 – Looking southeast, vegetation of median.

Photograph 18: Section 7 – Looking east, vegetation of median.

Photograph 19: Section 6 and 7 – Looking west, downstream at Substrate of Kicking Horse River main and side channel.

Photograph 20: Section 8 – Looking west, vegetation between Park Avenue and side channel.

Photograph 1: Looking south, north side of Highway 95 Bridge, Section 1 vegetation - TOG flower bed on right along road edge.

Photograph 2: Looking east, Section 2 riparian vegetation.

Photograph 3: Looking west, Section 2 riparian vegetation.

Photograph 4: Looking upstream, Kicking Horse River north bank substrate.

Photograph 5: Section 3 Vegetation - Side Channel North Bank.

Photograph 6: Section 4 Vegetation - Side Channel South Bank.

Photograph 7: Section 3/4 – Looking west, downstream at Substrate of side channel.

Photograph 8: : Section 3/4 – Looking east, upstream at Substrate of side channel.

Photograph 9: Section 5 – Vegetation in Kumsheen Park.

Photograph 10: : Section 6 – Looking east, upstream at Substrate of side channel along Section 6/7 from bridge.

Photograph 11: Section 6 – Looking east, upstream at vegetation of side channel riparian.

Photograph 12: : Section 6 – Looking west, downstream at Substrate of side channel.

Photograph 13: Section 7 – Overview of Median vegetation between Kicking Horse River main and side channel.

Photograph 17: Section 7 – Vegetation of median.

Photograph 15: Section 7 – Vegetation of median.

Photograph 16: Section 7 – Vegetation of median.

Photograph 17: Section 7 – Looking west, Vegetation of median.

Photograph 18: Section 6/7 – Looking west, downstream at Substrate of Kicking Horse River main and side channel.

Photograph 19: Section 8 – Looking southeast, vegetation between Park Avenue and side channel.