Request for Review

Please note that Guidance on Submitting a Request for Review is available at the end of this form. This guidance explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

A) Contact information

Name of Business/Company:

BC Ministry of Transportation and Infrastructure

Name of Proponent:

Krista Englund

Mailing address:

310-1500 Woolridge Street

City/Town:

Coquitlam

Province/Territory:

British Columbia

Postal Code:

V3K 0B8

Tel. No. :

239-468-1959

Fax No.:

Email:

Krista.Englund@gov.bc.ca

Is the Proponent the main/primary contact? ○ Yes ◉ No

Select additional contact:
Contractor/Agency/Consultant *(if applicable):*

Tim Poulton
Hatfield Consultants LLP

Mailing address:

200-850 Harbourside Dr.

City/Town:

North Vancouver

Province/Territory:

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604-330-2468

Fax No.:

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tpoulton@hatfieldgroup.com

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If no, please enter information for the primary contact or any additional contact.

Tim Poulton, Hatfield Consultants LLP

B) Description of Project

If your project has a title, please provide it.

Trout Lake Creek Bridge No. 10505, Hick's Lake Road

Is the project in response to an emergency circumstance*? ○ Yes ◉ No

Does your project involve work in water? ◉ Yes ○ No

If yes, is the work below the High Water Mark*? ◉ Yes ○ No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

Damage to the Trout Lake Creek crossing of Hick's Lake Road occurred as a result of flooding associated with the November 2021 "atmospheric river" flood event. Emergency repair works associated with the 2021 flood were conducted at site DF4 and MOTI subsequently retained Associated Engineering (AE) to conduct an options analysis (AE 2022) to support the design of a new permanent crossing.

The November 2021 flood event was the most recent of multiple washouts at site DF4 (AE 2022). The 2021 flood resulted in channel embankment erosion and caused Trout Lake Creek to top its banks and wash out a temporary railcar bridge (installed following a previous flood event in 2020). Emergency works included the removal of flood debris and the washed-out bridge, the installation of four 1500 mm diameter High-Density Polyethylene (HDPE) culverts, and the installation of associated riprap erosion protection (AE 2022 and Figure 2). The options analysis (AE 2022) included four (4) potential permanent design solutions:

- Option 1: Maintain existing 4 HDPE culverts;
- Option 2: Install a new Corrugated Steel Pipe (CSP) arch culvert with upstream debris mitigation;
- Option 3: Install a new bridge with upstream debris mitigation; and
- Option 4: Install a new bridge sized to convey debris floods.

Significant works on BC Parks land would be required to install upstream debris mitigation, and maintaining the existing culverts would likely result in another flood and washout due to their limited hydraulic capacity and inability to pass debris. Given the hydraulic capacity and the ability to convey the design debris flood, Design Option 4 (i.e., a new clear-span bridge) was selected as the preferred option.

The new bridge will have a 19 m span and will be 9.6 m wide. Key components of the bridge design include:

- 100 mm asphalt overlay with protection board and waterproofing;
- 8 x 800 mm deep precast prestressed concrete box stringers;
- Standard bridge parapets with steel bicycle railings;
- Semi-integral reinforced concrete abutments with parallel wing walls; and
- Four reinforced concrete piles with permanent steel casing at each abutment with a diameter of 610 mm (AE 2022).

The hydraulic opening of the bridge will be adequate to convey the design flow of 40.4 m3/s. This is equivalent to a 100-year, peak instantaneous, climate change-adjusted flow with a 10% bulking factor (AE 2023). The 200-year maximum daily flow is 40.1 m3/s.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

Once the temporary culverts are removed a new section of Trout Lake Creek will be constructed within the footprint of the new bridge. The newly constructed channel will be lined with riprap scour protection, and a portion of the channel banks will include buried riprap in the event of a berm failure that is currently located upstream of site DF4 along the left bank of Trout Lake Creek on BC Parks land. Several fish habitat enhancement features (refer to Section 4.1) will be installed upstream and downstream of the new bridge including riparian plantings within the riparian areas disturbed during construction. Detailed design drawings are included in Appendix A1.

A temporary clear-span detour bridge to facilitate traffic during construction will be installed sometime between November 2023 and April 2024 prior to the construction of the new bridge in the summer of 2024. The temporary detour bridge is being installed early to expedite works during the 2024 least-risk window for fish, and to maintain traffic should another flood event and subsequent washout occur during the fall 2023/winter 2024 rainy season. The temporary detour bridge will also be able to convey the 200-year maximum

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daily flow and will be installed per the conditions and measures to protect fish and fish habitat described in the clear span bridge code of practice (DFO 2022). MOTI will submit a Notification to the regional DFO office a minimum of 10 working days before starting work. Accordingly, the temporary detour bridge is not part of the WUA discussed in this request for review.
Construction means and methods will ultimately be determined by the successful contractor awarded the Project per MOTI Standard Specifications (MOTI 2020a); however, it is estimated that construction will proceed in the following sequence:
1. Mobilization and site preparation including installation of sediment and erosion control measures, fish salvages, and stream diversion/ isolation if the stream is not naturally dry (approximately 7 days);
2. Tree clearing and grubbing within the Project footprint (approximately 5 days);
3. Substructure (pilling, abutments, wingwalls, etc.) construction (approximately 20 days);
4. Removal of existing culverts and construction of the new channel within the footprint of the bridge (approximately 7 days);
5. Installation of riprap scour protection and bridge superstructure (girder installation, parapet, bicycle railing, etc.) construction (approximately 25 days);
6. Installation of fish habitat enhancement features (3 days);
7. Demobilization (approximately 5 days); and
8. Riparian restoration seeding/planting in fall 2024 (approximately 7 days).
Please refer to Sections 3.0 and 4.0 for a list of all Project WUA, duration of works, potential impacts, and mitigation measures.

Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached? (•) Yes ( ) No

Identify which work categories apply to your project.

- [ ] Aquaculture Operations
- [ ] Aquatic Vegetation Removal
- [ ] Beaches
- [ ] Berms
- [ ] Blasting / Explosives
- [ ] Boat Houses
- [ ] Boat Launches / Ramps
- [ ] Breakwaters
- [x] Bridges
- [ ] Cable Crossings
- [ ] Causeways
- [x] Culverts
- [ ] Dams
- [x] Dewatering / Pumping
- [ ] Docks
- [x] Dredging / Excavation
- [ ] Dykes
- [ ] Fishways / Ladders
- [ ] Flow Modification (hydro)
- [ ] Groundwater Extraction
- [ ] Groynes
- [x] Habitat Restoration
- [ ] Ice Bridges
- [ ] Log Handling / Dumps
- [ ] Log Removal
- [ ] Moorings
- [ ] Open Water Disposal
- [ ] Piers
- [x] Riparian Vegetation Removal
- [ ] Seismic Work
- [x] Shoreline Protection
- [ ] Stormwater Management Facilities
- [ ] Surface Water Taking
- [ ] Tailings Impoundment Areas
- [ ] Temporary Structures
- [ ] Turbines
- [ ] Water Control Structures
- [ ] Water Intakes / Fish Screens
- [ ] Water Outfalls
- [x] Watercourse Realignment
- [ ] Weirs
- [ ] Wharves
- [ ] Wind Power Structures

[ ] Other Please Specify

Was your project submitted for review to another federal or provincial department or agency? (•) Yes ( ) No

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If yes, indicate to whom and associated file number(s).

Water Sustainability Act Change Approval. Tracking No. 100426429; and Park Use Permit No. 111791

C) Location of the Project

Coordinates of the proposed project Latitude 49.342750 N Longitude -121.743664 W

OR UTM zone ; Easting

Northing

Include a map clearly indicating the location of the project as well as surrounding features.

Name of Nearest Community (City, Town, Village):	Harrison Hot Springs
Municipality, District, Township, County, Province:	District of Kent
Name of watershed (if applicable):	Trout Lake Creek
Name of watercourse(s) or waterbody(ies) near the proposed project:	Trout Lake Creek, drains into Harrison Lake

Provide detailed directions to access the project site:

From Harrison Hot Springs drive north along Rockwell Drive. Site DF4 (Trout Lake Creek Bridge) is just past the intersection of Rockwell Drive and Hick's Lake Road at the pull out for Sasquatch Provincial Park.

D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- ○ Estuary (Estuarine)
- ○ Lake (Lacustrine)
- ○ On the bank/shore at the interface between land and water (Riparian)
- ◉ River or stream (Riverine)
- ○ Salt water (Marine)
- ○ Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site. This description should include information on aquatic species at risk* (https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html), their residence* and critical habitat* if found in the area. An overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters can be found here http://dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Hatfield conducted a detailed desktop and field study for site DF4 in 2022 which is presented in the Environmental Overview Assessment (EOA) developed to support the options analysis (Hatfield 2023). The following sections provide a synopsis of those studies.

A summary of fish species documented to occur in Trout Lake Creek during previous desktop and field surveys (Hatfield 2023) is presented in Table 2. Trout Lake Creek is used by both spring and fall spawning salmonids. Spawning chum salmon (Oncorhynchus keta) were previously observed by Hatfield during a survey in November 2017 (Hatfield 2018), between the mouth of the Creek and Hick's Lake Road. Coastal cutthroat trout (Oncorhynchus clarkii clarkii) and rainbow trout (Oncorhynchus mykiss) were captured during the

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2017 survey upstream and downstream of Hick's Lake Road, respectively. Hick's Lake Road presents a barrier to upstream migration, therefore it is assumed that cutthroat trout captured upstream of the road are either moving downstream from Trout Lake or represent a small isolated population.
The Species at Risk Public Registry and DFO aquatic species at risk maps were also reviewed to identify potential aquatic species at risk and/or critical habitat within the Project area. There are no federally listed aquatic species at risk or critical habitat documented to occur in Trout Lake Creek.
Table 2 Documented fish species in Trout Lake Creek (Hatfield 2018).

Chum salmon, Pink salmon,
Coho salmon, Rainbow trout,
Coastal cutthroat trout, Sculpin,
Kokanee, Sockeye salmon,
Longnose dace, Stickleback

Hatfield previously conducted fish habitat baseline studies at site DF4 in 2017 and 2018 (Hatfield 2017 and Hatfield 2018); however, these studies have been updated due to extensive erosion and bedload movement which occurred during the 2020 and 2021 floods. Trout Lake Creek originates in Trout Lake, about 670 m upstream of site DF4 (Westrek, 2020), and the creek receives streamflow from Hick's Lake and other unnamed watercourses upstream of Trout Lake and within the watershed. Site DF4 is located approximately 300 m upstream of Harrison Lake and is surrounded by Sasquatch Provincial Park, and several private lots located on the fan west of Hick's Lake Road (Westrek 2020). The reaches of Trout Lake Creek conveyed over the fan are ephemeral, drying out and/or flowing subsurface during the late summer/early fall (i.e., August/September) as observed during the recent debris removal works at Green Point Bridge; the crossing of Trout Lake Creek at Rockwell Drive downstream of Hick's Lake Road. Trout Lake Creek upstream of Hick's Lake Road appears to flow year-round. Water temperature, pH, dissolved oxygen, and conductivity within a pool upstream of Hick's Lake Road were 8.7°C, 6.36, 11.86 mg/L, and 39.2 us/cm, respectively, during the March 30, 2022, field assessment.
A substantial amount of bedload and road fill material was deposited downstream of site DF4 during the 2020 and 2021 flood events (Hatfield 2023), resulting in morphological changes to Trout Lake Creek (e.g., raising the streambed profile, infilling of pools, accumulation of wood debris, and changes in substrate composition). Emergency works to remove accumulated debris upstream and downstream of the Green Point Bridge located further downstream at Rockwell Drive were conducted during the 2022 least-risk fisheries window to reinstate the freeboard under the bridge (Hatfield 2022 and Figure 3). The previous floods and associated emergency works have also resulted in changes to Trout Lake Creek upstream of site DF4. The approximate 100 m reach upstream of Hick's Lake Road previously characterized by riffle-run-pool morphology has shifted to primarily cascade-pool morphology and a considerable amount of riparian vegetation has been replaced with riprap erosion protection (Figure 3).
Fish habitat within Trout Lake Creek upstream of Hick's Lake Road has been heavily disturbed by the floods and provides limited opportunity for salmonid rearing or spawning given the change in channel morphology and substrate composition, infilling of pools, and displacement of riparian vegetation with riprap scour protection; however, this habitat is likely suitable for longnose dace (Rhinichtys cataractae) and sculpin (Cottus sp.) previously captured further upstream in 2017 (Hatfield 2017). Chum salmon (Oncorhynchus keta) were observed spawning within Trout Lake Creek during previous surveys in November 2017 downstream of Hick's Lake Road; however, much of the suitable gravel spawning substrate has been displaced downstream to the lower reaches of Trout Lake Creek at Harrison Lake. Similar to the previously perched culvert at site DF4 (Figure 3), the current crossing structure is a barrier to fish passage. A summary of fish habitat measurements from the 2022 habitat transects (Figure 4) is provided in Table 3.

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html) that describe the type of cause-effect relationships that apply to your project?

◉ Yes ○ No

If yes, select the PoEs that apply to your project.

- ☐ Addition or removal of aquatic vegetation
- ☐ Change in timing, duration and frequency of flow
- ☐ Cleaning or maintenance of bridges or other structures
- ☐ Dredging
- ☒ Placement of material or structures in water
- ☒ Riparian Planting
- ☐ Streamside livestock grazing
- ☒ Structure removal

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- [x] Excavation
- [ ] Fish passage issues
- [x] Grading
- [ ] Marine seismic surveys
- [ ] Organic debris management
- [ ] Placement of marine finfish aquaculture site
- [ ] Use of explosives
- [x] Use of industrial equipment
- [x] Vegetation Clearing
- [ ] Wastewater management
- [ ] Water extraction

Will there be changes (i.e., alteration) in the fish habitat*? (•) Yes ( ) No ( ) Unknown

If yes, provide a description.

The assessment of impacts considers the pre-2020 flood event as the baseline condition for Trout Lake Creek. Using the pre-2020 flood event captures impacts that have occurred as a result of emergency works associated with both the 2020 and 2021 flood events as well as impacts expected to occur from the new clear-span bridge.
It is expected that replacing the culverts with a bridge of current design standards that considers climate change and debris flood events will reduce erosion to Hick's Lake Road and Trout Lake Creek whereby subsequent flooding and damage of downstream environments, infrastructure, and property is reduced. Furthermore, the daylighting of Trout Lake Creek through the removal of the culverts will provide a net gain of aquatic habitat and improve fish passage during moderate flow conditions (refer to Section 4.1). Despite this overall net benefit, there are impacts associated with the previous emergency works, and not all Measures to Protect Fish and Fish Habitat (DFO 2019a) can be implemented for the proposed Project. Expected impacts to the aquatic and riparian environments of Trout Lake Creek associated with the Project are presented in Figure 5.

Generally, the footprint of the new bridge and associated riprap will be minimized to the extent feasible while maintaining current design standards. The new larger bridge span and removal of existing culverts will reduce channel constriction by maintaining the approximate upstream and downstream channel dimensions within the bridge footprint. As previously discussed, the new bridge will result in a net gain of aquatic habitat (Figure 6) and reduce erosion to Hick's Lake Road and Trout Lake Creek whereby subsequent flooding and damage to downstream environments, infrastructure, and property is reduced from current and pre-flood conditions.

Given the previous permanent crossing and current temporary crossing present a barrier to fish passage, the opportunity to improve fish passage through the new crossing has been extensively reviewed and discussed with the Project team during the options analysis. Based on the previous baseline studies conducted in 2017 and 2018 (Hatfield 2017 and Hatfield 2018), which documented suitable fish habitat in the form of potential rearing and spawning areas within an approximate 100 m reach upstream of Hick's Lake Road, it was originally determined that designing for fish passage was warranted; however, due to shifting baseline conditions as a result of the 2020 and 2021 flood events and associated emergency works, the previously identified suitable habitat has been downgraded to marginal habitat (refer to Section 2.1). Given the marginal habitat for fish upstream of Hick's Lake Road and engineering challenges associated with steep channel gradients and the large size of riprap required to construct a fishway (e.g., step-pools), we are no longer recommending this design mitigation strategy.
The Project team developed a fish habitat restoration options analysis to identify the most suitable fish habitat restoration option for the Project. Four restoration options were considered including:
- Option 1: Provide fish passage under the new bridge via the construction of a fishway (e.g., step-pools) to improve fish passage across a range of flows;
- Option 2: Restore a side channel downstream of the bridge to provide fish-rearing opportunities and refuge during future flood events;
- Option 3: The installation of mainstem channel habitat features upstream and downstream of the new bridge to provide instream complexity for cover and high-flow refuge. This option may also provide fish passage during moderate flow conditions; and
- Option 4: Provide no fish habitat restoration, given DF4 was already a fish barrier during baseline conditions and impacts to the creek occurred as a result of natural flood events.

The options analysis summarizing all considerations associated with each restoration option is presented in Table 5. Restoration Option 3 was selected as the most suitable restoration approach given the change in fish habitat values upstream of the bridge, property, maintenance, and constructability constraints associated with Restoration Option 1 and Option 2. Restoration Option 3 would provide appropriate mitigation for the Project and contribute to the restoration of fish habitat disturbed as a result of multiple flood events.

A number of design features have been incorporated into the Project to enhance fish habitat functions including:
1. Siting the new bridge within the footprint of the existing crossing to minimize negative impacts to fish and wildlife habitat;
2. Daylighting approximately 276 m2 of aquatic habitat (Figure 6) through the removal of the existing culverts which currently present a barrier

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to fish passage and grading the channel to an approximate slope of 8.6%;
3. Top-dressing riprap scour protection up to the high watermark (i.e., 2-year return flow) with native substrates (i.e., cobble/gravel/fines) salvaged during construction to fill riprap voids (and promote surface flow) and provide a natural channel appearance more suitable for benthic invertebrate production and fish habitat;
4. Installation of boulder clusters and large woody debris to provide habitat complexity, cover, and velocity hides for fish during high-flow events and provide fish passage during moderate-flow events; and
5. Minimizing clear and grub limits to the greatest extent possible, especially in areas adjacent to and within BC Parks land. A tree survey has been conducted to optimize clear and grub limits whereby significant trees are avoided if possible. Planting of native trees, shrubs, and forb species suited to site conditions will occur within riparian areas disturbed during construction and previous flood events.
Instream fish habitat enhancement features are presented in AE Drawing Nos 10505-114 and 10505-118 (Appendix A1).

Approximately 1,676 m2 of plantings will be installed within disturbed riparian areas (Appendix A2). Plants will be of guaranteed nursery stock and installed at one plant per square metre density (BC MoE 2008) or as specified per the landscape plan (Appendix A2). Large woody debris salvaged during construction will be placed throughout the planting areas.

Although there will be temporary and permanent changes to fish habitat associated with the Project, the temporary changes as a result of Project WUA are short in duration (i.e., instream works for 1.5 months and within the least risk work window) and low in magnitude (i.e., instream footprint of approximately 500 m2). Conventional BMPs are considered acceptable and practical to mitigate potential short-term construction-related impacts (Table 8) which will be detailed in the Project CEMP. Further, the permanent changes to fish habitat associated with the Project will provide a net gain in fish habitat (Table 7) and improve habitat quality including:

Is there likely to be a harmful alteration, disruption or destruction of habitat used by fish? ○ Yes ◉ No ○ Unknown

Is there likely to be destruction or loss of habitat used by fish? ○ Yes ◉ No ○ Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark*?

Approximately 500 m2

Is your project likely to change water flows or water levels? ○ Yes ◉ No ○ Unknown

If your project includes withdrawing water, provide source, volume, rate and duration.

NA

If your project includes a water control structure, provide the % of flow reduction.

NA

If your project includes discharge of water, provide source, volume and rate.

NA

Will your project cause death of fish? ○ Yes ◉ No ○ Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

NA

What is the time frame of your project?

The construction will start on 05/01/2024 and end by 10/31/2024

If applicable, the operation will start on MM/DD/YYYY and end by MM/DD/YYYY

If applicable, provide schedule for the maintenance

NA

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If applicable, provide schedule for decommissioning

NA

Are there additional effects to fish and fish habitat that will occur outside of the time periods identified above? ○ Yes ◉ No

(If yes, provide details)

Can you follow appropriate Timing Windows (http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html) for all your project activities below the High Water Mark*? ◉ Yes ○ No

(If no, provide explanations.)

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

◉ Yes ○ No

If yes, describe.

Refer to the description of project in this form.

Based on the options analysis report (AE 2022), Design Option 4 is the preferred long-term design option for site DF4 and is comprised of a new clear-span bridge to convey the design debris flood. Design Option 4 has the largest hydraulic opening of the design options and is the least susceptible to debris blockage. A temporary detour bridge will be required during construction; however, as previously discussed the temporary detour bridge is not part of the WUA associated with this request for review.
The assessment of impacts considers the pre-2020 flood event as the baseline condition for Trout Lake Creek. Using the pre-2020 flood event captures impacts that have occurred as a result of emergency works associated with both the 2020 and 2021 flood events as well as impacts expected to occur from the new clear-span bridge.
It is expected that replacing the culverts with a bridge of current design standards that considers climate change and debris flood events will reduce erosion to Hick's Lake Road and Trout Lake Creek whereby subsequent flooding and damage of downstream environments, infrastructure, and property is reduced. Furthermore, the daylighting of Trout Lake Creek through the removal of the culverts will provide a net gain of aquatic habitat and improve fish passage during moderate flow conditions (refer to Section 4.1).

Have you consulted DFO's Fish and Fish Habitat Protection Measures Habitat (https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html) to determine which measures apply to your project? ◉ Yes ○ No

Will you be incorporating applicable measures into your project? ○ Yes ◉ No

If yes, identify which ones. If No, identify which ones and provide reasons.

Hatfield has evaluated the proposed Project to confirm if all Measures to Protect Fish and Fish Habitat (DFO 2019a) can be implemented. Our review concluded that all measures as described in DFO (2019a) can be followed except for:
- Avoid placing fill or other temporary or permanent structures below the high watermark;
- Disturbing or removing materials from the banks, shoreline, or waterbody bed;
- Maintaining an undisturbed vegetated buffer zone between areas on land and the high watermark; and
- Avoiding tree removal in the riparian area.

Although there will be temporary and permanent changes to fish habitat associated with the Project, the temporary changes as a result of Project WUA are short in duration (i.e., instream works for 1.5 months and within the least risk work window) and low in magnitude (i.e., instream footprint of approximately 500 m2). Conventional BMPs are considered acceptable and practical to mitigate potential short-term construction-related impacts (Table 8) which will be detailed in the Project CEMP. Further, the permanent changes to fish habitat associated with the Project will provide a net gain in fish habitat (Table 7) and improve habitat quality including:
- Improved fish passage during moderate flows as a result of removing the perched culverts, reducing the channel slope, and installation of boulder clusters;
- Improved fish cover and resting areas during high flows as a result of the habitat enhancement features (i.e., boulder clusters and large

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woody debris);
- Resiliency to future flood events given the sizing of the new clear-span bridge to convey design flood and debris flows;
- Resiliency to future scour during flood events given the sour protection design features; and
- Improved long-term riparian function (e.g., allochthonous carbon input, shade, and LWD input) given the benefits of the Project landscape plan (Appendix A2).

Have you considered whether DFO standards and codes of practice apply to your project? ○ No ◉ Yes

If Yes, include a list.

Temporary cofferdams and diversion channels, End-of-pipe fish protection screens for small water intakes in freshwater, and clear span bridges.

Have you considered other avoidance and mitigation measures? ○ No ◉ Yes

If Yes, include a list.

The successful Contractor(s) will be required to submit a detailed Construction Environmental Management Plan (CEMP) with work procedures prior to commencing construction. The CEMP shall be prepared in compliance with MOTI's Standard Specifications for Highway Construction (MOTI 2020a) Section 165 Protection of the Environment (SS 165) and align with the Requirements and Best Management Practices for Making Changes in and About a Stream in British Columbia (Gov. BC 2022b), and the Measures to Protect Fish and Fish Habitat (DFO 2019a). The CEMP will be submitted to MOTI for review and approval prior to the start of works. Special provisions (SPs) contained in the Project tender package will identify any expectations that differ from MOTI SS 165 and will also include conditions of any environmental approvals. SPs may also refer to mitigation measures outlined in this, or any other environmental assessment reports prepared for the Project that form part of regulatory application submissions. Mitigation measures and BMPs detailed in the CEMP will include but not be limited to the following management plans:
- ☒ Fish and fish habitat protection plan (including fish salvages where required);
- ☒ Spill prevention (including concrete leachate) and emergency response plan;
- ☒ Erosion and sediment control plan;
- ☒ Vegetation management plan (including management of invasive and noxious weeds);
- ☒ Wildlife protection plan; and
- ☒ Waste management plan.

Underwater Noise
To install the reinforced concrete piles with steel casings, we understand the contractor will have the option to either drill (i.e., bore) the piles or drive the piles with a down-hole hammer. A Pile Driving Procedure underwater noise management plan will be developed if the contractor chooses to use a downhole hammer with appropriate underwater noise monitoring equipment (e.g., hydrophone) and mitigations if required (e.g., bubble curtain). The contractor's Appropriately Qualified Professional (AQP) will be required to include the following mitigation measures in the underwater noise management plan:
- ☒ The environmental monitor will be on-site during all down-hole pile driving activities to monitor for fish observations and hydroacoustic monitoring at the limits of the fish exclusion zone;
- ☒ Commence pile driving with a soft start where the impact energy is gradually increased over a 10 minute period;
- ☒ Ensure at the boundary of the fish exclusion zone, Peak and cumulative Sound Exposure Levels do not exceed the thresholds summarized in Table 6 (Popper et al. 2006); and
- ☒ If monitoring indicates sound levels exceed the thresholds the work must be halted. The work will only resume after additional measures (e.g., bubble curtain) have been implemented to reduce sound levels below the thresholds (Table 6).

Are there any relevant measures that you are unable to incorporate? ○ Yes ◉ No

(If yes, identify which ones.)

What harmful effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

None.

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Do these include effects on aquatic species at risk*? ○ Yes ◉ No

If yes, please describe, including how many individuals will be harmed, harassed, or otherwise affected by the project, and how?

Do these include effects on areas identified as their residence or critical habitat? ○ Yes ◉ No

If yes, please describe

Are there any aquatic invasive species in the vicinity of your project area? ○ Yes ◉ No

(If yes, identify which ones.)

Does your project aim to, or will it be likely to, effect any of these aquatic invasive species? ○ Yes ◉ No

If yes, how?

F) Signature

I, Tim Poulton (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature

29/09/2023
Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

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