



REPORT

Fairbanks Road Flood Response Project
Overview Environmental Assessment

Submitted to:

British Columbia Ministry of Transportation and Infrastructure

Submitted by:

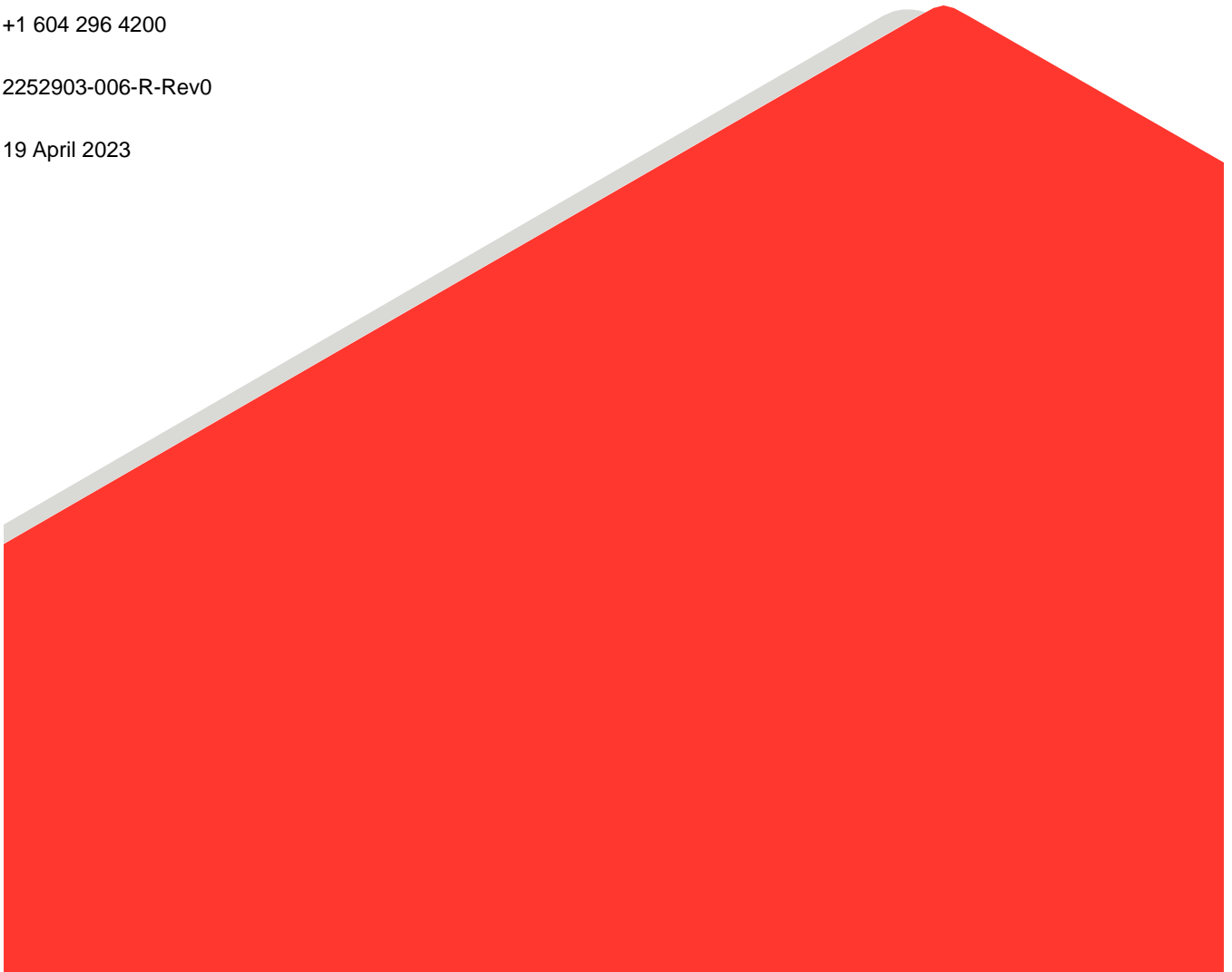
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Distribution List

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Study Limitations

This report was prepared for the exclusive use of the BC Ministry of Transportation and Infrastructure (MOTI), its assignees and representatives, and is intended to serve as an Overview Environmental Assessment (OEA) for the Fairbanks Road Flood Response Project (the Project). The Project footprint extends along a residential neighbourhood between 1108 and 1110 Fairbanks Road in Cowichan Bay, BC and areas east of Fairbanks Road, where a slope failure occurred (the Project Area); the Study Area consists of the Project Area plus a 1 km buffer. This report is intended to provide an overview level reconnaissance-based environmental assessment of anticipated effects of the proposed Project on marine and terrestrial habitats. This report is not intended to identify or evaluate potential effects outside of the proposed Project Area.

The inferences concerning the conditions of the Study Area are based on information obtained from a limited review of available literature, online government sources, and field investigations conducted by WSP staff on 1 September 2022 and on 19 January 2023. In developing this OEA, WSP has relied in good faith on information provided by MOTI, its contractors, and government agency resources. We accept no responsibility for any deficiency or inaccuracy contained in this report as a result of our reliance on the aforementioned information.

The findings and conclusions documented in this report have been prepared for specific application to this Project and have been developed in a manner consistent with the level of care normally exercised by environmental professionals currently practicing under similar conditions in the jurisdiction. WSP makes no other warranty, expressed or implied.

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1.0 INTRODUCTION

The Ministry of Transportation and Infrastructure (MOTI; the Proponent) is currently proposing works between 1108 and 1110 Fairbanks Road in Cowichan Bay, BC to repair and stabilize a portion of Fairbanks Road and an adjacent bank that were subject to failure during flooding caused by the atmospheric river event in November 2021 (the Project; Figure 1).

WSP was retained to develop an Overview Environmental Assessment (OEA) for the Project. The purpose of the OEA is to identify environmental sensitivities within the Project Area. This OEA characterizes marine and terrestrial resources in and adjacent to the Project Area, assesses potential Project-related effects to these resources, and provides recommended mitigation strategies to avoid, reduce or manage these effects. This OEA report is intended to inform the planning and construction phases of the Project and support procurement of environmental regulatory approvals.

1.1 Description of Works

The Project is located within a residential area, between 1108 and 1110 Fairbanks Road in Cowichan Bay, BC, and includes the portion of road between the properties located at these addresses, as well as areas east of Fairbanks Road to where the slope failure occurred (the Project Area). In order to describe the broader ecological context of the Project Area for the purposes of the desktop review, a Study Area was defined as the Project Area plus a 1 km buffer. The proposed Project consists of works to repair and stabilize the slope and may also include replacement of a culvert running underneath Fairbanks Road and drainage improvements. It is anticipated that materials and equipment will be transported to site via barge. Four temporary monopile dolphins will be placed in the marine environment to facilitate securing the barge at onshore and offshore positions. When not in use, the barge will be moored in an offshore position. A temporary landing platform for the barge will be created onshore. Specific design for the barge landing will be determined based on site profile and water depths determined through a site visit, but is anticipated to be created from either rig mats or lock blocks. During work activities, the barge will be moored in a position where it will remain floating at low tide, with a barge ramp extending to the temporary landing pad. The barge will also serve as a staging and laydown area for works along the foreshore. When not in use, the barge will be located offshore, moored at the temporary monopile dolphins.

The newly installed crossing structure will be a 450 to 600 mm diameter HDPE pipe leading from a cast-in-place concrete catchment structure to a pre-cast impact basin installed above the highest-high water large tide (HHWLT) mark on the foreshore. All concrete used near the HHWLT mark will be pre-cast. The pipe will be placed overland along the slope and will be shallow buried between the residences (minimum 300 mm cover).

Existing material from the previous slope failure will be stripped back to expose the pre-failure surfaces. The beach surface will be partially excavated to accommodate the installation of a shallow riprap key. Crushed gravel fill will be placed and compacted and the pre-cast impact basin installed on top, connected to the HDPE pipe. Edges of the impact basin would be 'blended' into the surrounding environment using some of the larger 500 kg riprap pieces. The base elevation of the pre-cast structure would be above the HHWLT (i.e., the top of fill, bottom of concrete).

Riprap will be used to reinstate and armor the slope along the failure zone (250 kg riprap along the slope, 500 kg riprap below 5.5 m elevation). Armoring at the outflow from the catchment basin will be riprap or coarse beach deposit. It is estimated approximately 750 m³ of material will be excavated from the slope and failure area, replaced with an equivalent volume of riprap.

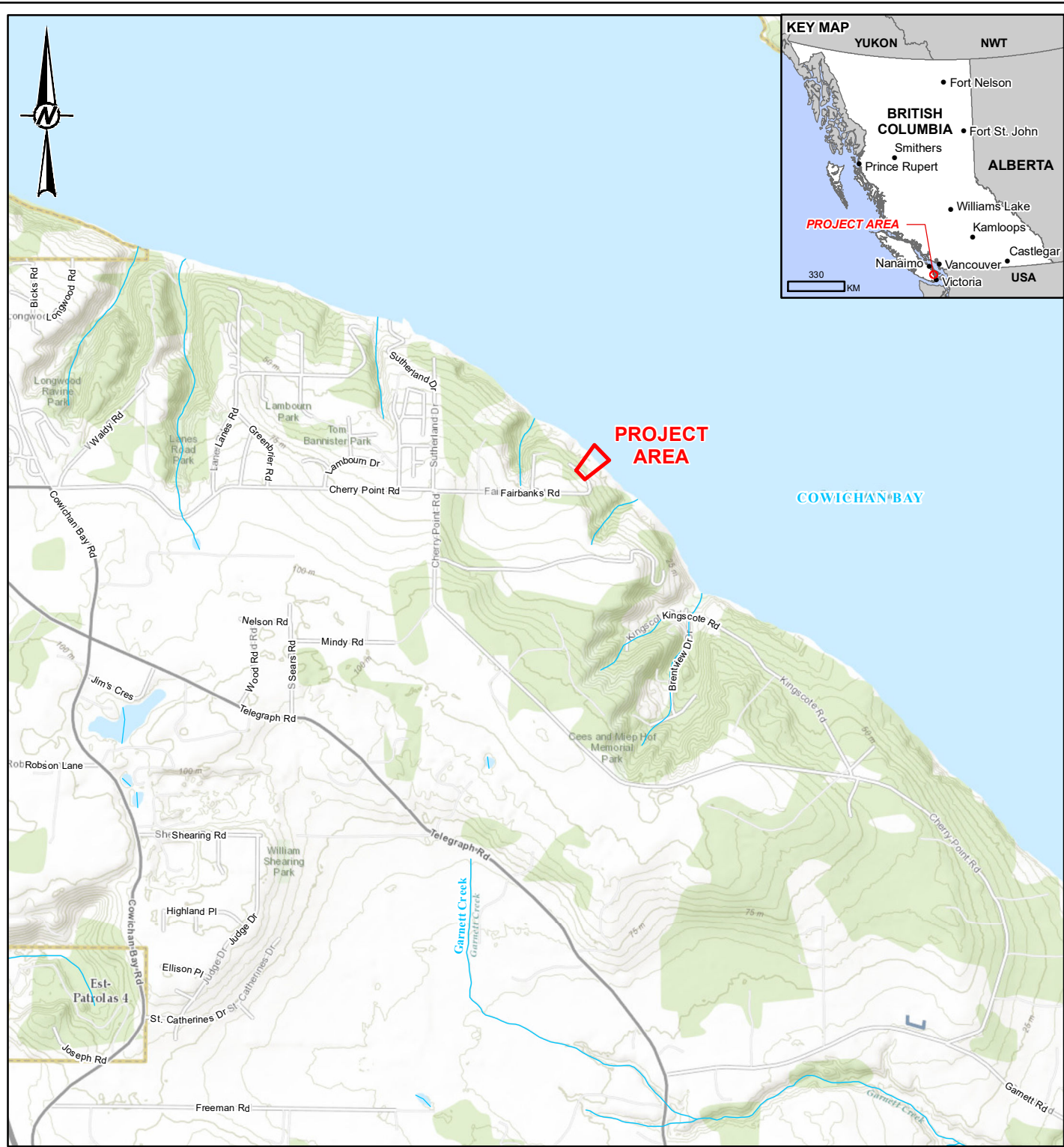
Limited vegetation clearing is anticipated to be required to facilitate access to the Project Area. Additionally, temporary disturbances to the intertidal and subtidal zones immediately adjacent to the Project Area are anticipated due to facilitating barge access and anchoring. The total area of disturbance, which includes aquatic, riparian, and non-riparian terrestrial habitat, at the Project site has been calculated at approximately 400 m² of permanent disturbance to terrestrial habitat, as well as approximately 475 m² of temporary disturbance to intertidal, subtidal, and non-riparian upland habitat due to the positioning of the temporary landing platform and monopile dolphins. No permanent disturbance to aquatic habitat is anticipated.

Project works are estimated to require approximately 90 days, with an anticipated start date in June 2023. In-water works are anticipated to occur throughout the Project schedule.

2.0 REGULATORY CONTEXT

The Project Area overlaps multiple jurisdictional boundaries. As such, federal, provincial, and municipal legislation is presented in this section. The following table provides a high-level summary of legislation applicable to the Project, along with its purpose, and relationship to the Project (Table 1).

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- LEGEND**
- ▬ PROJECT AREA
 - ▬ WATERCOURSE



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CLIENT
MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

PROJECT
MOTI FAIRBANKS ENVIRONMENTAL CONSTRAINTS

TITLE
PROJECT LOCATION

CONSULTANT	YYYY-MM-DD	2023-04-19
	DESIGNED	NM
	PREPARED	MH
	REVIEWED	KF
	APPROVED	SR

PROJECT NO.	CONTROL	REV.	FIGURE
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Table 1: Applicable Legislation

Applicable Legislation	Government Agency	Permits, Approvals, and Authorizations	Probability	Timeline for Review / Approval	Relevance to Project
Federal					
<i>Fisheries Act</i> Section 34.4[1] and 35[1]	Fisheries and Oceans Canada (DFO) – The Fish and Fish Habitat Protection Program	Request for Project Review	Likely	Likely 2 months (up to 3) to receive response	Activities that affect fish or fish habitat may require a Request for Review by DFO if projects can not completely implement the protection measures provided on the DFO website (https://www.dfompo.gc.ca/pnw-ppe/measures-mesureseng.html). A <i>Fisheries Act</i> authorization is required for activities that could cause death of fish or harmful alteration, disruption or destruction, (HADD) of fish habitat. Authorizations under the <i>Fisheries Act</i> require detailed Environmental Assessments and Habitat Offsetting Plans to be developed. Lower risk activities may only require a Letter of Advice. Works within 30 m of marine habitat adjacent to the Project Area will require a Request for Review. A <i>Fisheries Act</i> Authorization is not anticipated if Project-related clearing is limited. Additional clearing of vegetation, particularly mature trees, that would risk introducing additional effects (e.g., changes in water temperature), are not anticipated, and it is considered unlikely that this project would require an Authorization under the <i>Fisheries Act</i> . In-water works including placement of temporary monopile dolphins and a temporary landing platform, may require an Authorization depending on the final location and fish habitat present.
		Request for Authorization	Likely	150 days	

Applicable Legislation	Government Agency	Permits, Approvals, and Authorizations	Probability	Timeline for Review / Approval	Relevance to Project
<i>Canadian Navigable Waters Act</i> and Minor Works Order	Transport Canada	Application to the Navigation Protection Program	Required for barge operations, placement of temporary monopile dolphins, and a temporary landing platform	Minimum 30 days, up to 9 months	Assesses whether there are Project-related risks to navigation in waterways. An application to the Navigation Protection Program is required for works within navigable waterways. Based on the Project requirements, a 'No interference with navigation notification of work' would likely be required. This requires the deposition of information in areas specified by the Minister of Transportation, along with publishing a notice of work 30 days prior to start of work.
<i>Species At Risk Act (SARA)</i> – Schedule 1 Sections 32 (1), 33 and 58(1)	Environment and Climate Change Canada (ECCC) – Canadian Wildlife Service (CWS) or DFO	Permit under Section 73 of SARA	Not Required	N/A	No permits are anticipated to be required for this Project. Permits would be necessary for capture and relocation of an at-risk species on federal land. Due diligence requires assessment and measures to protect species at risk and their habitat.
<i>Migratory Birds Convention Act (MBCA)</i> Sections 5.1(2) and 5.2(2) Migratory Birds Regulations Section 5 Section 12 (h1)	ECCC – CWS	Damage or Danger Migratory Bird Permit Disturbance or destruction of migratory birds, their nests or eggs is prohibited (Government of Canada 1994).	Unlikely	N/A	Permit only required if a bird species that is protected under the MBCA has a nest that requires removal while actively in use, or a nest afforded year-round protection under the MBCA. Vegetation clearing should be undertaken outside of the bird breeding season. As per the MOTI Breeding Bird Nest Survey Protocol, the bird nesting season occurs between 15 March to 15 August; however, an Appropriately Qualified Professional may use guidance from the General Nesting Periods of Migratory Birds in Canada (i.e., Government of Canada 2018) to refine this window (MOTI 2020a). If vegetation clearing is to occur in the breeding season, a pre-clearing bird nest survey would be recommended. A “no work” buffers would be recommended around active nests based on the species observed.

Applicable Legislation	Government Agency	Permits, Approvals, and Authorizations	Probability	Timeline for Review / Approval	Relevance to Project
Provincial					
<i>Water Sustainability Act</i> Section 11 and Water Sustainability Regulation	BC Ministry of Forests (MOF)	The following changes in and about a stream are authorized changes under WSR 39(1)(l) : <i>the construction or maintenance of storm sewer outfalls, if both the following conditions are met:</i> <i>(i)the storm sewer outfall is designed by an engineering professional;</i> <i>(ii)the storm sewer outfall is constructed, maintained and used in a manner that does not obstruct the flow of water in the stream or cause erosion of the stream channel</i>	Unlikely	N/A	Works within or about a stream generally require authorization under the <i>Water Sustainability Act</i> (WSA). The culvert to be replaced is part of a stormwater ditch line and is considered as a drainage corridor, as defined by the WSR, meaning no permitting requirements are expected under the WSA.
<i>Wildlife Act, 1996</i>	BC Ministry of Environment and Climate Change (MENV), Environmental Stewardship Division	A general permit under the <i>Wildlife Act</i> is required to take, relocate, or destroy wildlife protected under the <i>Wildlife Act</i> .	Unlikely	N/A	Due diligence requires implementation of best management practices to protect wildlife and their residences. Many bird nests have recommended buffer zones to prevent disturbance during the nesting period. A site reconnaissance was conducted to evaluate the potential for bird species to nest in the surrounding area. Suitable nesting habitat is available for various passerines as well as raptors where mature trees are present.
Municipal					
Noxious Weeds Control Bylaw 3966	Cowichan Valley Regional District (CVRD)	N/A	N/A	N/A	Outlines requirements of property owners to eradicate noxious weeds. Currently, the only noxious weed listed by the CVRD is giant hogweed (<i>Heracleum mantegazzianum</i>) (CVRD 2016).

3.0 METHODS

3.1 Background Review

Publicly available sources of aquatic and terrestrial data were reviewed to characterize the existing conditions and potential environmental resources at the Project Area and Study Area (Figure 1). The Study Area consists of the Project Area plus a 1 km buffer. Information sources reviewed included:

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports from the *Species at Risk Act* (SARA) Public Registry (Government of Canada 2022).
- BC Conservation Data Centre (CDC) Species and Ecosystem Explorer database and associated reports (BC CDC 2022)
- Data BC's iMapBC and Habitat Wizard (Government of BC 2022a, b)
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Map (DFO 2022)
- Invasive Alien Plant Program (IAPP; Government of BC 2022c)
- Wildlife Tree Stewardship Atlas (WiTS; WiTS 2022)
- British Columbia Great Blue Heron Atlas (GBHE; GBHMT 2022)
- Air photos/online satellite imagery (e.g., Google Earth)

3.2 Site Visits

A site visit was conducted on 1 September 2022 by one WSP environmental specialist to identify sensitive environmental resources in the nearshore aquatic and terrestrial environment. A follow-up site visit was conducted on 19 January 2023 by one WSP marine biologist to identify sensitive environmental resources in the intertidal marine environment during a period of suitable low tides. The Project Area was walked in its entirety, with habitat and chance wildlife encounters recorded. Information gathered included:

- Structure and composition of vegetation communities.
- Wildlife habitat features.
- Chance encounters with wildlife and wildlife signs.
- Aquatic features providing potential habitat or additional habitat for terrestrial species.
- Marine habitat providing habitat for fish and other marine species.
- Presence or absence of species at risk.

4.0 EXISTING CONDITIONS

4.1 Marine and Aquatic Resources

There are no freshwater watercourses overlapping the Project Area, with the nearest being an unnamed stream approximately 150 m southeast (watershed code 920-243717), while a second unnamed stream occurs approximately 240 m to the northwest (watershed code 920-244140; Government of BC 2022b). Both streams flow directly into the marine environment and are not anticipated to be affected by the Project. Other watercourses mapped within the Study Area but not located within the Project Area are similarly unnamed and are not anticipated to be affected by the Project. No fish species have been recorded in watercourses in the Study Area (Government of BC 2022b).

A ditch runs along the west side of Fairbanks Road prior to flowing into a culvert that travels underneath the road. The other end of the culvert could not be located at the time of the field reconnaissance, but it is assumed that it emerges in an area of thick vegetation between 1108 and 1110 Fairbanks Road. This ditch meets the definition of a corridor drainage, as per the *Water Sustainability Regulation* Division 4, Section 31(1) (Government of BC 2016). As such, works that divert water in the ditch are expected to be exempt from the requirements under Section 6(1) of the *Water Sustainability Act* (Government of BC 2016).

The Project Area is located within the Strait of Georgia Marine Ecoregion, approximately 3.5 km southeast of the Cowichan River estuary (BC CDC 2022). The shoreline extends from the highest-high water large tide (HHWLT) mark, which lies at the toe of a steep upland slope, into a flat sand and gravel beach with a relatively shallow slope (Government of BC 2022a). Provincial mapping indicates marine substrate is sand which transitions to sand and shells and then to mud at deeper depths (Government of BC 2022a). Cowichan Bay and the surrounding area are in the Mud Substrate Marine Ecological Classification zone (BC CDC 2022). Intertidal substrates in the Project Area were observed during the site visit to consist of a mix of sand, gravel and cobble, with pockets of sand present in the upper intertidal zone near the HHWLT and mostly gravel and cobble substrate present in the mid and lower intertidal zones. A few scattered boulders were observed in the lower intertidal zone on the north side of the Project Area. Several large logs are also present on the beach with scattered, small woody debris. Subtidal substrates were not observed during the site visits.

There are two boat launches and nine marinas within approximately 8 km of the Project area (BC CDC 2022). There are no ferry routes adjacent to the Project Area; however, a cruise ship route passes between Cowichan Bay and the southwest portion of Saltspring Island (BC CDC 2022). In addition, commercial fishing vessels use this area as there are a number of fisheries that take place in these waters including commercial salmon netting along the southern coast of Saltspring Island, commercial salmon trolling to the north in the Sansum Narrows, and prawn fishing to the south toward Saanich Inlet (BC CDC 2022). There are approximately six clam beds in the vicinity of the Project Area, one within 2 km and five more within 8 km (BC CDC 2022). The Project site is also in a high-use recreational finfish fishery area and is adjacent to a very high-use recreational finfish fishery area which likely results in heavy vessel traffic (BC CDC 2022).

4.1.1 Marine Vegetation

The only mapped intertidal or subtidal vegetation present in areas proximal to the Project Area are salt tolerant grasses (Government of BC 2022a). There are eelgrass beds present approximately 4km from the Project site, further northwest into Cowichan Bay (BC CDC 2022). Japanese eelgrass (*Zostera japonica*), a species on the

Aquatic Invasive Plant Species list, is also present in the shallows of Cowichan Bay as well as in an area approximately 3.2 km southeast of the Project site (BC CDC 2022). There are no mapped kelp beds in the immediate vicinity of the Project site with the nearest mapped kelp beds occurring approximately 2.8 km to the northeast of the site off the shores of Saltspring Island (BC CDC 2022). No evidence of eelgrass or understory brown-bladed kelps was observed in the lower intertidal zone during site visits. Macroalgae observed included small amounts of rockweed (*Fucus* sp.) and sea lettuce (*Ulva* sp.) attached to boulders in the lower intertidal zone.

4.1.2 Marine Invertebrates

A number of mollusc species have the potential to occur in the Project Area, including two species listed under the Species at Risk Act (SARA): Olympia oyster (*Ostrea lurida*) and northern abalone (*Haliotis kamtschatkana*) (DFO 2022; BC CDC 2022). No evidence of Olympia oyster or northern abalone was observed during site visits. Marine invertebrates observed during the site visit included barnacles (*Balanus* sp.) on rocks and boulders in the lower intertidal zone and shore crabs (*Hemigrapsus* sp.) beneath the rocks. No evidence of clam siphons holes or clam beds was observed.

4.1.3 Marine Fish

Several fish species have the potential to utilize the marine environment within and adjacent to the Project Area, including several species of salmonids and species of forage fish, including Pacific herring (*Clupea pallasii*) and Pacific sand lance (*Ammodytes hexapterus*) which may occur on sand substrates within or adjacent to the Project Area. No fish species have been captured or observed within the Study Area, however there is potential for fish to occur if no barriers to fish passage are present (Government of BC 2022b). No evidence of fish or habitat important for use as nursery or rearing habitat was identified during the site visit on 19 January 2023.

Federally listed fish species known to occur in the surrounding Cowichan Bay area include:

- Rougheye Rockfish (*Sebastes aleutianus*)
- Yelloweye Rockfish (*S. ruberrimus*)
- Green Sturgeon (*Acipenser medirostris*)
- Longspine Thornyhead (*Sebastolobus altivelis*)

Based on life history characteristics and habitat preferences for these species, it is considered unlikely that the Project would have an impact or interaction with these species or their habitats.

There are three historic herring spawning areas within the vicinity of the Project Area, two in Genoa Bay approximately 2.9 km north of the site and one approximately 5 km southeast of the site off Salt Spring Island. The last recorded spawns in these areas took place in 1986 around March 18th and March 1st respectively (BC CDC 2022).

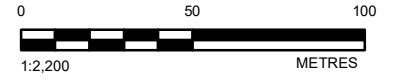
4.1.4 Marine Mammals

Several marine mammal species are known to occur or have the potential to occur in the vicinity of the Project Area. Pinnipeds observed in the Cowichan Bay area include harbour seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumetopias jubatus*) (BCCSN 2022). Harbour seals are common in the Cowichan Bay moorage areas. There is a harbour seal haul-out site approximately 5 km south along the shoreline from the Project Area, and there are numerous other haul-out sites outside Satellite Channel to the southwest. Steller sea lions are listed as *Special Concern* under SARA and are particularly susceptible to human disturbance when on land.



LEGEND

	PROJECT AREA		
	INVASIVE ALIEN PLANT	GK - GIANT KNOTWEED	
		JK - JAPANESE KNOTWEED	
	WATERCOURSE		
	ROAD		




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CLIENT
MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

PROJECT
MOTI FAIRBANKS ENVIRONMENTAL CONSTRAINTS

TITLE
ENVIRONMENTAL RESOURCES

	CONSULTANT	YYYY-MM-DD	2023-04-19
		DESIGNED	NM
		PREPARED	MH
		REVIEWED	KF
		APPROVED	SR

PROJECT NO.	CONTROL	REV.	FIGURE
22525903	1005	0	2

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The Project Area is within the range of several populations of killer whales (*Orcinus orca*), including the northeast pacific southern and northern resident populations, and the northeast pacific transient and offshore populations (threatened) (BC CDC 2022). The southern resident and transient populations are more likely to be seen in vicinity of the Project Area. The Project Area is also within the range of the harbour porpoise (*Phocoena phocoena vomerina*) which is listed as Special Concern under SARA. There is also potential for humpback whales to be in the area surrounding the Project site. No marine mammals were observed in the Project Area during site visits.

4.1.5 Marine Birds

There are a number of marine bird species with the potential to use the marine environment within and surrounding the Project Area, including grebes, herons, geese, sandpipers, murrelets, gulls, scoters, terns, and cormorants (BC CDC 2022b). Observations of purple martin, a Blue-Listed species in BC, were recorded in nest boxes on pilings in Cowichan Bay approximately 4 km from the Project site between 1972 and 2003 (BC CDC 2022a; 2022b). No marine birds were observed in the Project Area during site visits.

4.2 Terrestrial Resources

British Columbia has been classified into biogeoclimatic zones based on vegetation, geological and climatic conditions and uses local climate and landform conditions to reflect the distribution and presence of specific plant and animal communities and ecosystems.

The Project Area is located within the Coastal Douglas-fir (CDF) biogeoclimatic zone, moist marine subzone (CDFmm). The CDFmm occurs in areas of low elevations (150 m) along the southeast of Vancouver Island, including a narrow strip along the Sunshine Coast, the Gulf Islands and south of Cortes Island (Green and Klinka 1994). Characteristic zonal forested areas are dominated by coastal Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*) with dryer sides characterized by the presence of Garry oak (*Quercus garryana*) and arbutus (*Arbutus menziesii*). The understorey is typically dominated by salal (*Gaultheria shallon*), dull Oregon-grape (*Mahonia nervosa*), and oceanspray (*Holodiscus discolor* var. *discolor*) (Green and Klinka 1994).

4.2.1 Vegetation

The Project Area is comprised of Fairbanks Road, two houses (1108 and 1110 Fairbanks Road), and the slope leading towards the marine environment. Vegetation is present on the west side of Fairbanks Road, between the houses, and on the slope. Vegetation between the houses is generally comprised of ornamental shrubs and bigleaf maple, while native vegetation dominates the slope and area west of Fairbanks Road. A small grassy area is present at the top of the slope, while the slope itself contains a mixture of young to mature trees, with coastal Douglas-fir dominant and lesser amounts of arbutus, bigleaf maple, and western redcedar. The understorey mainly contains sword fern (*Polystichum munitum*), oceanspray, trailing blackberry (*Rubus ursinus*), English ivy (*Hedera helix*), thimbleberry (*Rubus parviflorus*), and Himalayan blackberry (*Rubus armeniacus*). Large portions of the slope are entirely covered by English ivy.

The Invasive Alien Plant Program (IAPP) has records of four invasive plant species occurring adjacent to the Project Area (i.e., within 500 m; Figure 2; Government of BC 2022c). These species are:

- Canada thistle (*Cirsium arvense*)
- Giant knotweed (*Reynoutria sachalinensis*)
- Japanese knotweed (*Reynoutria japonica* var. *japonica*)
- Himalayan blackberry

During the site visits, three invasive plant species were recorded:

- Curled dock (*Rumex crispus*)
- English ivy
- Himalayan blackberry

Of these six species, giant knotweed, Japanese knotweed, and Canada thistle are listed as noxious provincially (ISCBC and Government of BC 2021), while giant knotweed and Japanese knotweed are listed as high priority invasive plants by the Cowichan Valley Regional District (CVRD 2015).

4.2.2 Wildlife

4.2.2.1 Herptiles

Amphibians in BC can be grouped into aquatic breeding obligates (frogs, toads, newts, and mole salamanders / Ambystomatidae) and terrestrial breeding obligates (lungless salamanders / Plethodontidae; MOE 2014a). Adult amphibians occurring in the terrestrial environment generally require moist habitat with cover objects such as logs, shrubs, tree hollows, and rock crevices, to provide thermoregulatory and shelter sites.

No records of amphibians were found during the desktop review within or adjacent to the Project Area. No individual amphibians and no suitable amphibian habitat were observed during site visits. Due to the steep gradient and lack of suitable habitat, amphibians are not expected to occur in or adjacent to the Project Area.

Reptiles with ranges that overlap the Project Area include painted turtle (*Chrysemys picta*), northern alligator lizard (*Elgaria coerulea*), common garter snake (*Thamnophis sirtalis*), northwestern garter snake (*T. ordinoides*), and terrestrial garter snake (*T. elegans*). Suitable reptile habitat generally provides access to food sources (i.e., small mammals, amphibians, invertebrates), thermoregulatory habitat such as sunning outcrops and cover objects, shelter from predators, and access to hibernation sites (MOE 2014a). Garter snakes may forage in vegetated areas of the Project Area, particularly where shrub cover is abundant; however, no unique habitat features, such as hibernacula, were recorded. No reptiles were observed during site visits.

4.2.2.2 Birds

Passerine species use a variety of habitat types depending on life requisites such as nesting and foraging. Suitable nesting sites are available throughout and adjacent to the Project in trees and shrubs. Ground nesters, such as dark-eyed junco (*Junco hyemalis*), are not expected to nest in the Project Area due to the steep gradient of the site. Passerine species are expected to forage on available fruit, seeds, and insects. Foraging and nesting habitat for passerine species such as American robin (*Turdus migratorius*) is available throughout the Project Area where shrub and trees are present. A full list of bird species observed during the 1 September 2022 site visit is presented in Table 2.

Mature trees present in the Project Area provide suitable nesting habitat for raptor species, such as bald eagle (*Haliaeetus leucocephalus*) and red-tailed hawk (*Buteo jamaicensis*). Raptors may perch on trees to forage on small mammals, fish, and other prey items present in and/or adjacent to the Project Area. The Wildlife Tree Stewardship Atlas contains no recorded nest locations for bald eagle or osprey (*Pandion haliaetus*) within or adjacent to the Project Area (WiTS 2022). One bald eagle was observed flying over the Project Area during the 1 September 2022 site visit.

In addition to raptors, great blue heron (*Ardea herodias*) may nest in mature trees within the Project Area. The BC Great Blue Herons Atlas contains no recorded nest locations for great blue heron in or adjacent to the Project Area (GBHMT 2022).

Beach and marine habitats provide suitable foraging habitat for waterfowl, waterbirds (e.g., horned grebe [*Podiceps auratus*]), and shorebird species.

Table 2: Bird Species Observed During Site Visits

Common Name	Scientific Name	SARA	COSEWIC	BC List	Provincial Status
Bald eagle	<i>Haliaeetus leucocephalus</i>	-	-	Yellow	S5B,S5N
Chestnut-backed chickadee	<i>Poecile rufescens</i>	-	-	Yellow	S5
Glaucous-winged gull	<i>Larus glaucescens</i>	-	-	Yellow	S4
Song sparrow	<i>Melospiza melodia</i>	-	-	Yellow	S5

¹ **SARA:** Federal *Species at Risk Act* Schedule number (1-3) for this species. See the SARA website for more information (Government of Canada 2022). E = Endangered, T = Threatened, SC = Special Concern, DD = Data Deficient, NA = Not Assessed.

² **COSEWIC:** Committee on the Status of Endangered Wildlife in Canada. Ranks have the following meanings: E = ENDANGERED: A species facing imminent extirpation (no longer exists in Canada) or extinction (no longer exists)., T = THREATENED: A species that is likely to become endangered if limiting factors are not reversed, SC = SPECIAL CONCERN: A species that is particularly sensitive to human activities or natural events, but is not endangered or threatened., NAR = NOT AT RISK: A species that has been evaluated and found to be not at risk, DD = DATA DEFICIENT: A species for which there is insufficient scientific information to support status designation. NA = Not assessed (Government of Canada 2022).

³ **BC CDC List:** The provincial list to which the species or ecological community is assigned (BC CDC 2022). Possible values: Extinct, Red (Any indigenous species, subspecies or plant community that is extirpated, endangered, or threatened in BC.), Blue (Any indigenous species, subspecies or community considered to be of special concern in BC. Blue-listed elements are at risk, but are not extirpated, endangered, or threatened).

⁴ **Provincial Conservation Status** = Provincial Ranks apply to a species' or ecological community's conservation status in British Columbia. S1 = Critically imperilled, critically imperilled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province. S2= Imperilled, imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province. S3 = Vulnerable, vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation. S4=Apparently Secure, uncommon but not rare; some cause for long-term concern due to declines or other factors. S5= Secure, common; widespread; and abundant in the nation or state/province. SNR= Unranked, nation or state/province conservation status not yet assessed. SU = Unrankable, currently unrankable due to lack of information or due to substantially conflicting information about status or trends. SNA= Not Applicable, a conservation status rank is not applicable because the species is not a suitable target for conservation activities. S#S# = Range Rank, a numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

4.2.2.3 Mammals

Small mammals, such as rodents, are expected to occur in and around the Project Area in vegetated areas. Given the general steep gradient of the Project Area, arboreal rodents such as red squirrel (*Tamiasciurus hudsonicus*) are expected to be more likely rather than ground-dwelling species. Insects, seeds, and berries provide suitable foraging material for small mammals. Medium-sized mammals, such as raccoon (*Procyon lotor*), may forage along the beach. Large mammals, such as black bear (*Ursus americanus*) and cougar (*Puma concolor*), are not expected to occur given the small size and steep gradient of the Project Area.

4.2.2.4 Invertebrates

Vegetated areas within and adjacent to the Project Area are expected to host a variety of invertebrates which likely provide prey items for birds and mammals.

5.0 EFFECTS ASSESSMENT

The Project Area is located adjacent to a residential area and includes a portion of the road, as well as a disturbed slope. Works may also involve replacement of an existing culvert. Project activities will largely occur within an already disturbed and modified landscape. The temporary duration of the Project, limited footprint, and work activities involved are unlikely to have significant adverse effects on fish and wildlife that are using the Project Area. However, access requirements may result in temporary potential adverse effects to aquatic and terrestrial habitat and the wildlife and fish species utilizing those habitats.

Limited clearing of vegetation is anticipated to be required to facilitate access to the Project Area. Additionally, temporary disturbances to the intertidal and subtidal zones immediately adjacent to the Project Area are anticipated due to installation of the temporary landing structure and monopile dolphins. The total area of disturbance, which includes aquatic, riparian, and non-riparian terrestrial habitat, at the Project site has been calculated at 400 m² of permanent and temporary disturbance to terrestrial habitat, as well as approximately 475 m² of temporary disturbance to intertidal, subtidal, and non-riparian upland habitat. Details of effects are provided in Sections 5.1 and 5.2.

5.1 Marine and Aquatic Habitat Effects

Proposed construction activities for the repair and slope stabilization works in the Project Area may affect marine, aquatic, and riparian habitat due to the removal of riparian vegetation and direct disturbance. Project works may also result in indirect effects associated with surface runoff or accidental spills in upland locations.

Based on results of the site visit, and consulting the Fisheries and Oceans Canada (DFO) Pathways of Effects diagrams (DFO 2018), potential impacts to aquatic and riparian habitat from construction activities may include:

- Permanent loss or temporary disturbance of 400 m² vegetated riparian habitat, as well as temporary disturbance to 475 m² non-vegetated upland, intertidal and subtidal habitat.
- **Change in sediment concentrations** – may occur due to use of construction equipment, grounding or anchoring of the barge, during excavation, and removal of vegetation and topsoils, increasing erosion potential, which can affect fish by damaging gills, and can reduce the quality and availability of fish habitat.

- **Increase in contaminant concentrations** – may occur from the release of oil, grease, fuel, or other pollutants from construction equipment, which can cause lethal or sublethal (physical deformities, affect reproductive success, growth) effects to fish and their food sources.
- **Change in food supply** – may occur from clearing of riparian vegetation, which can adversely affect fish health.
- **Change in habitat structure and cover** – may occur from clearing of riparian vegetation, placement of structures below the HHWLT mark, or from anchoring or grounding the barge, which can affect fish health and habitat quality.
- **Accidental introduction of aquatic invasive species** – may occur due to improper maintenance of the barge brought to site.

The effects listed above are unlikely to affect fish species adjacent to the Project Area, as the effects are anticipated to be localised and largely temporary. Installation of the temporary landing structure and monopile dolphins is anticipated to have a total potential footprint of 475 m² below the HHWLT line, of which, approximately 45 m² would occur in the subtidal zone, representing a small fraction of available habitat for fish species, none of which is considered limited or critical.

It is expected that potential effects to the aquatic habitat resulting from increases in sedimentation, accidental spills, and riparian vegetation clearing within the Project Area can be managed through implementation of Best Management Plans (BMPs) and mitigation measures described in Section 6.0.

5.2 Terrestrial Habitat Effects

5.2.1 Vegetation

Vegetation clearing is anticipated to be required for the Project, however, the exact footprint is unknown, as the Project Area includes a section that previously underwent significant slope failure and loss of existing vegetation. Additional vegetation removal will be required to manage equipment access, install bank stabilization works, and potentially remove danger trees. Overall, potential effects of the Project to vegetation are anticipated to comprise

- Permanent loss of approximately 400 m² of vegetated and non-vegetated riparian area during construction within the Project Area.
- Temporary loss of topsoil within the stripping boundary (approximately 3-18 m wide) during construction.
- Accidental introduction and/or proliferation of invasive or non-native plant species during the proposed work that may lower the quality of remaining native vegetation.

With the exception of the area of permanent loss due to the installation of slope and erosion protection (riprap), it is expected that these effects can be managed, avoided, reduced, or mitigated through BMPs and the measures described in Section 6.0.

5.2.2 Wildlife

Project effects to wildlife are expected to be primarily limited to the Project Area, mainly where vegetation and habitat loss occurs. Potential effects to terrestrial wildlife species are anticipated to be a result of:

- Disturbance or accidental harm/mortality to wildlife.
- Accidental destruction or disruption of sensitive wildlife habitat (e.g., nests).
- Temporary and permanent alteration of wildlife habitat.
- Attraction of wildlife to the work area due to garbage and/or food waste.

Noise and other disturbances to wildlife are anticipated during Project activities. Increased noise associated with Project construction may temporarily decrease the quality of habitat for wildlife. Disturbance to nesting birds can result in nest abandonment by the adults or premature fledging of nestlings (MOE 2013, 2014).

The Project is also anticipated to result in permanent alteration of terrestrial habitat across the Project Area. This alteration may result in a loss of breeding and foraging habitat for some wildlife species.

It is anticipated that the majority of potential effects to terrestrial wildlife can be avoided, reduced, or mitigated through BMPs and the measures described in Section 6.0.

6.0 MITIGATION MEASURES

Potential effects of the Project on terrestrial and aquatic ecosystems can be avoided, mitigated, or managed through implementation of BMPs such as Section 165 (Protection of the Environment) of the 2020 Standard Specifications for Highway Construction (MOTI 2020b), *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (MOE 2014b), and *Land Development Guidelines for the Protection of Aquatic Habitat* (Chilibeck et al. 1993). Installation of the culvert and other drainage features should follow DFO's code of practice for culvert maintenance (DFO 2022). Prior to commencement of Project activities, it is recommended an Environmental Management Plan (EMP) be prepared that is consistent with the mitigation measures described below.

Construction of the Project should be planned such that loss of, and disturbance to, aquatic and terrestrial habitat is reduced, where possible, and effects to sensitive features (e.g., small mammal burrows, bird nests) are minimized. Work should be conducted in accordance with Provincial Best Management Practices.

These practices, available at: <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html>, should be reviewed by the Contractor prior to commencing work.

6.1 Erosion and Sediment Control

A detailed Erosion and Sediment Control (ESC) Plan should be prepared as a component of the EMP and implemented during Project activities. A review of the proposed construction operations by a qualified professional is recommended to adequately address potential sources of sediment, erosion, and drainage interactions. The ESC Plan should provide site-specific mitigation measures to achieve compliance with applicable legislation and regulations¹ and the BMPs and guidelines for erosion and sediment control outlined in the following:

- The Land Development Guidelines for the Protection of Aquatic Habitat (Chilibeck et al. 1993).
- Sediment control provisions implemented should be in accordance with DFO's Measures to Protect Fish and Fish Habitat (DFO 2019).

The plan should include detailed figures that identify specific control measures and other mitigation measures including:

- Soil disturbance should be minimized to only the areas required for site access, culvert replacement, and bank stabilization.
- Exposed soils should be covered with geotextile materials or tarps to reduce potential for erosion and subsequent sediment mobilization into nearby receptors.
- Preventative measures should be implemented in anticipation of the potential generation and release of sediment-laden water into Cowichan Bay during works (e.g., silt fences, straw bales, check dams, interception ditches), and should be implemented and maintained as necessary in accordance with permits and approvals, BMPs and anticipated field conditions.
- Any waste materials removed during Project works, as well as Project-related waste and other substances deleterious to aquatic life should be transported off-site and disposed of in an appropriate disposal facility.
- Foot traffic, vehicles and equipment should be restricted to designated work areas and designated access routes.
- Work site conditions should be monitored and suspended, if necessary, during intense rainfall events.
- Erosion and sediment control measures should be maintained until disturbed ground has been permanently stabilized.
- Areas temporarily disturbed during the Project should be re-vegetated as soon as possible following completion of the work.
- Erosion and sediment control measures should be removed from site once the site has stabilized.

¹ Such as: Canada *Fisheries Act*, Canada *Species at Risk Act*, BC *Water Sustainability Act* and Regulations, BC *Waste Management Act* and BC *Fish Protection Act*

6.2 Spill Prevention and Emergency Planning

A site-specific Spill Prevention and Emergency Response Plan should be prepared prior to site preparation and construction to reduce potential for spills and provide guidance on spill response. Spill prevention and emergency response planning should provide site-specific mitigation measures to achieve compliance with applicable legislation and regulations and be developed with consideration of applicable BMPs, and the mitigation measures outlined below.

- Vehicles and machinery should arrive on site in a clean and washed condition and should be maintained such that they are free of fluid leaks or excess grease, including at lubrication points.
- Leaks identified should be brought to the machine operators' attention and dealt with immediately.
- Equipment should be inspected by the Contractor(s) prior to start up at the beginning of each day.

Vehicles and machinery should arrive on site in a clean and washed condition and should be maintained such that they are free of fluid leaks or excess grease, including at lubrication points. Equipment should be inspected by the Contractor(s) prior to start up at the beginning of each day. Recommended mitigation for equipment fueling and maintenance are as follows:

- Equipment used by construction crews should be maintained in good working order, without leaks or excess grease, including at lubrication points.
- Any leaks identified should be brought to the machine operators' attention and dealt with immediately.
- Where possible, equipment shall use biodegradable oils and lubricants when working near water.
- Fuelling of vehicles and equipment and their maintenance should be conducted off-site in appropriately controlled locations, wherever possible. Where on-site fuelling or maintenance of vehicles and equipment is required, it should occur in pre-determined locations at least 30 m from any watercourses, and away from other pathways for receiving waters, where possible. Equipment used for works on the foreshore will not be able to follow the 30 m guideline. Fueling or maintenance of these vehicles and equipment will occur on the barge, within appropriate secondary containment.
- Used oil, filters, and grease cartridge lubrication containers and other products of equipment maintenance should be collected and kept in a secure receptacle for later disposal.

Spills or suspected spills of petroleum products or other potentially deleterious substances with potential to enter aquatic habitat should be immediately reported to the Emergency Management BC (EMBC) that is administered by the Environmental Emergency Program. Spills exceeding thresholds specified in the *Spill Reporting Regulation* should be reported immediately to the Environmental Emergency Program (1-800-663-3456). Additionally, ECCC has protocols for notification and reporting of environmental emergencies of substances established under the Environmental Emergency Regulations of the *Canadian Environmental Protections Act* (Government of Canada 2019). Emergency reporting is the same procedure as described above (i.e., reporting to the Environmental Emergency Program). Further, a written report is required to be sent to the Regional Director, Environmental Enforcement Directorate Pacific and Yukon Region (ec.pydalerimd-pyeeddgir.ec@canada.ca).

Identified spills should be cleaned up immediately. Hazardous wastes (as defined under the *BC Environmental Management Act*) and hazardous materials such as sorbent material, air and oil filters, hydraulic fluids, contaminated soils, contaminated/noxious vegetation, and petroleum products should be disposed of in an environmentally acceptable location and manner.

The following mitigation measures should be implemented during on-site refuelling and fuel transfers, if required:

- On-site fuelling or maintenance of vehicles and equipment should occur in pre-determined locations at least 30 m from aquatic habitats, and away from other pathways for receiving waters, where possible. The barge will be used as a fueling and equipment storage platform for foreshore works.
- Used oil, filters, and grease cartridge lubrication containers and other products of equipment maintenance should be collected and kept in a secure receptacle for later disposal.
- Service vehicles used for fuelling should be equipped with automatic shut-off valves. Valves should be in the closed position and locked and secured when not in use.
- During refuelling, an effective communication protocol should be followed to prevent accidental release or overfilling of the equipment.
- Accidental release or overfilling of equipment should be prevented by careful observation and communication.
- No ignition sources should be permitted within the fuelling area.
- A drip tray or pan should be used to collect excess fuel, oil, or other hazardous materials to avoid contamination of soils.
- Spill kits with absorbent pads (capable of handling both hydrocarbon and water-based materials) and containment booms should be available on each piece of heavy equipment and should also be kept on-site at each work area. Materials to be included in spill kits should be included in a site-specific EMP.
- Fuels and chemical products stored on site should be kept in a secure container and in a manner that prevents leaks, drips, and spills (i.e., containers standing upright with caps on tight).

Used spill clean-up materials should be replaced immediately, and an inventory of materials should be maintained throughout the duration of work activities within the Project Area.

The following additional spill prevention measures should be implemented:

- Plastic containers used to carry petroleum products should be designed for that purpose and should not be more than five years of age as per the *Transportation of Dangerous Goods Act (TDGA)* and *Transportation of Dangerous Goods Regulations*.
- Containers should be leak free, sealed with a proper fitting cap or lid and labelled according to the TDGA.
- Containers greater than 23 litres (L; 5 gallons), including 205 L (45 gallon) drums, should be transported upright, and secured to prevent shifting and toppling.
- Transportation of hydrocarbons to, and within, the construction areas should be in conformance with the requirements of the TDGA.
- Stationary equipment should be placed within secondary containment capable of holding 150% of the equipment's fluids.

6.3 Material Storage, Handling, and Waste Management

Clean-up of the Project Area should be an ongoing process. The Project Area should be kept free at all times from accumulations of waste materials or rubbish caused by employees or by the work. Garbage and recycling containment should be animal proof. Upon completion of work activities, rubbish and waste materials resulting from the operations should be removed and properly disposed of.

Applicable mitigation measures should be implemented on-site by the Contractor(s). Below are some general mitigation measures that should be implemented:

- Reasonable efforts should be made to reduce, reuse and/or recycle to reduce the amount of material being disposed of. Wastes should be disposed of in compliance with applicable legislation such as the *Canadian Environmental Management Act*.
- Hazardous waste registration, storage, permit and transportation requirements should be met, if applicable, and waste materials should be removed from the Project Area as soon as possible in accordance with applicable standards and regulations. The applicable records relating to the handling, storage, and removal of hazardous wastes should be maintained.
- An appropriate quantity and placement of garbage receptacles and recycling containers should be used to promote work-site cleanliness and sustainable practices.
- The dumping or burning of waste materials should not occur.
- Regular clean up and disposal of waste materials should be conducted to prevent the unnecessary accumulation of waste materials.

6.4 Concrete Management

Cast-in-place concrete placement will occur during construction of the Project. Concrete will be delivered to the site. The Contractor will ensure the following mitigation measures will be implemented during concrete placement on site:

- Ensure that all works involving the use of concrete, cement, mortars, and other Portland cement or lime-containing construction materials (concrete) will not deposit, directly or indirectly, sediments, debris, concrete, concrete fines, wash or contact water into or about any watercourse. Concrete materials cast-in-place must remain inside formed structures.
- Concrete placement procedures will be closely monitored to avoid overflow of concrete and spills. Concrete materials cast-in-place will be isolated for a minimum of 48 hours if ambient air temperature is above 0°C and for a minimum of 72 hours if ambient air temperature is below 0°C.
- Provide containment facilities for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment.
- All concrete wastewater will be prevented from entering any watercourse.
- Water contaminated with concrete will be contained in containment facilities such as lined sumps to allow for treatment prior to discharge to ground.

- Concrete-affected wastewater will be treated to decrease pH to between 6.5-9 prior to releasing to vegetation in a manner which does not cause pollution or contamination or returned to the concrete batch plant for re-use as process water.
- Surplus concrete will be disposed of in a manner which does not result in pollution.

6.5 Aquatic Life and Habitat Protection

Potential effects from development of the Project can be avoided or minimized by implementing appropriate mitigation measures and adhering to the 30 m riparian setback for watercourses in and around the Project Area, where practicable. Documents that provide recommendations for reducing the likelihood of causing death to fish or a harmful alteration, disruption, and destruction (HADD) of fish habitat include:

- Requirements and Best Management Practices for Making Changes In and About a Stream in British Columbia (Government of BC 2022d)
- A Users Guide to Changes In and About a Stream in B.C. (Government of BC 2022e)
- Measures to Protect Fish and Fish Habitat (DFO 2019)

Measures included in these guidelines and BMPs are generally effective for avoiding or reducing adverse effects to fish if implemented correctly and adapted as necessary to local site conditions. Although it is not anticipated in-water works will occur, it is important to be aware of the least-risk timing window for local fish species. DFO's Least Risk Timing Window for the Project Area (Cowichan - Area 18) is July 1 to October 1. No provincial timing windows are applicable to the Project activities. Project works are anticipated to occur outside the DFO timing window, and therefore, further mitigations are recommended below.

Strategies to maintain water quality for the protection of aquatic resources during construction of the Project are outlined below:

- Refuel construction equipment more than 30 m from marine environments where possible. Equipment used for works on the foreshore will not be able to follow the 30 m guideline. Fueling or maintenance of these vehicles and equipment will occur on the barge, within appropriate secondary containment. Establish protocols for refuelling and handling of fuel and oil products to reduce potential for spills and entry of fluids into Cowichan Bay.
- Keep machinery and equipment clean and in good operating condition (washed, free of leaks, excess oil and grease), and check condition of machinery before allowing it to enter the Project Area.
- Where possible, equipment shall use biodegradable oils and lubricants when working near water.
- Check weather forecasts frequently and communicate them to the Project work crews to reduce the likelihood for construction activities occurring during poor weather conditions that have the potential to impact the effectiveness of mitigation measures, and ultimately impact the aquatic environment.
- Schedule shore-based activities to avoid operating equipment during highest-high tide events or other high-water events where there is a realistic risk of machinery entering the water.

- Keep spill kits on-site at all times. Spill kits should be equipped with absorbent pads and containment booms capable of handling both hydrocarbon and water-based materials. Site personnel should be trained in the correct use and deployment of the emergency response and spill prevention equipment and supplies.
- Undertake and complete work in such a manner as to avoid or reduce the potential for release of silt, sediment or sediment-laden water, or other deleterious substances into marine environments.
- Fill materials (e.g., rock, crush) should be free of fine sediments, organic material, and deleterious substances.
- Limit barge footprint where practicable. Avoid positioning the barge in shallow subtidal areas where there is a risk of grounding at low tide, or where sensitive habitats (e.g., kelp beds) are located.
- A temporary landing structure will be constructed in the intertidal and shallow subtidal to facilitate loading and offloading during Project works. Temporary monopile dolphins will be placed in the subtidal area to secure the barge in onshore and offshore positions. Positioning of the piles will be selected to avoid any sensitive subtidal habitats, should they be identified.

6.6 Aquatic Invasive Species Management

A barge will be used to transport equipment and materials to the Project Area. The following mitigation measures will be employed to avoid the introduction of aquatic invasive species:

- Barge surfaces will be inspected for evidence of aquatic invasive species and cleaned (if required) before mobilization to site; wash water will be disposed of in a manner such that it does not enter a waterbody.
- The Contractor will comply with the *Wildlife Act* Controlled Alien Species Regulations.

6.7 Riparian Area and Vegetation Protection

Vegetation protection strategies outlined below are recommended for application during Project construction.

- Trees and shrubs should be retained as much as possible.
- Clearing boundaries should be clearly marked, and vegetation outside the work area should not be disturbed.
- Where revegetating disturbed areas is planned, it should be completed as quickly as possible after completion of the Project. If possible, plan seeding and planting to allow establishment to occur before the end of the growing season. If there is insufficient time remaining in the growing season for seeds to germinate, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring. Use weed-free mulches and other organic stabilizers to reduce potential for erosion until vegetation is established on sensitive soils. Native trees, shrubs and seed mixes should be used to re-vegetate the Project Area.
- Replanting with native vegetation should occur on disturbed soils to help reduce the spread of invasive species and control sediment mobilization and runoff.
- Conduct work in accordance with Provincial Best Management Practices. These practices, available at <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html>, should be reviewed prior to work in the Project Area.

6.8 Invasive Plant Management

The Project Area contains various invasive plant species (e.g., English ivy, Himalayan blackberry), which can be spread to other areas. Potential effects to the terrestrial and aquatic habitats resulting from the introduction of invasive species can be mitigated by implementing the following strategies consistent with those developed by the Invasive Species Council of BC (ISCBC) (2022):

- Minimize the amount of soil disturbance to only those areas required for the Project. Cover exposed soils with a tarp or geotextile to minimize invasive plant proliferation.
- Check machinery and equipment before it arrives on-site to make sure it is clean (i.e., free of mud and plants) to avoid potential for introduction of invasive plant species.
- Treat and/or properly dispose of invasive plant species to prevent further invasion of naturally vegetated areas and to increase the chance of survival of future plantings. Material containing invasive plants should not be stored or piled at or near the Project Area and should be disposed of at an acceptable disposal facility located off-site, using best management practices.
- Avoid potential effects to vegetation due to the potential introduction of contaminants into the environment during construction activities through development and implementation of a site-specific ESC Plan and a site-specific approach to spill prevention and response.
- Inspect clothing and vehicle/equipment undercarriages for plant parts or propagules if working in an area known to contain invasive plants. Remove plant seeds or propagules from clothes and/or equipment and contain washing fluids (i.e., water or mud) on-site at designated cleaning stations.
- Re-vegetate with regionally appropriate, non-invasive, non-persistent seed mixtures or plants and use native species when possible.
- Educate Contractor(s) to identify invasive plants that have the potential to establish at the Project Area.

6.9 Wildlife Protection

Wildlife protection strategies outlined below are recommended for application during Project construction.

- Where possible, avoid and reduce the amount of new disturbance and vegetation clearing, particularly clearing of trees and shrubs.
- Avoid or reduce clearing of important habitat features (e.g., snags) where possible. If applicable, coarse woody debris removed during construction should be replaced upon Project completion.
- Work within the Project Area should be conducted in accordance with Provincial Best Management Practices. These practices, available at <http://www.env.gov.bc.ca/wld/BMP/bmpintro.html>, should be reviewed prior to work in the Project Area:
 - Develop with Care: Environmental Guidelines for Urban and Rural Land Developments in British Columbia (MOE 2014b)
 - Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (MOE 2013)

- Garbage, refuse, and construction materials that could attract wildlife should be stored in an appropriate container and removed from the Project Area daily.
- Sightings of potential problem wildlife should be reported to the Site Supervisor, who will use the information to adapt work activities as appropriate, to reduce interaction with workers and wildlife.
- Vegetation clearing and grubbing activities within the Project Area should be conducted within the appropriate “least risk windows” (i.e., 16 August to 14 March) outlined in MOTI’s *Breeding Bird Nest Survey Protocol* (2020a), as well as those windows for non-passerines with potential to occur at or adjacent to the Project Area, which are outlined in the *Develop with Care* 2014 document (MOE 2013, 2014), to reduce potential contravention of Section 34 of the *BC Wildlife Act*, and concurrently, the *Migratory Birds Convention Act* for the protection of migratory birds and their nests. “Least risk windows” as defined as (MOTI 2020a; MOE 2013; MOE 2014b):
 - Bald eagle (*Haliaeetus leucocephalus*): September 1 – December 31
 - Osprey (*Pandion haliaetus*): 15 September – 31 March
 - Heron (*Ardea* sp.): 15 September – 15 January
 - Other raptors: 1 October – 28 February
 - Passerines: 1 September – 28 February
- Should it be necessary to clear vegetation during the breeding bird period, a pre-clearing nest survey should be conducted to search for active nests by a qualified biologist. Pre-clearing nest surveys should follow guidelines outlined in MOTI’s *Breeding Bird Nest Survey Protocol* (2020a). This includes completing three surveys over a five-day period and having vegetation clearing occur within 48 hours of the last survey and clearing and grubbing occurring within 10 days (MOTI 2020a). If an active bird nest is encountered, a species-specific no-clearing buffer zone should be established around the bird nest and clearing and site preparation activities within the buffer zone should be re-scheduled until the nest is no longer active to avoid contravention of the *Migratory Birds Convention Act* and the *BC Wildlife Act*. Appropriate buffer zones vary by species and will be determined by the qualified professional completing the work but are typically a 30 m radius no-disturbance buffer for songbirds. If stick nests or other raptor nests are identified prior to or during construction, appropriate setbacks should be established in accordance with *Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia* (MOE 2013). Osprey, eagle, heron, and falcon nests are protected year-round under the *BC Wildlife Act*, whether occupied or not.
- Pileated woodpecker (*Dryocopus pileatus*) nesting cavities are protected year-round under the MBCA. These cavities must not be removed until they have been verified as abandoned. Under the MBCA, a 36-month waiting period is required to pass with no occupation occurring to be verified as abandoned. This 36-month waiting period commences when a Nest Notification is submitted to ECCC’s Abandoned Nest Registry System. In exceptional cases, such as situations that are hazardous to human health or public safety, a s.70 Nest Destruction Permit may be issued to allow removal prior to the 36-month waiting period. Further, specific mitigation measures may be included as part of the nest destruction permit conditions (ECCC 2022). Currently, no pileated woodpecker nest cavities have been recorded within the Project Area, but a targeted survey to assess for cavities should be completed if vegetation clearing activities occur prior to or within the 2023 nesting season.

6.10 Environmental Monitoring

MOTI should retain a qualified Environmental Monitor (EM) to prepare a site-specific EMP based on the mitigation measures outlined above prior to the start of Project activities. The role of the Environmental Monitor would be to inspect, evaluate, and report on the performance of work activities, and the effectiveness of environmental control strategies and mitigation measures with respect to regulatory permits, approvals, and authorizations, environmental legislation, and BMPs. Environmental monitoring by qualified personnel would also reduce the likelihood of activities, whether accidental or intentional, that may contravene environmental legislation and regulations.

7.0 CLOSURE

We trust the information contained in this report is sufficient for your present needs. Should you have any additional questions regarding the Project please do not hesitate to contact the undersigned.

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[https://golderassociates.sharepoint.com/sites/163498/project files/6 deliverables/3.0_issued/22525903-006-r-rev0/22525903-006-r-rev0-oea-fairbanks road 19apr_23.docx](https://golderassociates.sharepoint.com/sites/163498/project%20files/6%20deliverables/3.0_issued/22525903-006-r-rev0/22525903-006-r-rev0-oea-fairbanks%20road%2019apr_23.docx)

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