REPORT

Environmental Support Services for The Highway 17 Saanich Uptown Mobility Hub

Overview Environmental Assessment

Submitted to:

BC Ministry of Transportation and Infrastructure

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Study Limitations

WSP Canada Inc. (WSP) has prepared this report for the exclusive use of the BC Ministry of Transportation and Infrastructure (BC MOTI), its assignees and representatives, and is intended to serve as an Overview Environmental Assessment (OEA) for the environmental support services for the Highway 17 Saanich Uptown Mobility Hub (The Project). This report is limited to an overview level reconnaissance-based assessment of potential effects of the proposed Project on aquatic 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 Project Area and Study Area are based on information obtained from a limited review of available literature, and a field reconnaissance conducted by WSP staff on 10 August 2022. In developing this overview environmental report, WSP has relied in good faith on information provided by government and BC MOTI. 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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Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the BC Ministry of Transportation and Infrastructure (MOTI) to provide environmental services for the Highway 17 Saanich Uptown Mobility Hub (the Project) The Project is located in Saanich, BC, from Highway 1 along Carey Road and Ravine Way (Project Area; Figure 1). This scope of work has been generated following a call-up under the BC MOTI Contract 851CS1161A – As & When Professional Environmental Project Coordination Services executed 30 April 2021.

The following Overview Environmental Assessment (OEA) provides details of the proposed Project and required works, identifies biophysical resources in and proximal to the Project, and provides mitigation measures to avoid and reduce the potential for adverse Project effects to the surrounding environment.

2.0 PROJECT DESCRIPTION

This scope of work for environmental services is provided to support the 100% Detailed Design stage for mobility upgrades from Highway 1, north along Carey Road to Ravine Way, northeast to Vernon Avenue, along with multi-use pathways adjacent to these areas (Figure 1).

The work will include the following components:

- New northbound stop, with bus shelter, in the northbound shoulder bus lane on Highway 1.
- New southbound bus stop with bus shelter in the southbound shoulder bus lane on Highway 1 with new multi-use pathway (MUP) connectivity to the existing Galloping Goose Trail.
- New MUP on the west side of Carey Road with connectivity to the corner of Highway 1 and Carey Road.
- New southbound bus bay with bus shelters on Carey Road.
- New shared pedestrian/cyclist crossing on Carey Road at the south leg of the Uptown Boulevard intersection, approximately seventy metres north of the intersection with Highway 1.
- New MUP on east side of Carey Road and south side of Ravine Way fronting the future Uptown Centre development site (3440 Saanich Road).
- Bi-directional bicycle lane on south side of Ravine Way between Blanshard Street and Vernon Avenue.
- Protected Intersection designs at Ravine Way and Carey Road, Blanshard Street and Ravine Way, and Vernon Avenue and Ravine Way.
- Relocation of the east curb, removal of the median, and laning reconfiguration on Ravine Way to accommodate an eastbound bus only lane between Carey Road and Vernon Avenue.
- Removal of the sidewalk on the north side of Ravine Way.
- Abandonment of the culvert that accommodated the pedestrian underpass on the north side of Ravine Way.
- New sidewalk on the south side of Ravine Way between Blanshard Street and Vernon Avenue.
- Modify the existing Saanich Plaza Mall driveway on Ravine Way by eliminating entry and left-turn exit. movements, while allowing only right-turn exit movements.

3.0 METHODS

3.1 Background Review

Publicly available sources of aquatic and terrestrial data were reviewed to characterize known information on the existing conditions and potential environmental resources. This review focused on the Project Area, as well as an additional 1 km buffer (the Study Area; Figure 1). The Study Area was considered primarily for context and to assess the potential for species at risk to occur in the Project Area along with the potential to be impacted by the Project. Information sources reviewed included the following:

- BC Conservation Data Centre (CDC) Species and Ecosystems Explorer (BC CDC 2024a)
- Province of BC Habitat Wizard (Government of BC 2024a)
- Province of BC iMap BC (Government of BC 2024b)
- British Columbia Great Blue Herons Nesting Atlas (GBHMT 2018)
- BC Ministry of Environment Species and Ecosystem Explorer (BC CDC 2024b)
- Invasive Alien Plant Program (IAPP; Government of BC 2024c)
- E-Flora BC (Klinkenberg 2021a)
- E-Fauna BC (Klinkenberg 2021b)
- eBird (2022)
- Wildlife Tree Stewardship (WiTS) Atlas of Raptor Nests (WiTS 2022)
- The Capital Regional District Web Map Viewer (CRD 2022)
- Google Earth Satellite Imagery

3.2 Field Reconnaissance

A field reconnaissance was conducted by two WSP biologists on 10 August 2022 and 6 June 2024. The objective of this visit was to verify and supplement information gathered during the background review and search for the environmental resources in the Project Area that could potentially be adversely affected by the proposed Project. Meander transects were walked throughout the Project Area, where access allowed. Habitat and chance wildlife encounters were recorded. Information gathered included:

- Structure and composition of vegetation communities
- Wildlife habitat features
- Chance encounters with wildlife and wildlife sign
- Potential for habitat to support provincially and/or federally designated species
- Invasive plant observations

Incidental wildlife observations from this survey are also described in Section 5.3.3. Detailed field notes and geo-referenced photos were taken to document and record the location of these habitat features when observed. Information derived from the reconnaissance survey was then used to describe the general habitat types available within the Project Area and to further refine the assessment of potential species at risk (SAR) presence.

3.3 Species and Ecosystems at Risk

Information on rare and endangered species in BC is available from both provincial and federal sources. Provincially, data on known rare and endangered species occurrences (referred to as element occurrences) are available through the BC Conservation Data Centre (BC CDC) (BC CDC 2024). The BC CDC data summarizes both **masked secured publicly available occurrences** and **publicly available occurrences** (non-sensitive element occurrences) for species at risk sightings. The BC CDC assigns a provincial rank or listing of red, blue, or yellow to a species based on its status within BC. Species on the provincial Red list are considered endangered or threatened in BC. Species on the Blue list are considered vulnerable (Special Concern) in BC. Species on the Yellow list are apparently secure and not at risk of extinction.

On a federal level, designations for species at risk occurring in Canada are initially determined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The committee is established under Section 14 of the federal *Species at Risk Act* (SARA). If approved by the federal Minister of the Environment, species are added to the federal List of Wildlife Species at Risk under Schedule 1 of SARA. Once included on Schedule 1, it is prohibited to kill, harm, harass, capture, possess, collect, buy, sell, or trade individuals, as well as damage or destroy the residence of a species listed as Extirpated, Endangered or Threatened (Government of Canada 2002).

A definition of each federal and provincial conservation status is provided in Table 1.

Table 1: Provincial and Federal Conservation Status Definitions

Agency	Status	Definition
COSEWIC and SARA (Federal)[1]	Extinct (XX)	A species that no longer exists.
	Extirpated (XT)	A species that no longer exists in Canada but exists elsewhere in the wild.
	Endangered (E)	A species facing imminent extirpation (no longer exists in Canada) or extinction (no longer exists).
	Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
	Special Concern (SC)	A species which may become threatened or endangered due to distinct biological characteristics and identified threats.
	Data Deficient (DD)	A species for which there is insufficient scientific information to support status designation.
	Not at Risk	A species that has been evaluated and found to be not at risk.

Agency	Status	Definition
BC CDC (Provincial)[2]	Red	Indigenous species, subspecies or plant communities that have, or are candidates for, Extirpated, Endangered, or Threatened status in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Not all Red-listed taxa necessarily become formally designated. Placing taxa on these lists flags them as being at risk and requiring investigation.
	Blue	Indigenous species, subspecies or plant communities considered to be of Special Concern (formerly Vulnerable) in British Columbia. Taxa of Special Concern have characteristics that make them particularly sensitive to human activities or natural events. Blue-listed taxa area at risk but not Extirpated, Endangered, or Threatened.
	Yellow	Any indigenous species, subspecies, or plant community considered to be secure in BC. Encompasses all those indigenous species not listed as red or blue.

Source: BC CDC (2022)

[1]COSEWIC = Committee on the Status of Endangered Wildlife in Canada; SARA = Federal *Species at Risk Act*.

[2]CDC = Conservation Data Centre

A review of species at risk potentially occurring in the Study Area was undertaken using species lists generated by a search of the BC CDC Species and Ecosystem Explorer (BC CDC 2024). Species potential to occur in the Project Area was ranked based on the following criteria:

- **Not Expected** – The Project Area and adjacent areas are not expected to provide suitable habitat for the species and/or the proposed Project is well removed from the known range of the species.
- **Unlikely** – The Project Area provides limited or low-quality habitat for the species. The species may occur in adjacent habitats and may be observed within the proposed Project Area infrequently.
- **Potential** – The Project Area provides suitable habitat for one or more life phases of the species.
- **Confirmed** – The species has been observed within or adjacent to the Project Area.

Potential use by fish and wildlife species not observed during the field visits is inferred from available habitats, relevant existing information, known species distributions, and professional knowledge of the species (Appendix A). To further refine the species likelihood ratings, site specific habitat surveys would be required when fish and wildlife species are expected to be observed and/or species-specific surveys would be required. Potential of occurrence was not assessed for plants as species-specific surveys would be required during the appropriate seasons to confirm the potential for at risk plants.

4.0 ENVIRONMENTAL REGULATORY CONTEXT

The provincial and federal approval processes and relevant environmental legislation guiding Project construction are described below in Table 2.

Table 2: Federal and Provincial Legislation Potentially Applicable to the Project

Act, Regulation or Bylaw	Description	Applicability to the Project
Federal		
Migratory Birds Convention Act (MBCA)	This Act prohibits the deposit of substances harmful to migratory birds. It also prohibits the killing, capturing, injuring, taking, or disturbing of migratory birds or the damaging, destroying, removing, or disturbing of their nests.	Vegetation clearing should be undertaken outside of the bird breeding season. As per the BC 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 (BC MOTI 2020;). If vegetation clearing is to occur in the breeding season, a pre-clearing bird nest survey would be recommended and "no work" buffers would be recommended around active nests based on the species observed.
Species at Risk Act (SARA)	SARA contains prohibitions against the killing, harming, harassing of individuals of endangered, threatened, and extirpated species in Schedule 1 of the Act. The Act also contains a prohibition against the damage or destruction of their residences (e.g., nest or den) and critical habitat. These prohibitions apply to: ■ all endangered, threatened, and extirpated species listed in Schedule 1 of SARA when found on federal lands. ■ all endangered, threatened, and extirpated migratory birds listed in Schedule 1 of SARA and protected by MBCA, anywhere they occur including private and provincial lands. ■ all endangered, threatened, and extirpated aquatic species listed in Schedule 1 of SARA, anywhere they occur, including private and provincial lands. When critical habitat, other than that referred to above, is located on private lands, provincial lands or lands within a territory and is not protected through stewardship agreements under SARA or other federal legislation or provincial/territorial laws, the prohibition may be applied.	The Project Area is not on federal land or within streams with designated critical habitat for aquatic species. The Project Area overlaps with designated critical habitat for the Audouin's night-stalking beetle (*Omus audouini*; see Section 5.4.4); however, as the Project is located on non-federal lands, protections afforded by this designation do not apply. It is still recommended to employ mitigation outlined in Section 7.6.1 to reduce potentially harming this species or its habitat. On non-federal lands, a SARA Section 73 permit would be required if there is the potential to affect the nest of an MBCA and SARA listed bird species.

Act, Regulation or Bylaw	Description	Applicability to the Project
Provincial		
Water Sustainability Act	The Act is the principal law for regulating streams, aquifers and associated water resources. Generally, any work that is likely to change the nature of a stream or stream channel must be properly authorized under the Act. Changes in and about a stream include work or activities that: ■ occur within the stream channel, meaning the bed of the stream and the banks, both above and below the natural boundary, ■ regardless of location, are likely to modify the stream or stream channel over time; or ■ occur at, or are planned under, the bed of the stream and are likely to influence the bed of the stream over time.	Works within or about a stream generally require authorization under the *Water Sustainability Act* (WSA). As there is no instream work anticipated, permitting under the WSA is not anticipated. Stormwater ditch lines that may be temporarily disturbed during the Project are considered drainage corridors and not streams as defined under the WSA, meaning no permitting requirements are expected under the WSA.
Wildlife Act	The Act protects wildlife and wildlife habitat in BC by identifying wildlife areas, defining human interactions with wildlife, and regulating hunting, trapping, and angling (Government of BC 1996a). Section 34 of the Act prohibits possessing, taking, or destroying: (a) a bird or its egg, (b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl, (c) or the nest of a bird not mentioned in (b), when the nest is occupied by a bird or its egg unless authorized under permit	If vegetation clearing is to occur in the bird breeding season (i.e., 15 March to 15 August [BC MOTI 2020])8), a pre-clearing bird nest survey should be undertaken. For any active nests recorded, “no work” buffers would be implemented around the nest depending upon the species observed. A permit would be required for an amphibian salvage.
Environmental Management Act	Regulates the discharge or emission of effluent, waste or contaminants and requires spill reporting for certain substances. Prohibits causing pollution (Government of BC 2003a).	Permits would be required for discharge or emission of effluent, waste or contaminants including pesticides and herbicides.
Integrated Pest Management Act	The Act outlines regulations, prohibitions, restrictions, and permits for use of pesticides in BC (Government of BC 2003b).	Permits may be required if pesticides are used to manage specific invasive plant species within the Project Area.
Weed Control Act	The Act mandates a duty to control noxious weeds by landowners (Government of BC 1996b).	Requires the control of noxious weeds within the Project Area.

Act, Regulation or Bylaw	Description	Applicability to the Project
Municipal – District of Saanich		
Tree Protection Bylaw, 2014, No. 9272	The Tree Protection Bylaw supports the goals of Saanich's Urban Forest Strategy by regulating tree cutting, removal or tree damaging activities, and sets requirements for replacing protected trees. Relevant definitions of protected trees include: ■ the following tree species that are 2.0 m or above in height or 4 cm in diameter when measured at breast height (i.e., diameter at breast height [DBH]): ▪ arbutus ▪ Garry oak ▪ Pacific dogwood ▪ Pacific yew ■ The following tree species that have a DBH of 30 cm or more: ▪ Douglas-fir ▪ Grand fir ▪ Bigleaf maple ▪ Western redcedar ■ Any tree with a DBH of 60 cm or more ■ Any replacement tree ■ Any tree planted or retained as a requirement of a subdivision application, development permit, blasting permit, building permit, fill permit or a plumbing permit ■ Any tree with evidence of a nest used by raptors or great blue heron ■ Any tree growing on Saanich-owned property	There are protected trees as defined in the bylaw in and adjacent to the Project Area (Figure 2). Removal or damaging of these protected trees located on property within the District of Saanich does not require permitting and approval by the District of Saanich because municipal bylaws do not apply on MOTI ROWs. However, MOTI may elect to follow the spirit of the bylaw (e.g., tree replacement). A tree survey may be undertaken to determine which trees will need a permit and replacement.

5.0 EXISTING CONDITIONS

5.1 Site Description

The Project Area is located from Highway 1, along Carey Road to Ravine Way, and along Ravine Way up to Vernon Avenue in the District of Saanich. The Project Area is located in an urban environment and is mainly comprised of tree-lined streets and commercial buildings. The Lochside Trail, a multi-use pathway, is located adjacent to the Project to the west and is comprised of a mixture of young to mature deciduous and coniferous trees and thick shrubs. A sidewalk that is no longer in use occurs between Ravine Way and the Lochside Trail, running parallel. A boarded up pedestrian culvert connects this sidewalk underneath Blanshard Street. A retaining wall is present on the east side of this boardwalk. It is unknown at this design stage if this retaining wall will be removed as part of the Project.

5.2 Aquatic Resources

Two stormwater ditches were identified during the desktop review for the Project Area. The first ditch runs parallel with and is immediately adjacent to the Lochside Trail, between Blanshard Street and Darwin Avenue (Figure 2). The second ditch runs parallel with the Lochside Trail and is located approximately 60 m west of Carey Road between Crease Avenue and Highway 1 (Figure 2). This second ditch overlaps with proposed Project activities along Highway 1. Capital Regional District (CRD) Mapping identifies these ditches as storm water runoff ditches (CRD 2022). These ditches meet 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 these ditches are expected to be exempt from the requirements under Section 6(1) of the *Water Sustainability Act* (Government of BC 2016). Further, these ditches and the areas adjacent to the Lochside Trail do not occur within Streamside Development Permit Areas (SPEAs) (SaanichMap 2022).

No natural watercourses occur within or proximal to the Project Area.

5.3 Terrestrial Resources

5.3.1 Ecological Context

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 and Study Area are 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 drier 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).

5.3.2 Vegetation

The majority of the Project Area is comprised of urbanized streets, sidewalks, and multi-use paths. Gravelled and grassy areas mainly occur adjacent to Highway 1, while Carey Road and Ravine Way are tree-lined streets. Areas between Ravine Way and the Lochside Trail are densely vegetated, with a mixture of mature coniferous and deciduous trees, including bigleaf maple, coastal Douglas-fir , western redcedar (*Thuja plicata*), Garry oak (*Quercus garryana*), Ponderosa Pine (*Pinus ponderosa*), Scots Pines (*Pinus silvestris*), and arbutus (*Arbutus menziesii*; Appendix B; Photograph 1). A dense shrub layer is present and is dominated by dull Oregon-grape (*Mahonia nervosa)*, oceanspray (*Holodiscus discolor* var*. discolor*), English ivy (*Hedera helix*), and other invasive and non-native vegetation.

The Invasive Alien Plant Program (IAPP) mapping has records of nine invasive species occurring in and adjacent to the Project Area (Figure 2; Government of BC 2024c). These species are:

- Bachelor's button (*Centaurea cyanus*) (listed as a Priority Invasive Plant in the CRD)
- Bohemian knotweed (*Reynoutria x bohemica*) (listed as a Priority Invasive Plant in the CRD)
- Japanese knotweed (*Reynoutria japonica var. japonica)* (listed as a Priority Invasive Plant in the CRD)
- Meadow goats-beard (*Tragopogon pratensis*)
- Milk thistle (*Silybum marianum* (listed as a Priority Invasive Plant in the CRD)
- Poison hemlock (*Conium maculatum*) (listed as a Priority Invasive Plant in the CRD)
- Spotted knapweed (*Centaurea stoebe* ssp. *micranthos*) (listed as a Priority Invasive Plant in the CRD)
- Spurge-laurel (*Daphne laureola*) (listed as a Priority Invasive Plant in the CRD)
- Sweet fennel (*Foeniculum vulgare*) (listed as a Priority Invasive Plant in the CRD)

During the 10 August 2022 field reconnaissance, the following invasive plant species were observed in the Project Area:

- Himalayan blackberry (*Rubus armeniacus*) (listed as a Priority Invasive Plant in the CRD)
- Scotch broom (*Cytisus scoparius*) (listed as a Priority Invasive Plant in the CRD)
- chicory (*Cichorium intybus*)
- Canada thistle (*Cirsium arvense*) (listed as a Priority Invasive Plant in the CRD)
- bull thistle (*Cirsium vulgare*) (listed as a Priority Invasive Plant in the CRD)
- field bindweed (*Convolvulus arvensis*)
- spurge-laurel
- wild carrot (*Daucus carota*)
- English Ivy (*Hedera helix*) (listed as a Priority Invasive Plant in the CRD)

- hairy cat's-ear (*Hypochaeris radicata*)
- narrow-leaved everlasting peavine (*Lathyrus sylvestris*)
- Black locust (*Robinia pseudoacacia*)
- curled dock (*Rumex crispus*)
- purple salsify (*Tragopogon porrifolious*) (listed as a Priority Invasive Plant in the CRD)
- Orchard grass (*Dactylis glomerata*) (listed as a Priority Invasive Plant in the CRD)

The CRD has listed priority invasive plant species for the Capital Region, with the objective of guiding and prioritizing reporting, education, and eradication efforts (CRD 2019). Of the 23 invasive plant species either recorded in IAPP or during the 10 August 2022 field reconnaissance, 15 are listed as priority species, as noted above (CRD 2019). Further, poison hemlock, spurge-laurel and English ivy are of particular concern due to their toxicity and hazard to human health, along with milk thistle due to its hazard to animal health (CRD 2019).

5.3.3 Wildlife

5.3.3.1 Herptiles

Amphibians in BC are grouped into either aquatic breeding obligates (frogs, toads, newts, and mole salamanders [*Ambystomatidae*]) or terrestrial breeding obligates (lungless salamanders [*Plethodontidae*]; BC MOE 2014a). Adult amphibians occurring in terrestrial environments 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 in the Study Area. Potential breeding habitat for Pacific treefrog (*Psedacris regilla*), a species that has adapted to urban environments (BC MELP 1996), occurs at the headwall of the ditch north of Highway 1 or potentially along the ditch line north of Lochside Trail; however, breeding suitability is considered low (Appendix B; Photograph 2). Upland habitat occurs in areas adjacent to the Lochside Trail. No individual amphibians or additional amphibian breeding habitat were identified in the Study Area during the desktop review.

Reptiles with ranges that overlap the Project area include common garter snake (*Thamnophis sirtalis*), northwestern garter snake (*T. ordinoides*), terrestrial garter snake (*T. elegans*), sharp-tailed snake (*Contia tenuis*), and northern alligator lizard (*Elgaria coerulea*). 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 (BC MOE 2014). Garter snakes may forage in vegetated areas of the Project area, particularly where shrub cover is abundant. Suitable denning habitat may be present in a rock outcrop located adjacent to the Lochside Trail as well as in the abandoned, boarded up pedestrian culvert (Appendix B; Photograph 3). No reptiles were observed during the 10 August 2022 field reconnaissance; however, European wall lizards (*Podarcis muralis*) were observed during the 6 June 2024 survey near the pedestrian tunnel north of Blanchard Street.

5.3.3.2 Birds

Passerine species use a variety of habitat types depending on life requisites such as nesting and foraging. Suitable nesting sites are available throughout the Project Area, in trees, shrubs, and anthropogenic structures. 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*) and dark-eyed junco (*Junco hyemalis*) is available throughout the Project Area where tree and shrub cover are present.

Mature trees present in areas proximal to the Lochside Trail may provide suitable nesting habitat for raptor species adapted to urban environments, such as bald eagle (*Haliaeetus leucocephalus*) and red-tailed hawk (*Buteo jamaicensis*). Raptors may perch on trees and tall structures and forage on small mammals and other prey items in open areas within and adjacent to the Project Area. The Wildlife Tree Stewardship Atlas contains no recorded nest locations for bald eagle or osprey (*Pandion haliaetus*) within the Project Area, while two bald eagle nests are present approximately 750 m to the northeast (WiTS 2022). These nests were last recorded as active in 2017 and 2020 respectively (WiTS 2022). One small stick nest was observed during the 10 August 2022 field reconnaissance; however, it was assumed to be that of an American crow (*Corvus brachyrhynchos*) based on size of the nest (Appendix B; Photograph 4).

Four bird species were observed during the field reconnaissance:

- Rock pigeon (*Columba livia*)
- House sparrow (*Passer domesticus*)
- Bushtit (*Psaltriparus minimus*)
- Glaucous-winged gull (*Larus glaucescens*)

5.3.3.3 Mammals

Small mammals, such as insectivores and rodents, are expected to occur in and around the Project Area. Insects, seeds, and berries provide suitable foraging material for small mammals. Medium-sized mammals, such as raccoon (*Procyon lotor*), are expected to forage in and around the Project Area. Bats, such as little brown myotis (*Myotis lucifugus*) may forage in vegetated areas associated with the Lochside Trail. Mature trees present in this area may also provide suitable roosting habitat. Bat emergence surveys conducted on 6 June 2024 did not record bats using the pedestrian culvert (Appendix B; Photograph 3. More information on this survey has been included in Appendix C. Due to the urban nature of the Project location, large mammals, such as black bear (*Ursus americanus*), cougar (*Puma concolor*), and Columbia black-tailed deer (*Odocoileus hemionus columbianus*) are not expected to occur in the Project Area.

Mammal sign observed during the field reconnaissance included hare pellets (suspected to be domesticated rabbits [*Oryctolagus cuniculus*]) observed along the vegetated area west of Carey Road. During the 6 June 2024 bat emergence survey, at least two hoary bats (*Lasiurus cinereus*) were recorded foraging in the Project Area. Due to the timing of observation occurring near dusk, it is assumed these bats were roosting in mature deciduous trees proximal to the Project Area.

5.3.3.4 Invertebrates

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

Two invertebrates, bald-faced hornet (*Dolichovespula maculata*) and Vosnesenski bumblebee (*Bombus vosnesenski*), were observed during the field reconnaissance.

A habitat assessment for Audouin's night-stalking tiger beetle (*Omus audouini*) was completed on 6 June 2024 as the Project Area overlaps with designated Critical Habitat (Government of BC 2024). Existing conditions were compared to required biophysical features, as outlined in the species' recovery strategy (ECCC 2022). Habitat within the Project Area was largely deemed unsuitable due to slopes greater than 50%, soil conditions, and substrate; however, lesser sloped areas at the northwestern corner of Ravine Way and Carey Road, west of the existing pedestrian walkway, may provide suitable habitat. Communication with Jennifer Heron, an Invertebrate Conservation Specialist with the BC Ministry of Water, Land and Resource Stewardship, indicated potential of occurrence is difficult to establish without trapping, and that there are still many unknowns about this species' habitat use (Heron 2024, pers. comm). Additional information on the habitat assessment is provided in Appendix C.

5.4 Species at Risk

A query of the BC CDC for at risk species, using a user defined polygon area, produced 145 wildlife species, 81 plant species, and 33 ecological communities with either federal designation as Endangered, Threatened or Special Concern, or provincial red- or blue- listed designation (i.e., designated species; Appendix A; BC CDC 2024).

5.4.1 Ecological Communities

The BC CDC query produced 33 provincially listed (red- or blue-listed) ecological communities with potential to occur regionally (BC CDC 2024). During the field reconnaissance it was noted that a fragmented ecosystem at risk containing Garry oak / arbutus (*Quercus garryana - Arbutus menziesii*) and Garry oak / oceanspray *(Quercus garryana / Holodiscus discolor*) communities, both of which are provincially red-listed (BC CDC 2024), were distributed along the forested area in between Ravine way and the Lochside Regional Trail. Aside from this forested area, listed ecological communities are not expected to occur elsewhere in the Project Area due to the urbanized nature of the site and existing disturbance. A list of provincially listed ecological communities with potential to occur in the regional area from the BC CDC query is provided in Appendix A.

The background desktop review found no non-sensitive occurrences of at-risk ecological communities mapped overlapping the Study Area (Government of BC 2024b).

5.4.2 Vegetation

The BC CDC query for at risk plant species produced 66 vascular, 3 non-vascular, and 12 lichen species with potential to occur regionally with either federal designation as Endangered, Threatened or Special Concern, or provincial red- or blue- listed designation (BC CDC 2024). A full list of plant species returned in the BC CDC query is provided in Appendix A. Potential of occurrence was not assessed for plants as species-specific surveys would be required during the appropriate seasons to confirm the potential for at risk plants.

At the time of the desktop review, no non-sensitive occurrences of at-risk plant species overlapped the Study Area (Government of BC 2024b). No at-risk plant species were observed during the field reconnaissance.

5.4.3 Fish and Wildlife

The BC CDC query for at risk fish and wildlife produced 137 federally (Endangered, Threatened or Special Concern) and/or provincially (red- or blue-listed) species (BC CDC 2024). This included a total of 5 fish, 4 amphibian, 4 reptile, 65 birds, 12 mammals, and 47 invertebrates. Based on habitat requirements and range, 17 species have the potential to occur in and proximal to the Project Area: 6 birds, 4 mammals, and 7 invertebrates (BC CDC 2024). Species with potential to occur in the Project Area are summarized in Table 3. The full list of provincially and federally listed wildlife species returned in the BC CDC query is provided in Appendix A along with their likelihood of occurrence.

At the time of the desktop review, three non-sensitive occurrences of wildlife species at risk overlapped with the Project Area (Figure 2). One record for Audouin's night-stalking beetle (*Omus audouni*), a provincially red-listed invertebrate that is federally designated as Endangered under Schedule 1 of SAeRA (BC CDC 2024), occurs on the Lochside Trail, immediately south of Vernon Avenue (Government of BC 2024b). Another record occurs for western bumble bee (*Bombus occidentalis*), a provincially blue-listed invertebrate that is currently not designated under SARA but is listed as Threatened by COSEWIC (BC CDC 2024), occurs at the intersection of Carey Road and Cadillac Avenue (Government of BC 2024b). Finally, one historical non-sensitive occurrence record of threaded vertigo (*Nearctula* sp. 1), a provincially blue-listed species that is designated as Special Concern under Schedule 1 of SARA (BC CDC 2024), a miniscule gastropod species typically associated with bigleaf maple trees was found to overlap the Project Area. Hoary bat, which is provincially blue-listed and designated as Endangered by COSEWIC (BC CDC 2024) were observed during the bat emergence survey.

Table 3: Wildlife Species at Risk with Potential to Occur within or Proximal to the Project Area

Common Name	Scientific Name	SARA[1]	COSEWIC[1]	BC List[1]	Provincial[1]	Habitat and Range[2]	Potential
Birds							
Band-tailed Pigeon	*Patagioenas fasciata*	1-SC	SC	Blue	S3S4	Breeding occurs from western BC and southern Vancouver Island, south to northern California and in the southern interior of the United States. Breeding along the Pacific coast occurs in low elevation (0 - 300m) coniferous forest with varying mixtures of Sitka spruce, western red cedar, western hemlock, and Douglas-fir. This species prefers habitat with fruit bearing shrubs or cultivated areas for foraging. The band tailed pigeon will also breed in temperate and mountain forests.	**Potential -** May nest in forested areas adjacent to the Project Area. May forage on berry-producing shrubs throughout the Project Area.
California Gull	*Larus californicus*	-	-	Red	S1B,SNRN	Occurs in Alberta and isolated locations in Washington, Oregon, and California during the breeding season. Only two breeding colonies have been documented in British Columbia, both in the Okanagan Valley. Breeding occurs on islands of inland natural lakes and river. Over-wintering occurs along the coast from extreme southwestern BC to Mexico. Along the Pacific coast of BC, this species inhabits rocky coasts, mudflats, estuaries, river deltas, and marine waters on the continental shelf.	**Potential -** May forage throughout the Project area.
Great Blue Heron, *fannini* subspecies	*Ardea herodias fannini*	1-SC	SC	Blue	S3B,S4N	Occurs on the Pacific Coast from Alaska south to Puget Sound, Washington. In BC, it is found year-round in coastal habitats and in the southern interior. It forages along water margins including marine habitat, slow moving freshwater, and grasslands. On the Pacific coast, the species typically nests in colonies in tall Sitka spruce, western red cedar, western hemlock, pine, red alder, Douglas-fir, and black cottonwood.	**Potential -** May forage in riparian areas adjacent to the Lochside Trail. May nest in mature trees in and adjacent to the Project Area.

Common Name	Scientific Name	SARA[1]	COSEWIC[1]	BC List[1]	Provincial[1]	Habitat and Range[2]	Potential
Short-eared Owl	*Asio flammeus*	1-SC	T	Blue	S3B,S1N	Breeding occurs from Alaska, throughout Canada (except the Arctic Islands), and northern United States. This species breeds from high arctic to mid-latitudes, including off-shore islands, in open habitats with low vegetation. Nests are built near a reliable source of small mammal prey. They use fresh and saltwater marshes, gravel pits, rock quarries, shrub thickets, and woodlots outside of the breeding period.	**Potential -** May occur in riparian habitat adjacent to the Lochside Trail during the winter months.
Western Screech-Owl, *kennicottii* subspecies	*Megascops kennicottii*	1-T	T	Blue	S2S3	Year-round habitat occurs in western North America from coastal areas of Alaska and BC, south throughout the western United States to Mexico. It typically occurs at low elevations in mature deciduous riparian habitat with available cavities, and wetland and forested habitat. It can also be found in treed urban and suburban environments, and at the edge of forested habitats close to open wetlands or fields.	**Potential -** May occur in riparian habitat adjacent to the Lochside Trail.
Barn Swallow	*Hirundo rustica*	1-T	SC	Yellow	S4B	In North America, this species breeds throughout the interior of Mexico, the continental United States and Canada, and as far north as southern Alaska, the Yukon, and the Northwest Territories. Typically inhabits open areas near water with low vegetation. Nesting typically occurs on horizontal surfaces, including natural structures (crevices, cavities, caves) and anthropogenic structures (rafters, ceiling, roofs, bridges), near water with access to mud for nest building.	**Potential -** May forage throughout Project Area. May nest on buildings throughout and adjacent to Project Area.
Mammals							
Hoary Bat	*Lasiurus cinereus*	-	E	Blue	S3S4	Occurs from southeast Alaska, east to Newfoundland, and south to South America. Exhibits migratory behaviour, moving northward for summer months. Occurs in deciduous and coniferous forests where it forages in open areas, particularly near and over water and in riparian corridors. Roosts in dense foliage. Feeds on invertebrates, mainly moths.	**Confirmed -** Recorded during emergence surveys on 6 June 2024.

Common Name	Scientific Name	SARA[1]	COSEWIC[1]	BC List[1]	Provincial[1]	Habitat and Range[2]	Potential
Silver-haired bat	*Lasionycteris noctivagans*	-	E	Yellow	S4S5	Occurs from southeastern Alaska east to southern Northwest Territories, south to northern Mexico and Bermuda. Exhibits migratory behaviour, moving northward for summer months. Occurs in forested habitats adjacent to lakes, ponds, and other water features. Roosts in trees in cavities and sloughing bark.	**Potential -** May forage and roost in habitats adjacent to the Lochside Trail.
Little Brown Myotis	*Myotis lucifugus*	1-E	E	Blue	S3S4	Little brown myotis are common in a wide range of forest types across BC. They appear more abundant in older forest stands, which is likely related to increased snag availability for roosting and ease of foraging under closed canopy. Females establish maternity colonies typically in buildings or cavities in large-diameter trees. Little brown myotis typically forage over still water, rivers, and in forest gaps, edges or along trails. During the winter months, they hibernate in caves.	**Potential -** May forage and roost in riparian habitats.
Yuma Myotis	*Myotis yumanensis*	-	-	Blue	S3	Occurs from BC south to Mexico, east to Montana and western Texas. Heavily associated with water. Occurs in a variety of habitats, including riparian areas, woodlands, and forests. Roosts in caves, cliff crevices, bridges, buildings, and other anthropogenic habitats. Hibernacula requirements are generally poorly understood.	**Potential -** May forage and roost in riparian habitats.

Common Name	Scientific Name	SARA[1]	COSEWIC[1]	BC List[1]	Provincial[1]	Habitat and Range[2]	Potential
Invertebrates							
Audouin's Night-stalking Tiger Beetle	*Omus audouini*	1-T	T	Red	S1	The range of the night stalking tiger beetle is confined to a narrow strip of lowland coastal area in southwestern BC around Boundary Bay and the Greater Victoria area of the Georgia Basin. Habitat occurs in coastal areas that are less than 20 m above sea level and are within 3 km of a body of salt water. Adults of this species crawl on the ground and are attracted to sunny areas such as open grasslands, habitats with sparse vegetation, coastal bluffs, meadows, open forests (Garry Oak), and old abandoned agricultural fields. Larvae are located in clay banks above the ocean high tide line or in stream banks. This species is tolerant of areas that are periodically flooded by both freshwater and seawater. The Audouin's night-stalking tiger beetle may be a pest of Douglas-fir cones.	**Confirmed -** One record of occurrence exists within the Project Area. Project area overlaps identified critical habitat for this species. May occur in habitat adjacent to Lochside Trail.
Silver-spotted Skipper, *californicus* subspecies	*Epargyreus clarus californicus*	-	-	Red	S1	The subspecies *californicus* occurs on Vancouver Island and the Lower Mainland. Suitable habitat occurs in disturbed areas and habitats with black locust trees. The larval foodplant for this subspecies is *Lotus crassifolius*.	**Potential -** May occur in areas where black locust trees are present.
Dun Skipper	*Euphyes vestris*	1-T	T	Blue	S2S3	The range of the western subspecies extends from southwestern BC to California. In BC, it occurs on Vancouver Island, the Lower Mainland and Fraser River canyon to Lillooet. Associated with open, moist habitat including roadside ditches, leave strips, and rights-of-way. Also found in fairly dry areas where spring floods or permanent springs provide moist conditions. Larval food plants include the sedges *Cyperus esculentus* and *Carex heliophile* and potentially other species in the genus Cyperus. Adults eat nectar from white, pink, or purple flowers including common milkweed and purple vetch.	**Potential -** May occur in riparian habitat adjacent to the Lochside Trail.

Common Name	Scientific Name	SARA[1]	COSEWIC[1]	BC List[1]	Provincial[1]	Habitat and Range[2]	Potential
Greenish Blue, *insulanus* subspecies	*Icaricia saepiolus insulanus*	1-E	E	Red	SH	The subspecies *insulanus* is endemic and occurs on Vancouver Island. Nothing is known about the species habitat requirements on Vancouver Island. Elsewhere, the adults and larvae are normally found near or on the host plant, clover (Trifolium spp.), along open streams and moist disturbed sites, such as old roads, fields, or campgrounds.	**Potential -** May occur in riparian habitat adjacent to the Lochside Trail where clover is present.
Western Bumble Bee	*Bombus occidentalis*	1-T	T	Yellow	S4	This species range includes much of western North America. In BC, the range includes the west coast, northern, and southern BC. Habitats for this species include open coniferous, deciduous, and mixed-wood forests, wet and dry meadows, montane meadows and prairie grasslands, meadows bordering riparian zones, and along roadsides in taiga adjacent to wooded areas, urban parks, gardens and agricultural areas, subalpine habitats, and more isolated natural areas	**Confirmed -** One record of occurrence exists within the Project Area. May occur in habitat adjacent to Lochside Trail. Other species of bumblebee observed foraging on thistle species within Project Area.
Western Thorn	*Carychium occidentale*	-	-	Blue	S3	In BC, the range extends from Vancouver Island and the Gulf Islands to the Lower Mainland, west of the Coast and Cascade Mountains. Suitable habitat occurs in the moist leaf litter at low elevation (less than 80 meters above sea level) deciduous and mixed wood forests. It is associated with big leaf maple. In addition, the species often inhabits riparian areas or moist areas near seeps.	**Potential -** May occur in riparian habitat adjacent to the Lochside Trail.
Threaded Vertigo	*Nearctula* sp. 1	1-SC	SC	Blue	S3	The range extends along western North America from BC to California. In BC, it occurs along the Sunshine Coast, Vancouver Island and the southern Gulf Islands. Suitable habitat occurs on the trunks of big leaf maple and in moist leaf litter on the forest-floor.	**Confirmed –** One historical record of occurrence overlaps the Project Area. May occur in habitat adjacent to the Lochside Trail where bigleaf maple is present.

1 See Table 1 for Term Definitions; SARA – federal *Species at Risk* Act; COSEWIC – Committee on the Status of Endangered Wildlife in Canada

2 Habitat information obtained from BC CDC Species Summary Reports (BC CDC 2024).

5.4.4 Critical Habitat

Critical habitat is defined as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy, or in an action plan for the species” (Government of Canada 2002). Under SARA, critical habitat is federally protected from activities that result in the destruction or degradation of designated habitat.

The Project Area overlaps with designated critical habitat for the Audouin’s night-stalking beetle. This critical habitat polygon extends from the intersection of Carey Road and Ravine Way, northeast where it encompasses the Lochside Trail and adjacent habitats, and the entire Swan Lake Christmas Hill Nature Sanctuary (Government of BC 2024b; Figure 2). Critical habitat is identified for this species by delineating all suitable habitat within a 10 km radius around extant populations (ECCC 2022). Suitable habitat is broken into those habitats required per life stage and differing functions within life stages. Eggs, larvae, and mating adults require sloped, moist substrates that are loose enough to burrow into, but not so much that burrows collapse, along with appropriate cover. This includes substrates with soil depths greater than 15 cm and includes clay, fine clay, or sands (ECCC 2022). Functions performed by adults outside of mating include hunting and seeking cover. These functions are fulfilled in habitats such as meadows, open forests, grassy areas, urban parks, and mature gardens where a variety of cover objects and a suitable abundance of prey are present (i.e., arthropods; ECCC 2022).

6.0 EFFECTS ASSESSMENT

6.1 Aquatics Effects

No effects to aquatic environments are expected from the Project Area due to the lack of overlapping watercourses or waterbodies. Overlapping stormwater drainage corridors may be impacted by the Project, but these are not mapped as connecting directly to natural watercourses. However, potential adverse effects to these ditches are still a possibility and should still be mitigated for. These effects include:

- Temporary elevated suspended sediment levels and water quality changes
- Accidental introduction of deleterious substances

These potential effects are expected to be temporary and can be mitigated by the application of measures and best management practices discussed further in Section 7.0.

6.2 Terrestrial Habitat Effects

6.2.1 Vegetation

The proposed Project is anticipated to result in vegetation disturbance where clearing is required for Project activities and associated access is required. The field reconnaissance confirmed a total of at least 10 trees along the west side of Carey Road and 5 trees along the south side of Highway 1 (Douglas Streed) that may require removal to accommodate the new multi-use pathway. In addition, there is the potential that trees may be required to be removed along the north side of Ravine Way to accommodate removal of the existing sidewalk no longer in use in the area.

The Project also has the potential to result in the accidental introduction and/or proliferation of invasive or non-native plant species, particularly those species observed in the Project Area such as Himalayan blackberry and Scotch broom, which may lower the quality of remaining native vegetation. It is anticipated that this effect can be avoided, reduced, or mitigated through best management practices (BMPs) and the measures described in Section 7.0.

6.2.2 Wildlife

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

- Permanent loss of vegetation, resulting in loss of wildlife habitat.
- Accidental harm / mortality to wildlife and wildlife species at risk.
- Sensory disturbance to wildlife during construction activities.
- Accidental destruction of sensitive wildlife habitat (e.g., nests).
- 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. The Project Area is in an urban area near Highway 1, and as such, wildlife using the Project Area are expected to be habituated to an existing level of anthropogenic noise and disturbances. However, increased noise associated with Project construction may temporarily decrease the already-marginalized quality of habitat for wildlife.

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. Recommended mitigation specific to birds are discussed in Section 7.6.

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 7.0.

7.0 MITIGATION

Potential effects of the Project on terrestrial and aquatic ecosystems can be avoided, mitigated, or managed through implementation of BMPs such as *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (BC MOE 2014a). Prior to Project activities, it is recommended that 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, terrestrial habitat is reduced, wherever possible, and effects to sensitive features (e.g., riparian habitat) are minimized.

7.1 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 regulations[1] 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 and remediation.
- 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 drainage corridors 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.
- Excavated soils and other 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*

Along with these general mitigation measures, the Plan should identify specific measures to control erosion and sediment control measures to be implemented if the retaining wall adjacent to Ravine Way will be removed.

7.2 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.

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 2018). 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 away from pathways for receiving waters.
- 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.

7.3 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, temporary structures, 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). Detailed and site-specific mitigation measures should be included and developed in the Project EMP. 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.

7.4 Vegetation Protection

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

- A preconstruction invasive plant survey should be undertaken and priority invasive plant species (i.e., poison hemlock) should be flagged in the field and disturbance avoided.
- 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.
- If 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.
- Consult with an invasive plant specialist to prepare additional BMPs to prevent spread of priority invasive plant species (i.e., poison hemlock).

7.5 Invasive Plant Management

The Project Area contains various invasive plant species (e.g., English ivy, Scotch broom, Himalayan blackberry), which can be spread to other areas. An Invasive Plant Management Plan should be developed as part of the EMP to provide guidance on mitigation measures to reduce the proliferation of invasive and non-native plant species. The Invasive Plant Management Plan should outline invasive and non-native species of concern and how to properly remove and dispose of these plant species. It should also outline suggested re-planting post-construction, and, if applicable, monitoring or follow up programs.

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 (Section 7.1) and a site-specific approach to spill prevention and response (Section 7.2).
- 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 staff and Contractor(s) to identify invasive plants that have the potential to establish at the site.

7.6 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 (BC MOE 2014a)
  - Guidelines for Amphibians and Reptile Conservation during Urban and Rural Land Development in British Columbia (BC MOE 2014b)
  - Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia (BC 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 (See Section 7.3).
- 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.
- Wetted areas associated with the ditch that runs perpendicular to Highway 1 may provide suitable breeding habitat for amphibians. The breeding season for amphibians occurs in the spring and summer with breeding occurring in southern Vancouver Island as early as March. If construction or vegetation clearing is scheduled during the breeding season, it is recommended that a survey for amphibians be conducted. If amphibians or signs of amphibian breeding are observed (i.e., egg masses, tadpoles, or adults in amplexus), exclusion fencing should be installed around the wetted area to avoid amphibians interacting with Project activities. If Project activities are not able to avoid amphibian breeding areas through timing or other mitigation measures (e.g., exclusion fencing), a subsequent salvage is recommended to be completed by a qualified environmental professional and would require a *Wildlife Act* General Wildlife permit.
- Vegetation clearing and grubbing activities within the Project Area should be conducted within the appropriate "least risk windows" outlined in BC MOTI's nest sweep protocol (i.e., 15 March to 15 August; MOTI 2023); however, the extended least risk window outlined in *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (BC MOE 2014a) should also be considered 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. Where vegetation clearing and grubbing activities cannot be scheduled within the least risk windows, pre-clearing bird nest surveys should be completed by a qualified biologist with experience conducting these surveys. "Least risk windows" as defined by the Develop with Care 2014 document are (BC MOE 2013; BC MOE 2014a):
  - Bald eagle (*Haliaeetus leucocephalus*): 1 September – 31 December
  - Osprey (*Pandion haliaetus*): 15 September – 31 March
  - Heron (*Ardea* sp.): 15 September – 15 January
  - Peregrine Falcon (*Falco peregrinus*): 30 July – 28 February
  - Other raptors: 1 October – 28 February
  - Passerines: 1 September – 28 February
  - COMBINED LEAST RISK WINDOW FOR BIRDS: 1 October – 31 December; however, raptor and heron nest surveys should still be completed if vegetation clearing is within this least risk window to verify no raptor or heron nests will be removed.
- Avoid clearing vegetation during the breeding bird period for passerines (15 March – 15 August, MOTI 2023). 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. 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 biologist 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* (BC MOE 2013). Osprey, eagle, heron, and falcon nests are protected year-round under the BC *Wildlife Act*, whether occupied or not.

- Pre-clearing nest surveys should follow guidelines outlined in BC MoTI's *Breeding Bird Nest Survey Protocol* (2020). 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 (BC MoTI 2023).
- Tree removal may also affect roosting bats if it occurs during the maternity roosting and general roosting season. It is recommended that pre-clearing bat roosting surveys be conducted, especially within mature trees and standing dead trees (snags), which may provide high potential little brown myotis roosting habitat if vegetation removal is slated in the spring through fall when bats may be active.
- Abandonment and infilling of the pedestrian culvert may affect roosting bats and/or denning snakes. It is recommended that pre-clearing bat roosting and snake presence surveys are completed prior to infilling, particularly if it will be completely sealed.

7.6.1 Audouin's Night-stalking Beetle

The Project overlaps with mapped critical habitat for the Audouin's night-stalking beetle. Habitat required by this species is provided in Section 5.4.4. Mitigation to reduce potential impacts on this species include:

- Limiting vegetation disturbance within the Project Area, specifically ground cover that this species would reside in.
- If soil disturbance is necessary, either re-use existing soil or use similar soil type (e.g., sand, clay etc.) to maintain functionality of habitat for the egg, larvae, and adult mating stages. Similarly, burying the existing retaining wall should use a similar soil type to what is already present.
- Where ground disturbance is necessary, replant with native vegetation. Salvage and/or replace cover objects (e.g., coarse woody debris, stones) that this species may utilize.

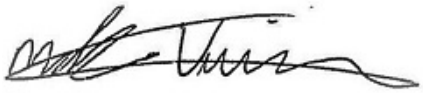
7.7 Environmental Monitoring

A qualified Environmental Monitor (EM) should be retained to prepare a detailed CEMP based on the mitigation measures outlined above and additional approval conditions. The EM should oversee the implementation of the above-mentioned mitigation measures. 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.

8.0 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.

WSP Canada Inc.



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Project Director, Group Leader – Eco EIA – Vancouver Island

MV/NM/TS/jts

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LEGEND

- PROJECT AREA
- STUDY AREA
- WATERCOURSE

REFERENCE(S)

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COORDINATE SYSTEM: NAD 1983 CSRS UTM ZONE 10N

CLIENT
MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

PROJECT
MOTI UPTOWN MOBILITY HUB OEA

TITLE
PROJECT LOCATION

CONSULTANT
wsp

YYYY-MM-DD	2024-07-18
DESIGNED	MV
PREPARED	MH
REVIEWED	MV
APPROVED	TS

PROJECT NO.	CONTROL	REV.	FIGURE
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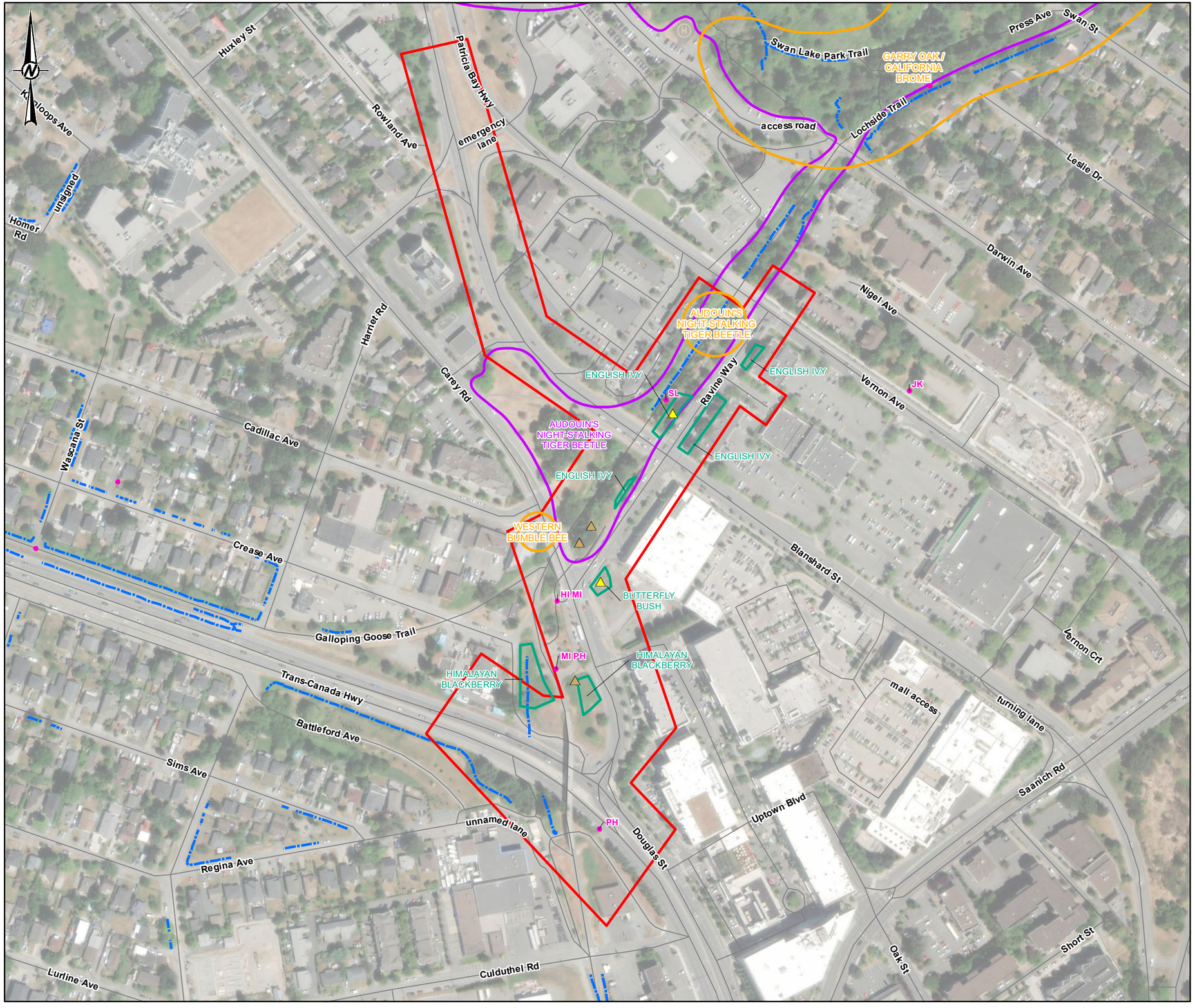

LEGEND

- PROJECT AREA
- FEDERALLY DESIGNATED CRITICAL HABITAT
- INVASIVE ALIEN PLANT
  - HI - HIMALAYAN BLACKBERRY
  - JK - JAPANESE KNOTWEED
  - MI - MILK THISTLE
  - PH - POISON HEMLOCK
  - SL - SPURGE-LAUREL
- SPECIES AT RISK
- INVASIVE PLANT SPECIES IDENTIFIED DURING FIELD RECONNAISSANCE
- ARBUTUS TREE
- GARRY OAK TREE
- ROAD
- DITCH

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REFERENCE(S)

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CLIENT
MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

PROJECT
MOTI UPTOWN MOBILITY HUB OEA

TITLE
ENVIRONMENTAL RESOURCES

CONSULTANT

wsp

YYYY-MM-DD	2024-07-18
DESIGNED	MV
PREPARED	MH
REVIEWED	MV
APPROVED	TS

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APPENDIX A

Species at Risk

Table 1: Provincially and Federally Designated Wildlife[1] Potentially Occurring within or adjacent to the Project Area.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Fish							
Cowichan Lake Lamprey	*Entosphenus macrostomus*	1-T	T	Red	S2	Endemic to Cowichan Lake and Mesachie Lake. Spawns in mouths of creeks where gravel substrate dominates. Parasitic feeder on salmonid fish.	**Not Expected -** Project Area is outside of species' known range.
Cutthroat Trout, *clarkii* subspecies	*Oncorhynchus clarkii clarkii*	-	-	Blue	S3S4	The range of this species extends from Alaska south to northern California. In BC this species occurs as marine populations, freshwater-resident populations, and headwater stream populations. Suitable habitat occurs in relatively small streams characterized by gravel substrates and a low gradient. Spawning generally occurs in streams.	**Not Expected -** No fresh watercourses within or adjacent to the Project Area.
Bull Trout	*Salvelinus confluentus*	-	SC	Blue	S3S4	The range extends from the southern Yukon south to the Columbia River drainage in Nevada and McCloud River drainage in California. In BC, bull trout generally occur in the interior of the province. It inhabits streams and coastal habitats where large rivers traverse the Coast Mountains to the Pacific Ocean.	**Not Expected -** No fresh watercourses within or adjacent to the Project Area.

[1] **Search Criteria:** BC CDC Species and Ecosystem Explorer search completed on 1 September 2022. Search Type: Animal (Restricted to Red, Blue, and Legally designated species) AND User Defined Polygon. Phylogenetic Ascending.

[2] **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.

[3] **COSEWIC**: Committee on the Status of Endangered Wildlife in Canada. Ranks have the following meanings: E = ENDANGERED: A species facing imminent extirpation or extinction, T = THREATENED: A species that is likely to become endangered if limiting factors are not reversed, SC = SPECIAL CONCERN: A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events, 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).

[4] **BC CDC List**: The provincial list to which the species or ecological community is assigned (BC CDC 2021). 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), Yellow (Any indigenous species, subspecies or community considered to be secure in British Columbia – encompasses all those not listed as red or blue), Accidental, **Unknown** and No Status.

[5] **Provincial Conservation Status** = Provincial Ranks apply to a species' or ecological community's conservation status in British Columbia. The number in parenthesis is the year the rank was last reviewed. The ranks have the following meaning: X = presumed extirpated, H = possibly extirpated, 1 = critically imperilled, 2 = imperilled, 3 = special concern, vulnerable to extirpation or extinction, 4 = apparently secure, 5 = demonstrably widespread, abundant, and secure, NA = not applicable, NR = unranked, U = unrankable. N= non-breeding; B= breeding, ? = inexact or uncertain (BC CDC 2022).

[6] Habitat information obtained from BC CDC Species Summary Reports.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Enos Lake Limnetic Stickleback	*Gasterosteus* sp. 2	1-E	E	Red	SX	Endemic to Enos Lake. Occurs in the limnetic zone of the lake.	**Not Expected -** Project Area is outside of species' known range.
Enos Lake Benthic Stickleback	*Gasterosteus* sp. 3	1-E	E	Red	SX	Endemic to Enos Lake. Occurs in the benthic zone of the lake.	**Not Expected -** Project Area is outside of species' known range.
Amphibians							
Western Toad	*Anaxyrus boreas*	1-SC	SC	Yellow	S4	The historical range extends from Alaska and southern Yukon south to Baja California. In BC, it is found from low to high elevations throughout the province and on Haida Gwaii. It is absent from the northern interior. The western toad breeds in shallow littoral zones of lakes, temporary and permanent pools, ditches, slow moving streams, and wetlands. Adults use terrestrial habitat, including forests and woodlands, with ample cover such as shrubs, woody debris, and rocks.	**Not Expected -** No suitable breeding habitat within or adjacent to the Project Area. The Project Area is heavily fragmented, likely precluding access.
Northern Leopard Frog	*Lithobates pipiens*	1-E	E	Red	S1	The range of this species is widespread across North America from southern Canada to southwestern United States. In BC, northern leopard frogs are restricted to the Creston Valley. Breeding occurs in ponds, marshes, lakes and occasionally slow-moving streams typically 1.5 - 2.0 m deep, with emergent vegetation and no fish. Adult frogs are found in moist habitat including riparian, meadows and prairies. Adults hibernate in waterbodies which do not completely freeze in the winter.	**Not Expected -** Project Area is outside of species' known range.
Northern Red-legged Frog	*Rana aurora*	1-SC	SC	Blue	S3	This species' range extends along the Pacific coast of North America from BC south to Baja California. In BC it is found on Vancouver Island, the Gulf Islands and the Lower Mainland on the west side of the Coast Mountains. The northern red-legged frog breeds in waterbodies with emergent vegetation including shallow ponds, wetlands, ditches, slow moving streams, and lake margins. Adults are found in moist upland habitat and forests with ample cover including woody debris, leaf litter, and shrubs. This species is typically found at low elevation.	**Not Expected -** No suitable breeding habitat within or adjacent to the Project Area. The Project Area is heavily fragmented, likely precluding access.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Wandering Salamander	*Aneides vagrans*	1-SC	SC	Blue	S3	The range of the wandering salamander is scattered along the Pacific coast with occurrences in coastal northern California and on Vancouver Island in BC. It inhabits mature, moist coniferous forests. Usually found under the bark of trees, in rotten logs, or moss-covered rock crevices. Eggs are laid in rotten logs, under bark, or among vegetation.	**Not Expected -** Project Area does not contain suitable habitat (i.e., mature coniferous forest)
Reptiles							
Leatherback Sea Turtle	*Dermochelys coriacea*	1-E	E	Red	S1N	The leatherback migrates throughout the year, breeding in tropical and subtropical waters and moving to temperate oceans to feed. Distinct populations are found in the Pacific and Atlantic Oceans. There have been few sightings in BC. Suitable habitat in BC occurs in temperate open oceans, often near the edge of the continental shelf, where prey is found.	**Not Expected -** Project Area is outside of species' known range.
Western Painted Turtle - Pacific Coast Population	*Chrysemys picta* pop. 1	1-T	T	Red	S1S2	The Pacific Coast subpopulation range extends through the southern part of the province on southern Vancouver Island and the coastal mainland. It occurs in ponds, lakes, sloughs, and slow-moving streams in shallow water with emergent vegetation, muddy substrates and suitable basking sites. Habitat may also include the riparian zones around these water bodies. Females dig nests in soft soil, and hatchlings remain in nest during winter and emerge in spring.	**Not Expected -** No suitable habitat within the Project Area (e.g., ponds, lakes, slow-moving streams with emergent vegetation).
Common Sharp-tailed Snake	*Contia tenuis*	1-E	E/T	Red	S1S2	The range for the sharp tailed snake extends from southwestern BC south to California. In BC, it is only known to occur at low elevations on Vancouver Island and the Gulf Islands. It inhabits rocky hillsides and outcrops in open woodlands dominated by Douglas-fir, arbutus, and Gary oak trees as well as moist pastures and meadows. This species requires shelter for cover, such as logs, rocks, fallen branches, and talus slopes.	**Not Expected -** No suitable habitat within the Project Area (e.g., rocky hillsides and outcrops).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Gophersnake, *catenifer* subspecies	*Pituophis catenifer catenifer*	1-XT	XT	Red	SX	The range extends from California, Arizona, and New Mexico, north to Washington and Idaho. This species is considered extirpated in BC. It is found mainly in dry grasslands, although it is sometimes associated with wetlands in the Bunchgrass and Ponderosa Pine biogeoclimatic zone. The *catenifer* subspecies is most common in semi-arid, brushy areas and adjacent to farms.	**Not Expected -** Species is considered extirpated from BC.
Birds							
Brant	*Branta bernicla*	-	-	Blue	S3M	The range in North America extends throughout the arctic region from Alaska east to Ellesmere Island and the north coast of Greenland. Wintering occurs along the Pacific coast. In BC, winters in Haida Gwaii, Tsawwassen and Boundary Bay in the Lower Mainland, the Strait of Georgia, the Strait of Juan de Fuca, and Vancouver Island. During migration it can be found in near shore coastal waters or foraging in open grassy areas such as lawns, pastures, golf courses, and marshes. Near shore coastal habitat is often associated with eel-grass and sea lettuce. Migrating birds concentrate around spawning herring.	**Not Expected -** No suitable migratory habitat (e.g., coastal waters, pastures, grassy fields etc.)
Canada Goose, *occidentalis* subspecies	*Branta canadensis occidentalis*	-	-	Red	S2?	The range extends from Alaska (breeding grounds) south to Oregon (wintering grounds). The occidentalis sub species winters and migrates in BC along the coast and on Vancouver Island. Wintering and migrating habitat occur in agricultural fields, salt marshes (deltas), rivers, and freshwater meadows. Typically, this subspecies prefers smaller fields, but can be found foraging with other Canada goose subspecies in various sized fields. This species is one of the smallest sub populations and is commonly confused with the Vancouver Canada geese sub population, which is commonly a year-round resident in BC.	**Not Expected -** No suitable migratory or overwintering habitat (e.g., agricultural fields, salt marshes, rivers etc.)

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Black Scoter	*Melanitta americana*	-	-	Blue	S3S4N	Breeding occurs along the western and northern coast of Alaska and in northern Quebec and Ontario. Nonbreeding range occurs along the coast of western North America from the Aleutian Islands south to northern Baja California and along the Atlantic coast. In BC, several thousand winter in calm waters between Vancouver Island and the mainland but occur all along the coast. Breeding occurs near lakes and nests are located on till or rock substrate. Wintering habitat is poorly studied. `	**Not Expected -** No marine habitat within or near the Project Area. Project Area is outside of the species' breeding range.
Surf Scoter	*Melanitta perspicillata*	-	-	Blue	S3B,S4N	Breeding occurs in Quebec, northern Canada, and Alaska. This species overwinters in coastal habitat. In BC, the surf scooter occurs throughout the province and is a year-round or seasonal resident, depending on its location within the province. Surf scoters are associated with sand-mud and cobble substrate and in rocky fjords.	**Not Expected -** No marine habitat within or near the Project Area.
Western Grebe	*Aechmophorus occidentalis*	1-SC	SC	Red	S1S2B,S2?	The range extends from coastal and southern BC, east to southwestern Manitoba, south to Baja California and Mexico. Year-round residents occur along the coast of BC and season residents (breeding) occurs in south central BC. Occurrence of this species within its range is dependent on the availability of suitable breeding lakes and marshes. Colonies are known in only three locations in BC: Salmon Arm Bay on Shuswap Lake, the north arm of Okanagan Lake, and the Creston Valley Wildlife Management Area (Blood 1999). Areas of open water with emergent vegetation along the edges are required on breeding water bodies. Wintering habitat occurs in brackish waters, estuaries, rivers, and sheltered seacoasts.	**Not Expected -** No marine habitat within or near the Project Area. Project Area is outside of the species' breeding range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Band-tailed Pigeon	*Patagioenas fasciata*	1-SC	SC	Blue	S3S4	Breeding occurs from western BC and southern Vancouver Island, south to northern California and in the southern interior of the United States. Breeding along the Pacific coast occurs in low elevation (0 - 300m) coniferous forest with varying mixtures of Sitka spruce, western red cedar, western hemlock, and Douglas-fir. This species prefers habitat with fruit bearing shrubs or cultivated areas for foraging. The band tailed pigeon will also breed in temperate and mountain forests.	**Potential -** May nest in forested areas adjacent to the Project Area. May forage on berry-producing shrubs throughout the Project Area.
Yellow-billed Cuckoo	*Coccyzus americanus*	-	-	Red	SXB	The breeding range of this species extends throughout the eastern United States, west to the Great Plains, and north to southern Ontario and Quebec. Breeding is also known in Arizona, New Mexico, and California, north to Idaho, Wyoming, and Montana. In BC, vagrants occur in the south of the province. Records of breeding for this species are known from the lower Fraser Valley and Vancouver Island; however, it is now considered extirpated. Suitable habitat occurs in dense deciduous riparian habitat composed of cottonwood, willow, and birch. It also inhabits abandoned farmland, orchards, and parks.	**Not Expected -** Project Area is outside of species' known range.
Common Nighthawk	*Chordeiles minor*	1-SC	SC	Blue	S3S5B	Breeding extends from the southern Northwest Territories and the Yukon, south throughout BC, east to southern Labrador, throughout the United States and into Mexico. The common nighthawk inhabits open and semi-open habitat including grasslands, coniferous forests, logged or slash-burned forests, prairies and plains, farm fields, rock outcrops, sand dunes and beaches, and urban/suburban areas. This species nests on the ground in open habitat such as short grasslands and gravel areas.	**Unlikely -** May forage above, but not expected to nest in the Project Area.
Black Swift	*Cypseloides niger*	1-E	E	Blue	S2S4B	Occurs across much of BC including Vancouver Island during the summer but does not occur on Haida Gwaii. Forages over forests or open habitats and breeds in rock crevice sites behind waterfalls, on sea cliffs, or in caves. Limited to a small number of known breeding sites in BC.	**Not Expected -** No suitable nesting habitat (i.e., rock crevice sites behind waterfalls, sea cliffs, or caves).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
American Golden-Plover	*Pluvialis dominica*	-	-	Blue	S3S4B	The breeding range in North America extends from northeastern Manitoba along Hudson's Bay, north through Nunavut, the Northwest Territories, the Yukon, and northwestern BC, and as far west as Alaska. In BC breeding is localized to the Chilcotin region. The American golden-plover winters in natural grasslands in South America. Suitable nesting habitat is found in the arctic and subarctic tundra and occasionally the montane tundra. Nests are located in sparsely vegetated areas, with rocky-slopes and well-drained soils. During migration, this species inhabits coastal and inland areas including prairies, fields, mudflats, shorelines, beaches, and estuaries.	**Not Expected -** No suitable migratory habitat (e.g., fields, mudflats, beaches etc.).
American Avocet	*Recurvirostra americana*	-	-	Blue	S2S3B	Breeding occurs in coastal California and the western interior of the United States, north to Alberta, Saskatchewan, and Manitoba, typically east of the Sierra Nevada and Cascade Mountains. In BC, breeding has been recorded in the Thompson-Okanagan region and west Kootenay region. Breeding occurs in salt ponds, potholes, and shallow alkaline wetlands dominated by bulrushes, sedges, or common cattails. The species may also breed around lakes and mudflats. Nests are built in sparse vegetation, often on islands. Seven nesting locations have been recorded in BC. Foraging occurs along the periphery of water bodies.	**Not Expected -** Project Area is outside of species' known range.
Upland Sandpiper	*Bartramia longicauda*	-	-	Red	S2?	The breeding range extends from southern Canada from Alberta east to Nova Scotia, and as far south as Missouri and Kansas. Scattered populations occur in eastern and central BC and from the Northwest Territories west to Alaska. Preferred habitat includes large areas of short grass for feeding and courtship with interspersed or adjacent taller grasses for nesting and brood cover. Typically nests on the ground among grasses.	**Not Expected -** Project Area is outside of species' known range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Red Knot	*Calidris canutus*	1-T	T	Blue	S3?M	Coastal BC : Primarily seacoasts on tidal flats and beaches, less frequently in marshes and flooded fields	**Not Expected -** No suitable migratory habitat (i.e., tidal flats and beaches).
Short-billed Dowitcher	*Limnodromus griseus*	-	-	Red	S1S2B,S2S3M	The short-billed dowitcher's breeding range is restricted to scattered areas in North America from Alaska and BC east to Alberta, Saskatchewan, Ontario, and Quebec. In BC, it occurs in the St. Elias Mountains and Haida Gwaii. This species nests occur in wet boggy muskeg and wet meadows in subalpine zones, plateaus, and valleys with a mix of grasses, sedges, and mosses.	**Not Expected -** No suitable migratory habitat (e.g., mud flats).
Hudsonian Godwit	*Limosa haemastica*	-	T	Red	S1B	The breeding range in North America includes scattered populations from eastern Alaska, east to Hudson's Bay. In BC, breeding is known from Chilkat Pass in the north of the province. Suitable breeding habitat occurs in open sedge meadows bordered by forest. It also inhabits bogs, spruce islands, and shallow pools surrounded by coniferous forests and upland areas dominated by grasses and lichens. The Hudsonian godwit winters in coastal marshes in South America.	**Not Expected -** Project Area is outside of species' known range.
Long-billed Curlew	*Numenius americanus*	1-SC	T	Yellow	S4B	Breeding occurs in western North America from southern BC, Alberta, and Saskatchewan south to California, Nevada, Utah, Colorado, and New Mexico. In BC, breeding occurs in the southern interior from the Thompson-Okanagan Plateau and Chilcotin-Cariboo region, north to Quesnel, and the eastern Kootenay region. This species nests in prairie habitat including short-grass and mixed prairie sites. Nesting does not occur in areas of dense vegetation. The long-billed curlew overwinters along the southern Pacific Coast in salt marshes, tidal estuaries, and moist pastures.	**Not Expected -** Project Area is outside of species' known range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Red-necked Phalarope	*Phalaropus lobatus*	1-SC	SC	Blue	S3B,SNRM	The distribution of the red-necked phalarope is considered circumpolar. In North America the breeding range extends from Alaska, east to northern Quebec, Labrador and Newfoundland, and southern Greenland. This species also breeds in northwestern BC, in the Kitimat and Stikine district. Wintering grounds occur largely at sea in tropical waters. In BC, during migration this species is apparent along the coast (Queen Charlotte Strait and Strait of Juan de Fuca) and inland (Charlie Lake) . Suitable breeding habitat occurs in subarctic tundra or tundra forest near freshwater lakes, ponds, bogs, marshes, and small streams. A variety of habitat types are used during migration including pelagic and inshore coastal areas, salt marshes, bays, inlets, lakes, ponds, ditches, marshes, irrigated fields, and estuaries.	**Not Expected -** Project area does not contain any marine habitat.
Wandering Tattler	*Tringa incana*	-	-	Blue	S3B	The breeding range extends from Alaska, east to the Yukon, western Northwest Territories, and south to northwestern BC. Wintering range extends along the coast from southern BC, south to Peru and on near shore islands. In North America, suitable breeding habitat is found in dwarf shrub and montane tundra. It also is found breeding near scree slopes, creeks, rivers, alpine lakes, and tailings ponds from mining activities. Wintering areas are found in rocky intertidal habitat including reefs, jetties, sea stacks, rocky shorelines, piers, and pilings. Also found in estuaries and freshwater water bodies near the coast.	**Not Expected -** No suitable overwintering habitat (e.g., rocky intertidal habitat, estuaries etc.).
Caspian Tern	*Hydroprogne caspia*	-	NAR	Blue	S3B	Breeds on Pacific coast including the Fraser River delta in BC. Breeding habitat consists of coastal estuarine, salt marsh, and barrier Island. Nests among driftwood and debris on low, flat, sandy or rocky islands, on shell banks and beaches, and on sparsely vegetated, sandy, muddy or pebbly shores. Also, on dredge material islands and salt dikes. Forages along coastlines, shorelines, lakes, rivers, estuaries, and sloughs.	**Not Expected -** No suitable breeding habitat (e.g., estuary, salt marsh etc.).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
California Gull	*Larus californicus*	-	-	Red	S1B,SNRN	This species occurs in Alberta and isolated locations in Washington, Oregon, and California during the breeding season. Only two breeding colonies have been documented in British Columbia, both in the Okanagan Valley. Breeding occurs on islands of inland natural lakes and river. Over-wintering occurs along the coast from extreme southwestern BC to Mexico. Along the Pacific coast of BC, this species inhabits rocky coasts, mudflats, estuaries, river deltas, and marine waters on the continental shelf.	**Potential -** May forage throughout the Project area.
Forster's Tern	*Sterna forsteri*	-	DD	Red	S1B	Breeding occurs from southeastern BC at Creston, south to Washington, Oregon, Idaho, Montana, and California. The breeding range also extends from eastern Alberta, east to Manitoba and south to North and South Dakota and Minnesota. Scattered breeding populations occur in other localities throughout North America. Suitable habitat occurs primarily in marshes with fresh, brackish, or salt water. This species also inhabits the edges of lakes, ponds, wetlands, and streams with emergent vegetation.	**Not Expected -** Project Area is outside of species' known range.
Marbled Murrelet	*Brachyramphus marmoratus*	1-T	T	Blue	S3	Lives out at sea except during the breeding season. In BC, breeds in coastal areas of the Georgia Depression and Coast and Mountains in mature/ old growth coniferous forests. Key habitat attributes for nesting include nest trees that are >30 m tall, small gaps in the canopy for accessing the nest, large limbs covered with deep moss that provide a landing pad and soft substrate for a nest cup, and overhead cover for shelter and protection from predators.	**Not Expected -** No suitable habitat within the Project Area (i.e., mature forest for nesting, marine habitat for foraging).
Tufted Puffin	*Fratercula cirrhata*	-	-	Blue	S3B,S4N	In BC, the tufted puffin winters in pelagic areas along the coast. The tufted puffin overwinters in deep, oceanic water and is mainly pelagic. Occasionally, individuals' winter in bays. This species breeds in colonies on steep rock islands and cliffs. The breeding range extends along the BC coast. Individuals nest on offshore islands or along the coast in ground burrows, sometimes under boulders and piles of rocks, and occasionally under dense vegetation.	**Not Expected -** Project area does not contain any marine habitat.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Horned Puffin	*Fratercula corniculata*	-	-	Red	S2?	The breeding range extends from coastal BC north to Alaska and across the Berring and Chukchi Sea. It is a rare breeder in BC, where colonies occur on bare islands and coastal cliffs. Wintering range occurs through the North Pacific Ocean.	**Not Expected -** Project area does not contain any marine habitat.
Cassin's Auklet	*Ptychoramphus aleuticus*	1-SC	SC	Red	S2B,S3N	The breeding range extends from Russia, through Alaska and BC, and extends south to Baja California. Up to 50% of the global population is found in the Scott Island group off Vancouver Island. Cassin's auklet nests on small islands, free of mammalian predators. It nests in shallow borrows, rock crevices, and under trees and logs. Outside of the breeding season, it is largely pelagic.	**Not Expected -** Project area does not contain any marine habitat.
Ancient Murrelet	*Synthliboramphus antiquus*	1-SC	SC	Blue	S2S3B,S4N	Breeding range occurs from the Aleutian Islands and Gulf of Alaska, and Haida Gwaii in BC. Breeding colonies establish on large islands with forests, shrub, or grass cover. Foraging occurs on the Pacific continental shelf and slope waters.	**Not Expected -** Project area does not contain any marine habitat.
Common Murre	*Uria aalge*	-	-	Red	S2B,S3S4N	Breeding occurs in the Aleutian Islands and along the coast of Alaska, south to Haida Gwaii and in the coastal areas of Oregon and northern California. Wintering range extends throughout the Pacific Northwest and the Bering Sea. In the east the range extends from the northeastern United States, north to Newfoundland and coastal are of Quebec and Labrador, to southern Greenland. This species is a year-round resident in most of coastal BC, with seasonal populations in the Kitimat-Stikine and Squamish-Lillooet districts. The common murre overwinters in sheltered bays and other coastal areas, often feeding on herring. Breeding habitat is on cliffs, rocky headlands of islands, or sloping islands near the ocean.	**Not Expected -** Project area does not contain any marine habitat.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Thick-billed Murre	*Uria lomvia*	-	-	Red	S1B,SUN	This species distribution is considered circumpolar in the arctic and subarctic zone. It breeds in the Atlantic, Arctic, and Pacific Oceans. A few breeding pairs occur in BC, and individuals also occur in the winter along the coast and on coastal islands. The thick billed murre overwinters in marine habitat on the continental-shelf and continental-slope waters in water > 30 m deep. Nesting for this species occurs on bare cliff ledges in open areas.	**Not Expected -** Project area does not contain any marine habitat.
Northern Fulmar	*Fulmarus glacialis*	-	-	Red	S1B,S4N	The Northern Fulmar's breeding range occurs in scattered locations along the coast of BC, Alaska, the Canadian Arctic, and eastern Canada. This species breeds on coastal cliffs located on islands and the mainland. Marine habitat ranges from ice-covered high-arctic regions to temperate boreal zones with preference for water temperature between 3 and 7°C.	**Not Expected -** Project area does not contain any marine habitat.
Double-crested Cormorant	*Nannopterum auritum*	-	NAR	Blue	S3S4	The range extends from Alaska south along the Pacific Coast to Mexico. Also occurs in the interior of Canada and the United States and Florida and the Caribbean. In BC, it breeds primarily in the Strait of Georgia, as well as at two inland colonies at Stum Lake, west of Quesnel, and in the Creston Valley Wildlife Area, near the southern BC border. Nests are located on protected offshore islands and rocks or on bridges, shipwrecks, docks, and nesting-towers. Ground nesting occurs on rocky islands and on mats of vegetation in wetlands. Forages mainly in marine habitats but may also visit inland lakes and the estuaries of large rivers. Overwinters in coastal areas.	**Not Expected -** Project area does not contain any marine habitat.
Brandt's Cormorant	*Urile penicillatus*	-	-	Red	S1B,S4N	This species occurs as a year-round resident in coastal areas from southern BC, including Vancouver Island, south to Baja California. Brandt's cormorant winters in coastal northern BC, Alaska, and the Pacific coast of Mexico. Habitat for this species occurs in marine and estuarine areas. Nesting colonies occur on islands, with cliff ledges and slope aspects facing marine habitat.	**Not Expected -** Project area does not contain any marine habitat.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
American White Pelican	*Pelecanus erythrorhynchos*	-	NAR	Red	S1B	The breeding range extends from south-eastern and central BC, east to western Ontario and the northwestern US states. Wintering occurs along the southern Pacific coast from California south to Baja California, coastal areas of Mexico, southeaster US, and parts of Central America. Suitable breeding habitat occurs on islands found in freshwater lakes, rivers, or marshes often with sparse vegetation. Breeding islands are often long distances from foraging areas. This species forages in marshlands, wetlands, rivers, and sometimes deep lakes. Migration habitat occurs along river valleys and other aquatic foraging areas.	**Not Expected -** Project Area is outside of species' known range.
Great Blue Heron, *fannini* subspecies	*Ardea herodias fannini*	1-SC	SC	Blue	S3B,S4N	The great blue heron *fannini* subspecies is occurs on the Pacific Coast from Alaska south to Puget Sound, Washington. In BC, it is found year-round in coastal habitats and in the southern interior. It forages along water margins including marine habitat, slow moving freshwater, and grasslands. On the Pacific coast, the species typically nests in colonies in tall Sitka spruce, western red cedar, western hemlock, pine, red alder, Douglas-fir, and black cottonwood.	**Potential -** May forage in areas adjacent to the Lochside Trail. May nest in mature trees in and adjacent to the Project Area.
American Bittern	*Botaurus lentiginosus*	-	-	Blue	S3B,SNRN	The range extends from northern Canada south to California, New Mexico, Arkansas, West Virginia, and North Carolina. It occurs in the south and central regions of BC. This species mostly occurs in BC during the breeding season, but a few will remain year-round along the coast. Found in large freshwater wetlands, dominated by tall, dense stands of cattails, sedges, or bulrushes with patches of open water. Readily uses wetlands created by impoundments, beaver dams, sloughs, and lake margins. Overwinters in areas where the temperature remains above freezing. The American bittern eats mainly fish, crayfish, amphibians, mice and shrews, insects, and other animals. This species may nest in grassy uplands surrounding wetlands or on a hummock floating in shallow water.	**Not Expected -** Project Area is outside of species' known range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Green Heron	*Butorides virescens*	-	-	Blue	S3S4B	The range in North America extends from southeastern Canada and south to Florida, where it breeds throughout the eastern United States. In the west it is found from southern BC, south to Baja California and Mexico where it occurs in coastal habitats. In BC, this species occurs along the south coast and is restricted to the Lower Mainland, as far east as Hope and Vancouver Island from Sooke north to Campbell River. The green heron is a resident along the south coast. Green heron occurs in swamps, mangroves, marshes and riparian zones along creeks and streams. Nests are in trees, thickets or bushes over water, dry woodlands and orchards.	**Unlikely -** Although this species has been recorded multiple times in the Swan Lake Christmas Hill Nature Sanctuary, the Project Area contains limited suitable foraging habitat.
Black-crowned Night-heron	*Nycticorax nycticorax*	-	-	Red	S1	Range extends across North America though status varies by province/state. The breeding range includes Washington State, Idaho, Saskatchewan, Michigan, and Nova Scotia and south into South America. Winter habitat includes states as far north as Oregon, also in Utah, New Mexico, Texas, Gulf Coast, and southern New England. In BC, they are a transient species in Kootenay, Thompson, and on Vancouver Island, a seasonal resident in the Okanagan region, and a year-round resident and confirmed breeder in Lower Mainland. This species is found in wetlands, mangroves, streams, and lakes. Nesting occurs in a variety of habitats such as wetlands, orchards, and on marine islands.	**Not Expected -** Project Area is outside of species' known range.
Northern Goshawk, *laingi* subspecies	*Accipiter gentilis laingi*	1-T	T	Red	S2	The *laingi* subspecies occurs in southeastern Alaska, coastal B.C., the Olympic Peninsula and possibly coastal areas of Washington and Oregon. This subspecies is a year-round resident that only occurs in Canada in coastal areas of BC, mainly on Haida Gwaii and Vancouver Island, and other large coastal islands. It inhabits mature forest with dense canopies, open understory, and sufficient tree limbs for nesting and perching platforms. Closed canopy likely provides the optimal microclimate for nesting by reducing predation and providing greater prey productivity.	**Not Expected -** No suitable habitat within the Project Area (i.e., mature forest).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Rough-legged Hawk	*Buteo lagopus*	-	NAR	Blue	S3N	Breeding occurs throughout the Canadian arctic islands, Alaska, the Yukon, the Northwest Territories, Nunavut, northern Ontario, northern Quebec, and Labrador. Winter range extends from southern Canada south to California, Texas, and the Gulf Coast. The rough-legged hawk is found in BC during migration and in the winter throughout most of the province east of the Coast Mountain Range, and north of 52°N. In addition, the species appears along the southeast coast of Vancouver Island and in the Fraser Lowland area. This species inhabits open treeless areas including grasslands, alpine meadows, wetlands (marshes, bogs, fens and swamps), sagebrush flats, and open cultivated areas (agricultural fields).	**Not Expected -** No suitable overwintering habitat within the Project Area (e.g., wetlands, grasslands, fields etc.).
Swainson's Hawk	*Buteo swainsoni*	-	-	Red	S2?	Breeding occurs east of the Cascades in western North America, east to Manitoba and south to Nevada, Arizona, New Mexico, Texas, and northern Mexico. In BC, it is found in the Okanagan and Thompson valleys and in the Bulkley Basin from Hazelton to Smithers. It inhabits savannah, open pine-oak woodland and cultivated lands (e.g., alfalfa and other hay crops, and certain grain and row croplands) with scattered trees. Typically nest in solitary trees, bushes, or small groves.	**Not Expected -** No suitable habitat within the Project Area (i.e., mature forest).
Barn Owl	*Tyto alba*	1-T	T	Blue	S3	The range extends from southern BC and Vancouver Island, south throughout the continental United States, Mexico, Central America, and the Caribbean. The barn owl can be a year-round or seasonal resident of BC depending on its location within the province. This species occurs in open and partly open grasslands, marshes and field habitats, often around human habitation. Nests in caves, buildings, hollow trees, and crevices on cliffs.	**Not Expected -** No suitable habitat within the Project Area (i.e., grasslands, marshes, fields).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Short-eared Owl	*Asio flammeus*	1-SC	T	Blue	S3B,S1N	Breeding for the short-eared owl occurs from Alaska, throughout Canada (except the Arctic Islands), and northern United States. This species breeds from high arctic to mid-latitudes, including off-shore islands, in open habitats with low vegetation. Nests are built near a reliable source of small mammal prey. They use fresh and saltwater marshes, gravel pits, rock quarries, shrub thickets, and woodlots outside of the breeding period.	**Potential -** May occur in habitat adjacent to the Lochside Trail during the winter months.
Burrowing Owl	*Athene cunicularia*	1-E	E	Red	S1B	Breeding occurs in BC, Alberta, Saskatchewan, Manitoba, and south throughout the western United States. In BC, breeding occurs in the interior. Habitat includes open grasslands (especially prairie), plains, savanna, and occasionally in open areas near human habitation. This species is associated with high densities of burrowing mammals. Listed as endangered under the BC Wildlife Act.	**Not Expected -** Project Area is outside of species' known range.
Northern Pygmy-owl, *swarthi* subspecies	*Glaucidium gnoma swarthi*	-	-	Blue	S3S4	The *swarthi* subspecies is endemic to Vancouver Island and is a year-round resident. Typically, this species inhabits mature old growth mixed and coniferous forests between 490 to 1220 m in elevation. The *swarthi* subspecies requires forests that have natural and man-made openings and sufficient numbers of natural or excavated cavities for nesting. These cavities are typically excavated in large-diameter trees.	**Not Expected -** Project Area does not contain suitable habitat (i.e., mature coniferous forest)
Western Screech-Owl, *kennicottii* subspecies	*Megascops kennicottii kennicottii*	1-T	T	Blue	S2S3	Year-round habitat occurs in western North America from coastal areas of Alaska and BC, south throughout the western United States to Mexico. It typically occurs at low elevations in mature deciduous riparian habitat with available cavities, and wetland and forested habitat. It can also be found in treed urban and suburban environments, and at the edge of forested habitats close to open wetlands or fields.	**Potential -** May occur in habitat adjacent to the Lochside Trail.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Lewis's Woodpecker	*Melanerpes lewis*	1-T	T	Blue	S2S3B	Breeding occurs in western North America from southern BC, south to New Mexico and west to California. This species occurs in areas with an open canopy and moderately dense understory with ample woody material in which birds can forage for insects. Habitat includes open ponderosa pine forests, riparian woodland with cottonwoods, or logged/ burnt pine forest.	**Not Expected -** Project Area is outside of species' known range.
Prairie Falcon	*Falco mexicanus*	-	NAR	Red	S1	The prairie falcon overwinters in the Great Plains and Great Basin. Breeding occurs in south central BC, southern Alberta, and Saskatchewan and throughout the western United States to northwestern Mexico. In BC, it is found in the Thompson-Okanagan Plateau and Chilcotin-Cariboo Basing as far north as Williams Lake. The prairie falcon occurs in dry, open habitat including grasslands, shrub steppe and alpine tundra. Nesting for this species occurs on cliffs and bluffs.	**Not Expected -** Project Area is outside of species' known range.
Peregrine Falcon, *pealei* subspecies	*Falco peregrinus pealei*	1-SC	SC	Blue	S3S4	The subspecies *pealei* is restricted to breeding on the Pacific Coast of North America and can be found along BC's coast, on Vancouver Island, Haida Gwaii and other smaller islands. Both seasonal and year-round residents are apparent in BC. It occurs in a variety of terrestrial (including tundra) and coastal habitats. This species generally nests on cliffs over forest or water (lakes, marine or river ecosystems), may be under overhanging Sitka spruce roots or in abandoned tree cavities.	**Unlikely -** May forage above, but not expected to nest in the Project Area.
Gyrfalcon	*Falco rusticolus*	-	NAR	Blue	S3S4B,SNRN	The breeding range extends from Alaska, east throughout the Canadian Arctic and Greenland. Wintering habitat extends as far south as the northern United States. Inhabits open country in the Arctic including tundra, open coniferous forest, mountainous regions, and rocky seacoasts. This species nests on cliff ledges, beneath sheltering overhangs, and occasionally in abandoned hawk or raven nests.	**Not Expected -** Project Area does not contain suitable overwintering habitat (e.g., agricultural areas, grasslands, seacoasts etc.).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Olive-sided Flycatcher	*Contopus cooperi*	1-SC	SC	Yellow	S4B	Breeds in montane and northern coniferous forests from sea-level to timberline but is usually found in mid- to high-elevation forests. This species is associated with forest openings and edges near natural openings (e.g., streams, lakes, wetlands, meadows), human-made openings (i.e., logged areas), burned forest, and open to semi-open forest.	**Unlikely -** Limited natural forest edge habitat within the Project Area.
Horned Lark, *strigata* subspecies	*Eremophila alpestris strigata*	1-E	E	Red	SXB	The breeding range extends from Alaska, east throughout the Canadian Arctic, and south from BC to Newfoundland. Year-round habitat extends from southern BC, Alberta, and Saskatchewan throughout the United States. Habitat occurs at low to high elevations (0 - 4000m) with short grasslands and barren ground. This species breeds in barren ground with short (< a few centimeters) grasses, bare agricultural fields, and abandoned surface mines.	**Not Expected -** Project Area does not contain suitable habitat (i.e., grasslands).
Barn Swallow	*Hirundo rustica*	1-T	SC	Yellow	S4B	In North America, this species breeds throughout the interior of Mexico, the continental United States and Canada, and as far north as southern Alaska, the Yukon, and the Northwest Territories. Typically inhabits open areas near water with low vegetation. Nesting typically occurs on horizontal surfaces, including natural structures (crevices, cavities, caves) and anthropogenic structures (rafters, ceiling, roofs, bridges), near water with access to mud for nest building.	**Potential -** May forage throughout Project Area. May nest on buildings throughout and adjacent to Project Area.
Purple Martin	*Progne subis*	-	-	Blue	S3S4B	Breeding occurs throughout the eastern United States and southeastern Canada. In western North America breeding populations are scattered in southern British Columbia south to California in coastal environments, and the central western United States. In BC, breeding populations occur along the south and east coast of Vancouver Island and the Gulf Islands as far north as Port Neville (Cousens and Lee 2012). Colonies also occur on the Lower Mainland at Rocky Point, Maplewood Flats, Blackie Spit, and Reifel wildlife refuge (Cousens and Lee 2012). Two inland sites	**Not Expected -** No nest boxes within Project Area.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
						in the Lower Fraser Valley, at Silvermere Lake and Nicomen Slough were occupied in 2006 and 2007 (Cousens and Lee 2012). Suitable habitat includes open and partly open areas, often near water or around towns. The purple martin is a cavity nester, often using woodpecker holes in trees and snags or holes in buildings. This species will frequently use nest boxes and artificial holes.	
Sage Thrasher	*Oreoscoptes montanus*	1-E	E	Red	S1B	The breeding range extends from southern BC, south to northern Arizona and New Mexico and east to southern Saskatchewan. The species wintering range occurs in the southwestern United States and central Mexico. In BC, it is known at the southern Okanagan and Similkameen Valleys. This species is highly associated with sagebrush habitat, which is used during the breeding season. Nesting occurs in shrubs with a minimum height of 1 m and on average nests are found in shrubs 1.5 m wide and 1.3 m high. Migrating sage thrashers have been observed in a variety of habitats including estuaries, beaches, agricultural fields, and dykes.	**Not Expected -** Project Area is outside of species' known range.
Evening Grosbeak	*Coccothraustes vespertinus*	1-SC	SC	Yellow	S5	Breeds mainly throughout the southern and central interior of BC at mid-elevations. Coniferous and mixed forests are preferred for nesting and breeding is frequently associated with outbreaks of forest-defoliating insects such as spruce budworm.	**Unlikely -** Project Area contains limited forest habitat.
Pine Grosbeak, *carlottae* subspecies	*Pinicola enucleator carlottae*	-	-	Blue	S3	The subspecies *carlottae* is a year-round resident that is restricted to Haida Gwaii in northwestern BC; however, they occasionally occur in the Lower Mainland and on Vancouver Island primarily during winter months. Suitable breeding habitat occurs in coastal forests dominated by Sitka spruce, where it commonly uses forest openings. Wintering habitat is found in areas dominated by mountain ash, ash and maple where it forages on fruits.	**Not Expected -** Project Area does not contain suitable habitat (i.e., Sitka spruce-dominated forest).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Canada Warbler	*Cardellina canadensis*	1-T	SC	Blue	S3B	Breeding occurs from northeastern BC, east to Nova Scotia, and south around the Great Lakes and the northeastern United States. In BC, the Canada warbler is found around the Peace River lowlands and in the western Taiga plains. This species occurs in mature deciduous and mixed forests, often in low vegetation, in damp microhabitats along streams. The Canada warbler breeds in moist, mixed coniferous and deciduous forests with a well-developed understory near streams, swamps, or bogs.	**Not Expected -** Project Area is outside of species' known range.
Connecticut Warbler	*Oporornis agilis*	-	-	Blue	S3B	The breeding range of the Connecticut warbler extends from northeastern BC and southwestern Northwest Territories, east to southwestern Quebec. It breeds in a variety of habitat types including open woods of boreal forests, poorly drained spruce-tamarack forests, moist second growth forests and areas with low shrubs, areas with thick undergrowth, sapling thickets, and deciduous and coniferous forest.	**Not Expected -** Project Area is outside of species' known range.
Bay-breasted Warbler	*Setophaga castanea*	-	-	Red	S2?	The northeastern area of British Columbia, northern Rockies and Peace River district is the western limit of the bay breasted warbler's breeding range. There has been one breeding record outside of the northeastern area near Good Hope Lake. This species of warbler inhabits dense, mature boreal coniferous forests with small openings. In addition, some occurrences have been recorded in pine (Pinus), hemlock (Tsuga), and mixed forests. Typically, individuals are found near open water, and occasionally in bogs and swamps.	**Not Expected -** Project Area is outside of species' known range.
Bobolink	*Dolichonyx oryzivorus*	1-T	SC	Red	S2?B	The bobolink breeds from BC and Alberta east to Newfoundland and in the northern United States. Individuals nest in tall or mixed grass prairie areas. Nesting will occur in cultivated fields with grasses and forbs and abandoned fields.	**Not Expected -** Project Area is outside of species' known range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Rusty Blackbird	*Euphagus carolinus*	1-SC	SC	Blue	S3S4B	The breeding range for the rusty blackbird occurs from Alaska across Canada east to Newfoundland; however, it is absent from the Canadian Arctic and southern British Columbia, Alberta, Saskatchewan, and Manitoba. In BC, this species is known in the south central and northern areas during the breeding season. This species inhabits low-elevation wetland habitat in coniferous and mixed forests, including fens, bogs, muskeg, beaver ponds, and other wet forest openings. Individuals nest almost exclusively near water, in the branches of deciduous trees or among emergent vegetation. The rusty black bird is an opportunistic feeder and may feed on insects, seeds, and some fruits.	**Not Expected -** Project Area is outside of species' known range.
Yellow-breasted Chat	*Icteria virens*	1-E	E	Red	S2?	The range extends from southern Canada, from BC east to Ontario, and south to central Mexico. The BC population is part of the subspecies *Icteria virens auricollis* which occurs in Canada from BC east to Saskatchewan in spring and summer. Suitable habitat occurs in dense thickets, riparian areas and overgrown clearings dominated by wild rose and willow.	**Not Expected -** Project Area is outside of species' known range.
Grasshopper Sparrow	*Ammodramus savannarum*	-	-	Red	S1B	In North America, the breeding range extends throughout the eastern United States, southern Ontario, and southern Quebec. Breeding also occurs in south-central BC, from southern Alberta east to southern Manitoba, and south to Washington, Oregon, California, Montana, and Colorado. Suitable habitat occurs in open grasslands and prairies with sparse to moderate shrub cover and patches of bare ground. The grasshopper sparrow inhabits areas with native bunchgrass.	**Not Expected -** Project Area is outside of species' known range.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Lark Sparrow	*Chondestes grammacus*	-	-	Blue	S2S4B	In BC, breeds in the southern interior in various open habitats with scattered bushes and trees including short-grass, mixed-grass, and tall-grass prairie, parkland, sand hills, barrens, fields, shrub thickets, shrub steppes, woodland edges, orchards, riparian areas, pastures, and savanna. Nests are often in woody vegetation on or near the ground. within BC, this species is documented as breeding in the Okanagan and Similkameen valleys north to Kamloops	**Not Expected -** Project Area is outside of species' known range.
Vesper Sparrow, *affinis* subspecies	*Pooecetes gramineus affinis*	1-E	E	Red	S1B	The breeding range extends from BC, east to Nova Scotia, and south from California, Arizona and New Mexico in the west to Missouri, Kentucky and Virginia in the east. In BC, breeding occurs from the southern interior, to the Chilcotin and Cariboo plateaus and as far north as the Peace River region. It inhabits grasslands, sagebrush steppes, native prairies, and montane meadows. Breeding occurs in open areas characterized by short, patch herbaceous species and low shrubs and forbs. This subspecies of vesper nests on the ground in small depressions.	**Not Expected -** Project Area is outside of species' known range.
Smith's Longspur	*Calcarius pictus*	-	-	Blue	S3S5B	Breeding range occurs from Alaska east to northern Ontario. In BC, breeding occurs in the Chilkat Pass. Breeding habitat includes wet meadows and wetlands in the forest-tundra transition zone on the north edge of the boreal tree-line. Also occurs in grassy mountain valleys or passes and in shrubby tundra up to 1700m.	**Not Expected -** Project Area is outside of species' known range.
Mammals							
Western Water Shrew, *brooksi* subspecies	*Sorex navigator brooksi*	-	-	Blue	S2S3	The subspecies *brooksi* is restricted to Vancouver Island. It is commonly found in wet habitat, primarily around fast-flowing streams with rapids and small riffles. This subspecies may also be found in wet meadows and alder-willow thickets around ponds or lakes. It inhabits the rocks, boulders, and tree roots adjacent to streams and nests are located near water in burrows, rafted logs, and beaver lodges.	**Not Expected -** Project Area does not contain fast-flowing streams.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Townsend's Big-eared Bat	*Corynorhinus townsendii*	-	-	Blue	S3	In BC, the range of Townsend's big-eared bat extends from Vancouver Island and the Gulf Islands to the Vancouver area. In the interior of BC, this species is found north to William's Lake and east to Creston. It inhabits coastal forests and dry, interior grasslands. It can be found from sea level to 1070 meters.	**Not Expected -** Project Area does not contain suitable habitat (e.g., forests).
Hoary Bat	*Lasiurus cinereus*	-	E	Blue	S3S4	Occurs from southeast Alaska, east to Newfoundland, and south to South America. Exhibits migratory behaviour, moving northward for summer months. Occurs in deciduous and coniferous forests where it forages in open areas, particularly near and over water and in riparian corridors. Roosts in dense foliage. Feeds on invertebrates, mainly moths.	**Confirmed** - Recorded during emergence surveys on 6 June 2024.
Silver-haired Bat	*Lasionycteris noctivagans*	-	E	Yellow	S4S5	Occurs from southeastern Alaska east to southern Northwest Territories, south to northern Mexico and Bermuda. Exhibits migratory behaviour, moving northward for summer months. Occurs in forested habitats adjacent to lakes, ponds, and other water features. Roosts in trees in cavities and sloughing bark.	**Potential -** May forage and roost in habitats adjacent to the Lochside Trail.
Little Brown Myotis	*Myotis lucifugus*	1-E	E	Blue	S3S4	Little brown myotis are common in a wide range of forest types across BC. They appear more abundant in older forest stands, which is likely related to increased snag availability for roosting and ease of foraging under closed canopy. Females establish maternity colonies typically in buildings or cavities in large-diameter trees. Little brown myotis typically forage over still water, rivers, and in forest gaps, edges or along trails. During the winter months, they hibernate in caves.	**Potential -** May forage and roost in habitats adjacent to the Lochside Trail.
Yuma Myotis	*Myotis yumanensis*	-	-	Blue	S3	Occurs from BC south to Mexico, east to Montana and western Texas. Heavily associated with water. Occurs in a variety of habitats, including riparian areas, woodlands, and forests. Roosts in caves, cliff crevices, bridges, buildings, and other anthropogenic habitats. Hibernacula requirements are generally poorly understood.	**Potential -** May forage and roost in habitats adjacent to the Lochside Trail.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Wolverine, *vancouverensis* subspecies	*Gulo gulo vancouverensis*	1-SC	SC	Red	SH	The *vancouverensis* subspecies is found only on Vancouver Island. Habitat includes boreal forests, subarctic and arctic tundra, montane forests, and alpine tundra. It is generally found at high elevations and latitudes. Habitat requirements include a consistent, year-round supply of food.	**Not Expected -** Project Area is located in a heavily urbanized area.
Ermine, *anguinae* subspecies	*Mustela richardsonii anguinae*	-	-	Blue	S3	The *anguinae* subspecies is endemic to Vancouver Island in BC. This species is a generalist and can be found in a variety of forest and woodland habitats. Typically, this species can be found in coniferous or mixed wood forests that vary in moisture regime (dry to moist), grasslands with shrub species, and along riparian habitats. Riparian habitat consists of shrub, herbaceous or gravel bar areas. Occasionally, the species is found in active or old agricultural land, grassland meadows and sparsely vegetated rocky slopes.	**Not Expected -** Project Area is highly fragmented from continuous, natural habitat.
Steller Sea Lion	*Eumetopias jubatus*	1-SC	SC	Blue	S3S4B,S4N	The range extends from California to the Bering Sea and Kurile Islands. In BC, three breeding populations are recognized and are located in the Scott Islands, Cape St. James and offshore of Banks Island. Aquatic habitat includes coastal waters of the North Pacific Ocean, where feeding occurs mainly on the continental shelf. Terrestrial habitat includes rookeries, year-round haul-out sites and winter haul-out sites. Terrestrial habitat tends to be limited to areas devoid of predators such as bears or wolves and generally occurs on small rock islets.	**Not Expected -** Project Area does not contain marine habitat.
Northern Elephant Seal	*Mirounga angustirostris*	-	NAR	Red	S1B,S4N	Northern elephant seals are deep-diving pelagic seals and haul-out on land two times a year during breeding and moulting. The at-sea distribution of northern elephant seals in BC is understudied.	**Not Expected -** Project Area does not contain marine habitat.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Roosevelt Elk	*Cervus elaphus roosevelti*	-	-	Blue	S3S4	The Roosevelt elk population in BC is predominately found on Vancouver Island, with populations located on the mainland including the head of Phillips Arm and Loughborough Inlet, around Powell River, and the Sechelt Peninsula. Roosevelt elk inhabit areas of dense vegetation which provide shelter from predators. Foraging habitat includes areas with abundant herb vegetation, shrub seedlings and riparian habitat. Old growth forest is used as wintering habitat.	**Not Expected -** Project Area is located in a heavily urbanized area.
Grey Whale	*Eschrichtius robustus*	1-SC	SC/E/NAR	No Status	S3S4	Members of this population migrate annually from winter calving grounds in Mexico along the West Coast of Canada to summer feeding areas in Russia. Feeding areas in summer and autumn are located primarily in two small areas off the north-eastern coast of Sakhalin Island and off southern Kamchatka. The population is growing but remains depleted at about 174 adults. The population faces many threats, including cumulative effects of increasing oil and gas activities in its summer range.	**Not Expected -** Project Area does not contain marine habitat.
Invertebrates							
Sinuous Snaketail	*Ophiogomphus occidentis*	-	-	Blue	S3	Occurs throughout much of BC south of 51°N, including the Lower Mainland, Powell River, Vancouver Island, and the Okanagan on warm streambanks and lakeshores. Females lay eggs directly into water along edges of warm streams and lakes, and larvae burrow into sediments. Flight period is early June to early October.	**Not Expected -** Project Area does not contain suitable habitat (i.e., streams, lakes).
Western Pondhawk	*Erythemis collocata*	-	-	Yellow	S4	In BC, the range extends from the lowlands along the south coast east to Osoyoos Lake in the interior. Members of this family are most common around ponds, marshy lakeshores and slow streams that contain floating vegetation.	**Not Expected -** Project Area does not contain suitable habitat (i.e., streams, lakes).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Blue Dasher	*Pachydiplax longipennis*	-	-	Yellow	S4S5	In BC, the range extends from low elevation sites along the south coast and Osoyoos Lake in the interior. This species inhabits ponds and lakes with abundant emergent vegetation and a vegetated riparian zone.	**Not Expected -** Project Area does not contain suitable habitat (i.e., ponds, lakes).
Autumn Meadowhawk	*Sympetrum vicinum*	-	-	Blue	S3S4	In BC, the autumn meadowhawk's range includes the southern interior, from the southern Okanagan Valley and Kootenay River to Creston, and the south coast. It inhabits marshes, ponds, slow streams, and lakes with emergent vegetation. Eggs are deposited in moss and vegetation along the bank, or in, water bodies.	**Not Expected -** Project Area does not contain suitable habitat (i.e., ponds, lakes, streams).
Black Saddlebags	*Tramea lacerata*	-	-	Red	S3	In BC, the range includes Vancouver Island and possibly the Lower Mainland and southern interior. This species can be found near ponds and lakes with abundant aquatic vegetation.	**Not Expected -** Project Area does not contain suitable habitat (i.e., ponds, lakes).
Audouin's Night-stalking Tiger Beetle	*Omus audouini*	1-T	T	Red	S1	The range of the night stalking tiger beetle is confined to a narrow strip of lowland coastal area in southwestern BC around Boundary Bay and the Greater Victoria area of the Georgia Basin. Habitat occurs in coastal areas that are less than 20 m above sea level and are within 3 km of a body of salt water. Adults of this species crawl on the ground and are attracted to sunny areas such as open grasslands, habitats with sparse vegetation, coastal bluffs, meadows, open forests (Garry Oak), and old abandoned agricultural fields. Larvae are located in clay banks above the ocean high tide line or in stream banks. This species is tolerant of areas that are periodically flooded by both freshwater and seawater. The Audouin's night-stalking tiger beetle may be a pest of Douglas-fir cones.	**Confirmed -** One record of occurrence exists within the Project Area. Project area overlaps identified critical habitat for this species. May occur in habitat adjacent to Lochside Trail.
Silver-spotted Skipper, *californicus* subspecies	*Epargyreus clarus californicus*	-	-	Red	S1	The subspecies *californicus* occurs on Vancouver Island and the Lower Mainland. Suitable habitat occurs in disturbed areas and habitats with black locust trees. The larval foodplant for this subspecies is *Lotus crassifolius*.	**Potential -** May occur in areas where black locust trees are present.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Propertius Duskywing	*Erynnis propertius*	-	-	Red	S2	The range extends from southern Vancouver Island to Baja California. In BC, their range is limited to the Garry oak ecosystems of southeastern Vancouver Island and adjacent Gulf Islands (as far north as Hornby Island) and an isolated Garry oak site on Sumas Mountain. This species is typically found in Garry oak sites, but stray individuals have been recorded at non-Garry oak sites in the Lower Mainland, north to Mount Currie. The propertius duskywing is dependent on substrate under trees for overwintering purposes. The larval food plant and nectar plant is Garry oak.	**Unlikely -** Limited Garry oak sites within the Project Area.
Dun Skipper	*Euphyes vestris*	1-T	T	Blue	S2S3	The range of the western subspecies extends from southwestern BC to California. In BC, it occurs on Vancouver Island, the Lower Mainland and Fraser River canyon to Lillooet. Associated with open, moist habitat including roadside ditches, leave strips, and rights-of-way. Also found in fairly dry areas where spring floods or permanent springs provide moist conditions. Larval food plants include the sedges Cyperus esculentus and *Carex heliophile* and potentially other species in the genus Cyperus. Adults eat nectar from white, pink, or purple flowers including common milkweed and purple vetch.	**Potential -** May occur in habitat adjacent to the Lochside Trail.
Western Branded Skipper, *oregonia* subspecies	*Hesperia colorado oregonia*	1-E	E	Red	S2	The range in Canada is restricted to the coastal lowlands of Vancouver Island from Victoria to the Cowichan Valley. Locations on Vancouver Island include Rithets Bog, Island View Beach, Mt. Douglas, Observatory Hill, Goldstream and Camas Hill. The western branded skipper *oregonia* subspecies is a Garry oak ecosystem species that inhabits coastal sand habitats with sparse vegetation and scrub oak ecosystems. The larvae of this subspecies are known to feed upon grasses including ryegrass and brome grass.	**Not Expected -** Project Area does not contain suitable habitat (i.e., coastal sand habitats).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Clodius Parnassian, *claudianus* subspecies	*Parnassius clodius claudianus*	-	-	Blue	S3S4	In BC, this subspecies occurs on Vancouver Island. The *claudianus* subspecies inhabits moist riparian habitats near streams at low elevations and wet subalpine meadows and subalpine riparian habitat at higher elevations. Larval food plant in BC is bleeding heart, in the family Fumariaceae. Steer's head is the larval food plant for this species in California, and possibly in Oregon, and Washington.	**Not Expected -** Project Area does not contain suitable habitat (e.g., streams, subalpine meadows etc.).
Rocky Mountain Parnassian, *olympiannus* subspecies	*Parnassius smintheus olympiannus*	-	-	Blue	S3	The subspecies *olympiannus* occurs on Vancouver Island and the Olympic Peninsula in Washington. Suitable habitat occurs where the larval food plant occurs in dry, open areas with sparse vegetation and in the alpine tundra. Larval food plants for the Rocky Mountain Parnassian are stonecrop species including *Sedum divergens* and *S. oreganums* on the coast.	**Not Expected -** Project Area does not contain suitable habitat (e.g., alpine tundra).
Large Marble, *insulanus* subspecies	*Euchloe ausonides insulanus*	1-XT	XT	Red	SX	There are no published accounts of the habitat of the Island Marble. From locality labels on the 14 specimens that are known to exist in museum collections, it appears that the butterfly inhabited open grassland in Garry Oak woodland. The island marble is thought to be extirpated in Canada.	**Not Expected -** Species is considered extirpated from Canada.
Western Pine Elfin, *sheltonensis* subspecies	*Callophrys eryphon sheltonensis*	-	-	Red	S2	The subspecies *sheltonensis* occurs on Vancouver Island and in the Lower Fraser Valley regions of BC. This subspecies is associated with pine dominated forests. Adult nectar plants include *Salix prolixa*. The larval food plant is generally lodgepole pine but may also include Ponderosa pine and western white pine.	**Not Expected -** Project Area does not contain suitable habitat (e.g., pine-dominated forests).
Johnson's Hairstreak	*Callophrys johnsoni*	-	SC	Red	S2?	In BC, this species occurs on southeastern Vancouver Island and the Lower Mainland, west of Hope at four locations. The four extant locations in BC are: Stanley Park, Lynn Canyon Park, Pacific Spirit Park and UBC Haney Research Forest. Johnson's hairstreak occurs in the canopy of mature forests where the food plant, hemlock dwarf mistletoe, is available. Hemlock dwarf mistletoe is known to parasitize western hemlock trees.	**Not Expected -** Project Area does not contain suitable habitat (e.g., mature forests).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Moss' Elfin, *mossii* subspecies	*Callophrys mossii mossii*	-	-	Red	S2	The *mossii* subspecies is found on Vancouver Island. Suitable habitat includes scree slopes, dry and rocky bluffs, canyons, and ravines. The sub species food plant is a type of stonecrop (*Sedum spathulifolium*) which grows on dry bluffs and rocky outcrops.	**Not Expected -** Project Area does not contain suitable habitat (e.g., scree slopes, rocky bluffs etc.).
Boisduval's Blue, *blackmorei* subspecies	*Icaricia icarioides blackmorei*	-	-	Blue	S3	The range extends from southern British Columbia, east to southern Saskatchewan and south to Baja California and northern Mexico. In BC, the subspecies *blackmorei* is found on the west coast of Vancouver Island. This species is associated with *Lupinus spp.* plants. Suitable habitat occurs at low-elevations on Vancouver Island and in forest openings or clear-cuts in the subalpine in areas which support lupine. It also inhabits sagebrush and prairie habitat. The larvae food plant is *Lupinus latifolius*.	**Not Expected -** Larval food plant not observed within the Project Area.
Greenish Blue, *insulanus* subspecies	*Icaricia saepiolus insulanus*	1-E	E	Red	SH	The subspecies *insulanus* is endemic and occurs on Vancouver Island. Nothing is known about the species habitat requirements on Vancouver Island. Elsewhere, the adults and larvae are normally found near or on the host plant, clover (Trifolium spp.), along open streams and moist disturbed sites, such as old roads, fields, or campgrounds.	**Potential -** May occur in habitat adjacent to the Lochside Trail where clover is present.
Common Wood-nymph, *incana* subspecies	*Cercyonis pegala incana*	-	-	Red	S2?	The *incana* subspecies occurs on Vancouver Island south to the Willamette Valley in Oregon. Suitable habitat includes forest openings dominated by grasses, clear-cuts, roadsides, meadows, and stream banks. In BC, the larval food plant is likely grasses, but may also include sedges.	**Not Expected -** Project Area does not contain suitable habitat (e.g., forest openings, meadows, stream banks etc.).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Common Ringlet, *insulana* subspecies	*Coenonympha california insulana*	-	-	Red	S1	The *insulana* subspecies is found at most elevations in southern BC and at low elevations in the Peace River District. Populations were originally only found in the Greater Victoria area, predominantly on the Saanich Peninsula, but these butterflies moved northwards as roads and development spread, providing new habitat for caterpillars. Larvae require green native grasses as food and may also feed on sedges. Suitable habitats include meadows and grasslands, which have sufficient moisture for the vegetation to stay green throughout the dry summer (providing habitat for the second-brood larvae).	**Not Expected -** Project Area does not contain suitable habitat (e.g., moist meadows, grasslands).
Monarch	*Danaus plexippus*	1-E	E	Red	S1?B	The monarch occurs mainly in the southern interior regions, Peace River, and Northern Rockies area. Occurrences do also occur along the coast, in the lower Fraser Valley and Vancouver Island. This species migrates to overwinter in coastal California or Mexico. This species occurs in open habitat, including agricultural fields, leave strips and roadside ditches, where milkweed and wildflowers including goldenrod, asters and purple loosestrife are available. Breeds in patches of milkweed host plant.	**Not Expected -** Host plant (milkweed) not observed in the Project Area.
Edith's Checkerspot, *taylori* subspecies	*Euphydryas editha taylori*	1-E	E	Red	S1	The range extends from southern BC to Baja California, Utah, and western Colorado. In BC, it occurs in dry meadows at low elevation on Vancouver Island (possibly reduced to Denman Island) and at high elevation above the timberline in the Kootenays. This species inhabits Garry oak and associated ecosystems but may also be found in old clear-cuts. Suitable habitat includes open grassland with sparse vegetation. Spring gold is an important nectar source for adults while the genus *Plantigo* is larval food plants (including the native species *P. maritima* and the introduced *P. lanceolata*).	**Not Expected -** Project Area does not contain suitable habitat (e.g., meadows, Garry oak ecosystems).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Zerene Fritillary, *bremnerii* subspecies	*Speyeria zerene bremnerii*	-	-	Red	S2	The *bremnerii* subspecies occurs on Vancouver Island and the Gulf Islands. Suitable habitat is found in moist to dry meadows, including sagebrush and ponderosa pine (Pinus ponderosa) habitat, with springs. In addition, the subspecies may occur in Douglas-fir forest in parts of its range. Larval food plants are species of the genus Viola.	**Not Expected -** Project Area does not contain suitable habitat (e.g., moist to dry meadows).
Edwards' Beach Moth	*Anarta edwardsii*	1-E	E	Red	S1	The range extends from southwestern BC to California. In BC, this species inhabits coastal sandy areas with sparse vegetation including beaches, sand dunes and sandy areas adjacent to salt marshes. It is known from habitats in Pacific Rim National Park on Vancouver Island and adjacent Gulf Islands, James, and Sydney Islands. The species larval food plant in Canada is unknown but may be in the family Chenopodeaceae or Abronia.	**Not Expected -** Project Area does not contain suitable habitat (i.e., coastal sandy habitat).
Sand-verbena Moth	*Copablepharon fuscum*	1-E	E	Red	S1	The range extends from southwestern BC south to Puget Sound in Washington. In BC, there have been two known occurrences, from the Comox region in the Strait of Georgia and one from the Georgia Strait near Sidney. Suitable habitat occurs in sandy, dry areas and sand dunes along the coast. The sand-verbena moth depends very heavily on its host plant, the yellow sand verbena.	**Not Expected -** Project Area does not contain suitable habitat (i.e., coastal sandy habitat).
Western Bumble Bee	*Bombus occidentalis*	1-T	T	Yellow	S4	This species range includes much of western North America. In BC, the range includes the west coast, northern, and southern BC. Habitats for this species include open coniferous, deciduous, and mixed-wood forests, wet and dry meadows, montane meadows and prairie grasslands, meadows bordering riparian zones, and along roadsides in taiga adjacent to wooded areas, urban parks, gardens and agricultural areas, subalpine habitats, and more isolated natural areas	**Confirmed -** One record of occurrence exists within the Project Area. May occur in habitat adjacent to Lochside Trail.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Olympia Oyster	*Ostrea lurida*	1-SC	SC	Blue	S3	The range extends throughout the west coast of North America. In BC, it is found in the Georgia Strait, the west coast of Vancouver Island and in the Queen Charlotte Strait. Suitable habitat occurs in saltwater lagoons and estuaries within the intertidal and sub tidal zones. It also inhabits tidal flats, bays, sounds, pilings, and tidal channels. This species requires hard substrate for establishment.	**Not Expected -** Project Area does not contain marine habitat.
Swamp Fingernailclam	*Musculium partumeium*	-	-	Blue	S2S4	The range of the swamp fingernail clam is uncertain, the last observation occurred in 1969 at Kootenay Lake. The population might be restricted to Kootenay Lake area of southeast BC. Typically, habitat for the species is lakes, ponds, swamps, and slow-moving streams where the dominate substrate is mud.	**Not Expected -** Project Area does not contain suitable habitat (e.g., ponds, swamps, streams etc.).
Long Fingernailclam	*Musculium transversum*	-	-	Blue	S3S5	This species is most common in large lakes and rivers; the largest densities are in waters less than 2 m deep. It does not have a strong substrate preference, having been recorded from rivers with strong currents and stony or rocky bottoms and from slow and quiet waters in sand and mud, including those with organic matter. There are two records at the Canadian Museum of Nature (Stuart Lake in northern BC (1972) and Quamichan Lake, Vancouver Island (1920)).	**Not Expected -** Project Area does not contain suitable habitat (i.e., rivers).
Northern Abalone	*Haliotis kamtschatkana*	1-E	E	Red	S2	The range extends from Alaska to California. In BC, it occurs along open coastal habitats. This is a marine species occurring in coastal waters, typically found in the sub tidal zone on rock or other hard surfaces. Suitable habitat also exists in the intertidal zone. It is often associated with kelp, sea urchins, sea stars and coralline algae.	**Not Expected -** Project Area does not contain marine habitat.
Prairie Fossaria	*Galba bulimoides*	-	-	Blue	S3?	Freshwater perennial or vernal habitats such as lakes, ponds, slow moving streams, and ditches, generally with seasonally flowing water.	**Not Expected -** Project Area does not contain suitable habitat (e.g., ponds, lakes, streams etc.).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Vancouver Fossaria	*Galba vancouverensis*	-	-	Red	SH	The range for this species is unknown; only one observation occurred at Nanaimo in 1939. This species may be extirpated from BC. If apparent in BC, this species would be found in permanent lakes and ponds.	**Not Expected -** Project Area does not contain suitable habitat (e.g., ponds, lakes etc.).
Rocky Mountain Physa	*Physella propinqua*	-	-	Blue	S3S4	Occurs in central and southern BC. May also occur in northern BC and on Vancouver Island. Little habitat information is available from the sources referenced in this document. This species has been found in lakes and rivers.	**Not Expected -** Project Area does not contain suitable habitat (e.g., rivers, lakes etc.).
Sunset Physa	*Physella virginea*	-	-	Blue	S3S5	Limited habitat information available. Historical records indicate this species is associated with lakes, rivers, creeks, and sloughs. Very few records in BC.	**Not Expected -** Project Area does not contain suitable habitat (e.g., rivers, lakes etc.).
Meadow Rams-horn	*Planorbula campestris*	-	-	Blue	S3S4	Eight records from this species are known in BC, from the south and east parts of the province (Wigwam River, Chilliwack Lake, and Okanagan Lake) and northern BC. Isolated record exists from Vancouver Island. Occur in seasonally wetted pools and portions of permanent waterbodies, which have mud substrate and dense vegetation.	**Not Expected -** Project Area does not contain suitable habitat (i.e., permanent waterbodies).
Umbilicate Sprite	*Promenetus umbilicatellus*	-	-	Blue	S2S3	The range extends from Alaska south to Oregon, Ohio, Colorado, and New Mexico and east to Manitoba and New York. Suitable habitat occurs in vernal ponds, marshes and springtime flooded margins of intermittent streams; also found in lakes and small rivers.	**Not Expected -** Project Area does not contain suitable habitat (e.g., rivers, lakes etc.).
Western Thorn	*Carychium occidentale*	-	-	Blue	S3	In BC, the range extends from Vancouver Island and the Gulf Islands to the Lower Mainland, west of the Coast and Cascade Mountains. Suitable habitat occurs in the moist leaf litter at low elevation (less than 80 meters above sea level) deciduous and mixed wood forests. It is associated with bigleaf maple. In addition, the species often inhabits riparian areas or moist areas near seeps.	**Potential -** May occur in habitat adjacent to the Lochside Trail.
Threaded Vertigo	*Nearctula* sp. 1	1-SC	SC	Blue	S3	The range extends along western North America from BC to California. In BC, it occurs along the Sunshine Coast, Vancouver Island, and the southern Gulf Islands. Suitable habitat occurs on the trunks of bigleaf maple and in moist leaf litter on the forest-floor.	**Potential -** May occur in habitat adjacent to the Lochside Trail where bigleaf maple is present.

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Dromedary Jumping-slug	*Hemphillia dromedarius*	1-T	T	Red	S2	The range extends from Vancouver Island south to the Cascade Range and Olympic Peninsula. In BC, this species has been observed in only seven locations on Vancouver Island. All known sites are in old growth forests, or areas that contain old-growth characteristics, located in moist habitat on western Vancouver Island or at elevations above 700 meters on Vancouver Island's southern interior. Suitable habitat contains abundant coarse woody debris.	**Not Expected -** Project Area does not contain suitable habitat (i.e., old-growth forest).
Warty Jumping-slug	*Hemphillia glandulosa*	1-SC	SC	Red	S2?	The warty jumping slugs range extends from Vancouver Island, south of Nanaimo, south to Washington and west-central Oregon. Suitable habitat includes moist forest, from old growth to young forest, at low to mid elevations. Shelter is a habitat requirement and may occur as decaying logs and other woody debris, leaf litter and at the base of sword ferns.	**Unlikely -** Project Area contains limited forest habitat.
Blue-grey Taildropper	*Prophysaon coeruleum*	1-T	T	Blue	S2S3	In BC, all records are from second-growth, mixed-wood stands in the coastal Douglas-fir biogeoclimatic zone on Vancouver Island. Suitable habitat occurs in coniferous and mixed-wood forests from mid-seral to mature age classes. All sites are moist and productive, as indicated by varied and abundant understory vegetation, which often includes sword fern. Abundant cover (coarse woody debris, talus, and/or leaf litter) is present at these sites.	**Unlikely -** Project Area contains limited forest habitat.
Broadwhorl Tightcoil	*Pristiloma johnsoni*	-	-	Blue	S3	The broadwhorl tightcoil occurs in southwestern BC in the lower mainland and on Vancouver Island. The broadwhorl's habitat is old growth deciduous, coniferous, and mixed wood forest at elevations over 1300 m in the subalpine zone. Typically, individuals occur in the leaf litter and woody debris on the forest floor.	**Not Expected -** Project Area does not contain suitable habitat (i.e., old-growth forest).

Common Name	Scientific Name	SARA[2]	COSEWIC[3]	BC List[4]	Provincial Status[5]	Habitat and Range[6]	Potential
Oregon Forestsnail	*Allogona townsendiana*	1-E	E	Red	S2	In BC, the Oregon forestsnail's range is restricted to the southwest corner of the province and is typically found at low elevations. They are found SW BC in Tsawwassen, the Lower Mainland, and through the Lower Fraser Valley. Most records occur in the Mission, Abbotsford, and Chilliwack area. Suitable habitat includes mature mixed-wood and deciduous forest dominated by bigleaf maple in the canopy and stinging nettle (Urtica dioica) in the understory. This species is associated with moist habitat, such as seepage areas, with large amounts of leaf litter and woody debris for cover.	**Unlikely -** Species is associated with stinging nettle, which was not recorded within the Project Area.
Puget Oregonian	*Cryptomastix devia*	1-XT	XT	Red	SX	It is considered extirpated from its historical range in BC and Canada. This species has not been recorded since 1905; however, the historical range included Vancouver Island and the SW mainland of BC. Habitat information is available from populations in the United States. Suitable habitat includes moist old-growth and late successional stage forests and riparian areas. A closed canopy, coarse woody debris and dense leaf litter are essential habitat components.	**Not Expected -** Species is considered extirpated from Canada.
an earthworm	*Arctiostrotus perrieri*	-	-	Exotic	SNA	In Oregon, this species has been found in cool canyons, in cold-water springs, and on an exposed ocean headland, in the spray zone. A typical resident of mixed forests in Oregon. Associated with Garry Oak Ecosystems in BC. Collected from Cedar-Hemlock and Hemlock-Amabilis communities on northern Vancouver Island.	**Not Expected -** Project Area does not contain suitable habitat (e.g., Garry Oak ecosystems, cool canyons etc.).
Georgia Basin Bog Spider	*Gnaphosa snohomish*	1-SC	SC	Red	S2	The Georgia Basin bog spider primarily inhabits bogs dominated by Sphagnum sp. and Ericaceae species. Known locations in Canada are from a cattail marsh on Vancouver Island and Burns Bog.	**Not Expected -** Project Area does not contain suitable habitat (i.e., bogs).
Quatsino Cave Amphipod	*Stygobromus quatsinensis*	-	-	Blue	S2S3	This species inhabits caves throughout Vancouver Island. The amphipod inhabits limestone caves, springs or drip pools that have substrates of mud, pebble, cobble, or bare rock. Generally, the water has high organic matter, low temperatures, and a neutral pH (~ 7.5 - 8.0).	**Not Expected -** Project Area does not contain suitable habitat (i.e., caves).

Table 2: Provincially and Federally Designated Vegetation[7] Potentially Occurring within or adjacent to the Project Area.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
giant chain fern	*Woodwardia fimbriata*	-	-	Blue	S3	The range extends from southwestern BC south to California, with disjunct populations in Arizona and Nevada. In BC it occurs on Vancouver Island, Lasqueti Island and Texada Island. This species occurs in the lowland zone in moist habitat. It inhabits coniferous and mixed forests and seepage near streams or in coastal areas.
yellow sand-verbena	*Abronia latifolia*	-	-	Blue	S3	The range extends from BC, south to California. In BC it is known from Haida Gwaii, Vancouver Island and the Gulf Islands. Suitable habitat occurs in moist areas along the coast. It is found along beaches characterized by sandy soils in the lowland zone. It also inhabits sand dunes and coastal scrub.
deltoid balsamroot	*Balsamorhiza deltoidea*	1-E	E	Red	S2	The range extends from southwestern BC, south to California. In BC, it is found on the southeastern side of Vancouver River between Victoria and Campbell River. Suitable habitat occurs in dry, well-drained Garry oak and/or Douglas-fir meadow sites in coastal areas. It occurs in deep soils but also rocky areas. Sites often occur in areas with a sparse shrub cover and a dense ground cover layer of invasive grasses.

[7] **Search Criteria:** BC CDC Species and Ecosystem Explorer search completed on 1 September 2022. Search Type: Plant (Restricted to Red, Blue, and Legally designated species) AND User Defined Polygon. Phylogenetic Ascending

[8] **SARA:** Federal *Species at Risk Act* Schedule number (1-3) for this species. See the SARA website for more information (Government of Canada 2021). E = Endangered, T = Threatened, SC = Special Concern, DD = Data Deficient, NA = Not Assessed.

[9] **COSEWIC**: Committee on the Status of Endangered Wildlife in Canada. Ranks have the following meanings: E = ENDANGERED: A species facing imminent extirpation or extinction, T = THREATENED: A species that is likely to become endangered if limiting factors are not reversed, SC = SPECIAL CONCERN: A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events, 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).

[10] **BC CDC List**: The provincial list to which the species or ecological community is assigned (BC CDC 2021). 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), Yellow (Any indigenous species, subspecies or community considered to be secure in British Columbia – encompasses all those not listed as red or blue), Accidental, Unknown and No Status.

[11] **Provincial Conservation Status** = Provincial Ranks apply to a species' or ecological community's conservation status in British Columbia. The number in parenthesis is the year the rank was last reviewed. The ranks have the following meaning: X = presumed extirpated, H = possibly extirpated, 1 = critically imperilled, 2 = imperilled, 3 = special concern, vulnerable to extirpation or extinction, 4 = apparently secure, 5 = demonstrably widespread, abundant, and secure, NA = not applicable, NR = unranked, U = unrankable. N= non-breeding; B= breeding, ? = inexact or uncertain (BC CDC 2022).

[12] Habitat information obtained from BC CDC Species Summary reports.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
Vancouver Island beggarticks	*Bidens amplissima*	1-SC	SC	Blue	S3	This species is found in the Pacific northwest in BC and Washington. In BC, it is known to occur in the Lower Fraser Valley, from Delta east to Chilliwack, and the southern region of Vancouver Island. Suitable habitat for this wetland species occurs in wet to moist areas including ditches, wet fields, streambanks, and salt marshes. It primarily inhabits riparian habitat around lakes, ponds, and streams, where annual and seasonal water levels fluctuate. It also occurs in tidal zones where it is associated with waterfowl habitat and silty alluvial soils.
beach bindweed	*Calystegia soldanella*	-	-	Blue	S3	The range extends from BC south to California and in islands of the Pacific Ocean and in Europe. This species occurs in lowland zones and in coastal habitats. Suitable habitat occurs in moist to moderately moist sand dunes.
contorted-pod evening-primrose	*Camissonia contorta*	1-E	E	Red	S1S2	The range extends from southern Vancouver Island and the adjacent Gulf Islands, south to California, Nevada, and Idaho. Populations in BC are known from the Saanich Peninsula, Savary Island in the Georgia Strait, and islands near Victoria. Suitable habitat occurs on open, sandy areas in the lowland zone. It may also occur in open grasslands and woodlands with sparse vegetation. It is restricted to semi-stable sandy flats and dunes no more than 15 m above sea level.
golden paintbrush	*Castilleja levisecta*	1-E	E	Red	S1	The range extends from BC south to northwestern Oregon. In BC, this species is found west of the Cascade mountains and on Vancouver Island in the lowland zones. Suitable habitat occurs in dry to moist, grassy meadows characterized by a maritime climate. This species is associated with Garry oak ecosystems. Known recently from only Alpha Islet.
Victoria's owl-clover	*Castilleja victoriae*	1-E	E	Red	S1	Victoria owl-clover is endemic to BC, where it occurs on Vancouver Island near Victoria and adjacent islands, and the San Juan Islands in Washington. This species is associated with Garry Oak ecosystems and maritime climates. Suitable habitat occurs in areas with spring seepages and along the edges of shallow vernal pools, which are saturated for most of the year. This species occurs in coastal habitats, never more than 50 meters from the ocean. The combination of salt-spray, wind, and thin soils that experience extreme drought in summer and are saturated with water in the winter, restrict competition from native species.
wine-cup clarkia	*Clarkia purpurea* ssp. *quadrivulnera*	-	-	Red	S2	Clarkia purpurea has been found on open grassy slopes with shallow soils and thin vegetation cover. Its habitat often has early spring seepage and is influenced by the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Aspect ranges from 75 to 2350, although most sites are south- or west-facing. Slope ranges from 5 to 70%.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
Washington springbeauty	*Claytonia washingtoniana*	-	-	Blue	S3	The range extends from BC south to California. In BC, it occurs in the southwest of the province from the lowland to the montane zone. Suitable habitat occurs on moist rock outcrops, coastal bluffs, and forests. This species may be found in disturbed habitat where it is associated with red alder stands and moist cliffs.
Erect Pigmyweed	*Crassula connata*	-	-	Blue	S2S3	The range extends from southern Vancouver Island and the Gulf Islands in BC, south to Arizona, California, Mexico, and Chile. Suitable habitat occurs in wet to moist vernal pools on coastal bluffs and mossy rocks. It inhabits open habitats characterized by gravel substrate. This species is found in the lowland zone.
dense spike-primrose	*Epilobium densiflorum*	1-E	E	Red	S2	The range extends from southern Vancouver Island, east to Albert and south to Montana, Nevada, California, and Mexico. Suitable habitat occurs in moist to dry meadows, roadsides, and waste areas in the lowland zone. In Canada, it occurs in vernally moist meadows and roadsides (which dry below the permanent wilting point for much of the summer) in the dry coastal lowland zone. Occurs within the Garry Oak Ecosystem in open meadows and ditches that are moist in spring and very dry in summer.
brook spike-primrose	*Epilobium torreyi*	1-E	E	Red	SH	The range extends from southeastern Vancouver Island in BC south to Idaho, Nevada, and California. Suitable habitat occurs in lowland zones in moist grasslands and exposed slopes which generally dry in the summer. In Canada, it was restricted to two localities in the Victoria area. The species was at the northern extent of its range in North America, and it no longer occurs at either site.
salt marsh Philadelphia daisy	*Erigeron philadelphicus* var. *glaber*	-	-	Blue	S2S3	The range extends from the Yukon and Northwest Territories, east to Newfoundland and south to Florida, Texas, and California. Suitable habitat occurs in moist open grasslands, shrub-dominated habitats and open forests. It also inhabits salt marshes and beaches. This species occurs throughout BC in the lowland to montane zones.
rough-leaved aster	*Eurybia radulina*	-	-	Red	S2	The range extends from BC south to California. In BC it is known to occur on Trial Island. Suitable habitat occurs in moist meadows, fields, forest openings and edges. It inhabits the lowland zone and can also be found on rocky outcrops, oak woodlands, foothills, and yellow pine forests.
Oregon ash	*Fraxinus latifolia*	-	-	Red	S1S2	The range extends from BC south to California, where it is found in the lowland zone. In BC it is found on Vancouver Island. Suitable habitat occurs in moist to wet areas including swamps and estuaries.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
common bluecup	*Githopsis specularioides*	-	-	Blue	S3	The range extends from southern Vancouver Island south to California where it occurs in the lowland zone. Suitable habitat occurs in moist seepage areas and temporary pools on rock outcrops.
American glehnia	*Glehnia littoralis* ssp. *leiocarpa*	-	-	Blue	S3	The range extends from coastal BC north to Alaska and south to California. In BC occurs on Vancouver Island and Haida Gwaii in the lowland zone. Suitable habitat occurs in moist to moderately moist coastal dunes and sandy beaches.
seaside bird's foot lotus	*Hosackia gracilis*	1-E	E	Red	S2	The habitat of *Lotus formosissimus* consists of mesic maritime meadows which are affected by the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Habitat ranges from nearly level to moderate southeast to southwest slopes, and the meso-slope position is either level or on the lower slope. Soils are generally more than 20 cm deep and are moderately well to well drained. Vegetation type is dry meadow, mesic meadow, or mesic open deciduous or coniferous woodland.
bog bird's-foot lotus	*Hosackia pinnata*	1-E	E	Red	S2?	The range extends from southeastern Vancouver Island south to Idaho and California. In BC it is known only from locations near Nanaimo and Ladysmith. Suitable habitat occurs in lowland zones in wet to moist meadows, streambanks, and clearings.
rayless goldfields	*Lasthenia glaberrima*	1-E	E	Red	SX	The rayless goldfields is found west of the Cascade Mountains from BC to California. In BC this species is known from East Sooke Park located in the southwest of Vancouver Island. Suitable habitat occurs at low elevation in vernal pools. Sites are generally wet to moist for part of the year but dry out in the summer. Vernal pools may occur on rocky outcrops, wet meadows, or thin soils on bedrock.
silky beach pea	*Lathyrus littoralis*	-	T	Red	S2	The range extends from Vancouver Island and Haida Gwaii in BC south to northern California. It is known from locations in the Saanich Peninsula on Vancouver Island, on adjacent Gulf Island and on Haida Gwaii. Suitable habitat occurs in coastal dunes and sandy beaches. This species is salt-tolerant.
Macoun's meadow-foam	*Limnanthes macounii*	1-T	T	Red	S2?	The range is restricted to BC and California where it occurs at elevations from sea level to 200 meters. In BC, it is known to occur on Vancouver Island from East Sooke Park to Victoria, and the Gulf Islands. Suitable habitat occurs in wet depressions, vernal pools, and seepage sites in the lowland zone. This species is associated with Garry oak ecosystems. It grows in open areas, close to the shore of the Pacific Ocean, in sites with acidic soils with a high nutrient content.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
fern-leaved desert-parsley	*Lomatium dissectum*	-	-	Red	S2	This species occurs in southern BC. All known records for this species occur on Vancouver Island and adjacent islands. Suitable habitat includes dry grasslands, shrubland, talus, and rocky slopes in the steppe and montane zone.
butterfly bearing lomatium	*Lomatium papilioniferum*	1-T	T	Red	S2	Associated with dry coniferous forests, Garry oak woodlands, and rock outcrops.
prairie lupine	*Lupinus lepidus*	1-E	E	Red	S1	The range extends west of the Cascade Mountains from BC, south to Oregon. In BC, it is known only from southeastern Vancouver Island between Oak Bay, Langford and north of Duncan in the lowland zone. Suitable habitat occurs on well-drained, dry sites characterized by rocky substrate and nutrient poor, shallow soil. It inhabits gravelly openings and rock outcrops. This species is associate with Garry oak ecosystems.
dense-flowered lupine	*Lupinus microcarpus* var. *microcarpus*	1-E	E	Red	S1	In BC, *Lupinus densiflorus* var. *densiflorus* is restricted to the Southern Gulf Islands and Nanaimo Lowlands Ecosections, where it occurs in the lowland Coastal Douglas-fir biogeoclimatic zone. It occurs in dry to moist grassy openings, on clay cliffs, and on eroding grassy banks and benches on coastal bluffs, usually with a south or west aspect. Part of the population at Macaulay Point grows in a level meadow with shallow soils dominated by introduced grasses and forbs, and another grows on moderate to steep, unstable slopes similar to those in Beacon Hill Park and on Trial Island. Some of the population on Trial Island grows in mowed lawn by the lighthouse. The habitat has little or no bryophyte cover and is normally free of dense and taller vascular plants.
Kincaid's lupine	*Lupinus oreganus* var. *kincaidii*	1-XX	XT	Unknown	SU	Occurs in upland prairie habitats as well as ecotones between grassland and forest habitats.
coast manroot	*Marah oregana*	-	E	Red	S1	The range extends from southeastern Vancouver Island and the Gulf Islands (Saanich Peninsula, North Pender Island and Saltspring Island) in BC, south to California, generally west of the Cascade Mountains. Suitable habitat occurs in moist fields, meadows, and slopes in the lowland zone. This species is associated with Garry Oak ecosystems and is usually found near water sources
white meconella	*Meconella oregana*	1-E	E	Red	S1S2	The range extends from southwestern BC south to California. In BC it is known from Victoria to Nanaimo on Vancouver Island and on the Gulf Islands. Suitable habitat occurs in moist areas of the lowland zone. It inhabits vernally moist rocky or grassy slopes, characterized by shallow soils over bedrock where local topographic features enable early-season seepage. It is also found in meadows and on sandy, moist banks, and bluffs. This species is associated with Garry oak and associated ecosystems.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
coast microseris	*Microseris bigelovii*	1-E	E	Red	S2	Moist, open, grassy coastal bluffs in the lowland zone (open sites without tall vegetation). In Canada, it is restricted to southeastern Vancouver Island and the Gulf Islands. This species inhabits exposed, sparsely vegetated pockets of sandy and loamy soil on coastal bluffs and steep slopes. Suitable habitat also occurs on hillsides, rocky substrate, and open areas.
Chamisso's montia	*Montia chamissoi*	-	-	Blue	S3	The range extends from Alaska, south to California and New Mexico and east to Manitoba. Disjunct populations occur in Idaho. Suitable habitat is found in bogs, marshes and stream banks of coastal valleys and mountains. This species is found wetlands of the lowland and montane zones.
Texas toadflax	*Nuttallanthus texanus*	-	-	Blue	S3	Suitable habitat occurs on coastal bluffs, grassy areas, cliffs, and rocky seepage areas. Garry oak associated species. One known occurrence on Vancouver Island.
rosy owl-clover	*Orthocarpus bracteosus*	1-E	E	Red	S1	The range extends west of the Cascade Mountains from BC south to California. The remaining known population in BC occurs on Trial Island. Suitable habitat occurs in the lowland zone in moist areas such as vernal pools and wet depressions. It occurs in wet sites that frequently dry in the summer and are characterized by soils rich in organic matter with a depth of 15 to 30 cm. This species is associated with Garry Oak ecosystems and inhabits meadows dominated by grasses and herbaceous perennials with little or no tree or shrub overstorey.
fragrant popcornflower	*Plagiobothrys figuratus* ssp. *figuratus*	1-E	E	Red	S1	The last reported Canadian occurrence of *Plagiobothrys figuratus i*s from Hornby Island. No individuals have been documented at this site since 2005 but there is an unconfirmed report of plants from 2011. Historically, Fragrant popcornflower was found along the southeastern coast of Vancouver Island from Comox to Victoria. Between 1885 and 1986, the species was recorded a total of 12 times from a minimum of seven independent locations: Comox, Nanaimo, Wellington, Hornby Island (two sites), Victoria, and Cedar Hill. However, the precise historical range cannot be determined from the limited information available from collection notes. Most historical localities have presumably been lost to urban development.
slender popcornflower	*Plagiobothrys tenellus*	1-T	T	Red	S1?	The range extends east of the Cascade Mountains from BC south to California and Nevada. In BC it is known only from southeastern Vancouver Island and the Gulf Islands. Suitable habitat is found in dry meadows and coastal bluffs. It inhabits dry grassy to mossy slopes, rock outcrops and coastal bluffs in, or near, Garry oak and associated ecosystems. Sites are generally steep, south facing, open and often with exposed gravelly soils or rocks and are found in the lowland zone.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
black knotweed	*Polygonum paronychia*	-	-	Blue	S3	The range of this species extends from BC south to California in lowland zones. In BC, it occurs on southern Vancouver Island and the Gulf Islands. This species inhabits coastal environments in moist to mesic sand dunes, scrub, and beaches.
tall woolly-heads	*Psilocarphus elatior*	1-E	E	Red	S2	The range extends from BC, east to Saskatchewan and south to Idaho and California. In BC this species occurs on southern Vancouver Island. Suitable habitat occurs in moist environments in the lowland zone. It inhabits vernal meadows, pools, and muddy path sides. It is also found in other open, moist, often disturbed sites in seasonally flooded, grass-dominated meadows. In the spring, these habitats can appear as nearly bare patches of muddy ground or shallow water in slight depressions.
leafless wintergreen	*Pyrola aphylla*	-	-	Blue	S3	In BC, records are known from Vancouver Island and the southern interior. The range extends from southern Vancouver Island, south to Oregon and east to Idaho.
water-plantain buttercup	*Ranunculus alismifolius* var. *alismifolius*	1-E	E	Red	S1	The range extends from British Columbia, south to California, and east to Montana, Wyoming, and Colorado. In BC, this species is restricted to the east side of Vancouver Island near Oak Bay and on Ballenas Island. Suitable habitat occurs in the lowland zone in moist to wet areas. It occurs along the shoreline of ponds, bogs, streams, and moist meadows. This species is associated with Garry Oak ecosystems and a maritime climate. It occurs in open, seasonally wet sites ranging from muddy ditches, pond margins, prairies, and streambanks. These coastal vernal pools are saturated for most of the year but dry out in the summers.
California buttercup	*Ranunculus californicus*	1-E	E	Red	S2	The range extends from southeastern Vancouver Island and nearby islands, south to Baja California. In BC, it is restricted to four confirmed populations. It inhabits moist to dry, grassy coastal bluffs and meadows. The plants are tolerant of salt spray. Known sites where this species occurs are open and somewhat moist in the spring; all are within 50 meters of the coast where the influence of the ocean moderates winter temperatures.
Lobb's water-buttercup	*Ranunculus lobbii*	-	-	Red	SH	The range extends from BC to Oregon and California. Suitable habitat occurs from sea level to 300 meters in shallow ponds and vernal pools.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
dwarf sandwort	*Sabulina pusilla*	1-E	E	Red	S1	In BC, the only known habitat of *Minuartia pusilla* at Rocky Point is a shallow depression in a sloping, vernal seepage area on a rocky maritime headland. Vernal seeps are shallow flows that occur where groundwater emerges on sloping terrain, usually on the lower slopes of hillsides, and they tend to dry up by late spring or early summer. The southeast sloping (0-24%) depression is wet in the spring and mesic to dry later in the season. The substrate consists of shallow (3-7 cm deep) organic mineral soil with no pronounced structure, overlying bedrock. Soils are a rapidly draining sandy moder with poor nutrient content and no soil moisture late in the season. The root-restricting layer is 1-20 cm, and the coarse fragment content is about 35-70%. The soil is saturated during the winter and remains damp through the spring, but dries completely by early summer, traits that help suppress encroachment of competing herbaceous or woody species. The vegetation of the coastal headlands where *M. pusilla* occurs is controlled by exposure to winds and salt spray.
bear's-foot sanicle	*Sanicula arctopoides*	1-T	T	Red	S2	The range extends from BC south to California where it is found in the lowland zone. In BC, it occurs on Vancouver Island near Victoria and on Trial Island. Suitable habitat occurs in dry areas that may experience seasonal moisture. It inhabits dry rocky outcrops and coastal grassy bluffs where Douglas-fir is the dominant canopy species.
purple sanicle	*Sanicula bipinnatifida*	1-T	T	Red	S2	The range extends from BC, south to Baja California. In BC, this species is found in the southeast of Vancouver Island and the Gulf Islands. Suitable habitat occurs in moist to dry areas in meadows, shrubby or grass knolls, and woodlands in the lowland zone. Grows in grass-forb meadow openings in Garry oak woodlands and associated ecosystems and along eroding, sandy banks on seashore cliffs.
white-top aster	*Sericocarpus rigidus*	1-SC	SC	Blue	S3	The range extends west of the Coast and Cascade Mountains from BC, south to Oregon. In BC it is found on Hornby Island and Vancouver Island from Nanaimo to Victoria and near Port Alberni. Suitable habitat occurs in coastal areas including meadows, rocky slopes, and woodlands in the lowland zone. White-top aster inhabits Garry oak and Douglas-fir woodlands where it generally occupies dry micro-sites in open or partially shaded sites. This species is associated an open shrub layer composed of common snowberry, oceanspray, and scotch broom.
Henderson's checker-mallow	*Sidalcea hendersonii*	-	-	Blue	S3	This species is restricted in range to southern Vancouver Island, the Gulf Islands, and the Lower Mainland in BC, south to Oregon. It occurs in the lowland zone and is associated with moist environments. Suitable habitat occurs in areas with wet meadows, estuaries, tidal marshes and flats.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
coastal Scouler's catchfly	*Silene scouleri* ssp. *scouleri*	1-E	E	Red	S1	*Silene scouleri* ssp. *grandis* is found in dry to mesic maritime meadows and mesic, open, deciduous woodlands in the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Habitat occurs on nearly level to gentle slopes with various aspects. Meso-slope position is usually level but may include upper and middle slopes. Sites are well to rapidly drained and are dry in summer and moist in winter. Habitat occurs on shallow soils to bedrock, or in locations with severe exposure to wind and/or salt spray. There may be no root restricting layer. Trees are generally not present. Shrubs, including *Rosa nutkana* or *Symphoricarpos albus*, are occasionally present. A mix of native and introduced plant species dominate the herbaceous layer.
small-flowered tonella	*Tonella tenella*	1-E	E	Blue	S3	The range extends from BC, south to California where it occurs in the lowland zone. In BC it is restricted to an occurrence on Saltspring Island in the southwest of the province. Suitable habitat occurs in dry rocky areas including on talus slopes and rocky outcrops. The small-flowered tonella is associated with Garry Oak ecosystem and bigleaf maple-arbutus forests.
poverty clover	*Trifolium depauperatum* var. *depauperatum*	-	-	Blue	S3	The range extends from BC south to California. In BC it is found on Vancouver Island and adjacent Gulf Islands in the lowland zone. Suitable habitat occurs in vernally wet to moist grassy sites.
Macrae's clover	*Trifolium dichotomum*	-	-	Red	S2	In BC, it occurs on southeastern Vancouver Island and adjacent islands. Suitable habitat occurs in moist to dry sites where it inhabits open, grassy areas such as coastal bluffs, talus slopes and banks. The sites are generally steep.
bearded owl-clover	*Triphysaria versicolor* ssp. *versicolor*	1-E	E	Red	S1	*Triphysaria versicolor* ssp. *versicolor* is found in wet meadows and vernal pool margins within 30 m of the shoreline in the sub-Mediterranean climate caused by the rain shadow of the Olympic and Vancouver Island mountains. Habitat occurs on nearly level sites with a range of aspects (most sites have a southern aspect, but a few have eastern or northeastern aspects). Meso-slope position is a depression. Sites are imperfectly to poorly drained and remain wet through the winter months but dry up by mid summer. Habitat occurs on shallow soils to bedrock. Trees are absent. Shrubs, including *Cytisus scoparius* or *Ulex europaeus*, are occasionally present at the edges of habitat. A mix of native and introduced plant species dominate the herbaceous layer
Lindley's microseris	*Uropappus lindleyi*	1-E	E	Red	S1S2	The species occurs in BC south to California, New Mexico, Texas, and Arizona. The disjunct BC populations is known only from the Gulf Islands and southern Vancouver Island. This species is associated with Garry Oak ecosystems and Mediterranean-like climates. It inhabits moist to dry areas such as grassy slopes, open deciduous forests, shrub steppe habitat and evergreen forests. It also occurs on sandstone cliffs, desert, rocky bluffs, road banks and gravelly substrate.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
ochroleucous bladderwort	*Utricularia ochroleuca*	-	-	Blue	S2S3	The range extends from BC, south to Oregon with known occurrences in Ontario. Suitable habitat is limited to oligotrophic and dystrophic (low nutrient) lakes in the montane zone.
Howell's violet	*Viola howellii*	-	-	Red	S1S2	The range extends from Vancouver Island and the Fraser Valley in BC south to Oregon where it is found in the lowland zone. Suitable habitat occurs in moist woodlands and forests.
yellow montane violet	*Viola praemorsa* var. *praemorsa*	1-E	E	Red	S1	*Viola praemorsa* ssp. *praemorsa* occupies a number of different habitats in Garry oak woodland communities and grass-dominated meadows, including maritime meadows. These low-elevation (< 30 m), herb-dominated ecosystems are largely confined to coastal situations (within 3 km of the shoreline) along south-eastern Vancouver Island and on nearby offshore islands. Most microhabitats occupied by *V. praemorsa* ssp. *praemorsa* have shallow soils over bedrock, are relatively level or south-facing, have little or no shrub cover but an abundant cover of herbaceous species.
Muhlenberg's centaury	*Zeltnera muehlenbergii*	1-E	E	Red	S1	*Centaurium muhlenbergii* is currently found in two distinct habitat types in B.C.: a vernal pool within a large meadow in a Garry oak woodland, and along the margins of a tidal saltgrass marsh. Both habitat types are characterized by a sub-Mediterranean-like climate with dry, warm summers and mild, wet winters, and in which most precipitation falls during the winter months. Both habitat types also experience seasonal flooding by rainwater or by the ocean. Vernal pools and depressions in B.C. typically form on relatively level sites underlain by bedrock or by an impervious hardpan soil layer, and they experience winter and spring inundations followed by complete drying in late spring (Miller 2003). Salt marshes are the upper vegetated portions of intertidal mudflats, often in sheltered locations, which undergo varying frequency of inundation. *C. muhlenbergii* occurs in a drier part of a saltmarsh, which likely only occasionally experiences tidal inundation. The species occurs in patches of open, bare, moist soil within the habitat types. The habitats of *C. muhlenbergii* occur within Garry oak ecosystems, which are located in the drier subzone of the Coastal Douglas-fir zone. The Garry oak ecosystem is very restricted in B.C. and has been reduced to less than 5% of its original extent. Associated species at the vernal pool site are *Camassia quamash*, *Holcus lanatus*, *Agrostis* spp., and *Dactylis glomerata.*
slimleaf onion	*Allium amplectens*	-	-	Blue	S3	The range of slimleaf onion extends from British Columbia, south to California where it occurs in the lowland zone. In BC it is found on the southeast of Vancouver Island, the Gulf Islands, and the mainland near Powell River. Suitable habitat occurs in clay soils, serpentine, dry fields, and hillsides.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
foothill sedge	*Carex tumulicola*	1-E	E	Yellow	S3S4	In Canada, *Carex tumulicola* is found only on the southeast corner of Vancouver Island and an adjacent offshore island. Within this area, it is found mainly on dry, open areas including dry grassy meadows, forest openings, and non-forested wetland margins. It is found most often within the Garry oak woodland ecosystem and in ecosystems associated with the Garry oak woodland ecosystem. Soils are variable but usually deep. The species is uncommon on shallow, rocky, overly dry soils. It sometimes occurs on sites that are both seasonally wet and seasonably dry. Occurrences tend to be concentrated on edges of shrub patches. The grass and forb dominated ecosystems where this plant is found have undergone substantial disturbance and modification over the past century. Documented occurrences of *C. tumulicola* have all been from disturbed weedy sites.
phantom orchid	*Cephalanthera austiniae*	1-T	E	Red	S2	The phantom orchid is endemic to the Pacific northwest of North America and is found from BC south to California and Idaho. In BC this species is known from the Saanich Peninsula on Vancouver Island, Saltspring Island, and the lower Fraser Valley. Suitable habitat occurs in moist forests in the lowland zone. It inhabits sites with a thick humus layer in mixed and coniferous forests mature and old-growth forests. It is found in shaded areas with sparse ground cover often on south or west facing slopes.
Ozette coralroot	*Corallorhiza maculata* var. *ozettensis*	-	-	Blue	S3	Associated with dry coniferous forests.
dwarf red fescue	*Festuca rubra* ssp. *mediana*	-	-	Yellow	S5?	Occurs in coastal southwestern BC. Occurs on beaches, tidal marshes, streambanks, meadows, gravelly sites, and other disturbed areas. Elevation ranges from the lowland to alpine zones.
Kellogg's rush	*Juncus kelloggii*	1-E	E	Red	S1S2	The range extends from BC south to California and Nevada in the lowland zone. The only known occurrence in BC on southeastern Vancouver Island. This is a Garry Oak associated species. Suitable habitat occurs in seasonally wet depressions, seepage areas and vernal pools characterized by sand and clay dominated soils. It is often found in wet depressions in fields and meadows.
white-lip rein orchid	*Platanthera ephemerantha*	-	-	Blue	S3	Associated with Garry oak woodlands.
Idaho blue-eyed-grass	*Sisyrinchium idahoense* var. *segetum*	-	-	Red	S1	Occurs in southwestern BC. Occurs in moist grassy meadows.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
Howell's triteleia	*Triteleia howellii*	1-E	E	Red	S1	The range extends from BC south to California. All known occurrences in BC are from southeastern Vancouver Island. This species is associated with Garry Oak woodlands. Suitable habitat occurs in moist to dry grassy coastal bluffs and meadows. It occurs in the lowland zone in areas characterized by a maritime climate. It also inhabits disturbed sites such as roadsides.
Non-vascular Plants						
rigid apple moss	*Bartramia aprica*	1-E	E	Red	S2	The range extends from BC, south to California. In BC it is known from eastern Vancouver Island and adjacent Gulf Islands. Suitable habitat occurs in Mediterranean-like climates at low elevation. Requires open, steep, south to southeast facing slopes that are dry in summer and saturated in the winter. Sites include grass-dominated slopes with rock outcrops within open stands of Garry oak, Douglas-fir, and Arbutus. Inhabits two distinct microsites: on rock outcrops and on disturbed soils. It inhabits thin soils on rock crevices and outcrops. Where it occurs on soil, the sites are open and exposed with shallow soils that are well-humidified.
banded cord-moss	*Entosthodon fascicularis*	1-SC	SC	Blue	S2S3	The range in North America extends from BC, south to Oregon and Idaho. It occurs in coastal areas of BC primarily in the southwest of the province, but it is also known from the Kootenay region. Almost all Canadian populations occur in Garry oak ecosystems where it grows on bare soil or leaf litter. It inhabits open, semi-shaded areas with rock outcrops. Most sites occur in moist, seepage areas or vernal pools in seasonally wet areas. Banded cord-moss usually grows amongst other moss species and small vascular plants. Sites are usually fairly open.
twisted oak moss	*Syntrichia laevipila*	1-SC	SC	Blue	S3	The range in North America extends from BC south to California. In BC this species occurs on Vancouver Island in suitable Garry oak and associated ecosystems. This species grows on tree bark, particularly on the bark of Garry Oaks. It can also be found at the base and on the upper branches of trees. The majority of the population occurs on trees in open habitats characterized by dry, mild to hot summers and humid, cool to cold winters. Twisted oak moss rarely grows in combination with other mosses or lichens.
Lichens						
strip-tease pixie	*Cladonia decorticata*	-	-	Blue	S3	Occurs on humus and soil in open areas and coniferous forests.
Pacific tarpaper	*Collema furfuraceum* var. *luzonense*	-	-	Blue	S2S3	Occurs on trees and mossy rocks in sheltered habitats at lower elevations.

Common Name	Scientific Name	SARA[8]	COSEWIC[9]	BC List[10]	Provincial Status[11]	Habitat and Range[12]
quilted stippleback	*Dermatocarpon intestiniforme*	-	-	Blue	S2S3	No habitat information available.
vole felt	*Erioderma sorediatum*	-	-	Blue	S2S3	Associated with shore pine, Sitka spruce, and ericaceous shrubs, particularly on sand dunes. Occurs on twigs and branches, but also grows on rocks.
coral crackers	*Fuscopannaria coralloidea*	-	-	Blue	S3	No habitat information available.
seaside bone	*Hypogymnia heterophylla*	1-T	NAR	Red	S2	The range extends from BC, south to California. In BC this species is known from the East Sooke Regional Park, Bentinck Island and Sheringham Point on southwestern Vancouver Island. Suitable habitat occurs on the branches and terminal twigs of conifers, particularly lodgepole pine (Pinus contorta) which grow in exposed seaside habitats such as low elevation coastal ledges. Marine aerosols from salt spray may be a habitat requirement. Appears to be restricted to early to intermediate seral lodgepole pine stands. Documented in areas with high solar radiation and humidity, moderate precipitation and strong west and southwesterly winds.
felted elf	*Leioderma sorediatum*	-	-	Blue	S2S3	The range extends from Western North America to eastern Eurasia. In BC it is known only from Vancouver Island. Suitable habitat occurs on the branches and bark of coniferous trees in open forests. Often found in association with mosses in moist habitats.
midlife vinyl	*Scytinium californicum*	-	-	Blue	S2S3	Occurs on rocks in open, dry maritime and intermontane locations in the Coastal Douglas-fir biogeoclimatc zone.
batwing vinyl	*Scytinium platynum*	1-E	E	Yellow	S3S4	No habitat information available.
peacock vinyl	*Scytinium polycarpum*	1-SC	SC	Yellow	S4	No habitat information available.
considerable gingerbread	*Pannaria rubiginosa*	-	-	Red	S2	No habitat information available.
bottlebrush frost	*Physconia detersa*	-	-	Red	S2?	Bottlebrush frost ranges from Colorado to Alaska, is likely circumpolar. Its rare over coniferous and probably deciduous trees in open sites at lower elevations in boreal sites

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APPENDIX B

Site Photographs

Photograph 1: Example of habitat adjacent to Lochside Trail and Ravine Way. 10 August 2022.

Photograph 2: Potential amphibian breeding habitat at headwall of ditch adjacent to Highway 1. 10 August 2022.

Photograph 3: Pedestrian culvert running underneath Blanshard Street to be filled in that may provide suitable snake denning and/or bat roosting habitat. 10 August 2022.

Photograph 4: American crow (Corvus brachyrhynchos) stick nest observed during field reconnaissance. 10 August 2022.

APPENDIX C

Audouin's Night-Stalking Tiger Beetle and Bat Emergency Survey Technical Memo

16 July 2024 Reference No. CA0031261.8999-009-L-Rev1

Susan O'Bryan, Environmental Coordinator
Ministry of Transportation and Infrastructure
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AUDOUIN'S NIGHT-STALKING TIGER BEETLE HABITAT ASSESSMENT AND BAT EMERGENCE SURVEY FOR HIGHWAY 17 SAANICH UPTOWN MOBILITY HUB

1.0 BACKGROUND

The BC Ministry of Transportation and Infrastructure (MOTI) is proposing to upgrade active transportation infrastructure along Ravine Way in the District of Saanich, BC. This work involves the expansion of the existing road on Ravine Way into the boulevard northwest of the street and the infilling of a pedestrian culvert under Blanshard Street (the Project). The portion of the Project relevant to this technical memorandum runs along the western portion of Ravine Way, from Carey Road north to Vernon Avenue (the Survey Area).

During an Overview Environmental Assessment (OEA) completed by WSP Canada Inc. (WSP 2024), the boulevard was identified to overlap with federally designated critical habitat for the Audouin's night-stalking tiger beetle (*Omus audouini*), which is provincially red-listed and federally designated as Endangered under Schedule 1 of the *Species at Risk Act* (BC CDC 2024). Critical habitat contains certain biophysical attributes that are important for singular or multiple life phases (e.g., larval) and/or behaviours (e.g., foraging). A habitat assessment of those areas of the Project that overlap with both designated critical habitat and where ground disturbance will occur was proposed, along with a simplified visual search for individuals. Additionally, the culvert to be infilled was identified as potential roosting habitat for bats (WSP 2024). An emergence survey was proposed to assess current use of the culvert by bats prior to infilling.

This technical memorandum addresses the findings of the Audouin's night-stalking tiger beetle habitat assessment and visual search and bat emergence survey.

2.0 METHODS

Two WSP biologists visited the Survey Area on 6 June 2024 to complete the Audouin's night-stalking tiger beetle critical habitat assessment and visual search survey and the bat emergence survey.

2.1 Audouin's Night-Stalking Tiger Beetle Survey

Portions of the Project where ground disturbance will occur that overlap with critical habitat for Audouin's night-stalking tiger beetle were assessed for suitable larval and adult habitat. Larvae require cohesive soil with a minimum of 15 cm depth for burrowing, and typically use banks with a slope less than 50% made of clay, fine clay, sand, or fine sand (ECCC 2022). These burrow sites typically involve open habitats such as streambanks, coastal bluffs, or anthropogenically created habitats such as road cuts, and tend to be on south-facing slopes and rarely on flat ground (MWLRS 2024). Occupied sites typically have shallow leaf litter depth (MWLRS 2024).

The Survey Area was searched for suitable conditions, with soil pits dug with hand trowels up to 20 cm deep to assess larval habitat. Adults require habitats with adequate sightlines for hunting, but also security cover (e.g., coarse woody debris) for mating and protection from predation and weather (ECCC 2022). To assess available adult habitat, existing conditions of the Survey Area were recorded and a visual survey for individuals was completed. Surveys for adults were completed during the day and prior to dusk to account for potentially differing activity levels.

2.2 Bat Emergence Survey

The bat emergence survey was completed following protocols outlined in the Resource Information Standards Committee (RISC) Inventory Methods for Bats (RISC 2022). The pedestrian culvert to be infilled was accessed from the north and south with observation locations at each side to watch for bat emergence. An Echo Meter Touch Pro II ultrasonic detector device was used to aid in detection and to acoustically identify bats that may emerge. Due to people sheltering beside the north end of the culvert, a direct line of site on the entrance was not possible. Because of this, the northern observation location was stationed above the culvert with a partially obstructed view as to not disturb the people below.

3.0 RESULTS

3.1 Audouin's Night-Stalking Tiger Beetle Survey

The ground cover of the Survey Area north of Blanshard Street consisted mostly of English ivy (*Hedera helix*) and pine needles from ornamental pine trees (Attachment 1; Photos 1-2). The slope of this portion of the Survey Area ranged from 30% to greater than 50%, with a northwest facing aspect and minimal coarse woody debris. There were no exposed areas of soil in this portion of the Survey Area besides two walking paths that were comprised of compacted soil that was difficult to excavate. Five soil pits were dug in this area (Figure 1), with the soil containing thick roots of English ivy and substrate that did not match the clay and/or sand requirements of this species (Attachment 1; Photo 3). The area surveyed measured approximately 400m^2.

The area south of Blanshard Street consisted of a very narrow strip of boulevard above the retaining wall with more ornamental pine trees, dense English ivy, and a small trail (Attachment 1; Photos 4-5). This area had a southeastern aspect but was flat and contained no coarse woody debris. Due to the dense ground vegetation, the small, flat nature of the area, and the existence of the retaining wall to the west and Ravine Way to the east, which is anticipated to preclude access for distributing individuals, it is unlikely this area provides suitable habitat for adult or larval beetles.

The area below the retaining wall ranged from approximately 0 to 30% in slope and consisted of habitat with long grass adjacent to a concrete path (Attachment 1; Photo 6). This area had a southeastern aspect with minimal coarse woody debris. Two soil pits were dug in this area (Figure 1), with soil similar in composition to the area north of Blanshard Street and described above, with clay present at approximately 15 cm from the surface (Attachment 1; Photo 7). The grassy site did not contain open areas similar to streambanks or road cuts where larvae are typically found. No signs of larval burrows were encountered while assessing the habitat and digging soils pits. Although this area does not include all biophysical features required by the species, habitat requirements and use are still largely unknown (Heron 2024, pers.comm.). As such, due to overlapping critical habitat for this species and the presence of some suitable features, this area may provide suitable habitat for Audouin's night-stalking tiger beetle. This area measured approximately 200m^2. The area north of Blanshard had people living under the bridge of Vernon Avenue and beside the pedestrian culvert beneath Blanshard, so these areas were avoided during the assessment.

Visual search effort for adults consisted of 24 minutes in the grassy area south of Blanshard Street and 32 minutes in the ivy-covered area north of Blanshard Street in the afternoon, and 32 minutes in the grassy area just prior to dusk. The survey was conducted by slowly walking meander transects while looking at the ground in all accessible areas and moving vegetation to try and locate adults. No adult beetles or burrows of larvae were seen during these searches. Besides a small ant nest located on a path in the Survey Area north of Blanshard Street, potential prey items for this species' were limited. Further, this area also contained invasive European wall lizards (*Podarcis muralis*), which may predate on adult beetles while also compete for prey items. Seven individuals were recorded while surveying.

3.2 Bat Emergence Survey

The bat emergence survey began at 20:41, 30 minutes before sunset, and ended at 22:11, an hour after sunset. Vantage points of both north and south ends of the pedestrian culvert are provided in Figure 1 and Attachment 1 (Photos 8 and 9). No bats were observed, either visually or acoustically, emerging from either end of the culvert. No signs of bat presence (e.g., guano, urine staining) were observed at the southern end of the culvert. The northern end was not assessed for sign due to the presence of people at the entrance of the culvert. At least two hoary bats (*Lasiurus cinereus*), a tree roosting species (Lausen et al. 2022), were detected flying above and adjacent to the Survey Area, presumably roosting in mature trees present nearby based on the timing of observation. Identification was based on long, flat echolocation calls around the 20 kilohertz frequency, as described in Lausen et al. (2022). Records of hoary bats roosting in caves and buildings are rare (Lausen et al. 2022). As such, potential for use of the culvert by this species is considered unlikely.

4.0 RECOMMENDATIONS

Areas of the Project where ground disturbance is proposed generally provides unsuitable habitat for Audouin's night-stalking tiger beetle when compared to habitat requirements in the species' recovery strategy (ECCC 2022) and outlined in the draft Best Management Practice Guidebook (MWLRS 2024). Potentially suitable habitat is present in the grassy area at the corner of Ravine Way and Carey Road (Figure 1). As such, disturbance to this area should be minimized, including minimizing heavy machinery presence and/or stockpiling to the extent possible to avoid soil compaction and additional habitat loss, as well as direct mortality (MWLRS 2024). Further mitigation includes the following (MWLRS 2024):

- Construction and clearing activities should be planned for October through to February when adult beetles are not active.
- Avoid and minimize the spread of non-native and invasive plant species.
- Retain large woody debris, where present. Where trees are to be cut or limbed, coarse woody debris can be placed sporadically in the grassy area to provide additional cover habitat for adult beetles.
- Avoid the use of herbicides and pesticides.
- Hand-clear vegetation where possible.

It is understood that infilling to protect the existing retaining wall south of Blanshard Street will result in the loss of some vegetated habitat potentially providing suitable Audouin's night-stalking tiger beetle habitat. To the extent feasible, infilling should be completed in a manner that minimizes habitat loss. Although some habitat will be lost, infilling and eventual hydroseeding may increase potentially suitable habitat for this species. As salvages are not a viable option for the Audouin's night-stalking tiger beetle (MWLRS 2024), if individual adults or larvae are observed, a QEP should be contacted for further recommendations.

With the completion of the bat emergence survey, the potential for bats roosting in the pedestrian culvert is considered to be low. Prior to infilling, a final visual assessment should be made inside the culvert for roosting bats. If bats are observed, infilling should not proceed, and a Qualified Professional contacted. As per the Project's OEA, prior to tree removal, pre-clearing bat roosting surveys should be conducted around mature trees, especially if falling is to occur during the maternity period (i.e., spring through fall; WSP 2024).

5.0 CLOSURE

We trust the information contained in this letter is sufficiently detailed for your review purposes. Should there be any questions concerning this letter, please contact the undersigned.

Yours very truly,

WSP Canada Inc.

Thompson Hyggen, BSc
Junior Biologist

Neil Moss, RPBio
Senior Wildlife Biologist

Tanya Seebacher, MSc, RPBio
Principal Terrestrial Biologist

TH/NM/TS/asd

Attachments: Figure 1
Attachment 1 - Photographs

https://wsponlinecan.sharepoint.com/sites/CA-CA00312618999/Shared Documents/06. Deliverables/3.0_ISSUED/CA0031261.8999-009-L-Rev1/CA0031261.8999-009-L-Rev1-MoTI Bat and Beetle Survey-16JUL_24.docx

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LEGEND

- BAT EMERGENCE SURVEY LOCATION
- SOIL PIT
- POTENTIALLY SUITABLE AUDOUIN'S NIGHT-STALKING TIGER BEETLE HABITAT
- PROJECT AREA
- FEDERALLY DESIGNATED CRITICAL HABITAT
- ROAD
- DITCH

0 40 80

1:3,000 METRES

REFERENCE(S)

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MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE

PROJECT
MOTI UPTOWN MOBILITY HUB OEA

TITLE
HIGHWAY 17 SAANICH UPTOWN MOBILITY HUB –BEETLE AND BAT EMERGENCE SURVEYS

CONSULTANT

YYYY-MM-DD	2024-07-10
DESIGNED	MV
PREPARED	MH
REVIEWED	MV
APPROVED	TS

PROJECT NO.	CONTROL	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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ATTACHMENT 1

Photographs

PHOTOGRAPHS

Photo 1: The Survey area assessed for Audouin's night-stalking tiger beetle adult and larval habitat north of Blanshard street. Photo facing southwest.

Photo 2: The Survey area assessed for Audouin's night-stalking tiger beetle adult and larval habitat north of Blanshard Street. Photo facing northeast.

Photo 3: Soil conditions at one of the pits dug north of Blanshard Street. All soil conditions were consistent for the pits in this area.

Photo 4: The Survey area south of Blanshard Street above the retaining wall. Photo facing northeast.

Photo 5: The Survey area south of Blanshard Street above the retaining wall. The grassy habitat is visible on the right side of this image. Photo facing southwest.

Photo 6: The grassy area south of Blanshard Street. It is understood this area will be minimally affected by construction activities. Photo facing northeast.

Photo 7: Soil pit dug in the grassy area south of Blanshard street. Soil conditions were similar to those north of Blanshard Street, which did not match those described as critical habitat for larvae.

Photo 8: The south side of the culvert to be infilled and the vantage point used by one of the biologists for the bat emergence survey. Photo facing north.

Photo 9: The north side of the culvert to be infilled and the vantage point used by one of the biologists for the bat emergence survey. Photo facing north.

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