

WSP PROJECT NUMBER: 20M -00758-00

FRASER SURREY PORT LAND – TRANSPORTATION IMPROVEMENTS BIOPHYSICAL SURVEY AND ASSESSMENT REPORT

MAY 17, 2021

CONFIDENTIAL





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VANCOUVER FRASER PORT AUTHORITY

REPORT

PROJECT NO.: 20M-00758-00
CLIENT REF:#20-0173
DATE: MAY 17, 2021

WSP
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VANCOUVER, BRITISH COLUMBIA

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May 17, 2021

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Vancouver Fraser Port Authority
Senior Construction Project Specialist
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Attention: Vinil Reddy, M.Sc., MBA, PMP, P.Eng., ENV SP

Dear Vinil:

Subject: Fraser Surrey Ports Land Transportation Improvement –Biophysical Survey and Assessment Report
Client ref.:

WSP is please to submit our Biophysical Survey and Assessment Report for your review and consideration. The Biophysical Survey and Assessment Report presents the preliminary survey and assessment of fish and fish habitat, vegetation and wildlife from the proposed activities for the construction and operations of the Fraser Surrey Port Lands Transportation Improvement Project based on 30% design stage. Additional surveys and field work will be required to confirm the findings of this report. The report also includes reports for each of the biophysical components outlined in the Project & Environmental Review Application Submission Requirements including:

- Nesting Bird Survey;
- Species-at-Risk Assessment;
- Invasive Species Assessment;
- Vegetation Plan; and,
- Construction and Environmental Management Plan (including Spill and Emergency Response Procedures)

We look forward to working with you on this Project to ensure successful and compliant delivery of services.

Yours sincerely,

Rosalyn Smedley, R.P.Bio.
Biologist

WSP ref.:

SIGNATURES

PREPARED¹ BY



Rosalyn Smedley, R.P.Bio.
Biologist

14 May 2021

Date



Susan Blundell, R.P.Bio.
Plant Ecologist

14 May 2021

Date



Karen Truman, R.P.Bio.
Wildlife Biologist

14 May 2021

Date

APPROVED² BY



Michael Taylor, BLA, MRM
Team Lead, Ecology & EIA

14 May 2021

Date

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CONTRIBUTORS

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TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Project Overview	1
1.1.1	Project Location.....	1
1.1.2	Background and Rationale	3
1.1.3	Project Dates	6
1.2	Description of Proposed Works.....	6
1.2.1	At-Grade Railway Crossing Upgrades	6
1.2.2	New Roadway Connection for Timberland Road South to Robson Road.....	6
1.2.3	Pavement Rehabilitation and Pavement Markings along Robson Road	9
1.3	Objectives of the Report.....	10
1.4	Regulatory Requirements.....	10
2	METHODOLOGY.....	12
2.1	Desktop review	12
2.1.1	Study Area	12
2.1.2	Desktop information Resources	12
2.2	Site visit.....	13
2.2.1	Fish and Fish Habitat	13
2.2.2	Wildlife	14
2.2.3	Vegetation.....	14
3	EXISTING CONDITIONS	15
3.1	Fish and Fish habitat	15
3.1.1	Desktop review	15
3.1.2	Site visit.....	20
3.2	Vegetation	32
3.2.1	Desktop Review	32
3.2.2	Site visit.....	35
3.3	Wildlife.....	39
3.3.1	Desktop Review	39
3.3.2	Site visit.....	42
4	POTENTIAL PROJECT EFFECTS AND MITIGATION MEASURES	43
4.1	Project Interactions.....	43

4.2	Potential Effects and Mitigation Measures	44
4.2.1	Fish and Fish Habitat	44
4.2.2	Vegetation.....	58
4.2.3	Invasive Species	58
4.2.4	Wildlife	58
4.3	Residual Effects.....	61
4.3.1	Residual Effects for fish and fish habitat.....	61
4.3.2	Residual Effects For Vegetation.....	62
4.3.3	Residual Effects For Wildlife.....	62
5	SUMMARY AND CONCLUSIONS	62
	REFERENCES	63

TABLES

TABLE 1 - SUMMARY OF PROPOSED WORK.....	8
TABLE 2 - SUMMARY OF PROPOSED WORK.....	9
TABLE 3 - SUMMARY OF PERMITS AND APPROVALS.....	10
TABLE 4 - CRITERIA OF HABITAT QUALITY RANKING.....	14
TABLE 5 - FISH SPECIES PRESENCE	15
TABLE 6 - SUMMARY OF WATERCOURSE SITES ASSESSED ON 16 DECEMBER 2020.....	21
TABLE 7 - PLANT SPECIES CONSIDERED “AT RISK” UNDER PROVINCIAL AND / OR FEDERAL LEGISLATION THAT MAY INHABIT THE PROJECT STUDY AREA.....	34
TABLE 8 - SUMMARY OF VEGETATION SPECIES ENCOUNTERED DURING SURVEY	36
TABLE 9 - BIRD SPECIES ENCOUNTERED DURING APRIL 20, 2021 SURVEY	42
TABLE 9 - PROJECT ACTIVITIES AND POTENTIAL EFFECTS ...	43
TABLE 10 - PROTECTION PLANS PREPARED FOR THE WORKS	46
TABLE 11 - LEAST RISK TIMING WINDOW (UNSHADED) FOR LOWER MAINLAND FISH SPECIES	47
TABLE 12 - SUMMARY OF POTENTIAL INTERACTIONS AND ASSOCIATED EFFECTS AND THEIR PROPOSED MITIGATION	50
TABLE 13 - SUMMARY OF POTENTIAL INTERACTIONS, ASSOCIATED EFFECTS AND PROPOSED MITIGATION FOR VEGETATION AND WILDLIFE	59
TABLE 14 - HABITAT BALANCE.....	61

FIGURES

FIGURE 1: OVERVIEW MAP	2
FIGURE 2A/B: PROJECT LOCATION AND ASSESSMENT AREA .	4
FIGURE 3: RARE/SENSITIVE SPECIES CRITICAL HABITAT AND INVASIVE SPECIES.	17
FIGURE 4: WATERCOURSE	19
FIGURE 5: GREEN INFRASTRUCTURE & STREAMSIDE AREAS	33
FIGURE 6: HABITAT SUITABILITY	41

APPENDICES

A	SITE DATA		
A-1	Stream Characteristics		
A-2	Water Quality		
A-3	Habitat Quality		
B	CONSTRUCTION	ENVIRONMENTAL	MANAGEMENT
	PLAN		



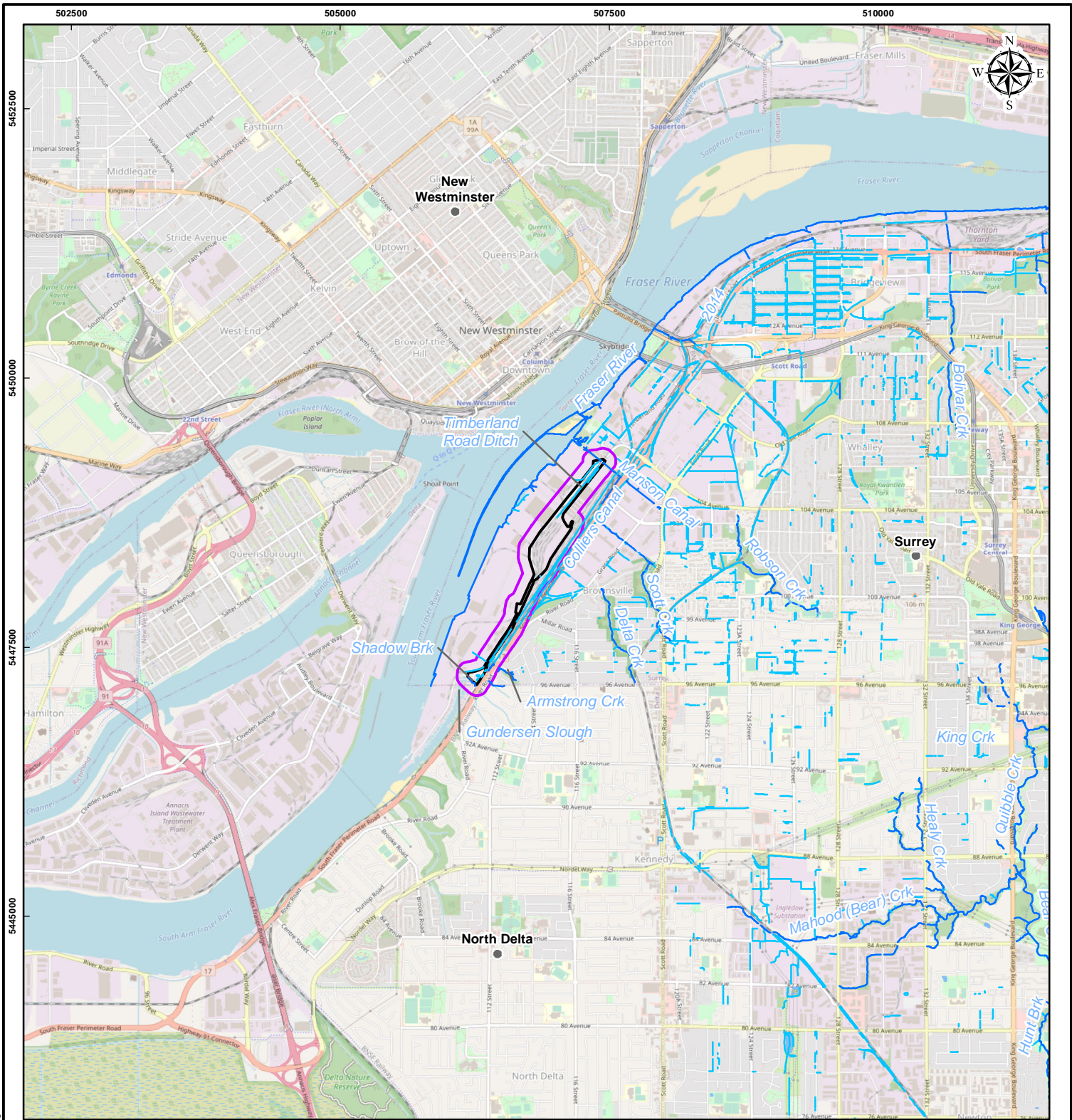
1 INTRODUCTION

The Vancouver Fraser Port Authority (VFPA) is proposing to improve transportation infrastructure within the Fraser Surrey Port Lands (FSPL) called the FSPL – Transportation Improvement Project (FSPL-TI) (the “Project”). The report has been prepared in accordance with PER Guidelines for habitat assessment as well as the Guidance for Applications or Notifications for Changes in and about a Stream under the *Water Sustainability Act* in the South Coast Region (MFLNRORD 2019). This report also provides the information in support of a *Fisheries Act* Request for Review. This Biophysical Survey and Assessment Report should be considered preliminary as the assessment of fish and fish habitat, vegetation, and wildlife is based on 30% design of the Project and should be amended as necessary to accommodate changes to the final design. The content of this report describes the existing conditions of the environment based on a desktop and a preliminary site survey, a summary of the impacts at 30% design and the proposed mitigation measures for those impacts.

1.1 PROJECT OVERVIEW

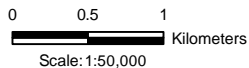
1.1.1 PROJECT LOCATION

As a component of the Greater Vancouver Gateway 2030 Program, the Project includes an options confirmation review and preliminary engineering design of new or upgraded transportation infrastructure within the City of Surrey FSPL (Figure 1). The Greater Vancouver Gateway 2030 Program is the Gateway Transportation Collaboration Forum’s strategy for smart infrastructure investment in removing bottlenecks impeding the growth of trade, while addressing community impacts on good movement and population growth.





Legend

- Populated Place
- Ditch
- Creek and River
- Waterbody
- ▨ Wetlands
- ▭ Project Area (100m buffer)
- ▭ Study Area



References:
 Data BC - BC Catalogue
 Open Government License
 (<http://www.data.gov.bc.ca/>)
 NRCAN Geotris
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 (<http://geotris.cgdi.gc.ca/>)

CLIENT:  PORT of vancouver Vancouver Fraser Port Authority	
PROJECT: Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services	
TITLE: <h2 style="text-align: center;">Project Location Map</h2>	
DATE: June 11, 2020	PROJECT NO: 20M-00758-00
Figure 1	
GIS FILE: 01-01-001_Overview.mxd	
COORDINATE SYSTEM: NAD 1983 UTM Zone 10N	ANALYST: MY
	REVIEWED: SB
	

1.1.2 BACKGROUND AND RATIONALE

The primary purpose of the Project is to improve the road network within FSPL and ease congestion in the general area. The project will support VFPA's core mission which is to enable Canada's trade objectives through sustainable development that protect the environment as well as local communities. The project will provide several benefits to the port tenants, road users and rail operations, such as improved public safety, more reliable commute times, reduced noise levels, reduced Green House Gas (GHG) emissions, reduced congestion and improved freight capacity. This will be done by creating a main transportation corridor; upgrading associated intersections and signage (road and rail); and constructing a staging area and additional turn bays to manage traffic flows.

The current Robson Road – Timberland Road North corridor is primarily a 50 km/h two-lane roadway under the jurisdiction of the VFPA that acts as the main thoroughfare within FSPL (Figure 2A and 2B). Tannery Road access is located on the east, Gunderson Slough is located at the west end, and a total of nine separate at-grade rail crossings runs in between the two ends of the corridor. The Robson Road – Timberland North corridor is a through-route where all truck, passenger vehicle, and emergency vehicle traffic must use this route to travel in and out of the area. It also provides direct access to several tenant properties, including DP Word Fraser Surrey (DPWFS), Paper Excellence, Seaspan Ferries, Mainland Sand and Gravel, and Western Cleanwood Preservers.

Timberland Road South is a roadway that branches off Robson Road – Timberland Road North corridor at the north end of the FSPL at a forked intersection known as “Timberland Wye” (Figure 2B). It provides access to tenants including Westran, TMS Transportation, and CP lease area. Elevator Road, Alaska Way and Gunderson Road are 50 km/h roadways located on the south end of the FSPL (Figure 2A). Various sections of these three roads are under the jurisdiction of the VFPA, the City of Surrey, and the City of Delta. They provide direct access to various tenant and private properties. The junction of these three roads form a roundabout or turnaround area for vehicles travelling into and out of FSPL. Tannery Road is a 50 km/h roadway under the jurisdiction of City of Surrey that is used by most traffic traveling in and out of FSPL. It provides connectivity to the north end of Robson Road – Timberland Road North corridor and connects to Highway 17 via an interchange and connects to 120th Street, a major municipal arterial route, to Pattullo Bridge for travel across the Fraser River. Highway 17, known as South Fraser Perimeter Road, is an 80 km/h urban expressway under the jurisdiction of B.C. Ministry of Transportation and Infrastructure (BC MoTI) that runs along the south shore of the Fraser River. It connects FSPL to other hubs of trade activity throughout the region, including connection to the Deltaport container terminal, regional highways for access to the Centerm and Vanterm container terminals, and Highway 1.

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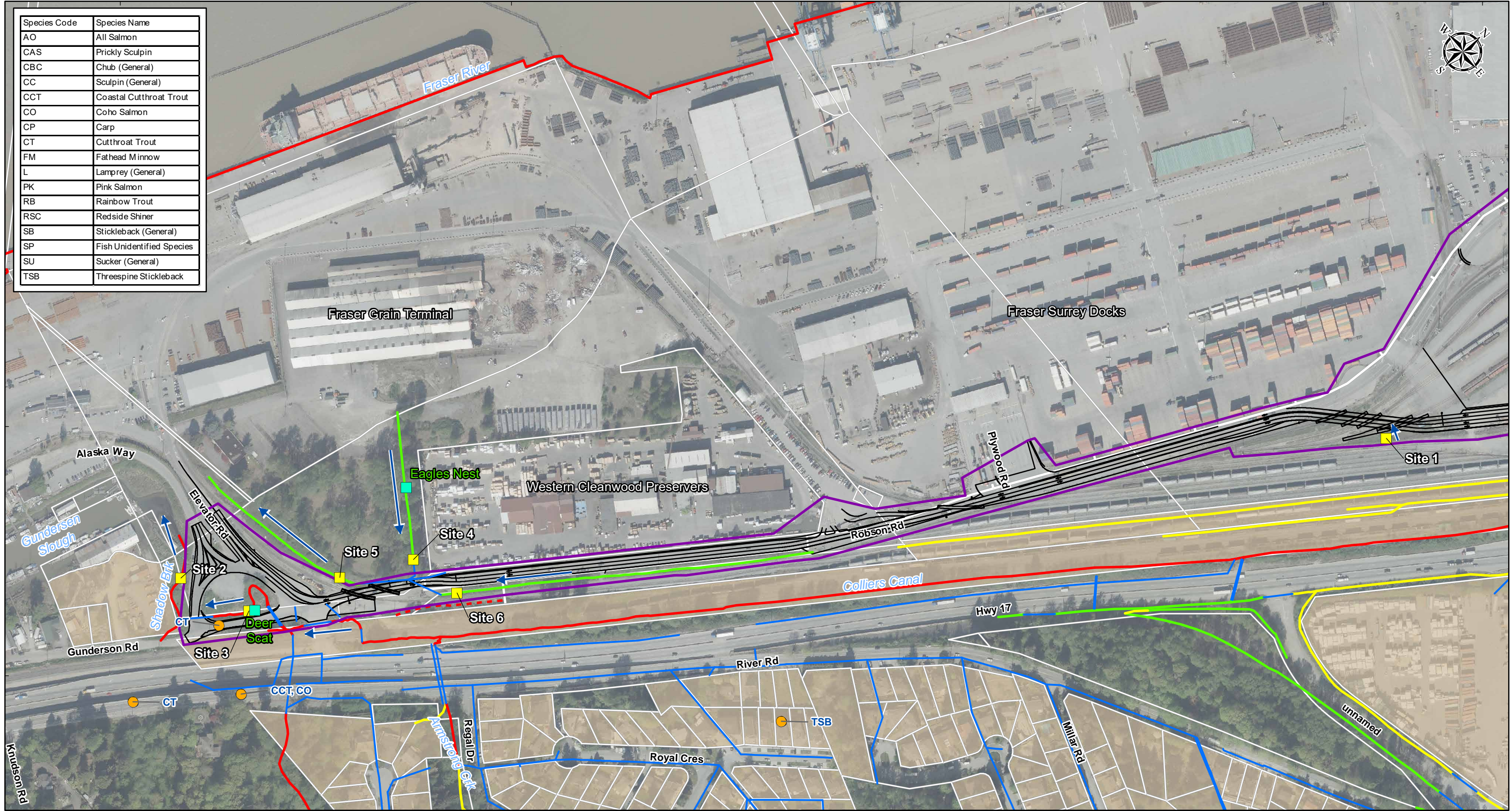
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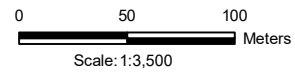
Species Code	Species Name
AO	All Salmon
CAS	Prickly Sculpin
CBC	Chub (General)
CC	Sculpin (General)
CCT	Coastal Cutthroat Trout
CO	Coho Salmon
CP	Carp
CT	Cutthroat Trout
FM	Fathead Minnow
L	Lamprey (General)
PK	Pink Salmon
RB	Rainbow Trout
RSC	Redside Shiner
SB	Stickleback (General)
SP	Fish Unidentified Species
SU	Sucker (General)
TSB	Threespine Stickleback



- Legend**
- FISS Point
 - Aquatic Site
 - Wildlife Location
 - Flow Direction
 - Drainage Main
 - ▭ Parcel
 - ▭ Private Lands
 - Project Design Linework
 - ▭ Study Area

Watercourse (Fish Classification) - City of Surrey

- A
- - - AO
- B
- C
- Unknown



Notes: Fish Classification

Class A: Inhabited by fish year-round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class B: Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat by the defined by the Federal Fisheries Act

Class C: A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

References:
 Data BC - BC Catalogue
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PROJECT:
 Fraser Surrey Port Lands - Transportation Improvements
 Preliminary Design Services

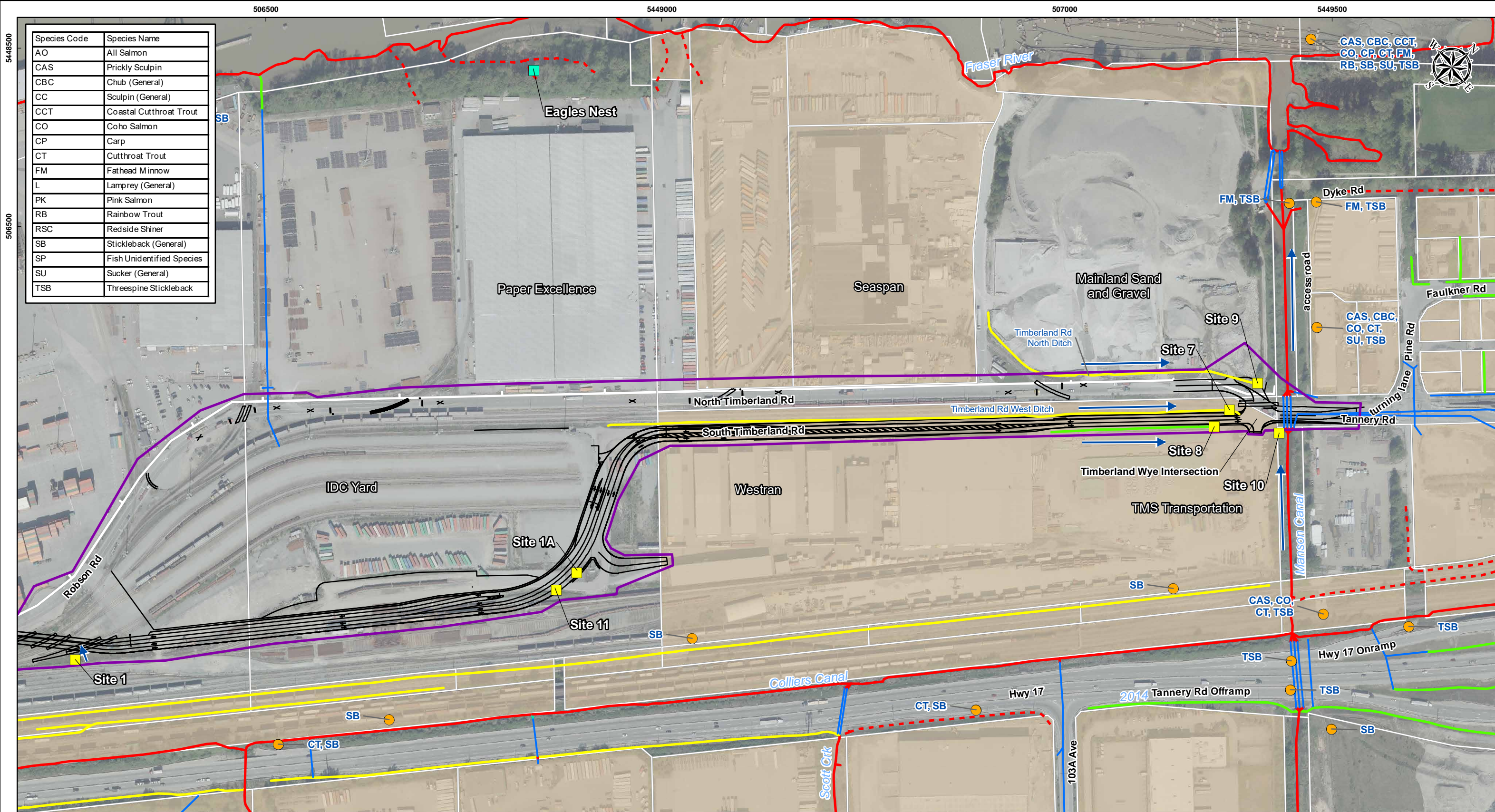
TITLE:
**Project Location and
 Assessment Area**

CLIENT:
 PORT of vancouver Vancouver Fraser Port Authority

DATE: May 14, 2021
 ANALYST: MY
 REVIEWED: RS
Figure 2A

GIS FILE:
 02-01-001_Assessment_Area_v2.mxd
 PROJECT NO:
 20M-00758-00
 COORDINATE SYSTEM:
 NAD 1983 UTM Zone 10N





Species Code	Species Name
AO	All Salmon
CAS	Prickly Sculpin
CBC	Chub (General)
CC	Sculpin (General)
CCT	Coastal Cutthroat Trout
CO	Coho Salmon
CP	Carp
CT	Cutthroat Trout
FM	Fathead Minnow
L	Lamprey (General)
PK	Pink Salmon
RB	Rainbow Trout
RSC	Redside Shiner
SB	Stickleback (General)
SP	Fish Unidentified Species
SU	Sucker (General)
TSB	Threespine Stickleback

CAS, CBC, CCT, CO, CP, CT, FM, RB, SB, SU, TSB



- Legend**
- FISS Point
 - Aquatic Site
 - Wildlife Location
 - Flow Direction
 - Drainage Main
 - ▭ Parcel
 - ▭ Private Lands
 - Project Design Linework
 - ▭ Study Area

Watercourse (Fish Classification) - City of Surrey

- A
- - - AO
- B
- C
- Unknown

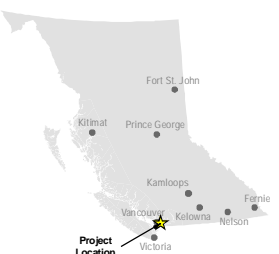
Notes: Fish Classification

Class A: Inhabited by fish year-round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class B: Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat by the defined by the Federal Fisheries Act

Class C: A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

References:
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 NRCAN Geogratis
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 (http://geogratis.cgdi.gc.ca/)



PROJECT:
 Fraser Surrey Port Lands - Transportation Improvements
 Preliminary Design Services

CLIENT:
 PORT of vancouver Vancouver Fraser Port Authority


TITLE:
 Project Location and
 Assessment Area

DATE: May 14, 2021
 ANALYST: MY
 REVIEWED: RS
Figure 2B

GIS FILE:
 02-01-001_Assessment_Area_v2.mxd

PROJECT NO:
 20M-00758-00

COORDINATE SYSTEM:
 NAD 1983 UTM Zone 10N



1.1.3 PROJECT DATES

Construction is expected to be completed in two stages between February 2022 and November 2022. See more details in the description of proposed works (Table 1) for each activity proposed.

1.2 DESCRIPTION OF PROPOSED WORKS

The three main components of the FSPL-TI project include:

1. At-Grade Railway Crossing Updates: With extensive amounts of un-signalized railroad crossings along Timberland Road North, vehicles drivers experience stop-go movements as they approach crossings which add delays to already slow-moving traffic in the area. Upgrading the at-grade rail crossings at FSPL will improve the safety and efficiency of road users driving within FSPL.
2. New Roadway Connection for Timberland Road South to Robson Road: Re-alignment of the Robson Road-Timberland Road North corridor with the introduction of the Timberland Road South as the main access road within FSPL will enable most road users to avoid conflicts with at-grade rail crossing along the existing Timberland Road North. Road widening along Timberland Road South, including a new signalized intersection at Timberland Wye is proposed as part of this Project. The project will also provide the long-term rail footprint in the area for trains servicing the planned future terminals. With majority of truck traffic being directed to the new road alignment, this eases up traffic flow on the existing Timberland Road.

Changing the inbound container truck movements by providing a dedicated truck auxiliary lane, complete with Vehicle Access Control System (VACS) gates will manage inbound truck traffic into DPWFS container gate and streamline traffic flow.

3. Pavement Rehabilitation and Pavement Markings along Robson Road: Rehabilitation of Robson Rd to address pavement and drainage issues which contributes to the overall operation of the road corridor and maintenance costs at FSPL. Enhancement of pavement markings along Robson Rd will allow for better lane usage.

1.2.1 AT-GRADE RAILWAY CROSSING UPGRADES

At-grade rail signal designs are proposed to be completed for two crossing locations, and one new crossing at the IDC Yard as a result of the realigned Robson Road - Timberland Road South Corridor. At -grade railway crossing upgrades include extending crossing surfaces by 0.5m, repainting double stop bars and railway crossing and updating signage as required.

1.2.2 NEW ROADWAY CONNECTION FOR TIMBERLAND ROAD SOUTH TO ROBSON ROAD

1.2.2.1 NEW TIMBERLAND ROAD SOUTH

The mid-section of the realigned Robson Road - Timberland Road South Corridor consists of the new Timberland Road South roadway connecting Robson Road and the existing Timberland Road South complete with new pavement throughout (Figure 2B). Due to the constraints in this area, most notably the existing railroad track switches that cannot be relocated, the new road alignment is situated between these existing switches.



North of the rail crossing, Timberland Road South geometry continues as a two-lane road with a single inbound truck auxiliary lane and shoulder, which is separated by concrete roadside barriers. Initially, four auxiliary lanes were proposed for truck staging, but a recently implemented appointment-based reservation system has reduced the need of auxiliary lanes to one lane only. A 3.0 m shoulder is proposed for the truck-maneuvering in the event a vehicle breaks down in this lane.

Construction steps include excavation, clearing and grubbing vegetation, regrading, and placement of new asphalt. An existing culvert and vegetated ditch will be removed and infilled for the new road. A summary of proposed construction works, their timing and duration and proposed footprint is provided in Table 1.

1.2.2.2 EXISTING TIMBERLAND ROAD SOUTH

The new Timberland Road South alignment will tie into the existing two-lane Timberland Road South. The northbound and south bound through lanes are separated by a gore-marked median. Along the north edge of road is a proposed 3.6 m shoulder to support future tenant and FSPL operations in this area; the shoulder transitions to an inbound container truck inspection lane as discussed previously. To develop the southbound shoulder, the existing west ditch will be partially infilled with light-weight fill; the remaining channel will be used to capture track drainage west of the project limit (Figure 2B). Roadway drainage that is currently flowing into the west ditch will be diverted through curbs and gutters, into catch basins, and conveyed through a closed pipe system.

The existing Timberland Road South will be rehabilitated with road widening involving new pavement. The existing east ditch south of Timberland Wye Intersection will remain and capture road drainage. Some of the curb vegetation will be removed to accommodate the road widening (Figure 2B).

Construction steps begin with isolating the west ditch and pumping water if needed. The west ditch will then be excavated, partially infilled and the bank recontoured, and new pavement extending the road width and re-establish flow. A summary of proposed construction works, their timing and duration and proposed footprint is provided in Table 1.

1.2.2.3 TIMBERLAND WYE INTERSECTION

A new traffic signal is warranted at the existing Timberland Wye to develop a four-legged intersection (Figure 2B).

- The north leg will require that the northbound through lane to be widened.
- The east leg will be widened to support truck ingress and egress into the TMS Transportation Property
- For the south leg, a 1.5 m shoulder will be provided north of the east ditch to allow through traffic to pass vehicles making left turns.
- For the west leg, to accommodate southbound right-turning vehicle entering Timberland Road North, the existing curve immediately west of Timberland Road will be widened, which will require the existing north ditch to be infilled. The ditch water instead will be piped under this section of road to its outlet at Manson Canal.

It is proposed to provide curb and gutter with catch basins for this section of road. The flow from the catch basins will collect into a new storm sewer, which will run to the north-east towards Manson Canal. The storm sewer will tie into an existing storm manhole on the south side of the 'Timberland Wye' junction. The downstream conditions from this manhole are unknown, including the pipe size, inverts, material and outfall location. This information will be required to determine if this is a viable solution and if additional upgrades are required to meet the flow requirements.



Due to the increase in impermeable area for this section as a result of widened road, additional storage will be provided to match pre and post-development flows. It is proposed to oversize the proposed storm sewer to provide the required additional attenuation storage in the system. A flow control manhole that regulates rate to pre-development flow will be installed downstream and an oil water separator will be placed at the outlet of the new storm sewer, just prior to discharging into the Manson Canal.

Construction steps and timing will be similar to the existing Timberland South Road, including infilling part of the North ditch. A summary of proposed construction works, their timing and duration and proposed footprint is provided in Table 1.

Table 1 - Summary of Proposed Work

Road Section ID	Proposed Work	Timing and Duration of work	Footprint (m ²)	Footprint in water, below HWM (m ²)
New Timberland Road South	Install ESC measures. Excavate existing ditch and remove existing culvert and heavy vegetative growth within the ditch with excavators operating from the top of bank. Remove headwall.	May 2022	300 m ²	N/A
	Clear and grub ground cover vegetation with excavators operating on existing road. Upon completion of clearing and grub, reshape and recompact subgrade.	March – Apr 2022	1,746 m ²	N/A
	Fill ditch with specified base material with excavator operating from the top of bank. Compact material with compaction equipment. Reshape the ground condition suitable for grading.	June -July 2022	235 m ²	N/A
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.	Sept - Nov 2022	1981 m ²	N/A
	At areas outside of proposed roadway, infill ditch with approved native material with a loader, complete with topsoil and hydroseeding.	Aug - Sept 2022	65 m ²	N/A
Existing Timberland Road South (partial infilling of the West Ditch)	Install ESC measures, pump water (as needed) with a dewatering pump in the ditch.	May - July 2022	3,046 m ²	N/A
	Clear heavy vegetative growth along bottom of existing ditch with excavator. Excavate slope along the area of road widening.	July - Aug 2022		
	Fill the exposed side of ditch with light-weight fill material and compact with an excavator operating from the top of bank.	Sept - Oct 2022		
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.	Oct - Nov 2022	1,792 m ²	N/A
Timberland Wye Intersection (Road Widening and Partial North Ditch Infill)	Clear and grub heavy vegetative growth above ground including all underbrush, deadwood, and surface debris with mowers on the road	July - Aug 2022	114 m ²	N/A
	Reshape the ground condition suitable for grading on the road.	July - Aug 2022		
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.	July - Aug 2022		
	Isolate the Timberland Road North ditch and pump water (if needed) with a dewatering pump in the ditch.	June 2022	106 m ²	123 m ²
	Excavate existing ditch and remove existing culvert and heavy vegetative growth within the ditch above ground with excavators.	July - Aug 2022		

	Fill ditch with specified base and pipe bedding material with excavator operating from the top of bank. Compact material with compaction equipment. Install new 600 mm concrete pipe with headwalls on either side of pipe.	Sept - Oct 2022		
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.	Oct - Nov 2022		

Note: ID = identification, m² = meter squared, HWM = high water mark, N/A = not applicable.

1.2.3 PAVEMENT REHABILITATION AND PAVEMENT MARKINGS ALONG ROBSON ROAD

1.2.3.1 GUNDERSON ROAD, ELEVATOR ROAD AND ROBSON ROAD

Modifications to this area consist of milling, resurfacing the poor pavement, pavement paintings to provide clarity in the traffic flow. Minor widening is proposed at the southeast corner of the roundabout to facilitate easier northbound vehicle movement towards Robson Road.

VFPA have observed localized flooding along this section of Robson Road, particularly near to the junction with Elevator Rd. Based upon our site observation in this area, they will re-grade between Robson Road and Gunderson Road to allow this section to drain towards the existing watercourse to the north-west. Vegetation maintenance along this section of road may occur during construction, this includes pruning of the vegetation in the roundabout. A summary of proposed construction works, their timing and duration and proposed footprint is provided in Table 2.

Table 2 - Summary of Proposed Work

Road Section ID	Proposed Work	Timing and Duration of work	Footprint (m ²)	Footprint in water (m ²)
Gunderson Road, Elevator Road and Robson Road (Pavement resurfacing)	Cut existing asphalt pavement and mill surface layer of asphalt using a milling machine on the road.	May – June 2022	N/A. Only existing asphalt pavement will be disturbed.	N/A. No works to be completed in water.
	Sweep or wash the exposed surface and repair cracks (if required) on the asphalt surface using crack-sealing material.	May – June 2022	N/A. Only existing asphalt pavement will be disturbed.	N/A. No works to be completed in water.
	Apply a layer of tack coat and place new asphalt pavement using a loader, dump truck, paver, and compactor on the road.	May – June 2022	N/A. Only existing asphalt pavement will be disturbed.	N/A. No works to be completed in water.
	Vegetation maintenance during operations	May – June 2022 and Ongoing	Unknown	N/A. No works to be completed in water.

Note: ID = identification, m² = meter squared, HWM = high water mark, N/A = not applicable.

1.3 OBJECTIVES OF THE REPORT

The objectives of the Biophysical Survey and Assessment Report is to conduct fish, wildlife and vegetation information review of the Project, to identify project interactions and potential effects to fish, wildlife and vegetation and to provide mitigation measures to avoid, minimize or eliminate those effects. The following tasks are included in this report:

- Identify potential permits and approvals required;
- Conduct a desktop information review and summarize results;
- Conduct a site visit to verify the desktop results;
- Identify potential timing window constraints;
- Identify potential effects;
- Describe mitigation measures; and,
- Describe any residual effects and provide recommendations.

1.4 REGULATORY REQUIREMENTS

A summary of permits and approvals that may be required, in addition to the Vancouver Fraser Port Authority PER is provided below in Table 3. In general, project activities within riparian and instream environments would require additional permitting, mitigation and monitoring effort. Federal Lands are not subject to the Riparian Areas Protection Regulation in that they are typically exempt from local government bylaw.

Under the Guidance for Applications or Notifications for Changes in and about a Stream under the *Water Sustainability Act* (WSA) in the South Coast Region (MFLNRORD 2019) a WSA Qualified Environmental Professional (QEP) questionnaire for stream infill may be required for the proposed infilling of ditches. The form requires a QEP to determine if the watercourse falls under the definition of stream under the WSA. The site history must be included using aerial photos to determine whether or not the stream channel of the stream has been modified or previously existed on site.

Table 3 - Summary of Permits and Approvals

Project Activity	Potential Permits and Approvals	Timing Constraints and Considerations
<ul style="list-style-type: none"> – Widening / realignment of existing roads – Construction of new roads 	<ul style="list-style-type: none"> – Vancouver Fraser Port Authority Project Environmental Review 	<ul style="list-style-type: none"> – Breeding bird window for Lower Mainland in compliance with BC <i>Wildlife Act</i> and <i>Migratory Birds Convention Act</i> – Detailed field surveys for environmental assessment of rare / sensitive vegetation species identified as potentially located with Project footprint / area (100 m buffer)



Project Activity	Potential Permits and Approvals	Timing Constraints and Considerations
<ul style="list-style-type: none"> – Riparian area / instream works 	<ul style="list-style-type: none"> – DFO Request for Review, potentially a Letter of Authorization under paragraph 35(2) of the <i>Fisheries Act</i> – Fish Salvage Permit – BC <i>Water Sustainability Act</i> notification or Change Approval 	<ul style="list-style-type: none"> – DFO - 60-day time limit to review an application to determine whether the required information has been submitted, and a 90-day time limit from the date of notification that the application is complete to issue the authorization (additional time would be required if Habitat Offsetting is required) – The reduced risk work window for the South Coast ranges between the end of May and end of October depending on the fish species present (BC Ministry of Environment 2006) – The target time for issuing a fish salvage permit is 30 days however processing time may be considerably longer if there is a required consultation process – <i>Water Sustainability Act</i> Change Approval estimated to be 12 to 18 weeks in the lower mainland.



2 METHODOLOGY

2.1 DESKTOP REVIEW

2.1.1 STUDY AREA

The Project study area for the fisheries, wildlife and vegetation desktop information review was defined as the area directly affected by the Project (Project footprint) plus a 100 m buffer (Project area), to ensure potential Project activities associated with construction and operations were included in the review (Figure 1). The fisheries desktop assessment also includes the Fraser River, providing a high-level summary of potential interactions. The wildlife and vegetation review included a summary of the rare and sensitive species and their potential habitat identified adjacent to the 100 m buffer for general information where present.

2.1.2 DESKTOP INFORMATION RESOURCES

The desktop information review included researching available data from the following websites:

- iMapBC (DataBC, 2020) <https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc>;
- TRIM mapping at 1:20,000 scale (Geo BC 2020) <https://pub.data.gov.bc.ca/datasets/177864/pdf/092G/092G016.pdf>;
- Biogeoclimatic Ecosystem Classification (BEC) Web (BC Ministry of Forests and Range, 2020) <https://www.for.gov.bc.ca/hre/becweb/resources/maps/FieldMaps.html>;
- Conservation Data Centre (Government of BC 2020) <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/conservation-data-centre>
- Habitat Wizard (Government of BC 2020) <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/ecosystems/habitatwizard>
- Aquatic Species at Risk Map (Fisheries and Oceans Canada [DFO] 2020) <https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>
- E-Flora (E-Flora BC, 2020) <https://ibis.geog.ubc.ca/biodiversity/eflora/>;
- Georgia Basin Habitat Atlas (Community Mapping Network, 2020) <http://cmnmaps.ca/GBHA/>;
- Important Bird Areas Canada (Bird Studies Canada, 2020) https://www.ibacanada.org/explore_how.jsp?lang=en
- Provincial Priority Invasive Plant List (Province of British Columbia 2020) <https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/invasive-species/priority-species/priority-plants/plants-table>
- [PlanSurrey - City of Surrey Official Community Plan \(OCP\) \(City of Surrey, 2014\)](#)



- Metro Vancouver Sensitive Ecosystem Inventory (Metro Vancouver, 2020) <https://gis.metrovancouver.org/maps/sei>; and
- Species-specific COSEWIC and SARA documents:
 - Committee on the Status of Endangered Wildlife in Canada Status Reports (COSEWIC, 2020) <http://www.cosewic.ca/index.php/en-ca/>;
 - *Species at Risk Act* reports (SARA, 2020) <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>;

2.2 SITE VISIT

2.2.1 FISH AND FISH HABITAT

A preliminary survey of fish habitat was conducted on 16 December 2020 by a WSP Aquatics Biologist and one assistant from Kwikwetlem First Nation. A follow-up survey was conducted on 20 April 2021 to review an additional ditch that will be infilled along the proposed Timberland Road South route.

The fish habitat survey targeted those identified watercourses and waterbodies that overlap the project footprint where works are likely to occur. An assessment of the larger desktop study areas including the Fraser River is not feasible and not practicable for the scope of this work. No fishing was conducted as part of this assessment due to the time constraints for obtaining a fish permit licence prior to the field assessment.

Watercourses and waterbodies were assessed and characterized using standard RISC methodology for 1:20,000 Fish and Fish Habitat Reconnaissance (RISC 2001) and supplemented by photographs for areas with dangerous traffic or areas with potential safety concerns or restricted access. Watercourses connectivity was assessed, and riparian vegetation was noted.

Information gathered during the assessment included:

- Channel widths (m) using either tape measure or meter stick;
- Wetted widths (m) using either tape measure or meter stick;
- Water depths (m) using a meter stick;
- Substrate composition (dominant and subdominant);
- Bank shape and composition;
- Riparian vegetation stage and composition;
- Dominant cover type available for fish;
- Water quality parameters taken using a calibrated Oakton multi-parameter PCTSTESTR 50P including temperature (± 0.5 °C), pH (± 0.01), conductivity ($\mu\text{S}/\text{cm}$, $\pm 1\%$ reading), and salinity (ppt, $\pm 1\%$ reading);
- Visual assessment of turbidity (clear, lightly turbid, moderately turbid, and turbid); and
- Georeference photos using Avenza maps.

Although no fish sampling was conducted, each site was assessed for overall fish habitat quality and habitat suitability for each life history (i.e., spawning, rearing, migration, and overwintering) of fish species known



or likely to be present in the watercourse and was rated according to life history requirements (e.g., presence of spawning gravel for salmonids, presence of deep-pools, presence of abundant cover) (Table 4).

Table 4 - Criteria of Habitat Quality Ranking

Habitat Quality Ranking	Criteria
None	No habitat present for any life history stage.
Poor	Most of the necessary components are missing. Absence of suitable spawning habitat, absence of deep pools, absence of cover habitat.
Moderate	Some of the necessary components are present but others are missing.
Good	All of the physical components are present for all life history stages.

If culverts were encountered during the assessment and were accessible, measurements including culvert type, size (mm), and direction of flow were noted. If the culvert was perched information on depth of the pool below and the perched height was also recorded.

2.2.2 WILDLIFE

During the 16 December 2020 site visit, chance wildlife was noted including scat and presence of nests. Any chance encounters were noted and photographed using Avenza maps.

A follow-up survey was conducted on 20 April 2021 by a WSP Wildlife Biologist with two assistants, one from the Kwikwetlem First Nation and one from the Tsawwassen First Nation.

2.2.3 VEGETATION

During the 16 December 2020 site visit, identification of vegetation was noted where vegetation existed in the winter. A follow-up survey was conducted on 20 April 2021 by a WSP Aquatic and Vegetation Biologist in conjunction with the wildlife survey.

3 EXISTING CONDITIONS

3.1 FISH AND FISH HABITAT

3.1.1 DESKTOP REVIEW

3.1.1.1 FISH PRESENCE AND WATERCOURSES

The fisheries information collected through literature review was compiled to document known or potential of fish species presence and their distribution within the rivers, canals and ditches in the Project area. A review of the publicly available data and mapping shows that the Project area is currently industrial. There are two fish-bearing canals and a roadside ditch overlapped by the Project footprint. The Fraser River is located approximately 350 m northwest of the Project site and WSP understands that the proposed Project will not directly affect the foreshore or marine environment. All the watercourses within the FSPL ultimately flow into the Fraser River.

According to the DFO Aquatic Species at Risk Map, no fish species at risk were identified overlapping with the Project area and no Critical Habitat has been identified by DFO. The DFO Aquatic Species at Risk Map indicated that the nearest federally designated Critical Habitat for the provincially Red listed Northern Abalone (*Haliotis kamtschatkana*) is located in Gundersen Slough, more than 300 m southwest of the Project site (Fisheries and Oceans Canada 2007) (Figure 3). The north end of Gundersen Slough is located approximately 25m south of the project site. Northern Abalone are exclusively a marine species and it is unlikely that there is suitable habitat in the Fraser River estuary or in Gundersen Slough. No critical habitat is shown on the BC CDC iMap. A summary of species at risk and the potential effects and mitigation measures is provided in Species at Risk Assessment Report.

An additional ditch was identified during the design works located at the north east corner of the IDC yard, however it does not appear in any desktop databases.

Table 5 below provides a summary of all fish species recorded within the Project footprint, 100 m buffer and neighbouring Fraser River.

Table 5 - Fish Species Presence

Common Name	Scientific Name	BC Listing	COSEWIC/ SARA	Date Observed	Project Footprint	Project Area (100 m Buffer)	Fraser River
Pink Salmon	<i>Oncorhynchus gorbuscha</i>	Yellow	-	2009	Yes	No	No
Coho Salmon	<i>Oncorhynchus kisutch</i>	Yellow	-	2011	Yes	Yes	Yes
Lamprey	<i>Entosphenus tridentatus</i>	Yellow		2007	Yes	Yes	Yes
Cutthroat Trout	<i>Oncorhynchus clarkii</i>	Yellow	-	2015	Yes	Yes	Yes
Coastal Cutthroat Trout	<i>Oncorhynchus clarkii</i>	Blue	-	2012	Yes	Yes	No
Prickly Sculpin	<i>Cottus asper</i>	Yellow	-	1995	Yes	Yes	Yes

Common Name	Scientific Name	BC Listing	COSEWIC/ SARA	Date Observed	Project Footprint	Project Area (100 m Buffer)	Fraser River
Threespine Stickleback	<i>Gasterosteus aculeatus</i>	Yellow	-	2011	Yes	Yes	Yes
Fathead Minnow	<i>Pimephales promelas</i>	Exotic	-	2009	Yes	Yes	Yes
Rainbow Trout	<i>Oncorhynchus mykiss</i>	Yellow	-	2015	No	Yes	Yes
Peamouth Chub	<i>Mylocheilus caurinus</i>	Yellow	-	1998	No	No	Yes
Brown Catfish (Brown bullhead)	<i>Ameiurus nebulosus</i>	Exotic	-	1998	No	No	Yes
White Sturgeon (Lower Fraser River Population)	<i>Acipenser transmontanus</i> pop. 4	Red	Threatened (2012)	2004	No	No	Yes
Northern Pikeminnow	<i>Ptychocheilus</i>	Yellow	-	1998	No	No	Yes
Redside Shiner	<i>Richardsonius balteatus</i>	Yellow	-	2009	No	No	Yes

Provincial Status:

Red: Includes any indigenous species or subspecies that have- or are candidates for- Extirpated, Endangered, or Threatened status in British Columbia. Not all Red-listed taxa will necessarily become formally designated.

Blue: Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened.

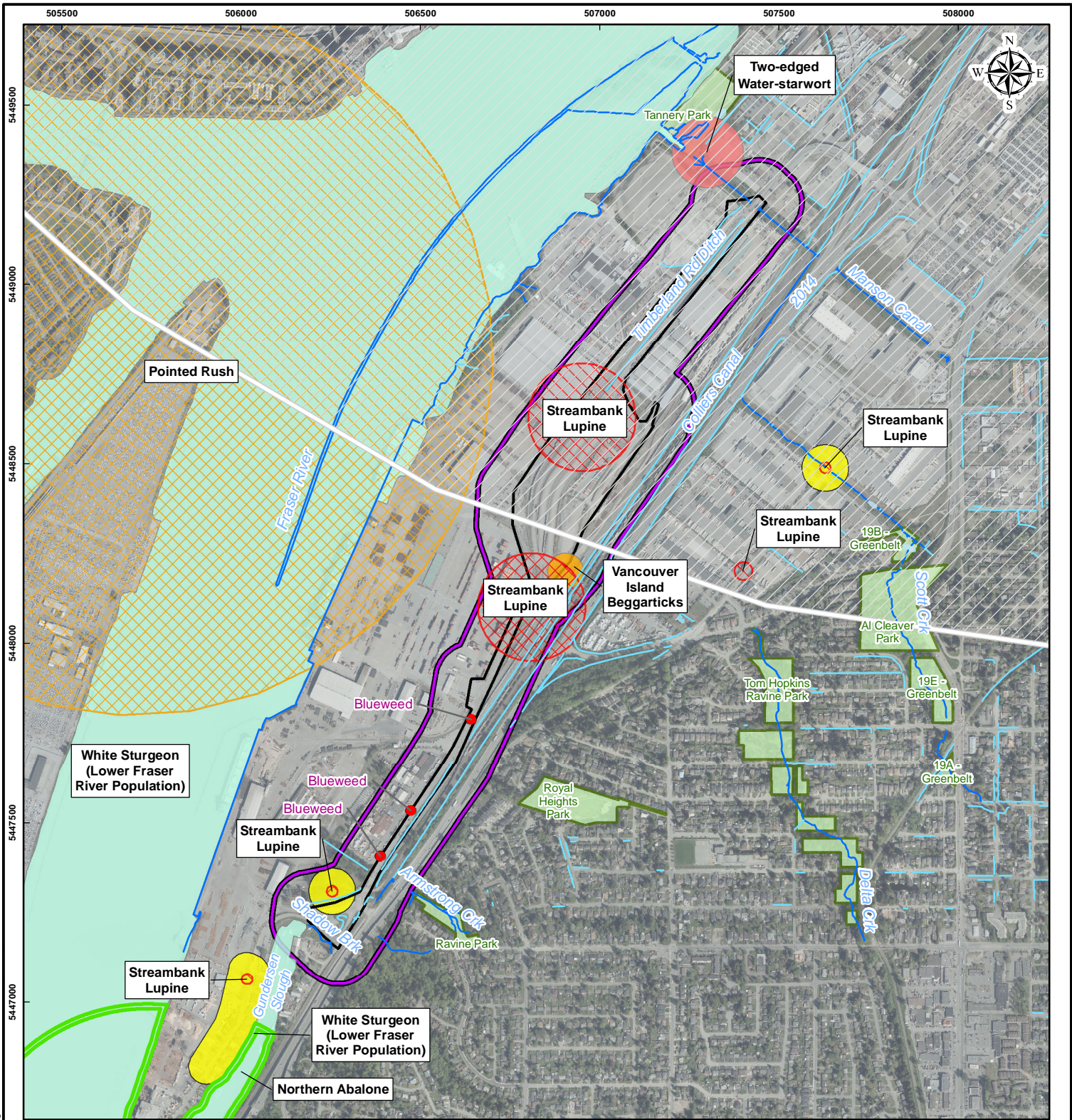
S1=Critically imperiled; S3=Special concern, vulnerable to extirpation or extinction; and SU=Unrankable.

SARA (*Species at Risk Act*) ranking:

The date that the rank was last reviewed is presented in parentheses.

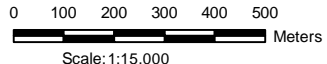
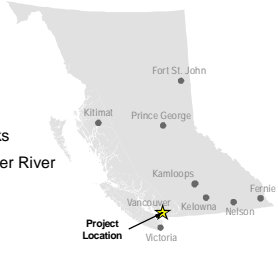
E = ENDANGERED: A species facing imminent extirpation or extinction.

SC = SPECIAL CONCERN: A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events.



Legend

- Populated Place
- IAPP Invasive Plant (Blueweed)
- Ditch
- Creek and River
- ▭ Project Area (100m)
- ▭ Study
- ▭ Parks
- ▭ Streambank Lupine Critical Habitat
- ▭ Waterbody
- ▭ Wetlands
- ▭ CDC Masked Sensitive
- CDC Non Sensitive
- ▨ Pointed Rush
- ▨ Streambank Lupine
- ▨ Two-edged Water-starwort
- ▨ Vancouver Island Beggarticks
- ▨ White Sturgeon (Lower Fraser River Population)
- ▨ DFO Aquatic Species at Risk Distribution 2019
- ▨ Northern Abalone



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

CLIENT: Vancouver Fraser Port Authority	
PROJECT: Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services	
TITLE: Rare / Sensitive Species, Critical Habitat and Invasive Species	
DATE: June 11, 2020	PROJECT NO: 20M-00758-00
Figure 3	
GIS FILE: 01-01-004_Enviro_Feature.mxd	
COORDINATE SYSTEM: NAD 1983 UTM Zone 10N	ANALYST: MY
	REVIEWED: SB

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Manson Canal (Stream Order 2, Magnitude 3) runs through the north portion of the Project footprint, perpendicular to Timberland Road, south of Pine Road and discharges into the Fraser River. Recorded fish species include Lamprey, Pink Salmon, Prickly Sculpin, Peamouth Chub, Threespine Stickleback, Stickleback, Fathead Minnow, Coastal Cutthroat Trout, Coho Salmon, Cutthroat Trout and Sucker (*Catostomus sp.*) (Figure 4). The Coastal Cutthroat Trout is provincially Blue-listed. No Critical Habitat has been mapped on Manson Canal. According to the City of Surrey COSMOS Map, Manson Canal is classified as Fish Class A, inhabited by fish year-round or potentially year-round. Class A is considered 'streams' as defined by the Provincial *Water Sustainability Act* and Riparian Areas Protection Regulation and fish habitat as defined by the *Federal Fisheries Act*.

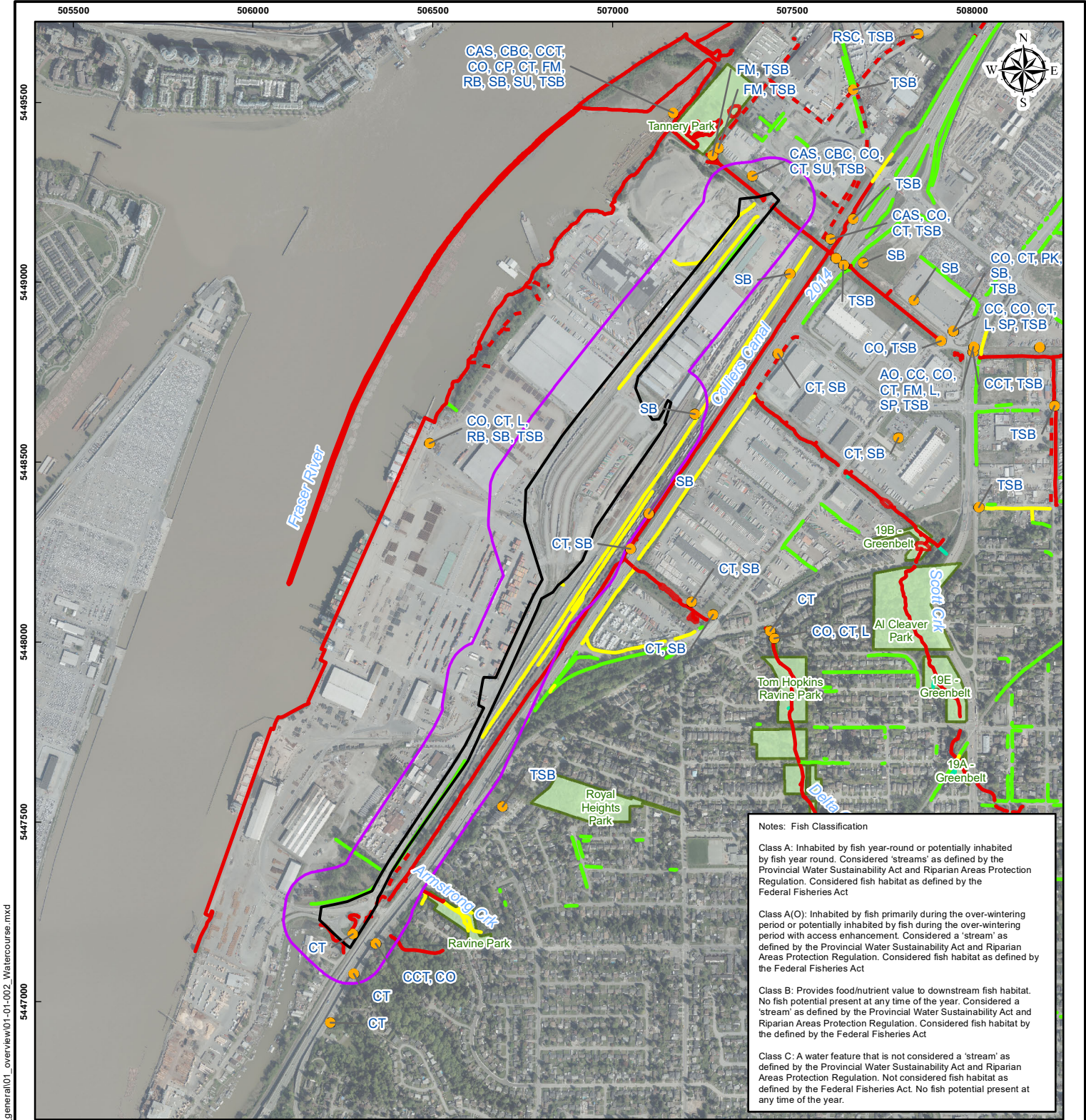
Colliers Canal (Stream Order 2, Magnitude 2) runs on the east boundary of the Project site (Figure 4), parallel to Highway 17. Colliers Canal confluences with Manson Canal at the north end of the Project footprint which then discharges into the Fraser River. Stickleback and Cutthroat Trout have been observed in Colliers Canal. According to the City of Surrey COSMOS Map, Colliers Canal is also classified as Fish Class A, which means that the creek is inhabited by salmonids year-round or potentially inhabited year-round.

The Timberland Road West and North Ditch, located in the west portion of the Project footprint, does not have publicly available data for fish presence/distribution; however, they are classified as Fish Class B by the City of Surrey, which indicates that they provide food / nutrient value to downstream fish habitat. No fish potential is present at any time of the year but Class B watercourses are defined as "stream" both provincially and federally.

Gundersen Slough is located approximately 25m southwest of the Project area. Fish species recorded include Threespine Stickleback, Cutthroat Trout, Coastal Cutthroat Trout, Coho Salmon and Rainbow Trout. ECOCAT reports note that Peamouth Chub, Carp, Brown Catfish (Brown bullhead), Threespine Stickleback, Coho Salmon, Northern Pikeminnow and Redside Shiner were observed in various drainage ditches north of the Project area. A culverted construction line network connection (stream order 1, stream magnitude 1) runs underneath the south portion of the Project area and discharges into the Fraser River. Fish species observed upstream include Coho Salmon, Cutthroat Trout, Stickleback, Threespine Stickleback, Rainbow Trout and Lamprey.

The Fraser River is located approximately 350 m west of the Project footprint. Fish species recorded in this area include Threespine Stickleback, Cutthroat Trout, Coho Salmon, Rainbow Trout, Stickleback, Lamprey, Sucker, Fathead Minnow, Carp, Prickly Sculpin and Chub species. According to the CDC, White Sturgeon are present in this area of the Fraser River; the last observation date was 2004. The White Sturgeon Lower Fraser River Population are provincially Red listed and are classified as Threatened by COSEWIC.

The fish bearing creeks within the Project area are located within the City of Surrey's Sensitive Ecosystems Development Permit Area - Streams. A Streamside 50 m buffer area is required from the shoreline of the Fraser River, Manson Canal, Colliers Canal and the Timberland Road Ditch (Figure 5). Colliers Canal and Manson Canal are in a Green Infrastructure Area and have a Green Infrastructure 50m buffer area.



Notes: Fish Classification

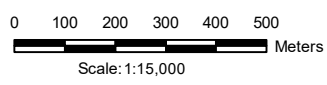
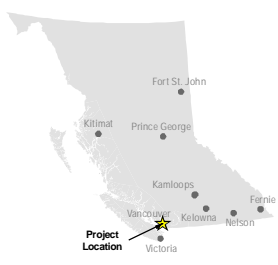
Class A: Inhabited by fish year-round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class A(O): Inhabited by fish primarily during the over-wintering period or potentially inhabited by fish during the over-wintering period with access enhancement. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class B: Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat by the defined by the Federal Fisheries Act

Class C: A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

- Legend**
- Populated Place
 - FISS Point
 - ▭ Project Footprint
 - ▭ Parks
 - ▭ Study Area
 - Watercourse (Fish Classification)**
 - A
 - - - AO
 - B
 - C
 - Unknown



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

CLIENT: PORT of vancouver Vancouver Fraser Port Authority	
PROJECT: Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services	
TITLE: Watercourse	
DATE: June 09, 2020	PROJECT NO: 20M-00758-00
Figure 4	
GIS FILE: 01-01-002_Watercourse.mxd	
COORDINATE SYSTEM: NAD 1983 UTM Zone 10N	ANALYST: MY
	REVIEWED: SB

Y:\GIS\Projects\2020\20M-00758-00_VFPA_Transportation\Mapping\01_general\01_overview\01-01-002_Watercourse.mxd

3.1.2 SITE VISIT

In total, 11 watercourse sites were assessed which included both drainage ditches and watercourses (Figure 2A and 2B). A summary of each site is provided in the sections below and Table 6 provides a summary of each site assessed. Data including, stream characteristics, water quality, and fish habitat ratings are provided in Appendix A-1, A-2 and A-3, respectively.

WATER QUALITY

In situ, water temperatures ranged between 7.0 °C to 9.2°C. The pH ranged from 6.91 to 9.52, the highest being in a drainage ditch (Site 9 North Ditch). Conductivity ranged from 77.6 to 419 µS/cm and salinity ranged from 0.0 to 0.20 ppt. Turbidity of the water for the watercourses and drainage ditches ranged from clear to turbid but turbidity was likely influenced by heavy rains that began in the afternoon when turbid waters were noted. Water quality parameters were compared to the BC Approved Water Quality Guidelines for the protection of Aquatic Life, Wildlife & Agriculture (BC MECCS, 2019). All parameters appeared to be within guidelines or normal for the time of the year except for one higher rating of pH of 9.52 (Site 9 North Ditch). This rating was not so high as to not support aquatic life if it was not sustained for a long period of time. Some of the drainage ditches were noted to have red colored water including Site 5 and 7 (West Ditch).



Table 6 - Summary of Watercourse Sites Assessed on 16 December 2020

Site ID	UTM Easting	UTM Northing	Name	Watershed Code	Description	Drains to	Accessible to fish (Y/N)
Site 1	506859	5448160	Unnamed Stream	None	Small section of watercourse that daylights for approximately 8 m. in the IDC yard. The watercourse is fenced off and was not accessible.	Unknown (likely Fraser River)	Unknown
Site 2	506219	5447189	Shadow Creek (Kendall Creek)	None	Section of stream at south end of project site that parallels Elevator Road. Stream is approximately only 5 m from the road in some sections.	Gundersen Slough	Y
Site 3	506285	5447219	Unnamed	None	Small creek in roundabout at Elevator Road and Robson Road.	Shadow Brook	Y
Site 4	506349	5447371	Unnamed drainage	None	Newly constructed drainage ditch that is perpendicular to Robson Road. The culvert under Robson Road appears clogged.	Other drainage ditch that parallels Robson Road (Site 5) and/or Fraser River	Unknown
Site 5	506317	5447306	Unnamed drainage	None	Drainage ditch that runs parallel to train tracks next to Elevator Road. Flow appears to come from under Robson Road from Site 6.	Unknown (likely Fraser River)	Unknown
Site 6	506400	5447382	Unnamed drainage	None	Drainage ditch between Robson Road and train tracks.	Culvert drains across Robson Road to Site 5.	Unknown
Site 7	507395	5449178	Unnamed drainage (West Ditch)	None	West drainage ditch next to Timberland Road South and train tracks.	Manson Canal	Unknown
Site 8	507398	5449156	Unnamed drainage	None	Asphalt and riprap drainage ditch between Timberland Road South and Westran Property.	Culvert drains to Site 7	Unknown
Site 9	507393	5449215	Unnamed drainage (North Ditch)	None	North drainage ditch on Timberland Road North.	Manson Canal	Unknown
Site 10	507444	5449200	Manson Canal	100-018500	Canal under Timberland Road.	Fraser River	Y
Site 11	507109	544856Sout	Unnamed drainage	None	Drainage ditch located south east of Timberland Road South next to IDC yard.	N/A	N

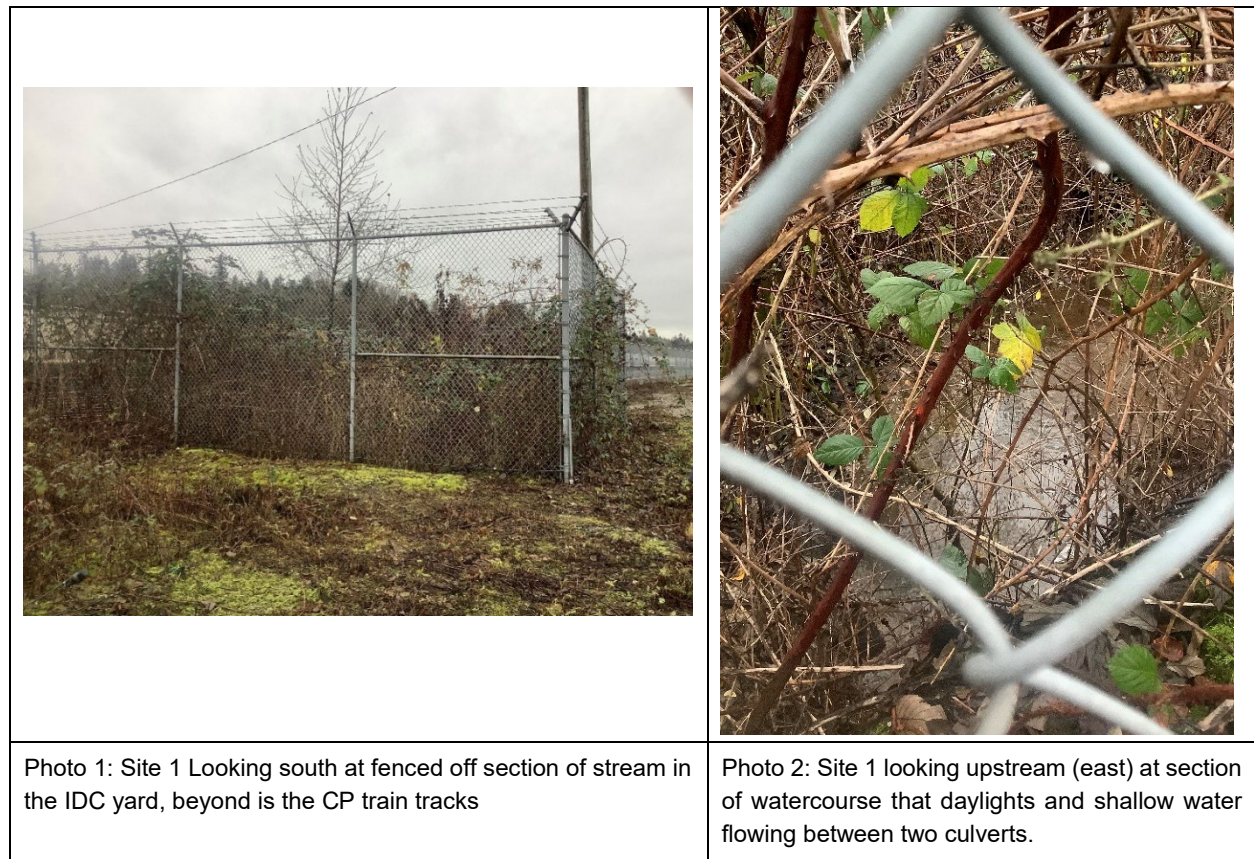
Notes: ID = identification, UTM is Universal Transverse Mercator, m = meters, Y = yes, N = no, N/A = not applicable.

3.1.2.1 FISH HABITAT

SITE 1

Site 1 is an unnamed watercourse that daylights for approximately 8 m in the IDC Yard (Table 6, Figure 2A). There is a fence with razor wire (Photo 1) that prevents access to the watercourse, therefore the watercourse was assessed visually. Water was observed flowing west between two culverts only the east culvert could be seen and was approximately 500 mm, the outlet culvert did not appear to be perched (Photo 2). The channel width is approximately 3.0 m in width and the wetted with of approximately 2.5 m and appeared shallow approximately 0.10 m in depth. Both the dominant and subdominant substrate was fines and the dominant cover for fish was overhanging vegetation. The banks were sloped and composed of fines. Riparian vegetation included shrubs (Himalayan blackberry), grasses and a few trees. Outside of the fence, the area is kept mowed. Water quality was not measured for this site due to accessibility.

There were no spawning gravels observed, the water level was quite low and seems that rearing habitat would only be available for small or juvenile fish, however this is unlikely due to the accessibility and is therefore rated as poor. Migration to the location is unlikely as only a small section of this stream daylights and the rest is buried via culvert under the train yards. It is unknown where this watercourse originates but it likely drains to the Fraser River. No fish were observed and based on the low flows and accessibility it is unlikely to contain fish.



SITE 2

Site 2 is located at the very south of the project at Shadow Creek which flows into Gunderson Slough. This creek, also known as Kendall Creek, and is approximately 118 m long where it parallels Elevator Road. The creek is only 5 m from Elevator Road in some sections. The entire length of the road is covered in dense blackberry shrubs limiting access from the east side. No access was available from the west (private property).

The creek channel width is 5.0 m wide, the wetted width is 3.5 m wide and the water depth was 0.90 m. Dominant substrate was cobbles and subdominant was fines. The dominant cover for fish was overhanging vegetation and the water depth. The banks were sloped and composed of fines and rip-rap. Riparian vegetation consisted of shrubs and grasses with Himalayan Blackberry on both sides (Photo 3, Photo 4).

There were no spawning gravels observed and the water depth was too deep for salmonid spawning. There was good rearing habitat as the water was deep and cover was provided by overhanging vegetation. A few boulders were also present in the stream. Overwintering and Migration were also considered good due to the depth of the water and no migration barriers were noted in this section of stream. No fish were observed at the time of assessment.



Photo 3: Site 2, Shadow Brook looking downstream (west) towards Gunderson Slough.



Photo 4: Site 2, Shadow Brook looking upstream (east) towards Gunderson Road.

SITE 3

Site 3 is an unnamed watercourse that flows through a series of culverts before its confluence with Shadow Creek. Within the project site it is approximately 150 m long. The watercourse flows from the east side of Robson Road, passes under the road via culvert, and outlets in the middle of the roundabout at Elevator Road. It meanders through the roundabout and then flows via culvert under Elevator Road to the south west towards Shadow Creek. Only the roundabout was accessible for assessment. The culvert to Shadow Brook is metal with sandbag headwall (Photo 5), and the other culvert at Robson Road was buried but flow was still observed overland (Photo 6).

The channel is approximately 1.5 m wide, the wetted width is 1.72 m and the depth was 0.25 m. Dominant substrate was fines and subdominant was gravels. The dominant cover for fish was overhanging vegetation. The banks were undercut or sloped and composed of fines. Riparian vegetation was mostly grass and shrubs including Himalayan blackberry.

No good patches of spawning gravels were observed, and gravels observed were slightly embedded or dispersed throughout the reach. Rearing habitat was considered good for smaller fish but poor for larger fish but may improve at higher flow volumes. There were no migration issues from Shadow Brook, the culvert is not perched, and fish can likely swim up from Shadow Brook at all times of the year. Channel size was larger in the south and then became more constrained farther upstream, likely inhibiting access for larger fish until the culvert under Robson Road. The culvert at Robson Road is buried and likely clogged. Overwintering is good for smaller fish only as there are no deep pools for larger fish and flows were quite low. No fish were observed at the time of assessment.



Photo 5: Site 3 Unnamed Creek, looking downstream (south) at culvert that flows into Shadow Creek.



Photo 6: Site 3 Unnamed Creek looking upstream (east) towards culvert under Robson Road.

SITE 4

Site 4 is a newly constructed 146 m long straight channelized drainage ditch that parallels the road from Fraser Grain Terminal to the Robson Road intersection (Photo 7). Water flow was stagnant between the culverts. The concrete culvert under Robson Road appeared clogged inside with debris (Photo 8).

The channel width and wetted width was similar due to the absence of natural banks characteristics and were approximately 3.6 m wide. The average channel depth was 0.30 m. The dominant substrate was fines with cobbles (likely rip-rap). The dominant cover for fish if accessible is cobbles and the turbidity of the water. The banks are sloped with rip-rap. The vegetation for the banks is beginning to grow with grasses.

No spawning gravels was observed and there was no flow. Rearing is considered poor and is likely only available for small fish. Water temperature may get high in the summer and prohibit fish from using this drainage ditch. Migration to this site is unlikely via any of the culverts. Overwintering is poor, as there are no deep pools. No fish were observed at the time of assessment.



Photo 7: Site 4, drainage ditch looking east towards Robson Road.



Photo 8: Site 4, looking at concrete culvert under Robson Road.

SITE 5

Site 5 is a 180 m long drainage ditch that runs between a set of train tracks next to Elevator Road (Photo 9, Photo 10). Water flow comes from another drainage ditch from Robson Road and flows west towards a culvert. This culvert may outlet at Fraser River.

The channel width is approximately 2.07 m and the wetted width is 1.42 m with a residual pool depth of 0.16 m. The dominant and subdominant substrate is fines, and the dominant cover for fish is overhanging vegetation. The banks are sloped or vertical in some sections and composed of fines. The south bank has recently been mowed and the north bank has shrubs, grasses and a few trees.

There are no spawning gravels, and rearing is only available for small fish and was considered poor. The migration to the ditch is unlikely as the culvert flows underground and likely outlets at the Fraser River. There is a small trash rack at the culvert outlet which appears clogged. Overwintering is poor and likely only available for small fish when water is present and if the site is accessible. No fish were observed at the time of assessment.



SITE 6

Site 6 is a 358 m long drainage ditch between Robson Road and the railroad tracks (Photo 11) that drains south and crosses Robson Street via a small concrete culvert (diameter 320 mm) to outlet into Site 5.

Only the culvert inlet at the south end has a defined channel (Photo 12), the rest of the ditch is wetted area with no defined channel or scour observed. No culvert was observed at the north end of ditch. At the channel inlet the channel width is approximately 1.9 m with a wetted width of 1.10 m and a residual pool depth of 0.16 m. The dominant and subdominant substrate near the inlet is fines. There are some cobbles near the inlet (likely riprap). The banks are sloped and composed of fines or organics. The riparian vegetation is reeds/cattails and grasses.

There is no fish habitat here except for rearing of small fish if they can access, however, it is unlikely that fish can migrate to this location due to the low flows, small culvert size, and portion of underground culvert.



Photo 11: Site 6, looking downstream (south) towards Elevator Road at section of drainage ditch between train tracks and Robson Road.



Photo 12: Looking upstream (north) at small section of defined channel prior to culvert.

SITE 7

Site 7 is a 616 m long, drainage ditch located between the Timberland South road and the train tracks (Photo 13), known as the West ditch for this project. Water collects from the road and train tracks and drains north to a culvert under Timberland Wye intersection. The culvert outlets on the east side of Timberland Road culverts before draining into Manson Canal. The culvert under the Timberland Wye intersection was partially collapsed and buried but was flowing. Water in the ditch was reddish in colour (Photo 14).

The stream channel at the outlet and inlet of the culvert were measured but the rest of the ditch (south-west) is wetted area with no defined channel. Channel width was 0.70 m with a wetted width of 0.57 m and a residual pool depth of 0.02 m. The dominant and subdominant substrate was fines and dominant cover for fish was overhanging vegetation. The banks are sloped and composed of fines. The channel outlet prior to Manson Canal is made up of road grade gravels and there are two small vertical drops of 0.10 and 0.15 m high before flowing into Manson Canal. Riparian vegetation is grass and shrubs and may be periodically maintained at the edge. Further south, vegetation is reeds (cattails), grasses, Himalayan blackberry and scotch broom. The upstream end of the ditch is vegetated and has limited scour before it becomes more inundated with water as it travels towards the Timberland Wye intersection.

There is no spawning habitat, and the existing habitat is poor and likely only suitable for small fish if accessible at higher flows. Access is unlikely from Manson Canal, due to the low flows and buried culvert. This drainage ditch likely only provides food and nutrients downstream and no fish were observed at the time of the assessment.



Photo 13: Site 7 Looking upstream (south) from Timberland Road South and train tracks.



Photo 14: Looking downstream (north) at collapsed metal culvert under Timberland Wye intersection.

SITE 8

Site 8 is a 158 m long drainage ditch between the Westran property and Timberland Road South (Photo 15). Water is collected on pavement surface (Photo 16) and collects into a ditch that flows next to the road. The water flows north east to a concrete culvert partially buried under debris near the Timberland Wye intersection. The culvert likely ties into the drainage for Site 7 and flows into Manson Canal.

The wetted width was 1.60 m and water depth was 0.14 m. No channel measurement was taken as this is a manufactured channel. The substrate in the channel is gravel and rip rap. The banks are sloped and composed of rip-rap up to the grade of the road. There is no vegetation, except a few opportunistic grasses. There was some sedimentation observed coming from the Westran property that flows into the channel. Habitat for fish is considered none to poor and would only support small fish when water is present and if they can access the channel. No fish were observed during the assessment.



Photo 15: Site 8 looking downstream (north) at drainage ditch between Westran property and Timberland Road South.



Photo 16: Site 8 looking upstream at pavement ditch collecting surface runoff.

SITE 9

Site 9 is 298 m long drainage ditch located on the north side of Timberland Road North, know as the North Ditch for this Project. Water flows north through a series of 5 culverts under various property driveways that connect to the Timberland Road North and eventually into Manson Canal. The last culvert is located under an access road next to the canal and is buried under debris but was flowing (Photo 17). In this last section there are also two concrete PVC pipe drainage pipes that flow into the drainage ditch (Photo 18). This drainage ditch is heavily influenced by the adjacent properties. In some sections the water has pooled, in other sections the channel is narrow and gravel and debris from the adjacent properties have fallen into the ditch. There is at least one perched culvert under one of the driveways that has a small drop of 0.2 m.

The mean channel width was 1.25 m and the wetted width was 0.88 m with a residual pool depth of 0.13 m. The dominant and subdominant substrate was fines. The dominant cover for fish is overhanging vegetation. The banks are sloped and composed of either rip-rap or fines. The riparian vegetation consists of reeds, grasses, and shrubs including Himalayan blackberry.

There is no spawning habitat, and the existing habitat is poor and likely only suitable for small fish if accessible at higher flows. Access is unlikely from Manson Canal, due to the low flows and buried culvert. This drainage ditch likely only provides food and nutrients downstream and no fish were observed at the time of the assessment.



Photo 17: Site 9 looking upstream (south) at the North Ditch along Timberland Road North at Timberland Wye intersection. Culvert inlet is buried under the vegetation.



Photo 18: Site 9, looking upstream at North Ditch and two concrete outflow pipe drainages that flow into the ditch along Timberland Road North.

SITE 10

Site 10 is Manson Canal and flows west towards the Fraser River. Both site 7 on the east side (Photo 19) and site 9 on the west side (Photo 20) flow into the canal. The canal is approximately 10m wide and flows through three box concrete culverts under Timberland Road. Water depth, and substrate composition was not taken due to safety concerns and lack of visibility. The banks are sloped and composed of fines where visible. Both sides of the canal have a mix of trees, shrubs and grasses.

No spawning gravels were observed, but rearing, migration and overwintering were considered to be good for both small and large fishes.



Photo 19: Site 7 and 10, looking downstream (north) at unnamed drainage that outlets into Manson Canal on the east side of Timberland Road.



Photo 20: Site 9 and 10, looking downstream (north) at outlet to Manson Canal on the west side of Timberland Road.

SITE 11

There is another ditch approximately 2.7 m wide located at the north-east corner of the IDC yard. The ditch is heavily vegetated and provides drainage between the train tracks and IDC yard which then flows northeast for approximately 100m. There is no scour or water observed at the time of assessment in April. There is no connection either upstream or downstream from this ditch to other watercourses or drainage features. There is no fish habitat in this ditch and is for drainage only.

3.2 VEGETATION

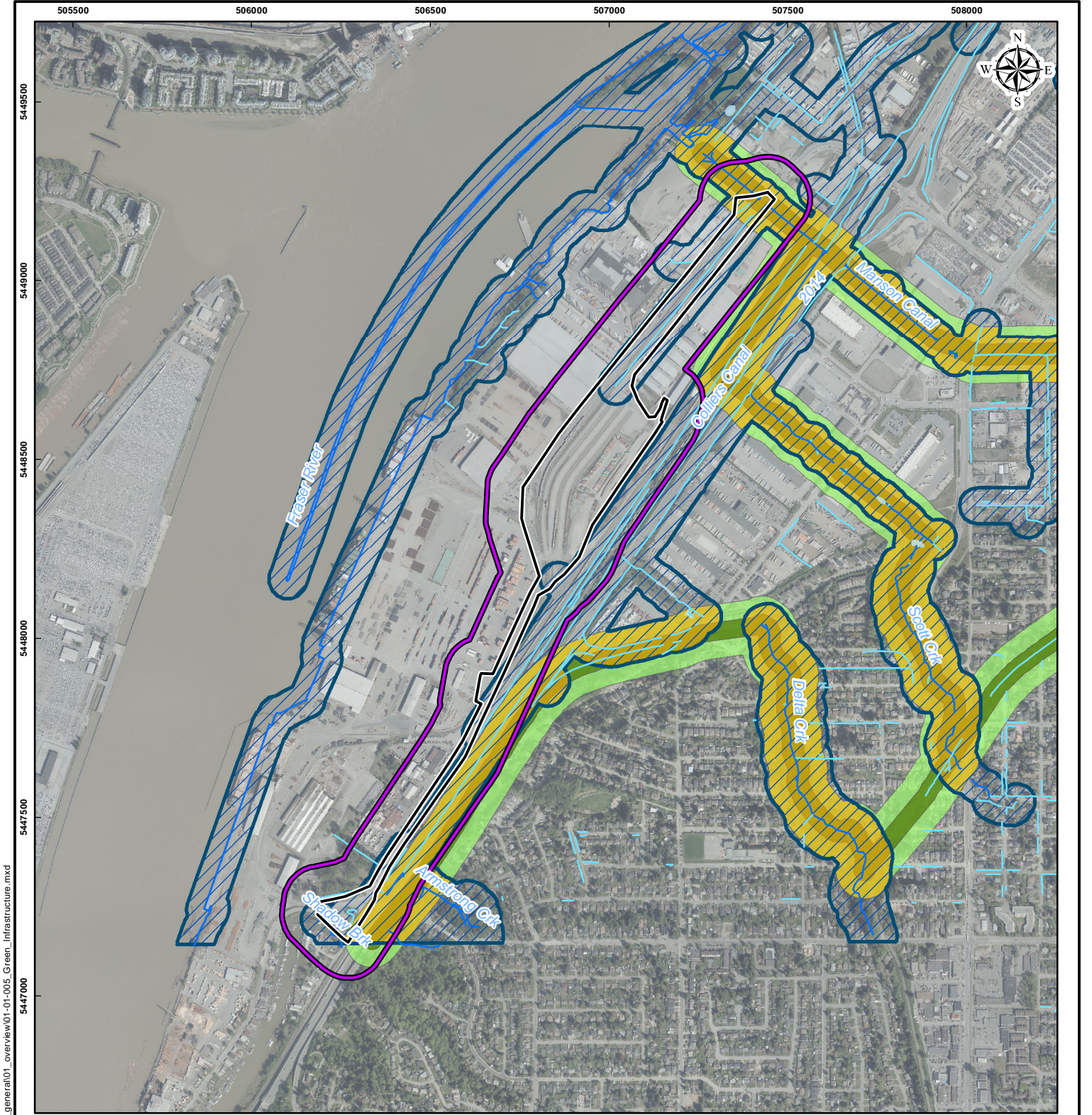
3.2.1 DESKTOP REVIEW

The general environment for the FSPL is predominately anthropogenically effected resulting in small, sporadic, disturbed areas colonized by a variety of native, early succession and invasive vegetation species. The Project area, which is predominately covered by roads, rail and industrial buildings, is located within the Coastal Western Hemlock Very Dry Maritime Biogeoclimatic subzone (CWHxm1). The drier subzones are found only in the central and southern portion of the CWH zone in the rain shadows of the Olympic Mountains, Vancouver Island Ranges, and Coast Mountains (including Metro Vancouver).

3.2.1.1 RARE/SENSITIVE VEGETATION AND ECOLOGICAL COMMUNITIES

A Sensitive Ecosystem Inventory (SEI) was conducted for Metro Vancouver based largely on 2009 aerial photography (Metro Vancouver, 2020). The SEI identifies and maps ecologically significant and relatively unmodified Sensitive Ecosystems, including wetlands, older forests and woodlands using provincial standards. No SEIs, parks, protected recreation or conservation areas were identified with the Project area by Metro Vancouver however as mentioned the City of Surrey has identified portions of the Project Area as Sensitive Ecosystem Development Permit Areas (Figure 5).

A summary of the rare / sensitive plant species, as documented by the BC Ministry of Sustainable Resource Management, is provided in Table 7 below and shown in Figure 3. There are rare ecological communities identified for the CWHxm1. Sixteen communities have been identified within the CWHxm1 subzone in Surrey; 3 within the Flood ecosystem group, 12 within the coniferous forest ecosystem group and 1 within the grassland ecosystem group. Due to the anthropogenic disturbances within the Project footprint it is unlikely that any are present.

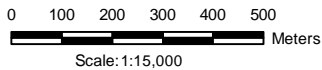


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Legend

- Populated Place
- Ditch
- Creek and River
- Waterbody
- Wetlands
- Parks
- Project Footprint
- Study Area
- Green Infrastructure Network Corridors

- Sensitive Ecosystems Development Permit Area
- Streamside Areas
 - Green Infrastructure Areas
 - Streamside and Green Infrastructure intersect



References:
 Data BC - BC Catalogue
 Open Government License
[\(http://www.data.gov.bc.ca/\)](http://www.data.gov.bc.ca/)
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CLIENT:		Vancouver Fraser Port Authority	
PROJECT:		Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services	
TITLE:		<h2 style="margin: 0;">Green Infrastructure & Streamside Areas</h2>	
DATE:	PROJECT NO:	Figure 5	
June 09, 2020	20M-00758-00		
GIS FILE:		01-01-005_Green_Infrastructure.mxd	
COORDINATE SYSTEM:		ANALYST:	REVIEWED:
NAD 1983 UTM Zone 10N		MY	SB

Table 7 - Plant Species Considered “at Risk” under Provincial and / or Federal Legislation that May Inhabit the Project Study Area

English Name	Scientific Name	Provincial Status	SARA / COSEWIC	Last Date Observed	Project Footprint	Project Area (100 m Buffer)
Streambank lupine	<i>Lupinus rivularis</i>	S1 (Red)	Schedule 1 / E (Nov 2002)	July 2013	Yes	Yes
Two-edged water-starwort	<i>Callitriche heterophylla</i> var. <i>heterophylla</i>	SU	Not applicable	Sept 10 1989	No	Yes
Vancouver Island beggarticks	<i>Bidens amplissima</i>	S3 (Blue)	Schedule 1 / SC (Nov 2001)	Sept 6 1988	Yes	Yes

Provincial Status:

Red: Includes any indigenous species or subspecies that have- or are candidates for- Extirpated, Endangered, or Threatened status in British Columbia. Not all Red-listed taxa will necessarily become formally designated.

Blue: Includes any indigenous species or subspecies considered to be of Special Concern (formerly Vulnerable) in British Columbia. Blue-listed taxa are at risk, but are not Extirpated, Endangered or Threatened.

S1=Critically imperiled: S3=Special concern, vulnerable to extirpation or extinction; and SU=Unrankable.

SARA (Species at Risk Act) ranking:

The date that the rank was last reviewed is presented in parentheses.

E = ENDANGERED: A species facing imminent extirpation or extinction.

SC = SPECIAL CONCERN: A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events.

Two clusters of Streambank lupine are overlapped by the Project footprint along Timberland / Robson Roads and the associated rail lines. A third population of Streambank lupine, located at the southern end of the Project, is not directly affected but falls within the Project area (100 m buffer). A federally designated 50 m Critical Habitat buffer applies to these Streambank lupine areas. The Recovery Strategy for the Streambank Lupine (Environment Canada 2016) describes the current status of the species, protection measures implemented and supporting information for working in areas where it is present.

Existing Permit no. SARA-PYR-2019-0480 authorizes the Vancouver Fraser Port Authority to harm and kill individuals (seed, seedlings and mature plants) of Streambank Lupine during the clearing of habitat identified as Critical Habitat, for the expansion of railway lines at Site 2b and during habitat enhancement activities at Site 2a (Government of Canada, 2019). Site 2b appears to overlap with the Project area and site (Streambank Lupine Recovery Team, 2014). As part of the SARA permit application, the Vancouver Fraser Port Authority proposed to offset any disturbance at Site 2b by enhancing the nearby sub-population of streambank lupine identified in Site 2a, located south of Site 2b near Alaska Way. The enhancement works in Site 2a are approved under the SARA permit. The permit includes enhancement and monitoring activities at Site 2a over a 5-year period and includes the removal of competing vegetation and appropriate maintenance activities to encourage seed germination and seedling establishment (e.g. watering and fine-scale vegetation maintenance).

A single small clump of two-edged water-starwort was observed submerged at high tide along the muddy shore of Mason Canal on September 10, 1989. Not directly overlapped by Project as it is located ~ 90 m north of Project’s northern limits.

No Vancouver Island beggarticks were observed on September 12, 2008, despite extensive surveys of ditches southwest of Grace Rd. and Fraser Way, on the east side of Bridge Road and along the railway up



to 200 m east of previously reported location. The CDC data search indicated that this species was last observed (and samples collected) on September 6, 1988 (Figure 3).

3.2.1.2 INVASIVE PLANT SPECIES

Several invasive plant species inhabit the FSPL (DataBC 2020). Based on available secondary data blueweed (*Echium vulgare*) labelled as BW on Figure 3, is the most common invasive plant species located within the Project footprint. Blueweed is categorized as regional containment / control which means the management objective is to prevent further expansion into new areas within the region through establishment of containment lines. Two other invasive plant species, Japanese knotweed (*Fallopia japonica*) and Scotch broom (*Cytisus scoparius*), fall just outside of the 100 m buffer.

3.2.2 SITE VISIT

A preliminary site visit was conducted on 16 December, 2020 and a follow-up assessment was completed on 20 April, 2021 to better document the plant species present within the Project footprint, in particular the presence of streambank lupine and Vancouver Island beggartick. Table 8 provides a summary of vegetation that was observed during the December 2020 and April 2021 site visits.

During the field survey conducted in April 2021 no occurrences of Streambank lupine were observed. Streambank lupine naturally occupies open, nutrient-poor, sandy or gravelly, river or creek bank sites at low elevations proximal to the coast, generally having little competitive ground cover (COSEWIC 2002). These habitats are usually prone to flooding and are frequently scoured and modified. Streambank lupine often use highly disturbed habitat for annual colonization, likely to avoid competitive exclusion of other plants. Typical habitats where this species survives today include railway right of ways (ROWs), roadside edges, open industrial sites, and dykes, many of which are frequently cleared of vegetation or disturbed in other ways. Many of the potential sites where this species might occur were heavily colonized by Himalayan blackberry and reed canary grass, excluding other species.

Vancouver Island beggarticks were not observed in the Project footprint during the April 2021 assessment but seedlings of this annual species typically appear in mid to late April or May so it is possible that seedlings were not present at the time of the assessment. No suitable habitat was observed during survey; this species occurs on narrow alluvial shoreline margins of lakes, ponds, creeks, bogs, tidal estuaries, and in ditches and other wet areas that undergo annually fluctuating water levels, summer drawdown, and siltation. Although ditches were observed, water levels were already extremely low and the degree of invasive plant colonization and the extremely poor water quality likely limits the potential for this species to occur.

It was confirmed that due to the anthropogenic disturbances within the Project footprint no rare plant communities are present. As well, no intact Sensitive Ecosystems were noted although there are several riparian ecosystems present that were heavily colonized with Himalayan blackberry and reed canarygrass.

A preliminary site visit was conducted on 16 December, 2020 with a follow up site visit on 20 April, 2020. Table 8 provides a summary of vegetation that was observed within the Project footprint.



Table 8 - Summary of Vegetation Species Encountered during Survey

Common Name	Scientific Name	Type ¹	Site #1	Site #1a	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Site #11
alfalfa	<i>Medicago sativa</i>	2								✓				✓
arbutus	<i>Arbutus menziesii</i>	1		✓										
bigleaf maple	<i>Acer macrophyllum</i>	1				✓								
bittercress	<i>Cardamine sp.</i>	2	✓	✓								✓		
black cottonwood	<i>Populus trichocarpa</i>	1		✓	✓			✓		✓		✓	✓	✓
blueweed	<i>Echium vulgare</i>	2,3	✓						✓	✓				
bull thistle	<i>Cirsium vulgare</i>	2,3										✓		
butterfly bush	<i>Buddleia davidii</i>	2,3	✓											
canada bluegrass	<i>Poa canadensis</i>	1			✓		✓		✓	✓				
Canada goldenrod	<i>Solidago canadensis</i>	1	✓	✓	✓		✓	✓		✓	✓			✓
changing forget-me-not	<i>Myosotis discolor</i>	2	✓									✓		
cleavers	<i>Galium aparine</i>	1										✓		
common burdock	<i>Arctium minus</i>	2,3										✓		
common cattail	<i>Typha latifolia</i>	1	✓			✓			✓	✓		✓	✓	
common groundsel	<i>Senecio vulgaris</i>	2,3		✓								✓		
common horsetail	<i>Equisetum arvense</i>	1	✓			✓	✓		✓	✓	✓	✓	✓	✓
common juniper	<i>Juniperus communis</i>	1				✓								
common mullein	<i>Verbascum thapsus</i>	2												✓
common rush	<i>Juncus effusus</i>	1						✓		✓		✓		
common snowberry	<i>Symphoricarpos albus</i>	1						✓						
creeping buttercup	<i>Ranunculus repens</i>	1			✓				✓			✓		
dandelion	<i>Taraxacum officinale</i>	2								✓	✓	✓		
early winter cress	<i>Barbarea verna</i>	2,3		✓										
english plantain	<i>Plantago lanceolata</i>	2								✓		✓		✓
evening primrose	<i>Oenothera biennis</i>	2		✓				✓		✓				✓
fireweed	<i>Epilobium angustifolium</i>	1					✓		✓	✓		✓		



Common Name	Scientific Name	Type ¹	Site #1	Site #1a	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Site #11
hardhack	<i>Spiraea douglasii</i>	1						✓	✓					<input type="checkbox"/>
hawkweed	<i>Hieracium sp.</i>	2									✓			
hedge bindweed	<i>Calystegia sepium</i>	2,3										✓		
hedge mustard	<i>Sisymbrium officinale</i>	2								✓		✓		
herb-Robert	<i>Geranium robertianum</i>	2									✓			
Himalayan blackberry	<i>Rubus armeniacus</i>	2,3	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
hoary rock moss	<i>Racomitrium lanuginosum</i>	1	✓	✓										
Hooker's willow	<i>Salix hookeriana</i>	1				✓		✓		✓		✓		
japanese knotweed	<i>Reynoutria japonica</i>	2,3				✓								
lady fern	<i>Athyrium filix-femina</i>	1				✓								
Nootka rose	<i>Rosa nutkana</i>	1				✓								
Pacific willow	<i>Salix lucida</i>	1								✓				
purple loosestrife	<i>Lythrum salicaria</i>	2,3						✓	✓	✓				
red alder	<i>Alnus rubra</i>	1	✓			✓						✓	✓	
red-osier dogwood	<i>Cornus sericea</i>	1			✓	✓						✓		
reed canarygrass	<i>Phalaris arundinacea</i>	2,3			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
rhododendron	<i>Rhododendron macrophyllum</i>	1				✓								
salmonberry	<i>Rubus spectabilis</i>	1				✓								
Scotch broom	<i>Cytisus scoparius</i>	2,3								✓			✓	✓
Scouler's willow	<i>Salix scouleriana</i>	1								✓				
scouring rush	<i>Equisetum hyemale affine</i>	1				✓				✓				
sheep sorrel	<i>Rumex acetosella</i>	2								✓				
silver birch	<i>Betula pubescens</i>	2		✓										
slough sedge	<i>Carex obnupta</i>	1								✓		✓		
smooth cat's ear	<i>Hypochaeris glabra</i>	2,3	✓	✓								✓		
spiny sow-thistle	<i>Sonchus asper</i>	2,3								✓	✓			
spotted touch-me-not	<i>Impatiens capensis</i>	2										✓		
st johns wort	<i>Hypericum perforatum</i>	2,3	✓	✓						✓	✓	✓		✓



Common Name	Scientific Name	Type ¹	Site #1	Site #1a	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8	Site #9	Site #10	Site #11
stork's bill	<i>Erodium cicutarium</i>	2									✓			
tansy	<i>Tanacetum vulgare</i>	2,3	✓		✓	✓				✓		✓	✓	✓
tansy ragwort	<i>Jacobaea vulgaris</i>	2,3									✓	✓	✓	
western white clematis	<i>Clematis ligusticifolia</i>	1									✓			
wild carrot	<i>Daucus carota</i>	2												✓
wintercress	<i>Barbarea vulgaris</i>	2,3									✓			

Note: 1= native, 2 = introduce, 3 = invasive, check mark indicates presence.

3.3 WILDLIFE

3.3.1 DESKTOP REVIEW

3.3.1.1 RARE/SENSITIVE WILDLIFE AND ASSOCIATED WILDLIFE HABITAT

Following a review of the Project site characteristics, historical observations and available information sources, it appears that there is minimal potential for rare/sensitive wildlife species to use the Project area. However, the Project overlaps the northern limits of a secured CDC mapped area, identified as Object ID: 38160 (Figure 3), and a request was sent to the CDC to clarify if the proposed Project needs to address potential effects on the masked species. The result is that the masked species will not interact with the proposed Project and that the occurrence is over 1 km away from the Project footprint.

Due to the proximity of the Fraser River and nearby terrestrial habitats there is the potential for various bird species to visit the Project area. It is highly unlikely that rare or sensitive bird species inhabited the Project footprint and 100 m buffer due to limited habitat and on-going disturbance. The Provincial *Wildlife Act* provides protection for the eggs and active nests of all birds during breeding season. Section 34 of the *Act* states "A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:

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

By default, protection of nests includes the protection of the trees containing them. Subsections 34(a) and (c) have generally been interpreted to protect the active nests of all birds during breeding season, which can begin in February and continue through August 15. The nests of the six birds listed in subsection (b) of the Provincial *Wildlife Act* are protected regardless of the time of year, or whether or not they are active. At the Federal level the *Migratory Birds Convention Act* (1994) provides similar protection for all migratory birds, during the breeding season in the Lower Mainland which is approximately March 1 to August 31 (Birds Canada, 2020).

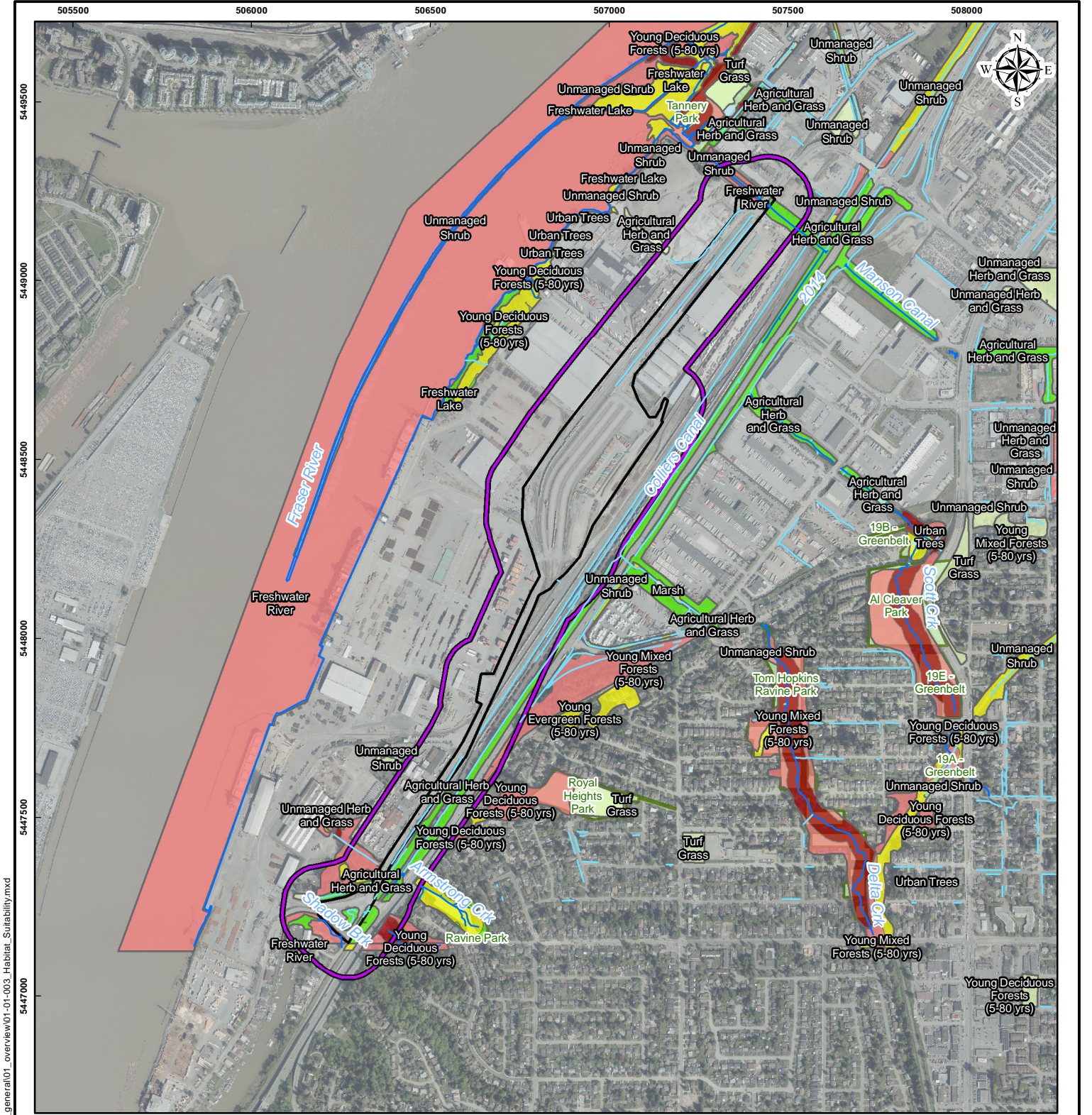
The City of Surrey has an inventory of vegetation communities and their habitat suitability ranking for wildlife based on the habitat type of the mapped polygon (Figure 6). The ecological value was identified as very high, moderate high, moderate, low and very low. The higher end of the rankings was found on the more natural environments including creeks and their riparian areas, and forested parks. The lower valued habitat occurred in rights-of-way and open space parks. The higher ranked habitat suitability polygons occur in the southern portion of the Project area however most of it is located outside the Project footprint.

The City in cooperation with the BC Nature Wildlife Tree Stewardship program maintains a database of bald eagle nests. An eagle nest tree is noted south of the Project area near the Alex Fraser Bridge on the south bank of the Fraser and another on the south bank of the Fraser River across the northern end of Annacis Island.



3.3.1.2 *IMPORTANT BIRD AREAS*

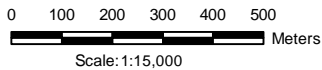
The Boundary Bay - Roberts Bank - Sturgeon Bank (Fraser River Estuary) Important Bird Area (IBA BC017) is a large interconnected mix of marine, estuarine, freshwater and agricultural habitats that includes the waters of Sturgeon Bank, between the north and south arms of the Fraser River, and Roberts Bank, south of the south arm of the Fraser River. This IBA is rated as follows: globally significant for Congregatory Species, Waterfowl Concentrations, Colonial Waterbirds/Seabird Concentrations, Shorebird Concentrations; continentally Significant for Congregatory Species; and Nationally Significant for Threatened Species, Congregatory Species, Wading Bird Concentrations. Threats to IBA BC017 associated with the Project would be limited to direct and indirect effects on the aquatic environment associated with construction activities and improved / increased traffic.



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Legend

- Populated Place
 - Ditch
 - Creek and River
 - Waterbody
 - Wetlands
 - Parks
 - Project Footprint
 - Study Area
- Suitability Ranking
 - Very High
 - Moderate High
 - Moderate
 - Low
 - Very Low



References:
 Data BC - BC Catalogue
 Open Government License
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CLIENT: **PORT of vancouver** Vancouver Fraser Port Authority

PROJECT: Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services

TITLE: **Habitat Suitability**

DATE: June 09, 2020	PROJECT NO: 20M-00758-00	Figure 6
GIS FILE: 01-01-003_Habitat_Suitability.mxd		
COORDINATE SYSTEM: NAD 1983 UTM Zone 10N		ANALYST: MY
		REVIEWED: SB



3.3.2 SITE VISIT

A preliminary site visit was conducted on 16 December 2020. Based on the timing of the site visit it was recommended that a follow-up site visit be conducted in Spring/Summer to identify birds. During the preliminary site survey, a bald eagles nest was observed at Site 4 near the entrance to the Fraser Grain Terminal at the end of the drainage ditch farthest from Robson Road (Figure 2A, Photo 21). Also observed was deer scat located in the roundabout at Elevator Road. The follow-up site visit occurred on April 20, 2021. Biologists assessed the Sites included in the December 2020 for the presence of wildlife and their habitat. Birds were the only species group detected during the site visit and included mostly resident species (Table 9).



Photo 21: Bald Eagle nest located near the entrance to Fraser Grain Terminal

Table 9 - Bird Species Encountered during April 20, 2021 Survey

Common Name	Latin Name	Status*	Location
Tree swallow	<i>Tachycineta bicolor</i>	Migratory	Throughout site
Red-winged blackbird	<i>Agelaius phoeniceus</i>	Year-round resident	Along ditch embankments
Northwestern crow	<i>Corvus caurinus</i>	Year-round resident	Throughout site
Killdeer	<i>Charadrius vociferus</i>	Year-round resident	Outside IDC yard
Song sparrow	<i>Melospiza melodia</i>	Year-round resident	Shrubby areas
Pine siskin	<i>Spinus pinus</i>	Year-round resident	Throughout site
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	Year-round resident	Shrubby areas
House sparrow	<i>Passer domesticus</i>	Year-round resident	Shrubby areas
Bald eagle	<i>Haliaeetus leucocephalus</i>	Year-round resident	Throughout site



A pair of killdeer were observed copulating outside the IDC yard in an area of gravel with some herbaceous cover and could use other areas of the Site where this habitat is present including parking lots and roadsides. This species can also use gravel rooftops for breeding sites. The remainder of the species observed could also use the Site as a breeding site however would be located within the shrub or forested areas of the Site. Later migrant species not detected during the survey could also use the gravelly areas, shrub and forested areas of the Site.

4 POTENTIAL PROJECT EFFECTS AND MITIGATION MEASURES

4.1 PROJECT INTERACTIONS

High-level potential project interactions for each project component and road section are summarized in Table 9 below and may include:

- Direct effects to vegetation including several rare / sensitive species;
- Direct and indirect effects to birds;
- Direct and indirect effects to fish and fish habitat; and
- Direct and indirect effects to water quality.

All proposed at-grade railway crossing upgrades will be within existing disturbance areas and there are no anticipated interactions from these activities with fish and fish habitat, vegetation, or wildlife. Therefore at-grade railway crossing upgrades will not be discussed further unless the designs for these upgrades change upon design completion.

Potential effects for the new roadway connection for Timberland South Road and the pavement rehabilitation for Robson Road. The environmental assessment below will provide a more detailed assessment of those project interactions, effects and mitigation measures and residual effects for fish and fish habitat, vegetation and wildlife.

Table 10 - Project Activities and Potential Effects

Component/Road Section	Project Activities	Potential Effect
At-Grade Railway Crossing Upgrades	<ul style="list-style-type: none"> – Extending crossing surfaces by 5 m – Painting – Updating/installing signage 	<ul style="list-style-type: none"> – None anticipated. All upgrades to be within existing disturbance areas.
New Roadway Connection for Timberland Road South to Robson Road	<ul style="list-style-type: none"> – Widening / realignment of existing roads – Construction of new roads – Riparian area and instream works – Infilling of West and North ditch and a drainage ditch along new proposed roadway. 	<ul style="list-style-type: none"> – Disturbance / removal of terrestrial vegetation, shrubs and trees – Direct mortality, physical injury or behavioral change to birds due to habitat disturbance or removal of nests – Direct / indirect effects to listed rare / sensitive vegetation species

Component/Road Section	Project Activities	Potential Effect
	<ul style="list-style-type: none"> – Clearing of vegetation 	<ul style="list-style-type: none"> – Decrease in water quality due to sedimentation or mobilization of historical soil contamination – Disturbance / loss of riparian area or instream freshwater habitat – Direct mortality, physical injury or behavioral change to fish due to instream works
Pavement Rehabilitation and Pavement Markings along Robson Road	<ul style="list-style-type: none"> – Pavement resurfacing of existing road – Vegetation maintenance along roundabout at Elevator Road. – Painting surfaces 	<ul style="list-style-type: none"> – Decrease in water quality due to contamination due to spills or leaks from equipment or machinery into nearby watercourses. – Disturbance / loss of riparian area or instream freshwater habitat.

4.2 POTENTIAL EFFECTS AND MITIGATION MEASURES

4.2.1 FISH AND FISH HABITAT

4.2.1.1 GENERAL PROJECT EFFECTS AND MITIGATION

DFO has developed Pathways of Effects (PoEs) (DFO 2018) and *Measures to Protect Fish and Fish Habitat* (DFO 2019) to help assess the potential for project-related activities for death to fish or to result in the harmful alteration, disruption or destruction (HADD) of fish habitat. Construction activities were reviewed and assessed using DFO’s PoEs to determine the extent of potential residual effects that may result in the death of fish, or a HADD.

The PoEs identified for this project include both land-based activities and in-water activities that may occur during construction and include:

- Excavation: the process of removing soil and rock from the land, achieved through mechanical cutting, digging, or scooping which leaves a cut, cavity, trench or depression in the land surface.
- Grading: The process of altering a land surface or adjusting the landscape slope for drainage, achieved through manual or mechanical compaction, cutting, filling, or smoothing operations.
- Dredging: the physical removal of materials including rocks, bottom sediments, plants, debris, sand, and refuse from the bed of a waterbody/watercourse for the purpose of excavating, cleaning, deepening, widening, or lengthening a watercourse.
- Use of Industrial equipment: use of mechanical equipment for the purpose of construction and transportation and generally any activity where machinery is working on land or in water.
- Vegetation clearing: the removal or clearing of existing terrestrial vegetation within a tract of land, achieved through manual or mechanized removal of vegetation.



- Change in timing, duration, and frequency of flow: the change can be caused by water extraction, installation of culverts, stream bank erosion and sediment deposit, and the construction of temporary dams.
- Placement of materials or structures in water: this could include the placement of rip-rap, infill material, dams or other structures that either fully or partially obstruct the flow of water.
- Riparian planting: planting terrestrial vegetation adjacent to a waterbody or watercourse. This could involve the use of fertilizers, site preparation methods, and introduction of native and non-native plant species.

Potential effects from these PoEs on fish and fish habitat include:

- Change in water temperature;
- Change in base flow;
- Change in habitat structure and cover;
- Change in sediment concentrations;
- Change in nutrient concentrations;
- Change in food supply; and
- Change in contaminant concentration.

Many of these potential effects can occur in multiple pathways or activities and can be interrelated but they can be summarized into the following: changes in fish habitat including riparian habitat, changes in surface water quality and changes in surface water quantity. These effects are further described in the sections below along with applicable mitigation measures.

Potential effects from the Project can be avoided or minimized by implementing appropriate mitigation measures. If after implementation of mitigation measures the effects are not completely avoided or minimized, they will be carried forward as a residual effect which is described in the section 4.1.2. Numerous BMPs, guidelines, and mitigation measures exist to avoid the death of fish, or a HADD. Documents that provide recommendations for reducing the likelihood of death or a HADD include:

- Standards and Best Practices for Instream Works (British Columbia Ministry of Water, Land and Air Protection [BC MWLAP], 2004b);
- A Users Guide to Working In and Around Water (BC MOE, 2009);
- Reduced Risk Instream Work Windows Ministry of Environment, Lower Mainland Region (BC MOE, 2006);
- Measures to Protect Fish and Fish Habitat (DFO, 2019);

Measures included in these guidelines and BMPs are generally effective for avoiding or reducing serious harm to fish if implemented correctly and adapted as necessary to local site conditions.

A preliminary Construction Environmental Management Plan (CEMP) and various other environmental protection plans are available in the Appendix B. Table 10 provides a summary of example Protection Plans that may be included during construction. The CEMP outlines how construction of the Project will minimize effects on fish and fish habitat will be finalized prior to construction. To check compliance with the CEMP and any site-specific environmental protection plans prepared by a contractor, a qualified environmental monitor will observe all construction activities around watercourses. These monitors will



have the authority to recommend if, when and where additional mitigation may be necessary and to stop work if prescribed mitigation measures are not being implemented or are being implemented incorrectly. Additional environmental plans that may be required include Contractor Environmental Protection Plan, and a Fish Salvage Plan. A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

Table 11 - Protection Plans Prepared for the Works

Project Activity	Environmental Protection Plans
<ul style="list-style-type: none"> – Widening / realignment of existing roads – Construction of new roads 	<ul style="list-style-type: none"> – CEMP which includes best management practices for construction activities and specifically outlines protection measures for rare / sensitive species (terrestrial and aquatic environments as required) – Vegetation Plan – Spill Response Plan for construction – Contractor Environmental Protection Plan (EPP) – Updated Environmental Management Plan for operations
<ul style="list-style-type: none"> – Riparian area and instream works 	<ul style="list-style-type: none"> – Riparian Habitat Restoration/Compensation Plan

4.2.1.2 CHANGES TO FISH AND RIPARIAN HABITAT

The destruction and alteration of fish habitat can occur from clearing/construction vehicles or machinery in the vicinity of aquatic habitats. The destruction and alteration of habitat can occur following clearing of trees and vegetation along watercourse leading to changes in bank stability resulting in erosion and sediment into nearby watercourses. Loss of riparian vegetation can reduce organic debris inputs that provide nutrients and organic litter into stream that are important for benthic invertebrate production. Shade helps reduce summer temperatures and overhanging vegetation provides cover for fish.

NEW ROADWAY CONNECTION FOR TIMBERLAND SOUTH ROAD

Potential effects to fish and riparian habitat may occur during the removal of riparian vegetation due to road expansion and ditch infilling along Timberland Road South, and Timberland Wye Intersection. Machinery will be required to remove vegetation, excavate for new stormwater pipes and then infilling of ditches. The ditches that flow into Manson Canal including Site 7 and 9 are food and nutrient streams only and are unlikely to contain fish. They may be dry for part of the year and are considered to have poor habitat quality for fish that may be in the area. Riparian vegetation is composed mostly of invasive species including blackberry. Therefore, it is unlikely that fish would use the riparian vegetation for cover. Anticipated effects from riparian vegetation removal are limited to downstream effects including loss of food and nutrients, erosion and sedimentation and changes in temperature. The other unnamed ditch located by the IDC yard is assumed to contain water for the purposes of this assessment and has been included in the removal of riparian vegetation.

To limit effects, watercourses will be avoided where possible including Site 1 in the IDC yard. Ditches will only be infilled to accommodate the functional safety of the new road but will continue to function in part or in whole. Because not all of the ditch infill and riparian vegetation removal can be avoided there will be residual effects from these construction activities which is outlined in 4.1.2.1 Residual Effects including the loss of approximately 3,690m² of riparian habitat and 123m² of instream habitat. Invasive vegetation will be removed and disposed of according to an Invasive Species Management Plan.

To avoid downstream effects to fish and fish habitat including changes in temperature and sedimentation, work should be conducted in the dry when there is no water in the ditch. If there is water in the ditch then



it is recommended that the site be isolated and that qualified environmental professional conduct a fish salvage prior to construction to avoid the death of fish. It is unlikely that fish are present in these ditches due to the quality of habitat and low flow rates, however access is available from Manson Canal. It is also recommended that work be conducted during the least risk period for fish that may be present in the area which is August 1 to September 15 in the Lower Mainland based on the presence of fish species in Mason Canal. (Table 4.3). A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

Table 12 - Least risk timing window (unshaded) for Lower Mainland Fish Species

Fish Species	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainbow, Steelhead, Cutthroat												
Pacific Salmon												

- Source: BC MOE, 2006.

PAVEMENT REHABILITATION AND PAVEMENT MARKINGS ALONG ROBSON ROAD

Potential effects to fish and riparian habitat may occur during vegetation maintenance within the roundabout. Regular riparian vegetation maintenance could reduce the riparian function of the stream (Site 3) in the roundabout including a change of food supply from existing conditions. There are no anticipated effects to fish habitat as no instream works will occur for this section of road. All works will be conducted within the existing footprint.

Vegetation within the roundabout included grasses and shrubs including the presence of the invasive Himalayan blackberry, there are no trees along this section of road that would require cutting. To reduce the effects of vegetation clearing the following mitigation measures include but are not limited to:

- Limit vegetation cutting as much as possible;
- Avoid clearing or grubbing near the watercourse;
- Conserve low growing vegetation (grasses);
- The use of an invasive species management plan for managing invasive plant species that may be encountered.

It is expected that the proper implementation of these measures will avoid any change to fish and riparian habitat and are there are no anticipated residual effects to water quality. A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

4.2.1.3 CHANGES TO WATER QUALITY

Water quality in streams can change through increased erosion caused by disturbing watercourse beds and banks during clearing, grubbing, grading and dredging activities. The on-site presence of machinery and equipment may also lead to deleterious substances such as fuel, oil and grease entering watercourse.

NEW ROADWAY CONNECTION FOR TIMBERLAND SOUTH ROAD

Construction activities in the North and West ditches (Site 7 and Site 9) may result in change to water quality downstream into Manson Canal. During operations the impervious surface will capture runoff



including any contaminants including fuel, oil and grease to enter the new storm system which outlets into Manson Canal.

To avoid and minimized these effects, the following mitigation measures include but are not limited to:

- Work in the dry if possible, if not isolate and pump water around construction site;
- Installation and implementation of erosion and sediment control measures prior to construction activities;
- Ensure machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, or soils from other sites;
- Conduct work from top of bank;
- Refuel and wash equipment off site or at least 100 m away from waterbodies or watercourses;
- Schedule instream work to avoid wet, windy or rainy periods;
- Avoid work in existing riparian vegetation to prevent sediment from entering nearby watercourse;
- Backfill and compact excavations as soon as possible;
- Ensure clean infill is used and immediately stabilize banks; and
- Any instream work will be conducted in the preferred timing window (unshaded), identified in Table 11 for the species potentially present in this Project.

In addition, during operations of the new road, an oil water separator will be placed at the outlet of the new storm sewer to prevent oil from entering the watercourse that may be collected from the road surface. It is expected that the proper implementation of these measure will avoid any change to water quality and are there are no anticipated residual effects to water quality. A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

PAVEMENT REHABILITATION AND PAVEMENT MARKINGS ALONG ROBSON ROAD

Vegetation within the roundabout included grasses and shrubs including the presence of the invasive Himalayan blackberry. During construction vehicles required for pavement rehabilitation may spill deleterious substances such as fuel, oil, and grease that may enter watercourses. Equipment required for vegetation maintenance on site may spill deleterious substances such as fuel, oil, and grease that may enter watercourses. In addition, herbicide use may be required to remove weed species from the right-of-way during operations/maintenance. Using herbicides may input toxins into nearby watercourses and waterbodies, which can affect fish and interrupt life processes.

To avoid and minimized these effects, the following mitigation measures include but are not limited to:

- Through the use of flagging or fencing, delineate the work zone and clearly mark the limits to active construction and the access and egress locations to avoid watercourses and waterbodies;
- Conserve low growing vegetation (grasses);
- Installation and implementation of erosion and sediment control measures prior to construction activities;
- Ensure machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, or soils from other sites;
- Refuel and wash equipment off site or at least 100 m away from waterbodies or watercourses; and



- Avoid the use of pesticides/herbicides near watercourses.

It is expected that the proper implementation of these measure will avoid any change to water quality and are there are no anticipated residual effects to water quality. A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

4.2.1.4 CHANGES TO WATER QUANTITY

NEW ROADWAY CONNECTION FOR TIMBERLAND SOUTH ROAD

The infill of drainage ditches and construction of new storm systems and drainage areas along new proposed Timberland Road can result in change of flow discharging into Manson Canal. The increase of impervious surface due to road widening may result in increased flows into nearby drainage ditches. To avoid changes to flow rates into Manson Canal the project proposes to place a flow control manhole that regulates the release rate to the pre-development flow rates.

During construction, additional mitigation measures include but are not limited to working in the dry season when there is no flow expected (late summer). If flows are present, then the site will be isolated, and water will be pumped around to maintain flows.

It is expected that the proper implementation of these measures and design features will avoid any change to water quantity and are there are no anticipated residual effects to water quantity. A summary of the potential interaction and associated effects and their proposed mitigation is presented in Table 12.

PAVEMENT REHABILITATION AND PAVEMENT MARKINGS ALONG ROBSON ROAD

Regular riparian vegetation maintenance could reduce the riparian function of the stream (Site 3) in the roundabout including a change of baseflows from existing conditions.

Vegetation within the roundabout included grasses and shrubs including the presence of Himalayan blackberry. Measures to avoid or minimize the loss of riparian vegetation include but are not limited to the following:

- Limit vegetation cutting as much as possible.
- Avoid clearing or grubbing near the watercourse;
- Conserve low growing vegetation (grasses) so as to prevent stormwater from directly entering the stream.

It is expected that the proper implementation of these measures and design features will avoid any change to water quantity and are there are no anticipated residual effects to water quantity. A summary of the potential interactions and associated effects and their proposed mitigation is presented in Table 12.

Table 13 - Summary of Potential Interactions and associated effects and their proposed mitigation

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
New Timberland Road South (New Road and infill of Ditch at NE corner of IDC yard)	Excavate existing ditch and remove existing culvert and heavy vegetative growth within the ditch with excavators. Remove headwall.	300 m ²	May 2022	None anticipated no fish habitat	N/A. Dry vegetated dry ditch for drainage only	None anticipated vegetated dry ditch for drainage only	<ul style="list-style-type: none"> – Install ESC Measures. – Operate machinery from top of bank. – Ensure machinery is clean prior to work. – Work in the dry if possible. – Restore flows through new pipes. 	None anticipated if all mitigations measures are properly implemented.
	Clear and grub ground cover vegetation with excavators operating on existing road. Upon completion of clearing and grub, reshape and recompact subgrade.	1,746 m ²	March – Apr 2022	None anticipated no fish habitat	N/A. Dry vegetated dry ditch for drainage only	None anticipated vegetated dry ditch for drainage only	<ul style="list-style-type: none"> – Maintain ESC Measures – Dispose cleared and grubbed material off-site as work progresses. – Ensure machinery is clean prior to work. 	None anticipated if all mitigations measures are properly implemented.
	Fill ditch with specified base material with excavator operating from the top of bank. Compact material with compaction equipment. Reshape the ground condition suitable for grading	235 m ²	Jun – July 2022	N/A	N/A. Dry vegetated dry ditch for drainage only	None anticipated vegetated dry ditch for drainage only	<ul style="list-style-type: none"> – Maintain ESC Measures. – Use of clean infill materials. 	None anticipated if all mitigations measures are properly implemented.
	Place new asphalt pavement structure using a loader,	1981 m ²	Sept – Nov 2022	N/A	N/A. Dry vegetated dry ditch	None anticipated vegetated dry	<ul style="list-style-type: none"> – Maintain ESC Measures. 	None anticipated if all mitigations measures

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
	dump truck, paver, and compactor on the road.				for drainage only	ditch for drainage only	<ul style="list-style-type: none"> – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	are properly implemented.
	At areas outside of proposed roadway, infill ditch with approved native material with a loader, complete with topsoil and hydroseeding.	65 m ²	Aug - Sept 2022	N/A	N/A . Dry vegetated dry ditch for drainage only	None anticipated vegetated dry ditch for drainage only	<ul style="list-style-type: none"> – Operate machinery from top of bank – Ensure machinery is clean prior to work. – Use of clean infill materials and sterile soil. – Use native seeds. 	None anticipated if all mitigations measures are properly implemented.
Existing Timberland Road South (Partial Infilling of the West Ditch)	Pump water (as needed) with a dewatering pump in the ditch.	3,046 m ² riparian vegetation	May - July 2022	N/A	Change in base flows	Change in sediment concentrations and or contaminants. Change in water temperature.	<ul style="list-style-type: none"> – Install ESC Measures – Conduct works within the timing window. – Work in the dry if possible. – Isolate and divert water. – Conduct fish salvage if required. 	None anticipated if all mitigations measures are properly implemented
	Clear heavy vegetative growth along bottom of existing ditch with excavator. Excavate slope along the area of road widening.		Jul - Aug 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Operate machinery from top of bank. 	None anticipated if all mitigations measures are properly implemented

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
							<ul style="list-style-type: none"> – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	
	Fill the exposed side of ditch with light-weight fill material and compact with an excavator.		Sept - Oct 2022	Loss of food and nutrient supply	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Operate machinery from top of bank. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. – Use of clean infill materials and sterile soil. 	Loss of 3,046 m ² of riparian habitat.
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.	1,792 m ²	Oct - Nov 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	None anticipated if all mitigations measures are properly implemented
Timberland Wye Intersection (Road Widening and Ditch Infill)	Clear and grub heavy vegetative growth above ground including all underbrush, deadwood, and surface debris with mowers on the road	114 m ²	July - Aug 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Install ESC Measures – Dispose cleared and grubbed material off-site as work progresses 	None anticipated if all mitigations measures are properly implemented

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
	Reshape the ground condition suitable for grading on the road.		July - Aug 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	None anticipated if all mitigations measures are properly implemented
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.		July – Aug 2022	Loss of food and nutrient supply	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	Loss of 114 m ² of riparian vegetation.
	Isolate the Timberland Road North ditch and pump water (if needed) with a dewatering pump in the ditch.	230 m ² ; this area includes the total impacted area of the ditch. 106 m ² of Riparian Vegetation. Only 123 m ² below high water mark.	Jun 2022	Loss of food and nutrient supply	Change in base flows	Change in sediment concentrations and or contaminants. Change in water temperature.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Operate machinery from top of bank – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. – Work in the dry if possible. – Isolate and divert water. – Restore flows through new pipes to 	None anticipated if all mitigations measures are properly implemented.

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
							<ul style="list-style-type: none"> pre-development flows. – Refer to CEMP for specific information. 	
	Excavate existing ditch and remove existing culvert and heavy vegetative growth within the ditch above ground with excavators.		Jul - Aug 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Operate machinery from top of bank. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	None anticipated if all mitigations measures are properly implemented.
	Fill ditch with specified base and pipe bedding material with excavator. Compact material with compaction equipment. Install new 600mm concrete pipe with headwalls on either side of pipe.		Sept - Oct 2022	Loss of food and nutrient supply	Change in base flows	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Operate machinery from top of bank. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. – Restore flows to Manson Canal through pipe to pre-development flows. – Use of clean infill materials and sterile soil. 	Loss of 106 m ² of riparian habitat. Loss of 123 m ² of instream habitat.

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
	Place new asphalt pavement structure using a loader, dump truck, paver, and compactor on the road.		Oct - Nov 2022	N/A	N/A	Change in sediment concentrations and or contaminants.	<ul style="list-style-type: none"> – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. 	None anticipated if all mitigations measures are properly implemented
Gunderson Road, Elevator Road and Robson Road (Pavement resurfacing)	Cut existing asphalt pavement and mill surface layer of asphalt using a milling machine on the road.	No additional extension of existing footprint	May – June 2022	N/A	N/A	Change in contaminants.	<ul style="list-style-type: none"> – Works will be conducted in existing footprint. – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. – Avoid working near streams. – Delineate and flag setbacks for existing riparian vegetation. 	None anticipated if all mitigations measures are properly implemented
	Sweep or wash the exposed surface and repair cracks (if required) on the asphalt surface using crack-sealing material.	No additional extension of existing footprint	May – June 2022	N/A	N/A	N/A	<ul style="list-style-type: none"> – Works will be conducted in existing footprint. – Maintain ESC Measures. – Avoid refueling near watercourse. 	None anticipated if all mitigations measures are properly implemented

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
							<ul style="list-style-type: none"> – Ensure machinery is clean prior to work. – Avoid working near streams. – Delineate and flag setbacks for existing riparian vegetation. 	
	Apply a layer of tack coat and place new asphalt pavement using a loader, dump truck, paver, and compactor on the road.	No additional extension of existing footprint	May – June 2022	N/A	N/A	N/A	<ul style="list-style-type: none"> – Works will be conducted in existing footprint. – Maintain ESC Measures. – Avoid refueling near watercourse. – Ensure machinery is clean prior to work. – Avoid working near streams. – Delineate and flag setbacks for existing riparian vegetation. 	None anticipated if all mitigations measures are properly implemented
	Vegetation maintenance during operations	Unknown	May – June 2022 and Ongoing	Loss of food and nutrient supply	Change in base flows	Change in sediment concentrations and or contaminants	<ul style="list-style-type: none"> – Avoid clearing or grubbing riparian vegetation. – Limit the amount of vegetation to be pruned. 	None anticipated if all mitigations measures are properly implemented

Road Section	Instream Activities/Works Description and Construction Stage	Area of Impact (Dimensions and Footprint)	Proposed Duration and Time of Year for Construction	Potential Aquatic and Riparian Benefit or Impact			Proposed Avoidance/Mitigation Measure	Residual Effect
				Aquatic Ecosystem Values	Water Quantity	Water Quality		
							<ul style="list-style-type: none"> – Avoid the use of pesticides/herbicides – Avoid working near streams. – Ensure machinery is clean prior to work. – Avoid refueling equipment near watercourses. 	

Notes: m² = meters squared, N/A = not applicable, ESC = erosion and sediment control, CEMP = construction environmental management plan.

4.2.2 VEGETATION

A summary of project effects and their mitigation measures is provided in Table 13. A summary of species at risk and the potential effects and mitigation measures is provided in a Species at Risk Assessment Report. Due to clearing and grubbing activities there is a potential to reduce native plant communities within the project footprint and result in the spread of invasive species. The use of construction vehicles and replanting may also introduce invasive species on site. Construction activities in at Robson Road and Elevator Road may encroach upon Streambank Lupine critical habitat.

To prevent the loss of Streambank Lupine critical habitat near Robson Road and Elevator Road, construction activities will avoid disturbing vegetation. Only the existing road will be excavated and resurfaced. Construction vehicles will be staged in such a way to minimize disturbance in this Critical Habitat area. Any critical habitat will be clearing demarcated to avoid accidental infringement on Streambank Lupine critical habitat. To avoid or reduce the potential for the spread of invasive species, all machinery or equipment should arrive on site in good clean condition. Replanting of vegetation should be done using native seed mixes or plants. Any topsoil used should be sterile prior to planting.

4.2.3 INVASIVE SPECIES

Invasive species encountered during preliminary site visit included: Himalayan blackberry (*Rubus armeniacus*), Scotch Broom (*Cytisus scoparius*), St. John's Wort (*Hypericum perforatum*), Japanese knotweed (*Reynoutria japonica*), Butterfly bush (*Buddleia davidii*), purple loosestrife (*Lythrum salicaria*), blueweed (*Echium vulgare*) and reed canary grass (*Phalaris arundinacea*). Further details regarding any invasive species removal and monitoring is presented in the Invasive Species Management Plan. In general, the plan includes guidelines on limiting the introduction of invasive plants, early detection and eradication methods, disposal of plant material, replanting with native species and monitoring recommendations.

4.2.4 WILDLIFE

A summary of project effects and their mitigation measures is provided in Table 13. A summary of species at risk and the potential effects and mitigation measures is provided in a Species at Risk Assessment Report. The noise from construction vehicles and clearing of vegetation has the potential to result in the mortality of birds nesting in the vicinity of the project. Clearing of vegetation, including trees and shrubs can also result in the loss of habitat for birds.

Where possible, avoid clearing and/or grubbing operations for construction during the regional breeding bird nesting period as defined by Environment and Climate Change Canada to minimize the risk of any contravention of the Migratory Birds Convention Act provisions.

If clearing cannot be avoided, then a pre-clearing bird nest survey must be completed by a Qualified Environmental Professional (QEP). Bird nest surveys should be completed within the first 3-4 hours after sunrise and should not be undertaken during periods of inclement weather (heavy rain) or under windy conditions (Beaufort Scale > 2). The QEP must have sufficient experience with bird biology and identification. Survey length will depend on QEPs assessment of habitat and should include an area of 30 m outside of the clearing and grubbing area if applicable. Observed nests that are in good condition must be considered active until an assessment can determine the status. A no work buffer zone will be placed around any active nests and the QEP will determine the set back. The buffer zone will depend on a number



of factors including; surrounding vegetative cover, species sensitivity, existing disturbance and the type of construction activity. The survey will occur before any vegetation clearing or ground works are to occur, and vegetation removal or ground work must initiate within 48 hours of the end of the survey. If an active nest is present, a management plan can be completed to ensure that this nest is not disturbed by the construction.

Sensitive areas around active nests within the project areas includes:

- For raptors, no active nests within 100 m from the working area;
- Songbirds; no active nests within 50 m from the working area;
- Waterbirds; no active nest within 60 m from the working area.

Bald eagle, peregrine falcon, osprey and great blue heron nest are protected year round, and a QEP should confirm that these species are not nesting in the areas where vegetation will be removed.

Table 14 - Summary of potential interactions, associated effects and proposed mitigation for Vegetation and Wildlife

Component	Potential Effect	Mitigation	Residual Effect
Plant Communities	Loss of Native Plant Communities as a result of road widening and construction	Avoid ground disturbance where possible and stage clearing areas. Clearly flag all areas that will be undisturbed prior to clearing works.	Loss of riparian and terrestrial plant communities Loss of 1,746 m ² of terrestrial vegetation
	Introduction of invasive plant species during construction and operations	Machinery should arrive on site in good clean condition. Replanting should occur with native seed mixes or plants. An invasive plant management control plan will outline measures to manage invasive plants species encountered onsite. Use of sterile (certified weed free) soil for covering disturbed areas.	None anticipated if mitigations measures are properly implemented.
Vegetation Species of Conservation Concern	No anticipated potential effects on SARA listed plant; streambank lupine was not present during the site assessment and suitable habitat for Vancouver Island Beggarticks was not observed. No Loss of other at-risk plant species due to vegetation removal during road widening and construction and continual maintenance during operations is possible	Limit construction to existing footprint. Construction is not anticipated to occur near streambank lupine critical habitat however demarcating (flag) could prevent accidental encroachment. If a plant species of conservation concern is noted during pre-construction or construction, work should be halted and a biologist should be consulted. Terms and conditions will be summarized in the CEMP	None anticipated if mitigations measures are properly implemented.

Component	Potential Effect	Mitigation	Residual Effect
Birds	Loss of habitat due to vegetation clearing during construction	Avoid ground disturbance where possible and stage clearing areas. Clearly flag all areas that will be undisturbed prior to clearing works. Replant vegetation with native seed mixes and plants.	Loss of 1,746 m ² of terrestrial vegetation, Quality to Wildlife to be determined during site visit.
	Mortality due to vegetation clearing	Conduct a bird nest surveys prior to construction, by a QEP. Work within the timing windows for birds	None anticipated if mitigations measures are properly implemented.
	Sensory disturbance from construction vehicles and increased traffic during operations.	A QEP will monitor any active nests prior to construction and during construction to determine if there is a disturbance. Mitigation measures to reduce sensory effects will be implemented.	None anticipated if mitigations measures are properly implemented.
Mammals	Loss of habitat due to vegetation clearing during construction	Avoid ground disturbance where possible and stage clearing areas. Clearly flag all areas that will be undisturbed prior to clearing works. Replant vegetation with native seed mixes and plants.	Loss of 1,746 m ² of terrestrial vegetation, Quality to Wildlife to be determined during site visit.
	Mortality due to vegetation clearing	Minimal risk, identify general wildlife mitigation in CEMP	None anticipated.
	Sensory disturbance from construction vehicles and increased traffic	Minimal risk, identify general wildlife mitigation in CEMP.	None anticipated.
Amphibians and Reptiles	Loss of habitat due to vegetation clearing during construction	Avoid ground disturbance where possible and stage clearing areas. Clearly flag all areas that will be undisturbed prior to clearing works. Replant vegetation with native seed mixes and plants.	Loss of 1,746 m ² of terrestrial vegetation. Quality to Wildlife to be determined during site visit.
	Mortality due to vegetation clearing	Pre-clearing amphibian salvage pre-construction to reduce effects on all species potentially present.	None anticipated.
	Sensory disturbance from construction vehicles and increased traffic	Pre-clearing amphibian salvage pre-construction to reduce effects on all species potentially present.	None anticipated.

Component	Potential Effect	Mitigation	Residual Effect
Wildlife Species of Conservation Concern	Loss of habitat due to vegetation clearing during construction	Potential for presence of wildlife species of conservation concern determined during site visit. Pre-clearing bird nest surveys and amphibian salvage pre-construction to reduce effects on all wildlife species potentially present.	None anticipated if mitigations measures are properly implemented.
	Mortality due to vegetation clearing	Potential for presence of wildlife species of conservation concern determined during site visit. Pre-clearing bird nest surveys and amphibian salvage pre-construction to reduce effects on all wildlife species potentially present.	None anticipated if mitigations measures are properly implemented.
	Sensory disturbance from construction vehicles and increased traffic	Potential for presence of wildlife species of conservation concern determined during site visit. Pre-clearing bird nest surveys and following terms and conditions of CEMP to reduce effects on all wildlife species potentially present. If Bald Eagle nests are active during construction, created a Bald Eagle Management Plan and monitor.	one anticipated if mitigations measures are properly implemented.

4.3 RESIDUAL EFFECTS

4.3.1 RESIDUAL EFFECTS FOR FISH AND FISH HABITAT

Due to the infill of the north ditch at Timberland Wye intersection to accommodate a right turning lane, and the partial infill of the west ditch to widen the Timberland Road South, there will be a loss of instream and riparian vegetation at these locations. It is not anticipated that instream habitat will be lost in the West Ditch as the ditch next to the train tracks will remain and the flows into Manson Canal will remain the same. Table 14 provides the breakdown of the habitat changes associated with the project. These ditches are for drainage of the roads only and are likely not considered streams under the *Water Sustainability Act*.

Table 15 - Habitat Balance

Sites Description of work	Stream Channel		Aquatic Ecosystem Impacts			Riparian Impacts		
	Length (m)	Width (m)	Loss (m ²)	Gain (m ²)	Net (Loss-Gain) (m ²)	Loss (m ²)	Gain (m ²)	Net (Loss-Gain) (m ²)
<i>Infilling of North Ditch at Timberland Wye intersection and along Timberland Road South (Site 9 and near Site 10)</i>	24.6	5.0	123	0	-123	106 (North Ditch) + 114 (Timberland Road next to Manson Canal)	0	-106+114
<i>Infilling of West Ditch along Timberland Road South (Site 7)</i>	600	3 (width of ditch)	0	0	0	3,046	0	-3,046

Notes: m = meters, m² = meters squared.

4.3.2 RESIDUAL EFFECTS FOR VEGETATION

Due to the proposed expansion and road widening of Timberland Road South there will be 1,746 m² of terrestrial vegetation that will be removed to accommodate the new road grades. It is anticipated that the existing roadway will be removed and replanted using a native seed mix. Further details will be provided in a Vegetation Plan.

4.3.3 RESIDUAL EFFECTS FOR WILDLIFE

The wildlife assessment confirms that there are no anticipated residual effects to wildlife due to project activities or footprint if mitigation is followed.

5 SUMMARY AND CONCLUSIONS

This document has been prepared in support of the Project and Environmental Review Application to the VFPA. This report can also be used for DFO Request for Review and the application for Section 11 Works in and around a Stream Authorization once design is 90% completed and there are no major changes to proposed activities or disturbed areas. Assessment updates to Fish and Fish Habitat, Vegetation and Wildlife will be finalized once design is completed. Other PER documents may also require updates including the Vegetation Plan, Bird Nest Survey Assessment, Invasive Species Assessment, and the Species at Risk Assessment.

A detailed CEMP has been prepared and should be updated once design is completed and will be submitted with Tender documents. The CEMP will include BMPs and project-specific mitigations measures to be put in place during construction to avoid or reduce the potential impacts to fish habitat, wildlife and vegetation.

Due to the loss of fish habitat and riparian vegetation from ditch infilling, these areas may have to be offset either onsite or at another location. A *Fisheries Act* Authorization as well as an Authorization under the *Water Sustainability Act* may be required. Onsite locations can include the enhancement of existing riparian areas and disturbed areas. The amount of offsetting can be determined once design is 90% complete. Site locations should have similar habitat features and should provide at minimum a 2:1 ratio of compensation.



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APPENDIX

A SITE DATA



APPENDIX

A-1 *STREAM CHARACTERISTICS*

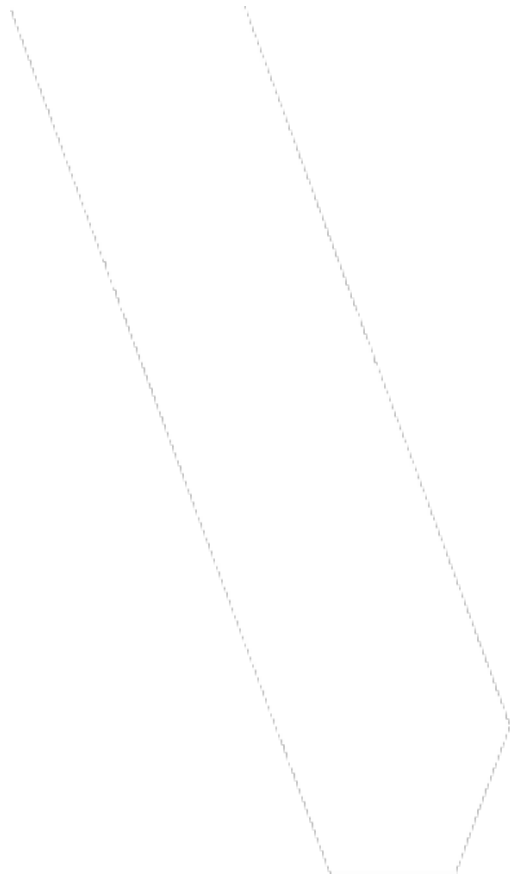




Table 1 – Summary of habitat characteristics

Site ID	Channel width (m)	Wetted Width (m)	Residual Pool depth (m)	Bankfull depth (m)	Gradient (%)	Crown Closure (%)	Dominant bed material	Subdominant bed material	Dominant Cover types	Cover Total	Bank description	Riparian vegetation description	Riparian Vegetation
Site 1	~ 3.0 m	~ 2.5 m	~ 0.10 m	~ 0.2.0 m	~1	1-20%	Fines	Fines	Overhanging vegetation	5-20%	sloped, fines	Shrubs, grasses and a few trees	Himalayan Blackberry, Alder, Common Tansy, Reed grass, Red osier dogwood
Site 2	5.00	3.50	0.90	0.90	1	1-20%	Cobbles	Fines	Overhanging vegetation	Moderate	Sloped, fines, rip-rap closest to road (RB)	Shrubs and grasses	Himalayan Blackberry on both banks
Site 3	1.50	1.72	0.25	0.46	1	1-20%	Fines	Gravels	Overhanging vegetation	Moderate	Undercut, fines	Shrubs and grasses	Himalayan blackberry, reed grass
Site 4	3.60	3.60	0.30	0.40	1	1-20%	Fines	Cobbles	Turbidity	<5%	Sloped rip-rap	grasses initial phase	Grass
Site 5	2.07	1.42	0.16	0.20	1	1-20%	Fines	Fines	Overhanging vegetation	<5%	Vertical, sloped fines	Shrubs, grasses and a few trees on RB, recently mowed on LB	Himalayan Blackberry
Site 6	1.90	1.10	0.05	0.10	1	1-20%	Fines	Fines	Overhanging vegetation	5-20%	Fines, sloped	Grasses	Cattails, Himalayan Blackberry
Site 7	0.70	0.57	0.02	0.10	1, 10 at outlet	1-20%	Fines	Fines	Overhanging vegetation	<5%	Fines/rip-rap, sloped	Grasses	Cattails, Himalayan Blackberry, Scotch Broom
Site 8	N/A	1.60	0.14	N/A	1	0%	riprap	riprap	Riprap	<5%	sloped/rip-rap	Grasses	Grass
Site 9	1.25	0.88	0.13	0.18	1, 10 at outlet	1-20%	Fines	Fines	Overhanging vegetation	<5%	sloped/rip-rap and fines	Shrubs and grasses	Grass, Himalayan Blackberry
Site 10	10	10	no data	no data	1	21%-40%	no data	no data	Overhanging vegetation	Moderate	Sloped	Shrubs and grasses	Himalayan Blackberry, Grasses, some trees on Left bank
Site 11	2.7	N/A	N/A	N/A	1	0%	N/A	N/A	N/A	N/A	Sloped	Shrubs and grasses	Himalayan Blackberry and grass in the ditch

Notes: ID = Identification, m = meters, % = percent, RB = right bank, LB = left bank, N/A = not applicable.



APPENDIX

A-2 *WATER QUALITY*

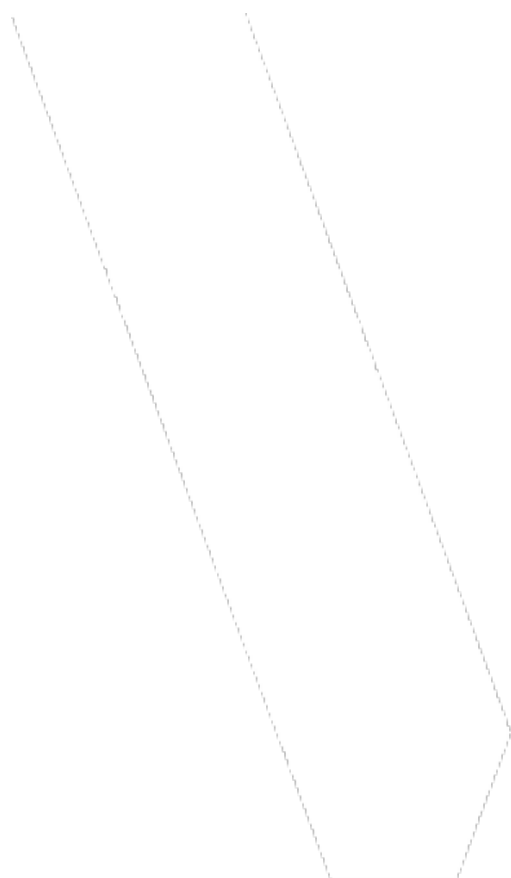




Table 1 – Summary of In Situ Water Quality Parameters Collected 16 December 2020.

Site ID	Water Temperature (°C)	pH	Conductivity (µS/cm)	TDS (ppm)	Salinity (ppt)	Turbidity (visual)
Site 1	No site access	No site access	No site access	No site access	No site access	Clear
Site 2	9.2	8.17	265	189	0.10	Clear
Site 3	9.4	7.72	273	193	0.10	Clear
Site 4	6.7	8.49	77	56	0.00	Turbid
Site 5	8.1	7.27	384	275	0.20	Lightly Turbid
Site 6	7.1	6.91	218	149	0.10	Clear
Site 7	7.1	7.38	183	128	0.00	Turbid
Site 8	See site 7	See site 7	See site 7	See site 7	See site 7	Turbid
Site 9	7.0	9.52	419	300	0.20	Turbid
Site 10	7.1	7.57	212	145	0.10	Turbid
Site 11	N/A	N/A	N/A	N/A	N/A	N/A

Notes: ID = Identification, °C = Celsius, µS/cm = micro Siemens per centimeter, ppm = parts per million, ppt = parts per trillion, N/A = not applicable no water.



APPENDIX

A-3 *HABITAT QUALITY*





Table 1 – Summary of In Situ Water Quality Parameters Collected 16 December 2020.

Site ID	Spawning	Rearing	Migration	Overwintering	Comments
Site 1	None: no spawning gravels observed	Poor: Water level was low, likely only available to small fish if accessible.	None: The stream runs underneath and only daylight for 7 m, migration to the open section is unlikely.	Poor: No deep pools observed within this section, likely only acceptable to small fishes.	This section of flowing water runs between two sets of the train yards and only daylight for approx. 8 m before flowing back into a concrete culvert. The site has been fenced off, prohibiting access. No fish observed.
Site 2	Poor: too deep for spawning, no gravel beds	Good: deep water and overhanging vegetation, a few boulders are present.	Good: There are no barriers in this section until the culvert	Good: Fish can likely overwinter in this section of stream	Long straight channel, approximately 1 m deep in the one point of access. Cobbles and fines observed along with some large boulders that may have come from the rip-rap bank next to the road. Left bank and right bank is covered in Himalayan Blackberry. No fish observed.
Site 3	None: no spawning gravels observed	Good/Poor: lower section is likely accessible to larger fish at higher flows, good cover for small fish.	Good/Poor: Migration from Shadow brook is good and small fish may access the tributary, larger fish may also access at higher flows. Upstream the channel becomes more confined and narrower until it disappears into buried culvert.	Moderate: No overwintering for larger fish (no deep pools), likely only good for small fish.	Stream flows via culvert to Shadow brook, no migration barriers observed leading up or out of culvert. The stream becomes smaller and more confined further upstream until it disappears underground. No culvert observed but water is flowing at both the inlet and outlet to the other side of Robson Road. Lots of debris observed in the stream (wood planks, sign). The stream on the other side of Robson was not accessible due to Himalayan Blackberry. No fish observed.
Site 4	None: no spawning gravels observed, no flow	Poor: few cover options other than turbidity, likely only used by small fishes if accessible.	Poor: Culvert does not daylight unlikely that fish can access, no flow	Poor: no deep pools observed likely only for small fishes.	This is a manufactured drainage ditch with culverts at each end. Culvert likely drains to Fraser River and there is no flow. The culvert at the west end may outlet at the Fraser River. No fish observed. Large bird nest observed at the west end of the culvert over the new culvert.
Site 5	None: no spawning gravels observed, low flow	Poor: few cover options other than turbidity, likely only used by small fishes if accessible.	Poor: Culvert does not daylight unlikely that fish can access, but there are no other barriers to fish passage other than low flow.	Poor: no deep pools observed likely only for small fishes, if water level is high enough.	This appears to be a drainage ditch with culverts at each end. The west end likely drains to the Fraser River and the east end likely connects to the drainage ditch that parallels Robson Road. There is strong smell of sulphur, and some sheen seen on surface of water. Culvert outlet has some debris jammed against the trash rack; very little flow observed through culvert. There are multiple smaller drainage outlets seen emptying into the ditch. No fish observed. The LB has been mowed and too steep to enter, straight channel, RB is covered in shrubs and blackberry.
Site 6	None: no spawning gravels observed, low flows	Poor: likely only small fish may access, no channel observed farther upstream.	None: Low flows may prohibit fish to migrate upstream, likely only small fish can access at higher flows if culvert is passable.	None/poor: low flows, likely only available for smaller fishes if they can access.	This drainage ditch is mostly wetland area composed of cattails. There is a small concrete culvert that inlet at the south end with some defined channel preceding. The wetland area is approximately 3 m in width. There was no culvert seen at the north end and it appears the drainage area just ends in grasses.
Site 7	None: no spawning gravels observed, low flows	Poor: likely only small fish may access, no channel observed farther upstream.	Poor: Low flows may prohibit fish to migrate upstream from Manson Canal, likely only small fish can access if culvert is passable.	Poor: low flows, likely only available for smaller fishes if they can access.	The drainage ditch runs between Timberland secondary road and train tracks. There is a wetland upstream that becomes channelized near the inlet under the Timberland roads. The inlet is partially collapsed metal culvert and is hard to see may be blocked with debris. The channel is more defined downstream of concrete culvert. The area is disturbed with some cobbles substrate, but it is likely rip rap. There is another drainage outlet that flows into it, but not accessible to fish. There are two small drops 0.10 to 0.15 m high before it outlets into Manson Canal.
Site 8	None: no spawning gravels observed, low flows	Poor: likely only small fish can access when water is present.	Poor: Low flows may prohibit fish to migrate upstream from Manson Canal, likely only small fish can access if culvert is passable.	Poor: low flows, likely only available for smaller fishes if they can access.	This is a manufactured drainage next to the Westran property. Asphalt collects water into a ditch that flows under the driveway to Westran and then into a riprap drainage ditch. Some sedimentation and water flows observed from the lot into the drainage ditch. Outlets into concrete culvert buried under debris. May connect under road to Site 7.
Site 9	None: no spawning gravels observed, low flows	Poor: likely only small fish can access when water is present.	Poor: Low flows may prohibit fish to migrate upstream from Manson Canal, likely only small fish can access if culverts are passable.	Poor: low flows, likely only available for smaller fishes if they can access.	This is drainage ditch. There are multiple culverts that pass under driveways from Timberland Road to adjacent property. The water collects and flows through a series of culvert before outlet to Manson Canal. The last culvert before Manson Canal is blocked and buried. Habitat for fish is unlikely and water may only be present at some times of the year. Large flooded area observed next to road upstream of perched culvert. Several other drainages seen that drain into this ditch that come from under Timberland Road. There was little scour observed farther upstream. Some debris from adjacent rock quarry has spilt into the ditch.
Site 10	Poor: substrate not observable, likely no suitable spawning habitat for salmonids due to depth .	Good: deep water and overhanging vegetation.	Good: there are no barriers observed at this section that may prohibit migration.	Good: Fish small and large can likely overwinter in this section of stream	Deep, turbid water for fish. The RB is sloped and grasses, the LB has is blackberry, grasses and some trees along the sloped bank. Did not take measurements due to accessibility and safety concerns. Visual estimates only.
Site 11	None: vegetated dry ditch for drainage only.	None: vegetated dry ditch for drainage only.	None: vegetated dry ditch for drainage only. No connection to any other drainage.	None: vegetated dry ditch for drainage only.	This is a vegetated drainage ditch for the road. No connection upstream or downstream to any other drainage. No fish habitat.

Notes: ID = identification number, m = metres, LB = left bank, RB = right bank.

APPENDIX

B CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN



VANCOUVER FRASER PORT AUTHORITY

DRAFT

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

FRASER SURREY PORT LANDS – TRANSPORTATION
IMPROVEMENTS

CONFIDENTIAL

PROJECT NO.: 20M-00758-00
DATE: FEBRUARY 05, 2021

WSP
840 HOWE STREET, SUITE 1000
VANCOUVER, BRITISH COLUMBIA

T: 604-631-9694

WSP.COM



PROJECT CONTACTS

The project contact list for the works proposed in this draft CEMP is provided below. This list will be updated and revised as appropriate.

ROLE	COMPANY	PRIMARY CONTACT	EMAIL
Project Owner/Developer	Vancouver Fraser Port Authority	Vinil Reddy	Vinil.Reddy@portvancouver.com
Project Lead	Vancouver Fraser Port Authority	Ken Berglund	Ken.Berglund@portvancouver.com
Contractor Project Manager	TBD		
Contractor Site Superintendent	TBD		
Subcontractor	TBD		
WSP Environmental Contact	WSP	Michael Taylor	Michael.taylor@wsp.com
Environmental Monitor	TBD		
Environmental Monitor	TBD		

EMERGENCY CONTACT LIST

CONTACT	NAME	OFFICE PHONE	MOBILE PHONE
Project Lead	Ken Berglund	604-665-9642	
Client Contact	Vinil Reddy	604-665-9171	
Site Superintendent	TBD		
Subcontractor Contact	TBD		
WSP Environmental Contact	Michael Taylor	604-631-9679	
Environmental Monitor	TBD		
Emergency Management BC (EMBC)	1-800-663-3456		
DFO Spill Reporting Line	1-800-465-4336		
Environment Canada Environmental Emergencies	604-666-6100		
RCMP/Fire/Emergency	911		



REVISION HISTORY

VERSION	DATE	COMMENTS

PREPARED BY

REVIEWED BY

Michael Taylor, BLA, MRM
Team Lead – Ecology & EIA

To Be Determined

No environmental site assessment, investigation or plan can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a site. Performance of a standardized environmental site assessment protocol is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the site, given reasonable limits of time and cost.

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*Reportable Spill Quantity (list of externally reportable quantities for commonly used substances)

PRODUCT	QUANTITY
Class 2.1 – Flammable gas (e.g. propane)	10 kg
Class 2.2 – Non-flammable gas (e.g. CO2)	10 kg
Class 3 – Flammable liquids (e.g. gasoline)	100 litres
Class 8 – Corrosives (e.g. battery acid)	5 kg or 5 L
Class 9 – Miscellaneous Products (e.g. lithium ion batteries)	25 kg or 25 L
Waste containing polycyclic aromatic hydrocarbons	5 kg or 5 L
Waste asbestos	50 kg
Waste Oil	100 L
Waste that contains a pest control product	5 kg or 5 L
PCB wastes	25 kg or 25 L
Other substances that can cause pollution	200 kg or 200 litres
Natural gas	10 kg

* Quantities are subject to change. Refer to Regulations for latest figures

*****ALL SPILLS TO WATER ARE REPORTABLE*****

*****ALL SPILLS TO STORM SEWER ARE REPORTABLE TO THE APPLICABLE MUNICIPALITY AND/OR REGIONAL DISTRICT*****



ABBREVIATION	DEFINITION
AOA	Archaeological Overview Assessment
BC	British Columbia
BMP	Best Management Practice
CDC	Conservation Data Centre of BC
CO	Conservation Officer
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ECCC	Environment and Climate Change Canada
EBMP	Environmental Best Management Practices
EIMS	Environmental Incident Management System
EMP	Environmental Management Plan
EM	Environmental Monitor
EMBC	Emergency Management British Columbia
ENV	Ministry of Environment & Climate Change Strategy
ESA	Environmentally Sensitive Area
ESC	Erosion and Sediment Control
HCA	<i>Heritage Conservation Act</i>
FLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
QEP	Qualified Environmental Professional
SARA	<i>Species at Risk Act</i>
TDG	Transportation of Dangerous Goods



TABLE OF CONTENTS

PROJECT CONTACTS	I
REVISION HISTORY	II
1 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN	1
1.1 PROJECT DESCRIPTION	1
1.2 PURPOSE	1
1.3 ENVIRONMENTAL RESPONSIBILITIES	2
1.4 ENVIRONMENTAL SETTING	2
1.5 ENVIRONMENTAL MONITORING	3
1.5.1 ROLE AND OBJECTIVES	3
1.5.2 RESPONSIBILITIES.....	4
1.5.3 AUTHORITY	4
1.5.4 SAMPLING	5
1.5.5 NON-COMPLIANCE WITH SPECIFICATIONS	5
1.5.6 REPORTING REQUIREMENTS	5
1.6 EMERGENCY CONTACT LIST	6
1.7 REGULATORY AND STAKEHOLDER COMMITMENTS.....	6
2 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	7
2.1 SOILS MANAGEMENT	7
2.1.1 EROSION AND SEDIMENT CONTROL	7
2.1.2 UNCONTAMINATED SOIL STORAGE.....	8
2.1.3 CONTAMINATED SOILS.....	8
2.2 WASTE MANAGEMENT	9
2.2.1 NON-HAZARDOUS WASTE.....	9
2.2.2 HAZARDOUS WASTE	9
2.3 WATER MANAGEMENT	10



2.4 WILDLIFE PROTECTION	10
2.5 FISH HABITAT AND PROTECTION.....	11
2.6 VEGETATION MANAGEMENT	11
2.6.1 TREE PROTECTION PLAN.....	12
2.6.2 INVASIVE SPECIES MANAGEMENT PLAN.....	13
2.7 NOISE AND DUST MANAGEMENT	13
2.8 SPILL PREVENTION AND RESPONSE.....	13
2.8.1 EQUIPMENT MAINTENANCE.....	13
2.8.2 FUEL AND COOLANT STORAGE, HANDLING & TRANSFERS	14
2.9 SAFETY DATA SHEETS	15
3 ARCHAEOLOGICAL AND HERITAGE RESOURCE MANAGEMENT	15
4 ENVIRONMENTAL INCIDENTS AND EMERGENCIES	16
4.1 SPILL RESPONSE PROCEDURES	16
4.2 ENVIRONMENTAL INCIDENTS - REPORTING.....	17

TABLES

TABLE 1	EMERGENCY CONTACTS	6
TABLE 2	WATER QUALITY PARAMETER CRITERIA.....	10

APPENDICES

A	FIGURES	
	• FIGURE 1	SITE LOCATION MAP
B	SPILL RESPONSE PLAN	

1 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

1.1 PROJECT DESCRIPTION

The Vancouver Fraser Port Authority is proposing to upgrade the transportation infrastructure within the City of Surrey Fraser Surrey Port Lands (FSPLs), the location for which is shown in Figure 1 (Appendix A). The primary purpose of the transportation infrastructure upgrade project will be to improve the road network and ease congestion in the general area by creating a main transportation corridor, upgrading associated intersections and signage and constructing a staging area and additional turn bays to manage traffic flows (referred to as the “Project”). WSP Canada Inc. (WSP) was asked to prepare a draft project-specific Construction Environmental Management Plan (draft CEMP) for the Project.

Construction activities for the Project have not been fully determined or scheduled at this time. Therefore, this draft CEMP summarizes the information available and provides a general outline of the environmental requirements during construction activities, and has been prepared by WSP for the Client to provide the following information:

- Potential environmental project impacts and environmental protection measures to be implemented;
- Environmental monitoring requirements and incident reporting documentation and reporting requirements;
- Disposal of wastes;
- Spill response measures including emergency spill response plan, reporting instructions, and documentation;
- Erosion and sediment control, in accordance with City of Surrey Erosion & Sediment Control Bylaw No. 16138 and Permit;
- Soil and Water Management;
- Other Relevant Environmental Issues such as, but not limited to:
 - watercourse and water quality protection;
 - non-hazardous solid waste disposal;
 - dust, noise and light control; and
 - oil, fuel and equipment usage/management and handling.

1.2 PURPOSE

This draft CEMP provides the template for the primary document to guide overall environmental management practices to be implemented during all phases of the Project. The completed CEMP, which will include project specific information, is intended to be a “living” document and can be updated as new information becomes available.

The purpose of the CEMP is to identify potential environmental risks of the Project and provide mitigation measures and a management plan to effectively mitigate those risks. The CEMP also outlines procedures to minimize environmental impact in the event of an incident.

For the purposes of this draft CEMP document, Vancouver Fraser Port Authority is considered the Project client and herein referred to as “the Client” and the contractor, who has yet to be determined, will be referred to as “the Contractor”.

It is the responsibility of the Contractor to ensure their employees and subcontractors are familiar with and comply with the contents of the CEMP.

It is recommended that an Environmental Monitor (EM) be present for the duration of Project construction activities. The EM can provide environmental orientation and training regarding the CEMP, once the construction plan and schedule has been determined, prior to construction initiation. The EM will discuss protection of the environment and findings of the environmental meetings and inspections with site personnel during toolbox meetings.

1.3 ENVIRONMENTAL RESPONSIBILITIES

The Contractor will take all reasonable and necessary measures to ensure that any activities undertaken in the performance of the Project are conducted in such a way as to minimize any disturbance or damage to the environment. This includes protecting the natural ground surface, soils, atmosphere, vegetation, wetlands, watercourses, wildlife, fish, and archaeological/heritage resources. It also includes minimizing disturbance to neighbours and the general public. Any condition which has resulted from the Contractor’s operations and which constitutes, or which could result in, unnecessary damage or disturbance to property and the environment must be corrected to the satisfaction of and within the time period specified by the Owner. Key commitments directly applicable to this Work are to:

- Meet applicable environmental laws, bylaws, regulations, directives and other requirements;
- Avoid causing environmental impacts and prevent pollution;
- Work is to adhere to the Standard Specifications and Special Provisions (once determined); and
- Restore or repair habitat if environmental impacts have been created.

It is the Contractor’s responsibility to satisfy these commitments by completing work according to the specifications and any additional environmental requirements provided by the Owner.

1.4 ENVIRONMENTAL SETTING

The Project is located within the Fraser Surrey Port Lands (FSPLs) in the City of Surrey, BC. The Project is in an industrial zone approximately 350m east of the Fraser River and immediately west of the South Fraser Perimeter Highway. The geographical coordinates at the Project’s approximate centre are 507086, 5448832. The Project area is predominately covered by roads, rail and industrial buildings. The general environment is predominately industrial resulting in small, disturbed areas of vegetation. There are two fish-bearing canals and a roadside ditch overlapped by the Project footprint. The City of Surrey COSMOS Map shows these watercourses as protected under their Sensitive Ecosystems Development Permit Area for Streams. WSP understands that the proposed Project will not directly affect the foreshore of marine environment.

1.5 ENVIRONMENTAL MONITORING

An Environmental Monitor (EM) should be available on-site during periods of construction for the duration of the Project (duration unknown at this time). The EM will be responsible for quality assurance of the Project environmental control measures as outlined in this document.

At a minimum, the EM should be available for site visits every 7 days and during significant rainfall events (i.e. >24 mm within a 24-hour period) during active construction. Based on the construction plan, the EM schedule may be revised. The EM will:

- 1 Monitor the implementation, effectiveness and compliance with the CEMP.
- 2 Monitor the effectiveness and compliance with the implemented erosion and sediment control measures
- 3 Monitor environmental protective measures for ditches and storm drains.
- 4 Monitor site machinery for leaks prior to mobilization on-site and any follow-up repair.
- 5 Observe, document and report spill clean-up to the Owner's representative.

If the EM identifies conditions that do not comply with the CEMP, a Halt Work Order may be issued until the condition is resolved. Additional site visits during construction may be warranted.

The following subsections provide details on the environmental monitoring program developed for this project. The role, responsibilities, and authority of the EM are described below. All environmental incidents shall be reported to the Contractor's Site Superintendent and the EM immediately, so that appropriate notifications can be made and site management can ensure that incidents are handled appropriately. For response to oil and chemical release emergencies, it is expected that the Contractor will adhere to the spill response plan attached in Appendix B.

1.5.1 ROLE AND OBJECTIVES

The appointed EM will provide environmental quality assurance and administer the environmental aspects of the Project. The primary role of the EM is to provide assurance that the environmental commitments made by the Contractor are achieved throughout the course of project activities. Full time monitoring is not anticipated to be required; however, if conditions are identified by the EM that do not comply with the CEMP, additional site visits may be required. The EM will be present for the start of construction activities to review the immediate area for sensitive environmental features that may be impacted by the Project and to conduct water monitoring in order to obtain baseline levels for comparison purposes. The EM will meet with the contractors before construction begins to review the CEMP. Thereafter, the EM will conduct a site visit every 7 days at a minimum. The EM will be on call to liaise with the Owner, the Contractor and Regulatory Agency representative(s), as required. The key objectives of the environmental monitoring program for this project are to:

- Assure that project construction activities are carried out in compliance with:
 - Environmental provisions defined in the CEMP;
 - Applicable Municipal, Provincial and Federal legislation, regulations and standards;
- Assure that appropriate levels of protection are in place to prevent or minimize impacts to environmental resources throughout project completion.
- Maintain an independent role from all other project parties in order to assess compliance, and to report non-compliance events to responsible parties and agencies as needed.

1.5.2 RESPONSIBILITIES

The specific responsibilities of the EM are listed below:

- Communicate and liaise effectively with the Owner and the Contractor on environmental issues and concerns.
- Assure that emergency response supplies and equipment are available at site and in sufficient quantities.
- Attend project-related meetings related to work near sensitive receptors as needed. The EM will provide a discussion of the relevant best management practices that should be put in place in order to avoid impacts to the receiving environment. Attendance may be by phone for low risk sites/activities.
- Collect water and/or soil samples as a result of environmental emergencies.
- Communicate with the Site Superintendent/Contractor in the event of an environmental incident.
- Following any spill, assist with cleanup and restoration activities.
- Assist in the documentation of spill events such as effects, dispersal, size, etc. (as feasible and if necessary).
- Halt work if Contractor activities are, in the opinion of the EM, posing a risk to environmental resources.
- Maintain detailed project records of project activities (field log, photographic data, georeferenced information, etc.).
- Provide advice, monitor, and oversee the implementation/installation and effectiveness of all mitigation and ESC measures.
- Assure that dewatering systems are sufficient (if necessary) and the work area is kept dry.
- Ensure that water being directed around the construction area is not impacted by construction activities;
- Assure waste management initiatives are properly addressed.
- Provide continuous environmental monitoring services throughout all environmentally sensitive activities during this project.
- Provide specialist recommendations to the Contractor on an as-needed basis.
- Provide timely advice and make recommendations to help safeguard the Contractor from unnecessary risks.
- Review Contractor work plans to assure that the conditions of the CEMP are met and make timely recommendations to address any deficiencies identified in such plans.
- The EM may also be requested by the Contractor to:
 - Answer questions, concerns or complaints that may arise as a result of the construction activities.
 - Participate in the training of Contractor staff on environmental issues.
- Work cooperatively with all project parties to resolve environmental issues and challenges.

1.5.3 AUTHORITY

The EM will have the authority to issue a Halt Work Order if, in their opinion site conditions, or actions by the Contractor, represent a threat to the environment. The EM will also make recommendations to resume the work once the causes leading to the Halt Work Order have been identified, addressed, and controlled, and environmental risks have been reduced or eliminated and once conditions detrimental to the environment have been rectified.

1.5.4 SAMPLING

Routine water monitoring is not predicted to be part of the CEMP scope.

In the event of an Environmental Incident, the EM will collect soil and/or water samples in key locations when it is safe to do so (*i.e.*, where there are no safety concerns in accessing sample locations). All samples collected throughout the Project will be collected following procedures outlined in the BC Field Sampling Manual (ENV, 2013).

1.5.5 NON-COMPLIANCE WITH SPECIFICATIONS

All project activities and resulting outcomes found to be in non-compliance with the provisions of the CEMP, or with applicable regulations and/or legislation, will be documented by the EM. This information will be conveyed verbally to the Contractor immediately upon discovery. The EM may issue a Halt Work Order if the non-compliance issue is not rectified and/or the significance of the non-compliance issue warrants it (at the sole discretion of the EM). Once informed, the Contractor, and the EM will discuss the non-compliance event, promptly develop a remedial plan and address the issue (as necessary), remediate the Site as needed, and the Contractor will develop a plan to prevent similar events from recurring.

1.5.6 REPORTING REQUIREMENTS

The EM will be responsible for documenting and maintaining detailed records of all communications and correspondence with the Owner, the Contractor(s) and Regulatory Agencies, including discussions, letters, and meeting minutes (as required). The EM will also be responsible for developing and maintaining a detailed record of all items inspected, inspection outcomes, and recommendations made, and will also document the actions taken by the Contractor(s) in response to recommendations made. The EM will be responsible for developing and maintaining a colour photographic record of working activities, environmental emergencies, and reasons for issuing Halted Work Orders (as possible). Environmental monitoring reports will be submitted every two weeks to the Vancouver Fraser Port Authority.

Upon discovery, the EM notify the Owner, the Site Superintendent or the Contractor and Regulatory Agencies of any environmental incidents and will provide an incident report within 24 hours of these occurring. Incident records shall include date, time, location, weather, type and nature of the incident, contacts made, environmental effects and resources affected, mitigation measures used during clean-up, and proactive measures taken to prevent similar incidents from occurring in the future. Refer to Section 4.2 of this draft CEMP for reporting protocols.

1.6 EMERGENCY CONTACT LIST

Table 1 Emergency Contacts

CONTACT	NAME	OFFICE PHONE	MOBILE PHONE
Site Superintendent	TBD		
Client Contact	Vinil Reddy	604-665-9171	
Subcontractor Contact	TBD		
WSP Environmental Contact	Michael Taylor	604-631-9679	
Environmental Monitor	TBD		
Emergency Management BC (EMBC)	1-800-663-3456		
DFO Spill Reporting Line	1-800-465-4336		
Environment Canada Environmental Emergencies	604-666-6100		
RCMP/Fire/Emergency	911		

1.7 REGULATORY AND STAKEHOLDER COMMITMENTS

The Project is located with the City of Surrey and therefore all project works must comply with the appropriate local bylaws. The City of Surrey requires an Erosion and Sediment Control Permit for construction projects that have a disturbed area equal to or greater than 2000m² as well as a Permit for Project activities within the Sensitive Ecosystems Development Permit Areas (Streamside Areas and Green Infrastructure Areas). A permit authorizing an Activity Affecting Listed Wildlife species Regulations under section 73 of the *Species at Risk Act* (for Streambank Lupine) may be required.

It is anticipated that a DFO Request for Review, potentially a Letter of Authorization under paragraph 35(2) of the *Fisheries Act* will be required for Riparian area/instream works.

The Owner and the Contractor will adhere to all laws and regulations of the federal and provincial governments and to the intent of local government bylaws and guidelines where applicable. Where such requirements have not been identified by the CEMP, it is the responsibility of the Contractor to ensure they have obtained the necessary permits and approvals.

The Contractor shall ensure that copies of all permits and approvals are available on site at all times. The Contractor shall be aware of the following applicable acts, regulations, guidelines and bylaws; however, this list is not exhaustive, and the reader should be aware that other acts, regulations and guidelines may apply:

- BC *Environmental Management Act*, ENV
- Contaminated Sites Regulation, ENV
- Hazardous Waste Regulation, ENV
- Federal *Fisheries Act*, DFO

- Land Development Guidelines for Protection of Aquatic Habitat, DFO
- BC *Water Sustainability Act*, ENV
- Federal *Species at Risk Act*, ECCC
- *Transportation of Dangerous Goods Act*, Transport Canada
- BC *Wildlife Act*, ENV
- BC Approved Water Quality Guidelines & Working Water Quality Guidelines, ENV
- BC *Wildfire Act*, FLNRORD

The Contractor(s) shall be aware of, and operate within the intent to abide by the spirit of municipal bylaws including, but not limited to:

- City of Surrey Erosion and Sediment Control Bylaw (No. 16138);
- City of Surrey Tree Protection Bylaw (No. 16100);
- City of Surrey Soil Removal and Deposition Bylaw (No. 16389);
- City of Surrey Stormwater Drainage Regulation and Charges bylaw (No. 16610);
- City of Surrey Noise Control Bylaw (No. 7044); and
- City of Surrey Official Community Plan (No. 18020).

2 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The contractor(s) will perform construction activities in a manner that prevents the release of oils, fuel, wastes and other pollutants into the atmosphere, soils, groundwater or watercourses. Waste and other pollutants include, but are not limited to, refuse, garbage, sewage effluent, contaminated soil, sediment, construction waste and chemicals.

2.1 SOILS MANAGEMENT

2.1.1 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls will be implemented by the Contractor. In general, the following plan should be followed:

- To the extent possible, work that requires clearing and grading should be scheduled for the dry weather period (summer), when the potential for surface runoff to erode exposed soils is lowest. As much as possible, the clearing and grading operations will be staged to avoid having large areas of disturbed soil present at any time, and particularly during the winter;
- Where possible, site clearing will immediately precede construction to minimize the amount of time that disturbed soils are exposed to weathering. Clearing will be limited to the minimum area necessary for construction;

- If any soil or other erodible material is to be temporarily stockpiled, it will be covered with polyethylene sheeting that is anchored securely to prevent displacement by wind or precipitation;
- Where necessary, silt fencing will be used to retain sediments on the construction site.
- The sediment control structures will be installed as the first construction activity. All sediment control structures will be inspected regularly, and repaired/maintained as necessary;
- Ditches and/or berms will be installed as necessary to direct surface runoff away from disturbed areas. The ditches will be designed to prevent erosion due to high water velocities through the use of check dams (sandbags), filter fabric, rock rip-rap or polyethylene lining. Apart from these necessary diversions, the natural drainage patterns will be maintained;
- Sediment and erosion control materials will be stockpiled on-site for use in any emergency situation that may arise. Stockpiled materials should include filter cloth, straw bales, rip-rap, grass seed, drain rock, culverts, and/or matting polyethylene, which can be determined by the EM once the construction plan has been established; and,
- As soon as practical after construction, any remaining disturbed soils will be revegetated using an appropriate grass seed mixture. Seeding will be conducted before the end of the growing season to allow establishment of germination/roots.

2.1.2 UNCONTAMINATED SOIL STORAGE

Soil removal and stockpiling may be planned for the Project. Uncontaminated soil stockpiles may be temporarily stored on-site in a location that minimizes the risk of sediment entering bounding ditches or roadways. Erosion controls of the stockpiled soil should be implemented. Soils will not be stockpiled on roadways or private property without proper authorization.

If soil stockpiles become a source of chronic siltation in nearby ditches or roadways, the Contractor(s) must immediately remedy the siltation as necessary to the satisfaction of the EM.

Should area constraints at the Project be identified, the Contractor will complete a site-specific plan to determine appropriate locations for potential stockpiles prior to any soil stockpiling or soil removal activities.

2.1.3 CONTAMINATED SOILS

Any potentially contaminated soils from construction activities must be handled, transported and disposed of in accordance with the BC *Environmental Management Act* (EMA) and its Regulations (Contaminated Sites Regulation and Hazardous Waste Regulation), and the federal Canadian Council of Ministers of the Environment (CCME) Guidelines and TDG Regulations. The Contractor(s) must not remove surplus soil from the site before the EM has assessed and approved the proposed soil disposal location.

If soil odour, debris, discolouration and/or water sheen is encountered during construction activities, the Contractor(s) must:

- Stop work and contact the Owner and EM immediately to report the location and nature of the suspected contamination;
- Under the supervision of an appropriately trained Environmental Professional (or delegate), segregate these soils from potentially un-contaminated soils during excavation;
- Arrange with EM for sampling, analysis and removal/disposal options of the contaminated soils;

- Stockpile soils on polyethylene sheeting (6 mil or greater) at least 30 metres from ditches, drainages and/or other waterbodies;
- Cover each pile with polyethylene sheeting to prevent erosion, silt and/or contaminant runoff.

If stockpiling the soil is not possible, the EM will arrange for the soils to be handled as inferred contaminated. The suspect soils will be removed from site by a licensed carrier for direct transport to a licensed facility.

The contractor(s) must be prepared with the following materials in the event that contaminated soil and/or water is encountered:

- Six mil (or greater) polyethylene sheeting to place contaminated soils on, and cover the soils with;
- Sufficient, non-erodible ballast material to secure the polyethylene sheeting on the contaminated soil;
- Ample oil absorbent materials;
- Shovels;
- Waterproof drums.

2.2 WASTE MANAGEMENT

The guiding principle for waste management is to maximize opportunity for reduction, re-use and recycling of solid waste. All waste, debris, and other construction related materials (wood forms, hardware, plastics, etc.) will be removed from the Project area and disposed of in an appropriate manner. The Contractor will separate and store recyclable and waste materials in appropriately labeled, covered, waterproof containers prior to transport to government authorized recycling and disposal facilities. Solid wastes generated by the Contractor will be contained and removed to maintain a clean and tidy environment and prevent the attraction of wildlife. The Contractor will be required to ensure generally accepted waste management guidelines are followed. Daily removal of lunch waste including recyclables will be the responsibility of each Project staff and ultimately the Contractor.

Upon completion of the Work, the Contractor will be responsible for a thorough clean-up of the construction area to ensure that all wastes from its operations are removed and disposed of in accordance with the BC EMA and its regulations, and federal TDG Regulations (as necessary).

2.2.1 NON-HAZARDOUS WASTE

Solid wastes generated during this Project and requiring disposal off site may need approval from the local landfill operator prior to disposal. Local landfills may have specific restrictions on waste items accepted. The Contractor is required to comply with these requirements. For disposal of soils, refer to Section 2.1: Soils Management of this draft CEMP.

2.2.2 HAZARDOUS WASTE

The Contractor will dispose of all hazardous materials and wastes in accordance with the BC EMA, HWR and its regulations, and federal TDG. The Contractor will contact the appropriate Municipal, Regional, Provincial or Federal authorities prior to waste disposal for approval. The Contractor will provide the Owner with a copy of this governmental authorization. Should evidence of historical contamination be uncovered during the Project, Work is to stop immediately, and the location and nature of the suspected contamination reported to the Owner and EM.

2.3 WATER MANAGEMENT

A review of the publicly available mapping data (including the City of Surrey’s COSMOS Map and BC ENV’s HabitatWizard) has revealed that there are two fish-bearing canals and a roadside ditch overlapped by the Project footprint. The Fraser River is located approximately 350m northwest of the Project area and WSP understands that the proposed Project will not directly affect the foreshore or marine environment. All the watercourses within the FSPLs ultimately flow into the Fraser River.

In general, as per the Fisheries and Oceans Canada “Land Development Guidelines for the Protection of Aquatic Habitat” (DFO 1993), runoff water from the development site should contain less than 25 mg/liter of suspended solids (or non-filterable residue, NFR) above the background suspended solids levels of the receiving waters during normal dry weather operation and less than 75 mg/liter of suspended solids above background levels during storm events. Should significant turbidity be observed, samples will be collected and sent for TSS analysis. According to the City of Surrey’s Erosion and Sediment Control Monitoring and Reporting requirements, the trigger value for requiring site discharge to be analysed for TSS is 65 NTU’s. Water leaving the construction site must additionally meet the following parameters:

Table 2 Water Quality Parameter Criteria

PARAMETER CRITERIA

Oil and Greases ¹	Not detectable by sight or smell
pH ²	6.5-9.0
Temperature ³	>15°C

1 - Values are from the BC Approved Water Quality Guidelines (Criteria) for Drinking and Recreational Water Uses

2 - Values are from the BC Approved Water Quality Guidelines (Criteria) Summary of pH Criteria

3- City of Surrey Monitoring & Reporting Requirements for ESC Permitted Sites, parameters

If significant impacts to the water quality are observed then a new worksite isolation practice, or treatment of the water prior to release, may be required. If any suspect odours or sheens are observed, water quality samples may be required to submit for laboratory analyses of contaminants of concern.

The Contractor will perform the Work in a manner that ensures no deleterious substances are introduced into any roadside ditches connected downstream to a watercourse.

The EM may direct the Contractor to suspend construction activities on the Site and order the Contractor to take corrective actions if water quality parameters exceed acceptable levels for freshwater aquatic life as specified by the Canadian Water Quality Guidelines or any other criteria set out by the BC Ministry of Environment, Fisheries and Oceans Canada, and/or Environment Canada. The Work will be suspended until the Contractor(s) has installed or completed adequate corrective measures to the satisfaction of the EM. The results of water quality measurements will be provided as necessary in the monitoring reports.

2.4 WILDLIFE PROTECTION

There is minimal potential for rare/sensitive wildlife species to use the Project Area; however, due to the proximity of the Fraser River, there is the potential for various bird species to visit the Project area and the site may be used by nesting birds during the spring and summer months. The construction works must be compliant with the federal

Migratory Birds Convention Act and the provincial *Wildlife Act*. Where there is the opportunity to retain trees, they should be protected using a Tree Protection Plan.

The Contractor will conduct construction activities in a manner that is sensitive to the wildlife habitat and population of the local surroundings:

- All meals and food waste will be securely stored in vehicles, offices or appropriate disposal facilities to prevent attraction of wildlife.
- Feeding of wildlife will not be permitted.
- The EM will ensure a pre-clearing bird nest survey has been completed before the beginning of the construction and include the natural features on-site as well as the structures including buildings, boxes and nearby power poles.
- The Contractor will not destroy, remove, or clear any active bird nests or the inactive nests encountered during the Work.
- Active nests of any birds and inactive nests of bald eagle and great blue heron are protected under the BC *Wildlife Act* and cannot be removed.
- If any wildlife nesting, breeding, denning or hibernaculum sites are encountered in the course of the Work, the Contractor will suspend Work and immediately report the finding to the Owner and EM.

Construction vehicle collisions with wildlife will be reported immediately to the EM. Wildlife carcasses must not be moved or transported until permission is received from the local conservation officer (1-800-663-9453) except in the circumstances where it is required for a medical emergency or endangers personal or road users' safety.

If wildlife carcasses are moved other than under the instruction of a Conservation Officer (CO), their position and state prior to and post-moving must be documented. Site personnel are reminded that carcasses or wounded animals frequently attract other, predatory and scavenging wildlife, increasing the probably of wildlife encounters on-site. Carcasses and remains located off-site but in the vicinity of the Project should, if identified, be reported as soon as possible to the EM, giving exact position and location directions, the EM will then be responsible for taking or initiating the requisite action.

Other wildlife-related encounters are to be reported within 24 hours to the EM and the Owner.

2.5 FISH HABITAT AND PROTECTION

According to provincial mapping and fisheries information, there are two fish-bearing canals and a roadside ditch overlapped by the Project footprint. The Fraser River is located approximately 350m northwest of the Project area and all the watercourses in the FSPLs flow into the Fraser River. Fisheries data and mapping from the BC Ministry of Environment indicates that Pink salmon, Coho salmon, Lamprey, Cutthroat trout, Coastal Cutthroat trout, Prickly sculpin, Threespine stickleback, Fathead minnow, Rainbow trout and Peamouth chub have been observed in the watercourses within the FSPLs.

The following provides a general discussion of construction considerations and mitigation strategies relative to fisheries resources:

- *Fish Windows* – It will be necessary to define an instream construction schedule that is compatible with fisheries resources downstream. Instream construction windows are dependent on the timing of alevin emergence and adult spawning. The proposed instream construction window for the streams in the area varies per species and typically falls within June 15th – September 15th. Should it become necessary to complete work outside of the

fisheries window, the FLNRORD Officer will be notified and extra measures will be put in place to ensure no impacts to fisheries resources.

- *Fish Salvage* – A fish salvage may be necessary. All fish captured will be identified and measured and then released upstream of the construction activities. The nets will remain in place through construction to prevent the migration of fish into the construction area. This protocol should be followed for any other salvage activities as required.

All care must be taken to avoid the deposition of deleterious substances (Section 36, Fisheries Act) including sand, sediment, erodible materials, stockpile materials and run-off, paving and associated substances into the on-site water courses.

2.6 VEGETATION MANAGEMENT

The City of Surrey has identified portions of the Project Area as Sensitive Ecosystem Development Permit Areas. According to the Environmental Overview Report (WSP 2020), two clusters of Streambank lupine were identified along Timberland/Robson Roads and the associated rail lines. It is understood that the Vancouver Fraser Port Authority holds a permit (SARA-PYR-2019-0480) which authorizes the removal of Streambank Lupine and clearing of critical habitat. Habitat offsetting will be required under the permit.

It is anticipated that clearing and grubbing of shrub and low cover vegetation species will be carried out to clear the construction work area. Prior to vegetation removal the shrub and low cover vegetation should be reviewed by the EM for sensitive environmental features related to protected bird species, wildlife and plant species at risk. In general, the following plan should be followed:

- When possible, avoid using surrounding areas for laydown and staging to protect trees and plants on adjacent land;
- Attend pre-construction kick off meetings with contractors to identify construction footprints;
- Equipment shall be cleaned and free of vegetative debris prior to entering the Project area;
- Any soil within the possible rooting zone of invasive species shall be considered to contain invasive species and shall require special handling and disposal;
- Inspect work vehicles prior to entering and leaving the Project area for the presence of noxious weeds to prevent transport to and/or from Project area;
- Exposed soil will be revegetated;
- Revegetate as close to former condition as practicable. If the area was previously covered with invasive or non-native plants, revegetate using native plants;
- No-go zones will be flagged prior to site work commencing and will include areas outside of the construction footprint; and
- if any rare or endangered species are detected, a special management program will need to be developed.

Invasive plants species including Blueweed (*Echium vulgare*), Japanese knotweed (*Fallopia japonica*) and Scotch broom (*Cytisus scoparius*) are anticipated to inhabit the FSPLs. If encountered, the Contractor will ensure noxious weeds are removed and segregated prior to appropriate disposal as per the instructions of the EM.

2.6.1 TREE PROTECTION PLAN

If tree removal does need to occur, the area should be reviewed by the EM prior to tree clearing for sensitive environmental features related to protected trees, protected bird species, wildlife and plant species at risk. An

arborist may also be required. Any tree clearing activities should occur outside of the migratory bird window for the region.

2.6.2 INVASIVE SPECIES MANAGEMENT PLAN

Measures to prevent invasive plant spread include:

- Ensure vehicles and equipment are clean of invasive plants and seed;
 - Minimize soil disturbance in all construction and maintenance activities;
 - Limit the movement of weed-infested soil or gravel;
 - When storing materials known to contain invasive plants and/or seeds it should be laid down on a tarp (and also covered with a tarp) to reduce contact with native soils and reduce wind dispersal;
 - When using mulch use straw rather than hay as hay often contains noxious weeds;
 - Use certified weed-free seed mixes or vegetation in disturbed areas to provide competition for any new weeds;
 - Where top-dressing with soil is necessary ensure that soil has been sterilized to reduce risk of introducing weeds; and
 - Contain neighbouring infestations and restrict movement of invasive plants from adjacent lands. Roadways, railways and waterways are often corridors for invasive plant spread.
-

2.7 NOISE AND DUST MANAGEMENT

Noise may be a nuisance to other workers, residents, or recreational users in the area, may pose a health hazard or may have negative effects on wildlife, birds and fish in habitats near the Project area. Measures that can be taken to reduce noise include maintaining mufflers and related equipment in good order and erecting physical barriers as appropriate. While it may be necessary for construction-related equipment to idle during the Project works, all efforts should be made to reduce overall idling times.

During construction activities, the Contractor must furnish all labour, equipment and materials required to reduce dust nuisance and to prevent dust which has originated from its operations from becoming a nuisance in any work areas. The use of oil or calcium chloride, or other chemicals for such purposes is not permitted. Instead, a street sweeper should be used on a regular basis if dust accumulation or track out occurs. Drawing water from any natural watercourses is not permitted.

2.8 SPILL PREVENTION AND RESPONSE

2.8.1 EQUIPMENT MAINTENANCE

The Contractor will maintain and operate their equipment so as to prevent and minimize losses of hydraulic fluids, lubricants, or fuels. This will include regular inspections of fuel and hydraulic lines. Equipment will be thoroughly examined for fluid leaks and steam cleaned prior to commencing work. These requirements will apply during mobilization to the site.

All scheduled vehicle and equipment maintenance, and emergency maintenance will, when possible, be carried out at a maintenance facility and not in the field.

Spill kits and equipment, including absorbent pads, booms and leak proof waste containers, will be provided by the Contractor and be readily available on-site and on each piece of mobile equipment (e.g. light trucks, excavators, backhoes, skid steers, etc.) in the quantities required to absorb the volume of liquid contained in the largest reservoir of each liquid type (hydrocarbon or water soluble) on the equipment. Sufficient quantities of absorbent pads suitable for coolant will also be included in each spill kit.

2.8.2 FUEL AND COOLANT STORAGE, HANDLING & TRANSFERS

The Contractor will supply, construct, operate and maintain all equipment and facilities for storage and transfer and refueling including environmental protection materials and equipment in accordance with the requirements of the BC Fire Code – Part 4 and the BC Summary of Environmental Standards and Guidelines for Fuel Handling, Transportation and Storage. Measures for storage and transfer will also include:

- An oil spill response plan;
- Fully stocked emergency spill response kits appropriate to the type of work being conducted, and including an adequate inventory of absorbent pads, socks and booms to respond to petroleum leaks and spills from construction related activities;
- Prior to the commencement of any oil transfers, the Contractor(s) will review these requirements with all staff/Contractor(s) involved in the transfers;
- All staff and Subcontractors must be adequately trained in their respective duties;
- Personnel must be present and fully alert at all times during any fluid transfers;
- An oil spill containment boom if heavy oil filled equipment is to be used over or adjacent to a water body;
- Appropriate containment for petroleum storage, transfer and refueling facilities that will contain any spillage or leakage;
- Fueling and servicing of equipment shall be done at least 15 m from a ditch and 30 m from a water body;
- All oil storage tanks must be inspected to ensure there are no potential leaks prior to, during and after filling;
- Wrap hose connections with absorbent material to catch any leaks and drips during oil transfer to/from the storage tanks;
- Fuel containing equipment left on-site overnight should be equipped with a drip tray;
- If a leak is observed from any equipment while on-site, stop the equipment and place drip trays and/or absorbent matting under the leak immediately. Repair the leak;
- Do not fill tanks to the top. Leave adequate head-space to ensure that overfilling does not occur;
- Containers of 23 litres (5 gallons) or less will be stored in equipment boxes or storage area capable of containing at least 110% of the stored volume in the event of a spill;
- Plastic containers used to carry petroleum products will be designed for that purpose and cannot be more than five years old;
- All fuels, oils, chemicals and wastes must be labeled, transported, and stored in accordance with the TDG Regulations and the Workplace Hazardous Materials Information System;

- Leak proof waste containers readily available on-site in quantities appropriate to the size of the Project.

Any waste oil or other waste materials must be removed from the Project area as soon as possible in accordance with TDG Regulations and the BC Hazardous Waste Regulation. All waste containers and containers of dangerous goods must be labeled appropriately and stored in a secure location, protected from weather until disposal can be arranged.

Contaminants from fueling and/or servicing must not enter surrounding areas or water bodies. In general, fueling and servicing of equipment should be done at least 30 m from any body of water.

The Contractor(s) must immediately report any spills to the Owner and the EM as per Section 4.1 and 4.2.

2.9 SAFETY DATA SHEETS

The Contractor(s) will maintain an up to date master file (“Register”) of Safety Data Sheets (“SDS”) for all materials used by the contractor in performing the construction activities and for materials that potentially could be spilled or found on the site.

Controlled, updated copies of these SDS will be immediately at hand:

- To each of the Contractor's Emergency Contacts
- In all of the Contractor's vehicles and
- Prominently displayed on all work sites

3 ARCHAEOLOGICAL AND HERITAGE RESOURCE MANAGEMENT

Although WSP has not been provided with archaeological or heritage resource assessment information for the Project area a general summary is provided below.

An archaeological site is a location where evidence of past human activity exists. Archaeological sites are the only physical evidence for 98% of the past history of British Columbia. The Province recognizes the importance of these sites and controls damaging activities by protecting them by law and requiring a permit to develop within site boundaries. Damaging an archaeological site without a permit is unlawful. Some examples of an archaeological site include stone carvings, remains of ancient houses and campsites, shell middens, culturally modified trees, and early trading posts. Items of interest that may be uncovered during construction activities include human bones, pithouses, stone tools and rock paintings (pictographs).

Archaeological sites (both recorded and unrecorded) are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. In the event that archaeological material is encountered during construction activities, work must be halted immediately pending archaeological investigations. The Contractor should immediately inform the Owner and the EM and the Archaeology Branch should be contacted for direction.

4 ENVIRONMENTAL INCIDENTS AND EMERGENCIES

4.1 SPILL RESPONSE PROCEDURES

In the event of any release of fuel, lubricant, sludge, or other industrial chemical (including gases), the Contractor will follow the Spill Response procedures as outlined in Appendix B. The Contractor will be responsible for ensuring personnel are competent to adequately respond to a spill. Considering that effective spill contingency and response procedures is a key environmental element in environmental protection, it is important to make a copy of these procedures available at all times, as the plan outlines the action items. Emergency spill kits should be available on-site at all times and for each piece of mobile equipment.

Spill kits and equipment, including absorbent pads, booms and leak-proof waste containers, will be provided by the Contractor and be readily available on-site and on each piece of mobile equipment (e.g. light trucks, excavators, backhoes, skid steers, etc.) in the quantities required for the equipment being used and the quantities of fluids onboard. An equipment emergency spill kit should be kept fully stocked and include at a minimum:

- 50 Absorbent Pads (Oil, Gas & Diesel)
- 25 Universal Absorbent Pads (Antifreeze and Non-Hazardous)
- 6 – 3" x 4' Absorbent Socks (Oil, Gas & Diesel)
- 4 – 3" x 8' Absorbent Socks (Oil, Gas & Diesel)
- HD Hazmat Disposal Bags
- Minimum 10 pairs of Nitrile Gloves (sized for crew)
- 1 Spill Instruction Sheet

All workers should be adequately trained in the application and use of the spill kit materials or have adequately trained supervision.

All spills, regardless of volume, and other environmental incidents, must be reported to the Owner and the EM. The Contractor is responsible for ensuring personnel know when to contact Emergency Management BC (EMBC). At least one crew leader with current training will be physically present on the work site at all times when work is being conducted.

It is the responsibility of the Contractor and the Owner to report spills in excess of the quantities included in Appendix B to the appropriate environmental agency. It is the responsibility of the Owner to report applicable spills and other environmental incidents internally.

*****ALL SPILLS TO WATER ARE REPORTABLE*****

*****ALL SPILLS TO STORM SEWER ARE REPORTABLE TO THE APPLICABLE MUNICIPALITY AND/OR REGIONAL DISTRICT*****

4.2 ENVIRONMENTAL INCIDENTS - REPORTING

All environmental incidents are required to be reported. An environmental incident report ensures timely communication and reporting to senior management and to appropriate technical individuals that may be impacted by the incident. Reporting of environmental incidents applies to all work, including work performed by Contractor, and all events which affect the Client and/or Owner.

An environmental incident is one that caused, or had the credible potential to cause (near miss), one or more of the following:

- Adverse impact on the quality of air, land or water, wildlife, aquatic species or species at risk;
- Violation of legislation, related policies or regulations;
- External reporting requirement derived from a commitment, especially if attached to a non-routine or unexpected event;
- Notification to external agencies due to an emergency beyond normal circumstances;
- Adverse publicity with respect to the environment;
- Alteration of, or damage to, heritage or archaeological resources; and
- Legal or regulatory action with respect to any of the above.

Environmental Incidents include, but are not limited to:

- Spills of oil, fuel, PCB or chemicals or uncontrolled release of air pollutant i.e. NOx, H2, propane;
- Discharge of deleterious substances into fish-bearing water;
- Landslides, erosion, or floods as they affect environmental quality;
- Violation of environmental regulations, permits or approvals;
- Forest fires related to construction activities;
- Ground disturbance where encountering an archaeological site or removal of a culturally modified tree;
- Adverse effect on plants or animals, birds or their protected habitat.
- Severe Incidents include, but are not limited to:
 - An environmental incident that triggers an investigation by an agency;
 - A major media story such as large spills or spills into sensitive publicly- recognized waters;
 - Significant impact to species habitat or population;
 - Incurs damages and/or remediation costs >\$100K

The Construction Superintendent or Contractor Supervisor who is on-site during the incident is responsible for informing the following personnel immediately:

- Power to Be (Site Owner/Developer); and
- Project Environmental Monitor.

The Contractor will ensure their staff are aware of and/or appropriately trained on their responsibilities of the environmental incident reporting requirements.

In addition to reporting internally to the Owner and the EM, it is necessary in some situations to notify regulatory agencies. Incidents where reporting to agencies is required are shown in the Spill Response Plan in Appendix B. It is the responsibility of the Contractor to make this notification.

APPENDIX

A FIGURES



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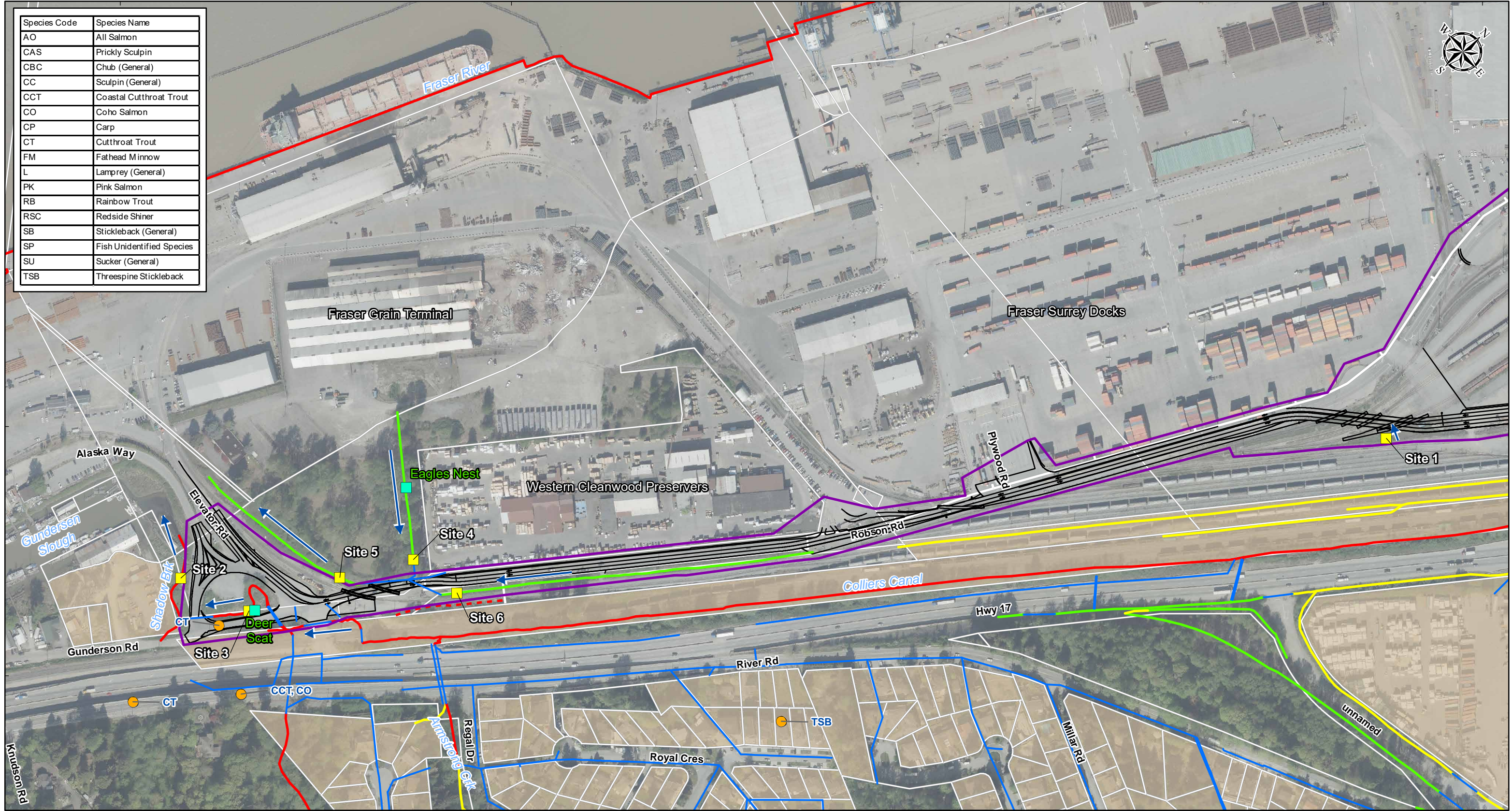
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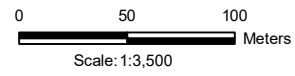
Species Code	Species Name
AO	All Salmon
CAS	Prickly Sculpin
CBC	Chub (General)
CC	Sculpin (General)
CCT	Coastal Cutthroat Trout
CO	Coho Salmon
CP	Carp
CT	Cutthroat Trout
FM	Fathead Minnow
L	Lamprey (General)
PK	Pink Salmon
RB	Rainbow Trout
RSC	Redside Shiner
SB	Stickleback (General)
SP	Fish Unidentified Species
SU	Sucker (General)
TSB	Threespine Stickleback



Legend

- FISS Point
- Aquatic Site
- Wildlife Location
- Flow Direction
- Drainage Main
- Parcel
- Private Lands
- Project Design Linework
- Study Area

- Watercourse (Fish Classification) - City of Surrey
- A
 - AO
 - B
 - C
 - Unknown



Notes: Fish Classification

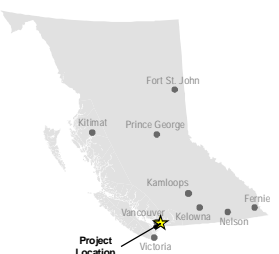
Class A: Inhabited by fish year-round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class A(O): Inhabited by fish primarily during the over-wintering period or potentially inhabited by fish during the over-wintering period with access enhancement. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class B: Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat by the defined by the Federal Fisheries Act

Class C: A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

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



PROJECT:
 Fraser Surrey Port Lands - Transportation Improvements
 Preliminary Design Services

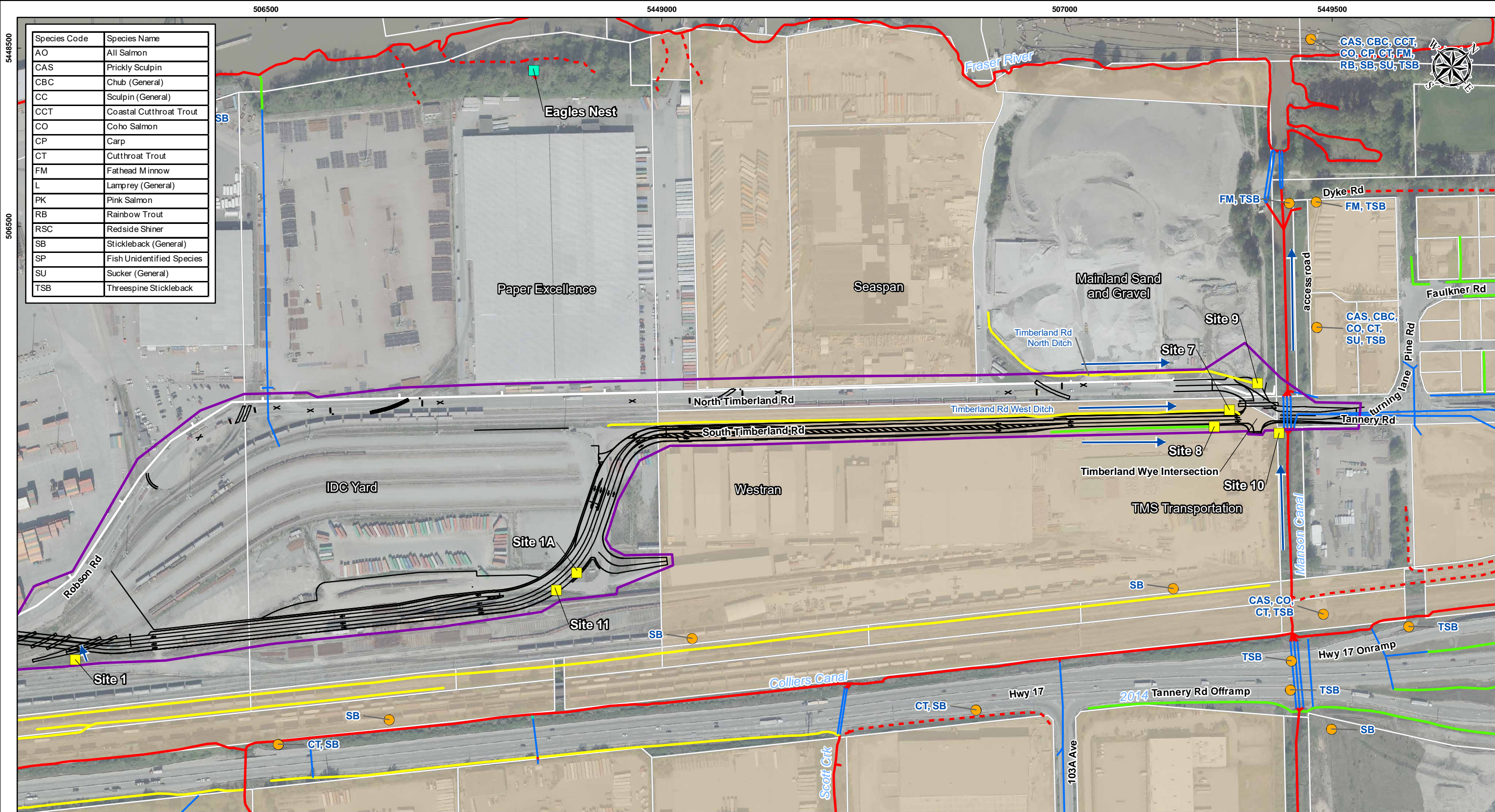
TITLE:
Project Location and Assessment Area

CLIENT:
 PORT of vancouver Vancouver Fraser Port Authority

DATE: May 14, 2021
 ANALYST: MY
 REVIEWED: RS
Figure 1A

GIS FILE:
 02-01-001_Assessment_Area_v2.mxd
 PROJECT NO:
 20M-00758-00
 COORDINATE SYSTEM:
 NAD 1983 UTM Zone 10N





Species Code	Species Name
AO	All Salmon
CAS	Prickly Sculpin
CBC	Chub (General)
CC	Sculpin (General)
CCT	Coastal Cutthroat Trout
CO	Coho Salmon
CP	Carp
CT	Cutthroat Trout
FM	Fathead Minnow
L	Lamprey (General)
PK	Pink Salmon
RB	Rainbow Trout
RSC	Redside Shiner
SB	Stickleback (General)
SP	Fish Unidentified Species
SU	Sucker (General)
TSB	Threespine Stickleback

- Legend**
- FISS Point
 - Aquatic Site
 - Wildlife Location
 - Flow Direction
 - Drainage Main
 - Parcel
 - Private Lands
 - Project Design Linework
 - Study Area

- Watercourse (Fish Classification) - City of Surrey**
- A
 - AO
 - B
 - C
 - Unknown

Notes: Fish Classification

Class A: Inhabited by fish year-round or potentially inhabited by fish year round. Considered 'streams' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

Class B: Provides food/nutrient value to downstream fish habitat. No fish potential present at any time of the year. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat by the defined by the Federal Fisheries Act

Class C: A water feature that is not considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Not considered fish habitat as defined by the Federal Fisheries Act. No fish potential present at any time of the year.

Class A(O): Inhabited by fish primarily during the over-wintering period or potentially inhabited by fish during the over-wintering period with access enhancement. Considered a 'stream' as defined by the Provincial Water Sustainability Act and Riparian Areas Protection Regulation. Considered fish habitat as defined by the Federal Fisheries Act

References:

Data BC - BC Catalogue
Open Government License
(<http://www.data.gov.bc.ca/>)

NRCAN Geogratis
Open Government License
(<http://geogratis.gc.ca/>)

PROJECT:
Fraser Surrey Port Lands - Transportation Improvements Preliminary Design Services

TITLE:
Project Location and Assessment Area

CLIENT:
PORT of vancouver Vancouver Fraser Port Authority

DATE: May 14, 2021

ANALYST: MY

REVIEWED: RS

Figure 1B

GIS FILE:
02-01-001_Assessment_Area_v2.mxd

PROJECT NO:
20M-00758-00

COORDINATE SYSTEM:
NAD 1983 UTM Zone 10N

APPENDIX

B

SPILL RESPONSE PLAN



SPILL AND EMERGENCY RESPONSE PLAN

In the event of spilled fuel, oils, lubricants or other harmful substances, the following procedure will be implemented.

Spill Response Steps

1. Ensure Safety
2. Stop the Flow (if possible and SAFE to do so)
3. Secure the Area
4. Contain the Spill
5. Notify and Report to the Ministry of Transportation and Infrastructure and Environmental Monitor
6. Notify (EMBC 1-800-663-3456) see table below for reportable spill volumes and flow chart below for reporting method
7. Cleanup

Circumstances may dictate another sequence of events

1 Ensure Safety

- Ensure personnel, public and environmental safety
- Wear appropriate Personal Protective Equipment (PPE)
- Never Rush in, always determine the product spilled before taking action, refer to MSDS when available
- Warn people in the immediate vicinity
- If spilled material is flammable, ensure no ignition sources are nearby

2 Stop the Flow (If possible and SAFE to do so)

- Act quickly to reduce environmental impacts
- Close valves, shut off pumps, plug or block holes or leaks, and set containers upright
- Stop the flow of the spill at its source

3 Secure the Area

- Limit access to the spill area
- Prevent unauthorized entry onto site and spill area

4 Contain the Spill

- Block off and protect any ditches and culverts in the vicinity of the spill
- Prevent spilled material from entering any drainage structures (ditches, culverts, drains)
- Use spill absorbent material to contain spill
- If necessary, use a dike, berm or any other method to prevent any discharge off-site
- Make every effort to minimize contamination
- Contain the spill as close to the source as possible

5 Notify and Report

- Notify the Owner and EM of incident (provide spill details)

- **When necessary**, the first external call should be made to **Emergency Management BC 1-800-663-3456** (see spill reporting requirements below)
- Provide necessary spill details to other external agencies

EXTERNALLY REPORTABLE SPILL QUANTITIES BY PRODUCT TYPE

PRODUCT	QUANTITY
Class 2.1 – Flammable gas (e.g. propane)	10 kg
Class 2.2 – Non-flammable gas (e.g. CO2)	10 kg
Class 3 – Flammable liquids (e.g. gasoline)	100 litres
Class 8 – Corrosives (e.g. battery acid)	5 kg or 5 L
Class 9 – Miscellaneous Products (e.g. lithium ion batteries)	25 kg or 25 L
Waste containing polycyclic aromatic hydrocarbons	5 kg or 5 L
Waste asbestos	50 kg
Waste Oil	100 L
Waste that contains a pest control product	5 kg or 5 L
PCB wastes	25 kg or 25 L
Other substances that can cause pollution	200 kg or 200 litres
Natural gas	10 kg

* Quantities are subject to change. Refer to Regulations for latest figures

Spill kits and equipment, including absorbent pads, booms and leak-proof waste containers, will be provided by the Contractor(s) and be readily available on-site and on each piece of mobile equipment (e.g. Light trucks, excavators, backhoes, Bobcats, etc.) in the quantities required for the equipment being used and the quantities of fluids on-board. An equipment emergency spill kit should be kept fully stocked and include at a minimum:

- 50 Absorbent Pads (Oil, Gas & Diesel)
- 25 Universal Absorbent Pads (Antifreeze and Non-Hazardous)
- 6 – 3” x 4’ Absorbent Socks (Oil, Gas & Diesel)
- 4 – 3” x 8’ Absorbent Socks (Oil, Gas & Diesel)
- HD Hazmat Disposal Bags
- Minimum 10 pairs of Nitrile Gloves (sized for crew)
- 1 Spill Instruction Sheet

EMERGENCY RESPONSE

Potential environmental emergencies that may occur while construction is ongoing may include, but are not limited to:

- Reportable fuel spills;
- Sediment laden water leaving the site or entering a waterbody;
- Negative wildlife interactions; and
- Observation of previously unidentified sensitive environmental features.

The EM should be notified of all environmental emergencies. The EM should assess and record all incidents and determine appropriate action. All significant emergencies should be reported to Emergency Management BC (formerly Provincial Emergency Program) and PMV's Operations Centre.

Provided below is the contact information for all parties who are responsible for the project, or are critical to the response or reporting of accidents or environmental emergencies.

CONTACT	NAME	OFFICE PHONE	MOBILE PHONE
Project Lead	Ken Berglund	604-665-9642	
Client Contact	Vinil Reddy	604-665-9171	
Site Superintendent	TBD		
PMV Operations Centre		604-665-9086	
Subcontractor Contact	TBD		
WSP Environmental Contact	Michael Taylor	604-631-9679	778-836-2677
Environmental Monitor	TBD		
Emergency Management BC (EMBC)	1-800-663-3456		
DFO Spill Reporting Line	1-800-465-4336		
Environment Canada Environmental Emergencies	604-666-6100		
RCMP/Fire/Emergency	911		

*****ALL SPILLS TO WATER ARE REPORTABLE*****

*****ALL SPILLS TO STORM SEWER ARE REPORTABLE TO THE APPLICABLE MUNICIPALITY AND/OR REGIONAL DISTRICT*****

SPILL RESPONSE CARD

