

Appendix J

Request for Review Submission to DFO and Letter of Determination from DFO



DILLON
CONSULTING

CANADIAN PACIFIC RAILWAY

Department of Fisheries and Oceans – Request for Project Review

Cascade Capacity Expansion Project

14 August 2018

Fisheries and Oceans Canada
Ecosystems Management Branch
200 – 401 Burrard Street
Vancouver, B.C. V6C 3S4

Request for Project Review – CP's Cascade Capacity Expansion Project

To Whom It May Concern:

On behalf of Canadian Pacific (CP), Dillon Consulting Limited is pleased to submit this Request for Review for CP's Cascade Capacity Expansion Project (the Project), which is currently being designed. The Project will include the extension of the existing embankment between Mile 118.06 and 118.67 to accommodate a new service/lead track north of CP's right-of way along of Burrard Inlet. The extension of the embankment will require the addition of structural fill and riprap into the riparian and foreshore areas of Burrard Inlet at several locations.

During the preliminary design process CP has engaged in discussions with the Vancouver Fraser Port Authority (VFPA) and will be securing the applicable permits and approvals to construct the proposed Capacity Expansion Project. As the design progresses, CP looks forward to collaborating with DFO in the development of an offsetting plan that contributes to the sustainability and ongoing productivity of Burrard Inlet fisheries.

Please contact me to discuss our Request for Project Review submission.

Sincerely,

DILLON CONSULTING LIMITED



Paul Schaap, M.Sc., R.P.Bio., LEED AP
Project Manager

Attachments

cc: Joe Van Humbeck, System Manager Environmental Assessment CP
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1.0 Project Overview

Canadian Pacific Railway (CP) is proposing to expand existing railway infrastructure to increase capacity along a section of their mainline right-of-way (ROW) on the Cascade Subdivision. The Cascade Subdivision is one of CP's busiest and the proposed Project will expand rail capacity into and out of the Port of Vancouver. Facility expansion at the Burrard Products Terminal by Suncor Energy (Suncor) requires a new track to serve as the switching lead/service track to enable capacity expansion on the Cascade Subdivision. The proposed lead/service track will be situated within CP's right-of-way on the north side of the existing mainline tracks. The addition of the proposed switching lead/service track will require extending the embankment by the addition of structural fill and rip rap into the riparian and foreshore areas of Burrard Inlet at several locations.

This document provides information and materials in support of a *Request for Project Review* by Fisheries and Oceans Canada (DFO) under the federal *Fisheries Act*. Included in this document is an overview of the Project location, an overview of the proposed scope and design, a description of environmental features associated with the Project area, and a review of potential impacts and proposed mitigation measures. A brief review of residual Project effects is also included.

The *Request for Project Review* form is attached as Appendix A.

1.1 Project Contacts

The primary contacts overseeing the Project include:

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1.2 Project Location

The proposed Cascade Capacity Expansion Project is located between Mile 118.06 (west of the public crossing to Reed Point Marina) and Mile 118.67 (west of Suncor's facility) along the shoreline of Burrard Inlet (**Figure 1**). The areas of interest for the proposed track expansion are situated west and east of Suncor's Burrard Products Terminal and include the intertidal and riparian zones.

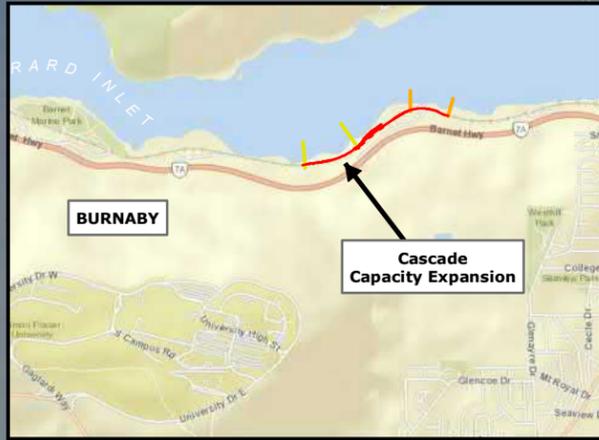


Figure 1 Project Location

The Project area extending approximately 399 metres to the west from the existing Burrard Terminal to the western extent of the proposed alignment is hereafter referred to as Area 1; the Project area

extending approximately 285 metres to the east from the existing Burrard Terminal trestle to the west end of the Reed Point Marina parking lot is referred to as Area 2 (**Figure 2**). The area between Areas 1 and 2 is referred to as the Burrard Terminal.

Currently, Areas 1 and 2 are not accessible via public roadways. Access to the Project site for construction purposes is described in Section 2.2.2.



Canadian Pacific
Cascade Capacity Expansion

Study Area Locations

Legend

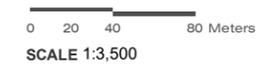
— Proposed Alignment

— Existing Alignment

Study Areas

— AREA 1

— AREA 2



MAP DRAWING INFORMATION:
 ESRI Basemaps

MAP CREATED BY: RBB
 MAP CHECKED BY: RD
 MAP PROJECTION: NAD_1983_UTM_Zone_10N



PROJECT: 18-7764
 STATUS: DRAFT
 DATE: 2018-08-13

2.0 Project Description

The expansion of the Burrard Products Terminal by Suncor requires a new track to serve as the switching lead/service track in order to accommodate an increased volume of rail cars entering, staging and exiting the facility. The proposed new lead/service track will be situated on CP property on the north side of the existing mainline, and will require the extension of the existing slope/embankment onto the Burrard Inlet foreshore at several locations. The completed embankment and new track will be permanent structures. Several temporary work areas are required to facilitate construction and will be removed following the completion of the Project unless considered to be of value to fish habitat offsetting.

Construction activities contemplated for the development of the new lead/service track include: vegetation clearing; minor excavation of soils; placement and grading of structural fill; and placement of riprap shoreline protection. The toe of the expanded fill and riprap will extend beyond CP's ROW at a number of locations up to 12 metres north of the existing mainline track. The total amount of material anticipated to be placed below the high high water mark is estimated to be 22,800 m³ (i.e., 16,800 m³ structural fill and 6,000 m³ riprap).

Preliminary design drawings of the proposed works are presented in Appendix B: Area 1 is presented in drawings SK-003 and SK-002 (west side of the Suncor facility); and Area 2 is presented in SK-002 (east side of the Suncor facility) and SK-001.

2.1 Project Schedule

Construction of the proposed service/lead embankment and track is anticipated to begin in the first quarter of 2019. Mobilization, site facilities and temporary working areas and access routes/track crossing will be established in late Q1/early Q2. Construction of the track embankment is scheduled to occur in Q2 2019 with a duration of approximately one month (tentatively scheduled for June 2019). Track work is expected to begin in August with the completion of construction anticipated for December 2019. The new service/lead track is planned to be in operation in January 2020.

A fish curtain is proposed to isolate the site and construction activities from fish and fish habitat given that the construction period is expected to occur outside the fisheries window. Additional details regarding the fish curtain and other mitigation measures are outlined in Section 4.3.2.

2.2 Project Construction Overview

2.2.1 Construction Methodology

There are two components to the proposed construction: development of the rail embankment upon which the new lead/service track will operate; and development of the new track and associated rail infrastructure (e.g., ballast, ties, rail, switches).

The proposed embankment will be constructed of fill and will extend north onto the Burrard Inlet foreshore in several locations. Construction methodology of the embankment will include: site and access preparation; excavation and establishment of the toe of slope; placement of well-graded structural fill and protective riprap to create a stable bench suitable for the development of the new lead/service track; and site clean-up, restoration and demobilization.

Excavators will establish the slope toe as a foundation for the extended embankment. It is anticipated that a ± 1 m layer of soft (i.e., unsuitable) soils will be excavated at the toe-of-slope location. Well-graded structural fill (maximum 50 mm) will be used to build the embankment. A 0.7 m layer of riprap will line the embankment providing long-term stability and erosion protection to the CP corridor. As construction at the base of the embankment will occur below the high water mark, structural fill and riprap will be placed coincidentally to ensure stability of materials during construction and to achieve an elevation above the high water mark as quickly as possible. The slope of the proposed rail embankment is 2:1. Sub-ballast and ballast material meeting CP track construction standards will be added to the top of the extended bench area to support the placement of the new track.

Based on a 12-hour workday and a 2-month total work schedule, approximately 53 trucks per day (or 5 – 7 trucks per hour) will be required if trucks are used to deliver materials to the Project site. CP is also considering the delivery of construction materials (i.e., fill, riprap) via work trains. There will be no onsite stockpiling of construction materials (fill or riprap).

2.2.2 Temporary Work Areas and Access

To facilitate construction, temporary working areas (i.e., temporary access pads, paths or rail crossings) will be developed at select locations to support machinery operation and to provide access, staging and turning locations for machinery, trucks and equipment. Inbound (i.e., loaded) trucks, for example, will use the temporary pads to turn, backup along the embankment footprint, and discharge fill or riprap at a predetermined location. A temporary rail crossing will also be established in the vicinity of Station O+725. Temporary working areas are identified on the Preliminary Design drawings included in Appendix B. No temporary working areas will be required outside the length of the embankment footprint.

All temporary work areas will be removed following the completion of construction unless these areas can be used for the development of offsetting fish habitat in consultation with DFO.

2.2.3

Limitations to Construction

The proximity of the CP right-of-way and mainline tracks to Burrard Inlet creates considerable challenges for construction of the proposed capacity expansion project. Given the volume and frequency of rail traffic (including daily commuter rail service) through this section of CP's Cascade Subdivision, extended "track blocks" (i.e., periods where train movements are prohibited) to support construction are not possible. The CP Project Team therefore considered construction methodologies from the water-side of the Project. Initial concepts for Project included pile-supported retaining walls to minimize encroachment outside of CP's existing right-of-way. Equipment needs for this design concept, however, required substantial barge-mounted equipment to operate from the water. Shallow nearshore depths, the potential for repeated grounding on foreshore habitat, construction operations under fluctuating tidal cycles, as well as spatial restrictions between the shoreline and existing floats at the Reed Point Marina, excluded the potential for barge-based construction activity. Barge-based construction also presented considerable constructability uncertainty (i.e., productivity, schedule). These limitations directed the Project Team to a land-based construction approach.

With land-based construction required, the original concept of pile-supported retaining walls was abandoned since the size and operating requirements of needed pile-driving equipment would conflict with CP mainline track operations. It was, therefore, decided that the expansion of the current rail embankment to the north was the most viable option. The proposed design and construction approach minimizes construction impacts to the foreshore by reducing the construction footprint, reducing select construction impacts (i.e., noise from pile-driving), and reduces construction duration.

3.0

Overview of Existing Habitat

Existing habitat of Areas 1 and 2 of the Project area was documented through both desktop and on-site assessment. Background habitat information sources included Habitat Wizard, species at risk online mapping databases, iMap BC, and other publicly available resources, as well as reports available to Dillon.

Visits to the Project area by professional biologists, technicians and planners have occurred on multiple occasions between June 2017 and July 2018 as follows:

| | | |
|---------------|---------------|---------------|
| June 27, 2017 | June 12, 2018 | June 26, 2018 |
| July 31, 2017 | June 21, 2018 | July 13, 2018 |

Visits have corresponded with a range of tide levels (0.3 feet to 11.5 feet) and generally clear weather conditions. These visits targeted the assessment of foreshore, riparian and upland habitat conditions existing in the vicinity of the proposed expansion of existing track infrastructure within the CP right-of-way.

Subtidal surveys have also been conducted in Areas 1 and 2 corresponding with the east and west sides of the existing Burrard Terminal facility, respectively. These surveys were completed by Foreshore Technologies on June 21st and June 22nd, 2018 and targeted the biophysical overview of approximately 50,000 m² of subtidal habitat along 14 belt transects as well as reconnaissance surveys between transects. Bottom substrates were characterized and the presence, distribution and abundance of biota were recorded and mapped. Photographs and video of typical and rare observations of habitat were documented along each transect.

3.1

Marine Aquatic Habitat

For ease of reference, the marine aquatic habitat associated with the Project has been partitioned into two distinct areas: Area 1 – the shoreline and foreshore extending west 399 metres from the west side of the existing Burrard Terminal to the western extent of the Project (i.e., Sta. 0+698 to Sta. 1+097); and Area 2 – the shoreline and foreshore extending from the chain link fence at Reed Point Marina 285 metres east to the east side of the Burrard Terminal (i.e., Sta. 0+000 to Sta. 0+285). **Figure 2** identifies the general extent of Area 1 and Area 2.

Foreshore habitat surveys were undertaken on multiple occasions under a range of tidal conditions. The foreshore was traversed by foot and observations of dominant physical features, biological communities and regional importance/uniqueness were recorded. Subtidal surveys were conducted by SCUBA-equipped QEPs with knowledge and experience of the local aquatic biology and ecology and targeted the characterization of bottom substrates and the presence, distribution and abundance of biota. Species and biota groups chosen for surveying and mapping purposes were selected by the QEPs at the time of the survey as those that best represented the environmental and habitat conditions present. The abundance levels of selected species or biota groups were based on the criteria adapted from the Department of Fisheries and Oceans'

Coastal/Estuarine Fish Habitat Description and Assessment Manual (1990) (see Appendix C for further details of the subtidal assessment methods). Additional substrate conditions noted during the survey included any significant build-up of shell hash, woody debris and/or anthropogenic materials. Elevations and boundaries between different substrate and biota types were mapped using tidal elevations, local geographical features and survey tapes. Elevations were related to Canadian Hydrographic Service Chart Datum.

3.1.1 Area 1 Marine Habitat Summary

Morphology of the Area 1 intertidal zone is defined by two large, generally stable and firm bars extending some distance from the shoreline and comprising mixtures of coarse sand, pebbles, small stones, and boulders (see Appendix D, Photos 1, 2, 3, 4 and 8). Substrates between 2.0m and -0.5m CD typically comprise cobble (60%), pebble (20%), sand (10%) and boulders (10%). A transition to sand (55%), mud (35%) and cobble (10%) occurs at approximately -0.5m CD while depths beyond -1.2m CD consist primarily of mud (80%) and sand (20%) in Area 1 (see *Drawing 3967-D-03.1 Substrate Conditions West* in Appendix C). The remainder of the subtidal area was characterized as almost entirely mud and sand which likely limits growth and colonization of vegetation and organisms.

Discrete and scattered pockets of grasses and boulders colonized by Rockweed (*Fucus gardneri*) and Sugar Kelp (*Laminaria saccharina*) occur along the Area 1 shoreline (see Appendix E, Photos 5 and 6) and are the dominant species. Other vegetation established in the upper foreshore includes Lyngbye's sedge (*Carex lynbyei*), Sea Milk-wort (*Glaux maritima* ssp. *obtusifolia*), and unidentified beach grasses (see Appendix D, Photo 7). Subtidal vegetation includes abundant sea lettuce and Laminarian kelp typically beyond -1.0m CD (see distribution and photos of intertidal and subtidal vegetation in Area 1 on *Drawing 3967-D-04.1 Biological Conditions West* and *Drawing 3967-D-06.1 Biota Photographs* in Appendix C).

Biotic diversity in Area 1 is low with common species including Thatched (*Semibalanus cariosus*) and Acorn Barnacle (*Balanus glandula*), Blue Mussel (*Mytilus trossulus*) and shore and hermit crabs being the most abundant within the intertidal zone. The shells of Butter Clam (*Saxidomus gigantean*), Dark Mahogany Clam (*Nuttallia obscurata*), Gaper species (*Tresus* sp.), Nuttall's Cockle (*Clinocardium nuttallii*), and Pacific Oyster (*Crassostrea gigas*) were also abundant across the generally homogeneous intertidal zone. Squirts from large unidentified bivalves, such as the Pacific geoduck clam (*Panopea abrupta*) or Fat Gaper (*Tresus capax*), were observed at several locations during one visit at very low tide. A swath of horse clams (*Tresus* spp.) was observed between -1.2m and -2.4m CD. Leather (*Dermasterias imbricata*), mottled (*Evasterias troschelii*) and ochre sea stars (*Pisaster ochraceus*), red rock (*Cancer productus*) and dungeness crabs (*Cancer magister*), as well as english sole fish (*Parophrys vetulus*), were typically observed in subtidal habitats between -1.0m and -4.5m CD (see *Drawing 3967-D-06.1 Biota Photographs* in Appendix C).

Table 1 summarizes all species of biota observed along the eight transects of Area 1 and their relative abundance (areal coverage/individuals encountered) and general location on the foreshore/nearshore at the time of the surveys. Only one species, acorn barnacle, was considered to be common across the full intertidal/subtidal zone of Area 1. The abundance of two crab species, hermit and shore crab, was observed

to be “Few” (i.e., 6 to 10 individuals along transect) and also widely distributed across the intertidal and subtidal zones surveyed. The abundance of all other biota was observed to be “Sparse” or “Rare”. Only one fish species, English sole, was observed during the SCUBA surveys in Area 1.

Table 1 Presence, relative abundance and location of biota in Area 1 (Foreshore Technologies – Appendix C)

| Common Name | Scientific Name | Transects - West (Area 1) | | | | | | | | Abundance | Chart Datum Range | |
|-----------------------|-------------------------------|---------------------------|---|---|----|----|----|----|----|-----------|-------------------|-------|
| | | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | | Upper | Lower |
| Green Algae | | | | | | | | | | | | |
| Sea Lettuce | <i>Ulva lactuca</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | 1.1 | -1.8 |
| Flat-tube Sea Lettuce | <i>Ulva linza</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | 1.5 | -1.8 |
| Brown Algae | | | | | | | | | | | | |
| Rockweed | <i>Fucus gardneri</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Rare | 1.8 | -1.9 |
| Sargassum | <i>Sargassum muticum</i> | | | | | | ✓ | ✓ | ✓ | Rare | -1.5 | -2.2 |
| Sugar Wrack Kelp | <i>Laminaria saccharina</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -1.0 | -5.0 |
| Agarum | <i>Agarum fimbriatum</i> | ✓ | | | | | | | ✓ | Rare | -2.0 | -5.0 |
| Red Algae | | | | | | | | | | | | |
| Filamentous Red | Unidentified | | | | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.5 | -4.0 |
| Anemones | | | | | | | | | | | | |
| Short Plumose | <i>Metridium senile</i> | | | | | | | | ✓ | Rare | -2.7 | -2.9 |
| Worms | | | | | | | | | | | | |
| Feather Duster | <i>Eudistylia vancouveri</i> | | | | | | | | ✓ | Rare | -2.7 | -2.9 |
| Bivalves | | | | | | | | | | | | |
| Bay Mussel | <i>Mytilus trossulus</i> | | | | | | | | ✓ | Rare | 1.5 | 1.0 |
| Horse Clam | <i>Tresus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -1.2 | -2.4 |
| Snails | | | | | | | | | | | | |
| Dogwinkle Snail | <i>Nucella sp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.3 | -2.6 |
| Crabs | | | | | | | | | | | | |
| Dungeness | <i>Cancer magister</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.7 | -5.0 |
| Red Rock | <i>Cancer productus</i> | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.2 | -5.0 |
| Hermit | <i>Pagurus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.1 | -3.5 |
| Shore Crab | <i>Hemigrapsus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.5 | -2.0 |
| Barnacles | | | | | | | | | | | | |
| Acorn | <i>Balanus glandula</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Common | 2.5 | -5.0 |
| Echinoderms | | | | | | | | | | | | |
| Leather Star | <i>Dermasterias imbricata</i> | ✓ | ✓ | | | | ✓ | | ✓ | Sparse | -2.2 | -5.0 |
| Mottled Star | <i>Evasterias troschelii</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | Sparse | -2.5 | -5.0 |
| Ochre Star | <i>Pisaster ochraceus</i> | ✓ | ✓ | | | ✓ | ✓ | | ✓ | Sparse | -1.5 | -5.0 |
| Fish | | | | | | | | | | | | |
| English Sole | <i>Parophrys vetulus</i> | | | | | | ✓ | ✓ | ✓ | Rare | -3.8 | -5.0 |

Abundance Legend

| Amount | % Areal Coverage | Individuals Along Transect |
|----------|------------------|----------------------------|
| Rare | <5% | 1 |
| Sparse | 5% to 25% | 2 to 5 |
| Few | 26% to 50% | 6 to 10 |
| Common | 51% to 75% | 11 to 30 |
| Abundant | >75% | >30 |

Other species identified during pedestrian surveys of the Area 1 foreshore were Bent-nose Macoma (*Macoma nasuta*) and limpet, as well as Tidepool Sculpin (*Oligocottus maculosus*). Multiple sculpin were observed in the single shallow tidal pool found in Area 1 which was situated on the easterly bar approximately 20 m from the high high water mark/toe of railway embankment.

3.1.2 Area 2 Marine Habitat Summary

Foreshore morphology of the Area 2 intertidal zone comprises a flat and firm bar gently and uniformly extending south from the toe of the CP track embankment. Immediately north of the intertidal zone is the floats and buildings of the Reed Point Marina which shelters the shoreline from waves. The intertidal zone is characterized by a mix of substrates dominated by sand with scattered pebbles and stones (see Appendix D, Photos 9 and 10). Similar to Area 1, substrates of the upper foreshore are coarser with boulders situated at the toe of slope and the percentage of cobbles and pebbles decreasing between 2.0 and 0.0m CD. The abundance of finer substrates increases toward the east end of the Area 2 foreshore. A transition to finer substrates of sand (55%) and mud (35%) occurs at approximately -0.5m CD while substrates at depths beyond -1.2m CD are represented primarily of mud (80%) and sand (20%) (see Appendix D, Photo 11). Drawing 3967-D-01.1 *Substrate Conditions East* in Appendix C illustrates the distribution of substrates along, and between, transects in Area 2.

Vegetation attending the Area 2 intertidal zone is an almost homogeneous stand of Lyngbye's sedge, Sea Milk-wort, and grasses (see Appendix D, Photo 12). Boulders and cobbles are colonized by Rockweed (*Fucus gardneri*) and Sugar Kelp (*Laminaria saccharina*) along this section of shoreline but are of lower abundance than in Area 1. Subtidal vegetation includes sea lettuce and Laminarian kelp typically beyond -1.0m CD (see distribution and photos of intertidal and subtidal vegetation in Area 1 on *Drawing 3967-D-02.1 Biological Conditions East* and *Drawing 3967-D-06.1 Biota Photographs* in Appendix C).

Similar to Area 1, biotic diversity in Area 2 is low (see Appendix D, Photos 12, 13, and 14). Species frequently observed during pedestrian surveys and/or widely distributed across the intertidal zone were Acorn Barnacle, Blue Mussel and shore and hermit crabs. Evidence (i.e., shells) of clam, cockle, oyster and crab species was observed across the intertidal zone as well as specimens of Checkered Periwinkle (*Littorina scutulata*). Other species observed in the intertidal zone were Leather and ochre sea stars and a deceased Sea blubber (*Cyanea capillata*). In the Area 2 subtidal zone, sea stars and crabs observed in Area 1, as well as horse clams coincident with the band between -1.2m and -2.4m CD, were observed. Three species of fish were observed during dive surveys in Area 2: scalyhead sculpin (*Artedius harringtoni*); tubesnout (*Aulorhynchus flavidus*) and english sole. Dive survey results and photographs of biota observed in Area 2 are illustrated in *Drawing 3967-D-02.1 Biological Conditions East* and *Drawing 3967-D-06.1 Biota Photographs* in Appendix C).

Table 2 summarizes all species of biota observed along the eight transects of Area 2 and their relative abundance (areal coverage/individuals encountered) and general location on the foreshore/nearshore at the time of the surveys. Like Area 1, only acorn barnacle was considered to be "Common" and hermit and shore crab was observed to be "Few" in intertidal/subtidal zone of Area 2. The abundance of all other biota was observed to be "Sparse" or "Rare". Three species of fish were observed during the Area 2 SCUBA surveys in very low abundance (i.e., 1 individual along the transect).

Table 2 Presence, relative abundance and location of biota in Area 2 (Foreshore Technologies – Appendix C)

| Common Name | Scientific Name | Transects - East (Area 2) | | | | | | Abundance | Chart Datum Range | |
|-------------------------|-----------------------------------|---------------------------|---|---|---|---|---|-----------|-------------------|-------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | | Upper | Lower |
| Green Algae | | | | | | | | | | |
| Sea Lettuce | <i>Ulva lactuca</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | 1.1 | -1.8 |
| Flat-tube Sea Lettuce | <i>Ulva linza</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | 1.5 | -1.8 |
| Brown Algae | | | | | | | | | | |
| Rockweed | <i>Fucus gardneri</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Rare | 1.8 | -1.9 |
| Sargassum | <i>Sargassum muticum</i> | | | | | | | Rare | -1.5 | -2.2 |
| Sugar Wrack Kelp | <i>Laminaria saccharina</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -1.0 | -5.0 |
| Agarum | <i>Agarum fimbriatum</i> | | ✓ | | | | | Rare | -2.0 | -5.0 |
| Bivalves | | | | | | | | | | |
| Horse Clam | <i>Tresus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -1.2 | -2.4 |
| Snails | | | | | | | | | | |
| Dogwinkle Snail | <i>Nucella sp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.3 | -2.6 |
| Crabs | | | | | | | | | | |
| Dungeness | <i>Cancer magister</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.7 | -5.0 |
| Red Rock | <i>Cancer productus</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.2 | -5.0 |
| Hermit | <i>Pagurus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.1 | -3.5 |
| Shore Crab | <i>Hemigrapsus spp.</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Few | 1.5 | -2.0 |
| Barnacles | | | | | | | | | | |
| Acorn | <i>Balanus glandula</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Common | 2.5 | -5.0 |
| Echinoderms | | | | | | | | | | |
| Leather Star | <i>Dermasterias imbricata</i> | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Sparse | -2.2 | -5.0 |
| Mottled Star | <i>Evasterias troschelii</i> | ✓ | ✓ | | ✓ | | ✓ | Sparse | -2.5 | -5.0 |
| Ochre Star | <i>Pisaster ochraceus</i> | ✓ | ✓ | ✓ | | ✓ | ✓ | Sparse | -1.5 | -5.0 |
| California Sea Cucumber | <i>Parastichopus californicus</i> | | | | | | | Sparse | -3.5 | -5.0 |
| Fish | | | | | | | | | | |
| Scalyhead Sculpin | <i>Artedius harringtoni</i> | ✓ | ✓ | | | | | Rare | -1.8 | -4.5 |
| Tubesnout | <i>Aulorhynchus flavidus</i> | | ✓ | | | | | Rare | -2.3 | -2.3 |
| English Sole | <i>Parophrys vetulus</i> | | | | | ✓ | | Rare | -3.8 | -5.0 |

Abundance Legend

| Amount | % Areal Coverage | Individuals Along Transect |
|----------|------------------|----------------------------|
| Rare | <5% | 1 |
| Sparse | 5% to 25% | 2 to 5 |
| Few | 26% to 50% | 6 to 10 |
| Common | 51% to 75% | 11 to 30 |
| Abundant | >75% | >30 |

3.2 Freshwater Aquatic Habitat

There is very limited freshwater aquatic habitat in the vicinity of the proposed capacity expansion project. Upslope drainage from forested areas between Barnet Highway and the CP right-of-way is conveyed via informal drainage pathways to the base of slope where it intersects constructed track-side ditches. Eight culverts direct intermittent flow beneath the CP mainline tracks to Burrard Inlet. Drainage pathways and culverts were assessed during a June 2018 site visit to consider their value as fish habitat and the potential for fish passage from Burrard Inlet.

A summary of information for these eight culverts is presented below in Table 3. Culvert locations are identified on the engineering drawings presented in Appendix B. Additional information for select culverts is provided below.

Table 3 Summary of Information for Culverts within the Project Area

| Station Number | CP Mileage (Cascade Subdivision) | Type | Size (m) | Length (m) | Comments (re: Project Construction) |
|----------------|----------------------------------|---------|-------------|------------|---|
| 0+004.31 | 118.08 | CMP | 0.91 | 18.3 | Culvert to be extended |
| 0+035.75 | 118.10 | CMP | 0.76 | 18.3 | Culvert to be extended |
| 0+236.91 | 118.20 | RCB | 1.20 x 1.20 | 17.4 | Culvert to be relined |
| 0+243.62 | 118.21 | Unknown | Unknown | Unknown | Culvert to be removed/replaced with CSP |
| 0+489.94 | 118.36 | CMP | 0.61 | 18.3 | - |
| 0+747.79 | 118.50 | CMP | 1.07 | 15.2 | Culvert to be relined and extended |
| 0+964.01 | 118.66 | CMP | 0.61 | 15.2 | Culvert to be relined and extended |
| 1+039.28 | 118.70 | CMP | 0.20 | 12.2 | Culvert to be relined and extended |

Surface water drainage does not follow a defined path upslope of the culvert at Station 0+004.31 (see Appendix D, Photos 15, 16, 17, and 18). Water does pool at the toe of slope/culvert inlet. No flow was observed entering the pool or culvert on the date of the assessment. The culvert outlet to Burrard Inlet is perched approximately 1.6m above the high tide line, therefore there is no potential for fish to access the culvert or upslope area from the Inlet. Groundwater seepage through the track embankment was observed on the exposed foreshore during field assessments at low tides. Fish habitat value of the drainage pathway upslope of Station 0+004.31 is therefore limited to food/nutrient contribution.

The inlet to the culvert at Station 0+035.75 is a drop structure located at the toe of slope (see Appendix D, Photos 19, 20, 21, and 22). There is evidence of a second culvert at this location that may have been historically abandoned. Upslope drainage pathways are undefined across the forested slope. The culvert outlet is perched high (i.e., 1.3m) above the high tide line and is inaccessible to Burrard Inlet fish. One of the two outlets was buried in riprap. Trickle flow was observed at the outlet to one culvert and groundwater seepage through the track embankment was observed on the exposed foreshore at low tides (see Appendix D, Photo 23). Fish habitat value of the drainage pathway(s) upslope of Station 0+035.75 is therefore limited to food/nutrient contribution.

There was an area of intertidal seepage observed between Station 0+035.75 and Station 0+236.91 (10 U 508037 5459855). No culvert was indicated on the engineering drawings and no culvert could be observed (see Appendix D, Photo 24).

One defined channel was located during searches of areas upslope of the culvert at Stations 0+236.91 and 0+243.62 (see Appendix D, Photos 25, 26, 27, and 28). Trickle flow was audible near the toe of slope, however, and seepage/flow into the inlet of the culvert at 0+236.91 was visible. There is no potential for

fish to be present in natural areas south of the CP right-of-way in the areas draining to these culverts. Fish habitat value of the drainage pathway(s) upslope of Stations 0+236.91 or 0+243.62 is therefore limited to food/nutrient contribution. The watercourse in the east culvert (Station 0+236.91) discharges over rocks down to the intertidal area, approximately 0.8 m above the high tide line. There is no channel downstream for the east watercourse. A small diameter pipe was noted that extends from the bank above the intertidal area immediately west and greater than 2 m above the high tide line. Therefore, there is no potential for fish to access the watercourse from Burrard Inlet. There was no access to the downstream section of the watercourse in the west culvert.

The culvert at Station 0+489.94 could only be assessed from the upstream portion, as the outflow in somewhere in the midst of the Suncor industrial area and could not be accessed (see Appendix D, Photos 29 and 30). To the south of the tracks, there are swales that discharge to a culvert drop structure from the west and east along the toe of the tracks. There is a very low potential for fish to be present in this watercourse since there is limited habitat potential. Habitat value is limited to a food/nutrient contribution.

The watercourse upstream of the culvert at 0+747.79 is known as Aliceville Creek and extends upstream beyond the Barnet Highway, along the boundary of Burnaby and Port Coquitlam (see Appendix D, Photos 31, 32, and 33). Surface water is conveyed down the forested slope north of Barnet Highway via a defined channel having a bankfull width of 2.2 m and bankfull depth of 0.3 m. At the time of the assessment the wetted width ranged from 0.4 to 1.1 m with a wetted depth of 0.1 m. The channel is steep and cascades into the culvert inlet. The outlet is perched approximately 1.0 m above the Burrard Inlet high tide line and cascades to the foreshore via a rock-lined channel. Access to the culvert outlet by fish is considered to be very low potential and would occur only at the highest tides. Access to habitat in reaches upstream of the culvert is also limited by high gradient and low flow. Fish habitat value of Aliceville Creek upslope of the culvert at Station 0+747.79 is therefore limited to food/nutrient contribution.

The watercourse upstream of the culvert at Station 0+964.01 is known as Cougar Creek (see Appendix D, Photos 34, 35, 36, and 37). A reach of the upslope channel is cobble-lined with a bankfull width ranging from 1.2 to 2.4 m and intersects a constructed swale along the toe of the slope which directs flow to the culvert inlet. The channel was observed to be dry at the time of the site visit. The culvert outlet is perched 0.3 to 0.4 m above the high tide line and is highly eroded. It is unlikely that fish can access the culvert outlet and upstream channel from Burrard Inlet due to the perched condition. Fish habitat value of Cougar Creek upslope of the culvert at Station 0+964.01 is therefore limited to food/nutrient contribution.

Surface and ground water upslope of the culvert at Station 1+039.28 is conveyed overland to the toe of slope where it is directed to the culvert (see Appendix D, Photos 38, 39, and 40). No flow was observed in the culvert on the date of the assessment. The outlet of this culvert is perched ~2.5 m above the high tide line and is considered to be inaccessible to Burrard Inlet fish. Fish habitat value upslope of this culvert is considered to be minimal and, therefore, the primary value of flows through this drainage path is its contribution of food and nutrients to productive fish habitat in Burrard Inlet.

Overall, there is a very low potential for Burrard Inlet fish to access any of the watercourses/drainage pathways due to the perched elevations of culvert outlets, flow limitations and channel morphology. The potential risk of project development to harm freshwater fish and fish habitat is anticipated to be very low.

3.3 Riparian Vegetation

The Project is located within the Coastal Western Hemlock biogeoclimatic zone which is dominated by coniferous forests with mild, wet climates that are often complex and highly productive (BC Ministry of Forests, 1999). For the purpose of this document, vegetation colonizing the narrow strip of land between the high water mark and the ballast of CP's north mainline track is hereafter referred to as riparian vegetation. This vegetation will be affected by the proposed Project activities.

3.3.1 Area 1 Vegetation

Riparian vegetation found in Area 1 is a mix of flowering plants, ferns, shrubs and large patches of mature deciduous trees. Flowering plants generally associated with ground cover include Hawksbeard (*Crepis* sp.), Common Foxglove (*Digitalis purpurea*), Creeping Buttercup (*Ranunculus repens*), Field Bindweed (*Convolvulus arvensis*), Policeman's Helmet (*Impatiens glandulifera*), Wild Pea (*Vicia* spp.), Reed Canary Grass (*Phalaris arundinacea*), Cutleaf Blackberry (*Rubus laciniatus*), and Fireweed (*Epilobium angustifolium*). Several unidentified grass species were also present. The fern and ally species observed were Sword Fern (*Polystichum munitum*), Common Horsetail (*Equisetum arvense*), and Bracken Fern (*Pteridium aquilinum*) (see Appendix D, Photos 41 and 47).

The shrub species attending the north mainline and Burrard Inlet foreshore are Willow (*Salix* sp.), Hardhack (*Spiraea douglasii*), Himalayan Blackberry (*Rubus armeniacus*), Indian Plum (*Oemleria cerasiformis*), Red Elderberry (*Sambucus racemose*), Red Huckleberry (*Vaccinium parvifolium*), Salmonberry (*Rubus spectabilis*), Thimbleberry (*Rubus parviflorus*), Hooker's Willow (*Salix hookeriana*), Nootka Rose (*Rosa nutkana*), and Pacific Crabapple (*Malus fusca*) (see Appendix D, Photo 42).

Mature trees found along the shoreline of Area 1 include Red Alder (*Alnus rubra*), Bigleaf Maple (*Acer macrophyllum*), and Black Cottonwood (*Populus balsamifera*) (see Appendix D, Photo 43). Nine distinct "clumps" of mature deciduous trees are found along the Area 1 shoreline. In many cases, these clumps are multiple stems from the same base. Table 4 summarizes the composition of the nine clumps of mature trees and the estimated size (diameter-at-breast-height) and number of individual stems within the clump. Clumps are numbered from the western Project boundary up to the west side of Suncor's Burrard Terminal (see Appendix D, Photos 44, 45 and 46).

Table 4 Description of Mature Riparian Tree “Clumps” in Area 1

| Clump Number | Species | Number of Primary Stems in Clump | Size of Primary Stems (diameter-at-breast-height (dbh)) |
|--------------|-----------------------|----------------------------------|---|
| 1 | Bigleaf maple | 14 | 8 stems X 14”; 6 stems X 8” |
| 2 | Bigleaf maple | 8 | 3 stems X 24+”; 2 stems X 14”; 3 stems X 8” |
| 3 | Bigleaf maple | 5 | 2 stems X 12”; 3 stems X 6” |
| 4 | Bigleaf maple | 10 | 2 stems X 18”; 1 stem X 12”; 1 stem X 8” |
| | Red alder | | 1 stem X 16” |
| | Bigleaf maple | | 1 stem X 12”; 1 stem X 8”; 1 stem X 6”; 2 stems X 4” |
| 5 | Black cottonwood | 8 | 1 stem X 20”; 1 stem X 16”; 2 stems X 12” |
| | Alder | | 1 stem X 6” |
| | Bigleaf maple | | 1 stem X 12”; 2 stems X 10” |
| 6 | Red alder (senescing) | 7 | 1 stem X 24”; 2 stems X 18”; 1 stem X 14”; 2 stems X 10”; 1 stem X 6” |
| 7 | Red alder | 7 | 5 stems X 12”; 2 stems X 10” |
| 8 | Red alder | 7 | 3 stems X 18”; 1 stem X 12”; 3 stems X 8” |
| 9 | Bigleaf maple | 7+ | 1 stem X 18” |
| | Red alder | | 3 stems X 14”; 3 stems X 8” |
| | Willow <i>spp.</i> | | Multiple stems |

Areas to the south of the CP right-of-way in Area 1 are densely forested with a mix of mature deciduous and coniferous tree species that provide habitat for an array of wildlife.

3.3.2 Area 2 Vegetation

Riparian vegetation in Area 2 comprises flowering plants, ferns and low shrubs. Abundant species include Common Foxglove, Creeping Buttercup, Field Bindweed, Wild Pea, Reed Canary Grass, Fireweed, Common Horsetail, Willow, Hardhack, Himalayan Blackberry, Indian Plum, Red Elderberry, Salmonberry, and Thimbleberry. Two large clusters of Japanese Knotweed (*Fallopia japonica*) were recorded near the east end of Area 2 immediately adjacent to CP’s north mainline track (see Appendix D, Photos 48, 49, and 50).

No mature trees are present in the riparian zone of Area 2.

3.4 Species at Risk

A search of the Species at Risk Public Registry for marine fishes in British Columbia identified one Schedule 1 species, namely, the Basking shark (*Cetorhinus maximus*) (Pacific population) as potentially found in the Project area. Basking sharks, however, are planktivores and the Project shoreline does not support habitat that is typically favoured by this species (i.e., areas of high zooplankton concentration such as areas of

converging water masses, headlands/islands with strong tidal flow (DFO, 2018)). According to DFO (2018), only six records of basking sharks in the Canadian Pacific have been confirmed over the past twenty years.

According to DFO's Aquatic Species at Risk Maps, the Project area appears on the British Columbia Southwest Map 4 and the Pacific Ocean Map 1 (Fisheries and Oceans Canada, 2017) for which there are 13 and 29 species at risk identified for each area, respectively. Through a review of species distribution and habitat requirements and comparison with habitat of the Project area, it was concluded that the only species from this list having the potential to occur in the Project area is the Northern Abalone (*Haliotis kamtschatkana*). Given that the Northern Abalone is typically found in rocky areas with waters depths of 10m or more, its presence in the Project area is not unlikely.

A search of the Species at Risk Public Registry for freshwater fishes in British Columbia identified 21 species (including several species having multiple populations)(Species at Risk Public Registry, 2018). Following a review of distribution and habitat requirements of these species, no listed freshwater fish were considered to potentially inhabit the freshwater drainage channels located south of CP's mainline tracks and pass through the Project area via culverts.

The great blue heron (*fannini* subspecies) is listed under Schedule 1 under SARA (Species at Risk Public Registry, 2018). Several great blue herons have been observed on the intertidal area during multiple site visits. Their presence at the Project site, however, is considered transitory. No nesting great blue herons were observed in the Project area.

No species at risk have been identified for the Project area according to the British Columbia Conservation Data Centre's database of known occurrences (Government of British Columbia, 2018).

4.0

Potential Environmental Effects & Proposed Mitigation Measures

Broadly, the quality of fish habitat in the Project area is considered to be of generally low value. The south shoreline of Burrard Inlet (Port Moody Arm) in the vicinity of the Project exhibits limited complexity in its morphometry and is generally sheltered from waves and diverse tidal flow conditions. Area 1 habitat is characterized by two large bars with a homogeneous mix of substrates dominated by pebbles. Scattered cobbles and boulders found near the high water mark provide some limited attachment points for sessile invertebrates and seaweeds and refugia for mobile invertebrates such as crabs. Finer-grained substrates that dominate the Area 2 foreshore and the lower Area 1 intertidal zone provide burrowing opportunities for species of clams and cockles. A total of 19 invertebrate species and four fish species were observed in the Project area.

4.1

Pathway of Effects

Qualified environmental professionals have assessed the Project for a variety of effects according to DFO's Pathways of Effects (POEs) approach. The primary POE of the Project on fish and fish habitat is associated with the "Placement of Materials or Structures in Water" (i.e., the placement of fill to accommodate the new service/lead track). In addition, other POEs applicable to the Project are:

- Excavation/Grading;
- Vegetation Clearing; and
- Use of Industrial Equipment.

It is fully expected that pathways of effects of the Project will potentially impact fish and aquatic life of the marine environment only. While drainage pathways on the south side of the CP right-of-way convey freshwater (and potential effects) across the right-of-way to Burrard Inlet, aquatic life within these drainage pathways is very limited (i.e., not fish-bearing).

POEs of the Project are discussed in **Sections 4.2 to 4.4** as they relate to various environmental components of the Project site. Proposed mitigation measures to avoid and/or minimize the potential effects of the Project are summarized below with additional best management practices identified in the Construction Environmental Management Plan appended.

4.2

Water Quality

4.2.1

Potential Effects

The applicable POEs that may affect water quality are as follows:

- Placement of Materials or Structures in Water;
- Excavation;
- Grading; and

- Use of Industrial Equipment.

The excavation/removal of unsuitable soils and placement and grading of structural fill and riprap in nearshore areas below the high water mark of Burrard Inlet using heavy construction equipment has the potential to generate and transport sediment and accidentally release deleterious substances (i.e., spills) which could negatively affect local water quality and fish habitat.

4.2.2 Recommended Mitigation Measures

To mitigate potential impacts on nearshore water quality and fish habitat in Burrard Inlet, the proponent is proposing the installation and maintenance of a floating silt curtain to isolate the construction area and any and all potential impacts to fish and fish habitat. The curtain will be installed by divers to ensure full contact (i.e., buried) with substrates and will be designed to operate effectively under the full range of expected tides. It is the proponent's intention to install the curtain within the "fisheries window" to minimize potential effects on fish and aquatic life. Any fish and aquatic life within the isolated area will be salvaged and relocated outside the curtain prior to construction. The curtain will be retained in place, and monitored regularly to ensure effectiveness, until all activities below the high water mark have been completed and no potential impact to water quality/fish and fish habitat remain.

An environmental monitor will be on-site to monitor the effectiveness of these measures and to determine whether additional mitigation and/or monitoring is required.

In addition, the following general mitigation measures will be implemented to minimize impacts to water quality:

- Storage of excavated material and debris will occur above the high water mark. All stockpiled material will be covered and secured to minimize risk of surface runoff;
- Areas of disturbed soils will be reseeded with appropriate seed mixes/species;
- The Environmental Monitor will verify that machinery is in good working condition and free of fuel and lubricant leaks. Necessary maintenance oils/lubricants will be stored in a separate contained lay-down area removed from Burrard Inlet and any drainage pathways;
- Where possible, fueling of machinery will be conducted at approved fueling locations having appropriate spill containment/clean up equipment and materials;
- Spill kits will be maintained in the active construction area and spill-containment kits containing sufficient quantities of absorbent material will be present in the active work area in proximity to working machinery;
- Should barges be required to deliver materials, etc., a floating boom will be placed around barges during offloading of materials that could negatively impair water quality;
- Environmental monitoring will be conducted, as required, during construction works to confirm appropriate mitigation measures are being implemented; and

Works will be conducted in accordance with applicable Acts, regulations, standards, and guidelines to protect the water quality of the marine habitat.

4.3 Marine Aquatic Habitat

4.3.1 Potential Effects

The applicable POEs that may affect the aquatic habitat of Burrard Inlet are:

- Placement of Materials or Structures in Water;
- Excavation;
- Grading;
- Vegetation Clearing; and
- Use of Industrial Equipment.

Potential effects to aquatic life of Burrard Inlet resulting through these POEs may include the following:

- Change in sediment loadings;
- Change in substrate composition;
- Change in food and nutrient supply;
- Change in contaminant concentrations;
- Change in habitat structure and cover;
- Potential for the mortality of invertebrates and fish/eggs/ova from equipment; and
- Potential for deleterious substances to enter marine habitat during construction.

4.3.2 Recommended Mitigation Measures

To minimize potential impacts to the marine aquatic life and their habitat, the following mitigation measures are proposed in addition to those listed above for water quality:

- Where possible, all work below the high water mark will occur at low tide;
- As quickly as possible, the new toe of slope will be established at an elevation above the high water mark allowing construction activities behind the toe of slope to occur outside of tidal influence;
- During the repair or replacement of culverts, the affected culvert will be blocked and flow will be pumped to the east or west into another culvert; and

The outlet of any pump will be directed onto a hard surface to reduce erosion potential and the generation/transport of sediment.

4.4 Riparian Vegetation

4.4.1 Potential Effects

Vegetation clearing using industrial equipment is the POE of the Project affecting riparian vegetation of the Burrard Inlet shoreline.

All vegetation between CP’s north mainline track and the current Burrard Inlet shoreline will be removed to allow construction and to accommodate the required offsets for the proposed new service/lead track. In

Area 1, riparian vegetation includes “clumps” of mature deciduous trees and shrubs. Riparian vegetation in Area 2 is exclusively low shrubs and herbaceous plants. This vegetation provides cover, shade and nutrients to the nearshore areas of Burrard Inlet however these contributions are of limited importance given the very large surface area and volume of the Inlet.

4.4.2 **Recommended Mitigation Measures**

To minimize impacts to riparian vegetation, the following mitigation measures are proposed:

- Where ever possible, riparian vegetation disturbance will be minimized to the greatest extent possible; and
- Where not in conflict with sightlines and operating standards, disturbed areas adjacent to Burrard Inlet will be seeded/planted to re-establish riparian vegetation areas.

Habitat Balance

CP's proposed Cascade Capacity Expansion Project represents a significant infrastructure investment to expand rail capacity into and out of the Port of Vancouver. The busy Cascade Subdivision attends the Burrard Inlet shoreline through the cities of Port Moody, Burnaby and Vancouver. In some cases the CP right-of-way extends beyond the high water mark. The proposed expansion project requires the permanent and temporary infilling of nearshore areas of Burrard Inlet (i.e., intertidal zone) to accommodate the proposed service/lead track at Suncor's Burrard Terminal enabling capacity expansion on the Cascade Subdivision.

Table 5 provides a summary of the estimated areas of habitat impacted by the proposed Project design. Both permanent and temporary areas of impact are identified for foreshore and riparian habitats. It is understood that habitat offsetting will be required to compensate for any serious harm to fish and fish habitat.

Table 5 Estimates of Permanent and Temporary Habitat Impacts of the Project

| Impact Type | Habitat Type | Estimated Area (m ²) |
|------------------------|---|----------------------------------|
| Permanent (Footprint) | Intertidal Zone – Area 1 (see Figure 1) | 4,670 |
| | Intertidal Zone – Area 2 (see Figure 1) | 1,890 |
| | Sub-total | 6,560 |
| | Riparian Zone – Area 1 | 4,525* |
| | Riparian Zone – Area 2 | 2,280* |
| | Sub-total | 6,805* |
| Temporary Working Zone | Intertidal Zone – Area 1 | 285 |
| | Intertidal Zone – Area 2 | 520 |
| | Sub-total | 805 |
| | Riparian Zone – Area 1 | 0 |
| | Riparian Zone – Area 2 | 0* |
| | Sub-total | 0* |

* denotes estimate of surface areal coverage by vegetation

Summary of Residual Effects

An assessment of the Pathways of Effects on the various environmental components of the Project results in the identification of residual impacts when mitigation measures cannot fully address the stressor. There is an extensive suite of standard best management practices that have been proven to effectively mitigate the range of potential impacts from construction activities similar to those proposed for CP's Capacity Expansion Project. Despite the availability of these measures, the encroachment of fill below the high water mark cannot be mitigated. Following from the analysis of fish and fish habitat effects for the Project (see **Table 6** that follows), the residual effects identified for this Project are, therefore, a loss of fish habitat of the Burrard Inlet foreshore, as well as a loss of riparian vegetation attending the shoreline. The majority of foreshore and riparian habitat loss will be permanent. As identified in Section 5.0, CP is committed to the concept of habitat offsetting to compensate for serious harm to fish and fish habitat resulting from the proposed capacity expansion program and will work with DFO and other stakeholders to develop an offsetting plan that contributes to the sustainability and ongoing productivity of Burrard Inlet fisheries.

Fish and Fish Habitat Effects Analysis Table

Project: Canadian Pacific (CP) Cascade Capacity Expansion Project

| Pathway of Effect(s) | Stressor (Potential Impact) | Mitigation Measures | Residual Effects | Risk of Serious Harm L/M/H | Rationale* |
|--|--|---|------------------|----------------------------|------------|
| <p>Vegetation Clearing</p> <p>Construction of the proposed service/lead track requires the clearing of vegetation within the CP right-of-way.</p> | Use of industrial equipment for clearing | See "Use of Industrial Equipment" POE below | - | - | - |
| | Increased erosion potential | <p>Areas cleared of vegetation will be replaced by structural fill and riprap that is non-erodible.</p> <p>A floating curtain will be installed on the intertidal zone of Burrard Inlet prior to construction to isolate the construction zone, contain site drainage/runoff, prevent erosion/transport of sediment, and exclude fish and aquatic life from potential erosion effects.</p> <p>The curtain and all other erosion and sediment controls established will be inspected and maintained on a regular basis throughout the construction period.</p> <p>Following construction, disturbed soils will be stabilized by seeding prior to the removal of temporary erosion and sediment controls.</p> | None | N/A | N/A |
| | Change in shade | <p>In Area 1, mature deciduous tree clumps provide shading of the upper intertidal zone. The importance of this function is reduced by the large surface area and volume of Burrard Inlet.</p> <p>Where possible, clearing will be minimized.</p> <p>Where not in conflict with sightlines and operating standards, cleared area adjacent to Burrard Inlet will be seeded/ planted to re-establish riparian vegetation areas.</p> | Negligible | None | N/A |
| | Change in external | Riparian vegetation in the Project area | Negligible | None | N/A |

| Fish and Fish Habitat Effects Analysis Table | | | | | |
|--|---|---|--|-----------------------------------|---|
| Project: Canadian Pacific (CP) Cascade Capacity Expansion Project | | | | | |
| Pathway of Effect(s) | Stressor (Potential Impact) | Mitigation Measures | Residual Effects | Risk of Serious Harm L/M/H | Rationale* |
| | nutrient/energy inputs | <p>contributes nutrients/energy to Burrard Inlet. The importance of these inputs is reduced by the large surface area and volume of Burrard Inlet.</p> <p>Where possible, clearing will be minimized.</p> <p>Where not in conflict with sightlines and operating standards, cleared areas adjacent to Burrard Inlet will be seeded/ planted to re-establish riparian vegetation areas.</p> | | | |
| <p>Use of Industrial Equipment</p> <p>Tracked excavator equipped with bucket and thumb will be used to excavate unsuitable soils, place structural fill, and place riprap for shoreline protection.</p> <p>Trucks and work trains will deliver structural fill, ballast and riprap to the site.</p> | Increased erosion potential | <p>Erosion and sediment controls will be installed prior to construction to isolate the construction zone, contain site drainage/ runoff and prevent erosion of exposed soils and transport of sediment to Burrard Inlet. This will include a floating silt curtain established on the foreshore that will remain in place while work is occurring below the high water mark.</p> <p>Working areas adjacent to Burrard Inlet will be stabilized by seeding and the shoreline protected from erosion with riprap.</p> <p>Environmental monitoring by a qualified environmental professional during construction will support effectiveness of sediment and erosion control measures.</p> | None | N/A | N/A |
| | Use of mobile and immobile industrial equipment | In-water work will be conducted within the Restricted Activity Period of March 1 to August 15 however the installation of the floating curtain during the fisheries window and subsequent exclusion from the work area will minimize potential mortality to all | Change in habitat structure and cover | Low | Work is short-term in duration and isolated areas will be available as soon as construction achieves high water elevation. |

Fish and Fish Habitat Effects Analysis Table

Project: Canadian Pacific (CP) Cascade Capacity Expansion Project

| Pathway of Effect(s) | Stressor (Potential Impact) | Mitigation Measures | Residual Effects | Risk of Serious Harm L/M/H | Rationale* |
|---|--|---|--|----------------------------|--|
| | | life stages of fish. | | | |
| | Fuel, oil and grease leaks from industrial equipment | <p>Construction equipment will be maintained in good working order to prevent the leakage of fuel, oil and other hazardous materials.</p> <p>Any equipment operating below the high water mark of Burrard Inlet will be inspected to be free of fluid leaks and arrive at the site in a clean condition prior to use.</p> <p>A project-specific spill management plan will be created to ensure that the appropriate spill planning, preparedness and response measures are in place and on-site at all times in the event of accidental spill or environmental incident during construction.</p> | None | None | N/A |
| Placement of Materials or Structures in Water The Project requires the placement of structural fill and riprap for shoreline protection below the high water mark of Burrard Inlet. | Change in hydraulics | Encroachment into Burrard Inlet and the placement of riprap protection along the shoreline is not expected to modify hydraulics or sediment transport. Proposed shoreline slope will be more gentle than current slope. | Negligible | None | N/A |
| | Change in substrate composition | Riprap will uniformly be placed along the Project extent of the shoreline for erosion protection. Riprap below high water mark is expected to provide attachment surface as well as interstitial spaces for marine biota. | Change in habitat cover and structure | Low | Work is short-term in duration, though encroachment and placed riprap is permanent. Riprap is expected to support habitat complexity. |
| | Change in marine vegetation | Limited marine vegetation occurs in the Project Area. Marine vegetation may be displaced during construction however | Negligible | None | N/A |

Fish and Fish Habitat Effects Analysis Table

Project: Canadian Pacific (CP) Cascade Capacity Expansion Project

| Pathway of Effect(s) | Stressor (Potential Impact) | Mitigation Measures | Residual Effects | Risk of Serious Harm L/M/H | Rationale* |
|---|--|---|--|----------------------------|---|
| | | riprap surfaces and interstitial spaces are expected to promote the establishment of rockweed and other marine vegetation of the upper foreshore within, and following, the year of construction year. | | | |
| | Change in water temperature and chemistry | Proposed encroachment and placement of riprap protection is not expected to alter the temperature or chemistry of Burrard Inlet. | None | N/A | N/A |
| | Diversion channels | Diversion channels are not proposed as an element of Project construction. | N/A | N/A | N/A |
| | Flow alteration (timing, duration, intensity) and creation of attraction flows and flow barriers | Proposed in-water construction activities and encroachment of the shoreline will not alter flow patterns or alter fish movement along the shoreline. In-water work will be conducted within the Restricted Activity Period of March 1 to August 15 however the installation of the floating curtain during the fisheries window and subsequent exclusion from the work area will minimize potential mortality to all life stages of fish. | None | N/A | N/A |
| Excavation/ Grading Construction of proposed fill and embankment requires the removal of unsuitable subgrade material and placement and grading of structural | Change in habitat structure and cover | Considerable areas of vegetation clearing, excavation, infill and grading will occur in Areas 1 and 2. Encroachment on the Burrard Inlet foreshore will occur in many areas. Erosion and sediment control measures, including the establishment of a floating curtain on the foreshore, will be implemented. In-water work will be conducted within the Restricted Activity Period of March 1 to August 15 however the installation of the | Change in habitat structure and cover | Low | Work is short-term in duration and isolated areas will be available as soon as construction achieves high water elevation. |

| Fish and Fish Habitat Effects Analysis Table | | | | | |
|--|------------------------------------|---|--|--|--------------------------------------|
| Project: Canadian Pacific (CP) Cascade Capacity Expansion Project | | | | | |
| Pathway of Effect(s) | Stressor (Potential Impact) | Mitigation Measures | Residual Effects | Risk of Serious Harm L/M/H | Rationale* |
| fill. | | floating curtain during the fisheries window and subsequent exclusion from the work area will minimize potential mortality to all life stages of fish. Where not in conflict with sightlines and operating standards, cleared area adjacent to Burrard Inlet will be seeded/ planted to re-establish riparian vegetation areas. | | | |
| | Change in sediment concentrations | Erosion and sediment controls will be installed prior to construction to isolate the construction zone, contain site drainage/ runoff and prevent erosion of exposed soils and transport of sediment to Burrard Inlet. The floating silt curtain established on the foreshore will remain in place while work is occurring below the high water mark. | None | N/A | N/A |
| Overall Risk of Causing Serious Harm to Fish: | | | Low <input checked="" type="checkbox"/> | Medium <input type="checkbox"/> | High <input type="checkbox"/> |

***Interpretation of Serious Harm to Fish (as per the Fisheries Protection Policy Statement)**

- 1. The expected duration of impacts** (For example, is the duration short enough that it does not diminish the ability of fish to carry out one or more of its life processes? It is important to note that, for many projects, the duration of impact will be longer than the duration of the work taking place in or near the water)
- 2. The geographic scale of impacts** (For example, is the scale small enough that the disturbance will not displace fish that would otherwise be occupying the habitat?)
- 3. The availability and condition of nearby fish habitat** (Is the habitat that is being altered or destroyed the only habitat of its type and quality in the area of the project?)
- 4. The impact on the relevant fish (stocks)** (For example, are the fish that are affected by the proposed project likely to experience increased mortality rates, increased stress and reduced fitness as a result of direct injury or reduced habitat function such that a localized effect on a fish population or stock is possible?)

Conclusion

CP is committed to completing the proposed Cascade Capacity Expansion Project in a manner that respects and protects the environmental values and attributes of Burrard Inlet and adjacent areas. CP has developed a preliminary design and construction approach that minimizes potential effects of Project development on fish and fish habitat. An analysis of potential effects of the Project has been completed and considered a range of effects pathways and stressors on fish and fish habitat. With the application of standard mitigation measures and environmental best management practices, many potential impacts of construction and operation of the new service/lead track can be avoided or minimized. The analysis did identify that the proposed encroachment of fill below the high water mark of Burrard Inlet cannot be mitigated and that residual effects to fish and fish habitat can, therefore, be expected from the proposed placement of materials in Burrard Inlet and vegetation clearing to accommodate the new track embankment.

CP appreciates DFO's review of fisheries-related aspects of the proposed Cascade Capacity Expansion Project and your determination regarding the Project. CP is committed to the concept of habitat offsetting to compensate for serious harm to fish and fish habitat resulting from the proposed capacity expansion project and looks forward to working with DFO and other stakeholders in develop an offsetting plan that contributes to the sustainability and ongoing productivity of Burrard Inlet fisheries.

8.0 References

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Appendix A

Request for Project Review Form



Request for Review

A) Contact information

Name of Business/Company:

Canadian Pacific Railway

Name of Proponent:

Joe Van Humbeck

Mailing address:

7550 Ogden Dale Road SE

City/Town:

Calgary

Province/Territory:

Alberta

Postal Code:

T2C 4X9

Tel. No. :

(403) 319-6530

Fax No.:

Email:

Joe_VanHumbeck@cpr.ca

Is the Proponent the main/primary contact? Yes No

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

Consultant Primary Contacts:
Paul Schaap: pschaap@dillon.ca
(604) 351-1174

Select additional contact:

Contractor/Agency/Consultant (if applicable):

Dillon Consulting Limited

Mailing address:

3820 Cessna Drive, Suite 510

City/Town:

Richmond

Province/Territory:

British Columbia

Postal Code:

V7B 0A2

Tel. No. :

(604) 278-7847 x4220

Fax No.:

(604) 278-7894

Email:

pschaap@dillon.ca



B) Description of Project

If your project has a title, please provide it.

Cascade Capacity Expansion Project

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

Does your project involve work in water? Yes No

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

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

Extension of the existing embankment located north of CP's Cascade Subdivision between Mile 118.06 and 118.67 to accommodate a new service/lead track north of existing north mainline on the south side of Burrard Inlet. Please see attached Request for Project Review document.

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

Please see attached Request for Project Review document.

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

Are details attached? Yes No

Identify which work categories apply to your project.

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



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

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

Vancouver Fraser Port Authority - Regan Elley, Planner, (604) 665-9594

C) Location of the Project

Coordinates of the proposed project Latitude N Longitude W

OR UTM zone ; Easting

Northing

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

Name of Nearest Community (City, Town, Village):

Burnaby and Port Moody

Municipality, District, Township, County, Province:

British Columbia

Name of watershed (if applicable):

Burrard Inlet Watershed

Name of watercourse(s) or waterbody(ies) near the proposed project:

Burrard Inlet

Provide detailed directions to access the project site:

The Project site is accessible only along the CP right-of-way via the public crossing at Reed Point Marina. A portion of the Project site is visible from the overhead structure leading to Suncor's Burrard Terminal.

D) Description of the Aquatic Environment

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

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

Provide a detailed description of biological and physical characteristics of the proposed project site.

Please refer to attached Request for Project Review document.

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



E) Potential Effects of the Proposed Project

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

Yes No

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

- | | |
|---|--|
| <input checked="" type="checkbox"/> Addition or removal of aquatic vegetation | <input checked="" type="checkbox"/> Placement of material or structures in water |
| <input type="checkbox"/> Change in timing, duration and frequency of flow | <input checked="" type="checkbox"/> Riparian Planting |
| <input type="checkbox"/> Cleaning or maintenance of bridges or other structures | <input type="checkbox"/> Streamside livestock grazing |
| <input type="checkbox"/> Dredging | <input type="checkbox"/> Structure removal |
| <input checked="" type="checkbox"/> Excavation | <input type="checkbox"/> Use of explosives |
| <input type="checkbox"/> Fish passage issues | <input checked="" type="checkbox"/> Use of industrial equipment |
| <input checked="" type="checkbox"/> Grading | <input checked="" type="checkbox"/> Vegetation Clearing |
| <input type="checkbox"/> Marine seismic surveys | <input type="checkbox"/> Wastewater management |
| <input type="checkbox"/> Organic debris management | <input type="checkbox"/> Water extraction |
| <input type="checkbox"/> Placement of marine finfish aquaculture site | |

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

If yes, provide description.

The proposed development of a new service/lead track (i.e., the Project) will require infilling below the high water mark of Burrard Inlet. Riparian and foreshore habitat will be permanently removed. Several areas on the foreshore will also be filled to facilitate construction of the Project. Fish habitat in these areas will be temporarily unavailable for use by fish.

Will the fish habitat alteration be permanent*? Yes No Unknown

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

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

The permanent footprint of the Project below the high water mark is 6,285 m2. The temporary work areas footprint of the Project is an additional 1,229 m2.

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

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

N/A

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

N/A

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

N/A

Will your project cause death of fish? Yes No Unknown

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

Given that the watercourses entering Burrard Inlet are not likely to have fish present, the potential for harm to fish and fish habitat in the watercourses is anticipated to be low. Therefore, the POEs are not likely to negatively impact the freshwater aquatic habitat.



Are there aquatic species at risk (http://www.sararegistry.gc.ca/species/aquatic_e.cfm) present? If yes, which ones?

Please refer to the Species at Risk section (Section 3.4) in the attached Request for Project Review document.

What is the time frame of your project?

The construction will start on 03/14/2019 and end by 12/20/2019

If applicable, the operation will start on 01/01/2020 and end by N/A

If applicable, provide schedule for the maintenance

Maintenance of the new infrastructure and works will be ongoing.

If applicable, provide schedule for decommissioning

N/A

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

(If yes, provide details)

N/A

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

Yes No

If yes, describe.

Due to the constrained nature of the area where the proposed service/lead track is being constructed, it is not possible for the construction to occur in a different area. Various designs for the proposed works have been considered to avoid negative effects to fish and fish habitat.

Have you consulted DFO's Measures to Avoid Harm to Fish and Fish Habitat (<http://www.dfo-mpo.gc.ca/pnw-ppe/measure-mesures/index-eng.html>) to determine which measures apply to your project?

Yes No

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

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

The applicable mitigation measures for the project are listed in Sections 4.2.2, 4.3.2, and 4.4.2 in the attached Request for Project Review document.

Have you considered and incorporated additional best practices and mitigation measures recommended in relevant guidelines to avoid negative effects to fish and fish habitat?

No Yes

If Yes, include a list of the guidelines being used to avoid negative effects to fish and fish habitat.

Please see Sections 4.2.2, 4.3.2, and 4.4.2 in the attached Request for Project Review document.

Are there any relevant best practices or mitigation measures that you are unable to incorporate? Yes No



(If yes, identify which ones.)

N/A

Can you follow appropriate Timing Windows (<http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>) for all your project activities below the High Water Mark*?

Yes No

(If no, provide explanations.)

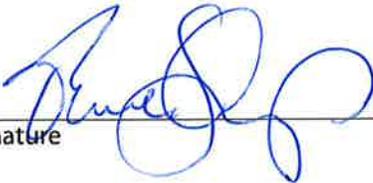
Depending on the timing of Project approvals from DFO and the VFPA, it may be necessary to undertake works within the restricted activity period (i.e., outside the fisheries window). CP is proposing to install a curtain during the fisheries window to isolate the Project site and potential construction impacts from fish and fish habitat.

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

With the implementation of proposed avoidance and mitigation measures described in the attached Request for Project Review document, construction of the Project will result in the permanent loss of approximately 6,200 m2 of low quality fish habitat, and the temporary loss of use of approximately 1,200 m2 of low quality fish habitat. CP is prepared to work with DFO in developing an off-setting plan to compensate for the permanent and temporary loss of fish habitat.

F) Signature

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


Signature

Date

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

*All definitions are provided in Section G of the *Guidance on Submitting a Request for Review*

Appendix B

Preliminary Design Drawings

BURRARD INLET

REED POINT MARINA



HIGHWAY 7A

MILE 117.75

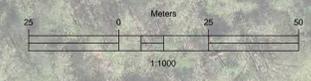
MILE 118.00

START OF PROPOSED RAIL ALIGNMENT

CP MAIN TRACK 1

CP MAIN TRACK 2

REED POINT MARINA ENTRANCE



PROJECT
 CP Rail
 Capacity Expansion
 Cascade Subdivision
 Mile 118.06 to
 Mile 118.67

9950 Barnet Highway
 Port Moody, BC



CONSULTANTS
 AECOM
 3292 Production Way
 Burnaby, BC, Canada V5A 4R4
 604.444.6400 tel 604.294.8597 fax
 www.aecom.com

DILLON CONSULTING
 3820 Cessna Drive, Suite 510
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 www.dillon.ca

ISSUE/REVISION

| NO. | DATE | DESCRIPTION |
|-----|------------|-----------------------|
| A | 2018/06/05 | ISSUED FOR DISCUSSION |
| I/R | DATE | DESCRIPTION |

INITIALS

| JTC | JTC | BJ | JTC |
|---------|----------|---------|----------|
| DRAFTER | DESIGNER | CHECKER | ENGINEER |

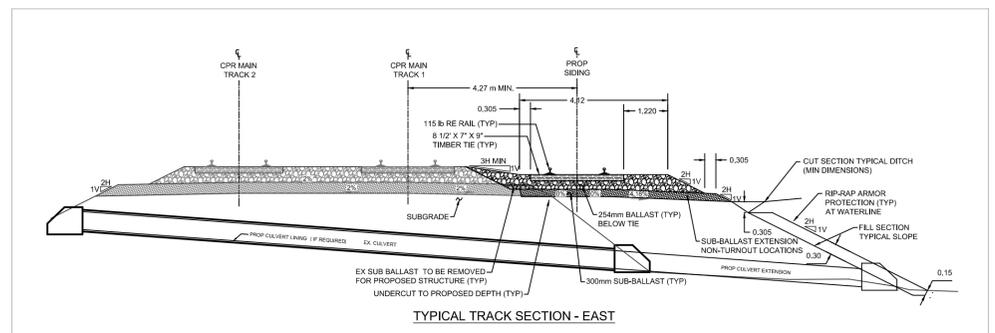
REGISTRATION

PRELIMINARY FOR DISCUSSION ONLY

PROJECT NUMBER
 60580255

SHEET TITLE
 GRADING IMPACT
 FULL SLOPE

SHEET NUMBER
 SK-001



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 SCALE 1:1000

LEGEND

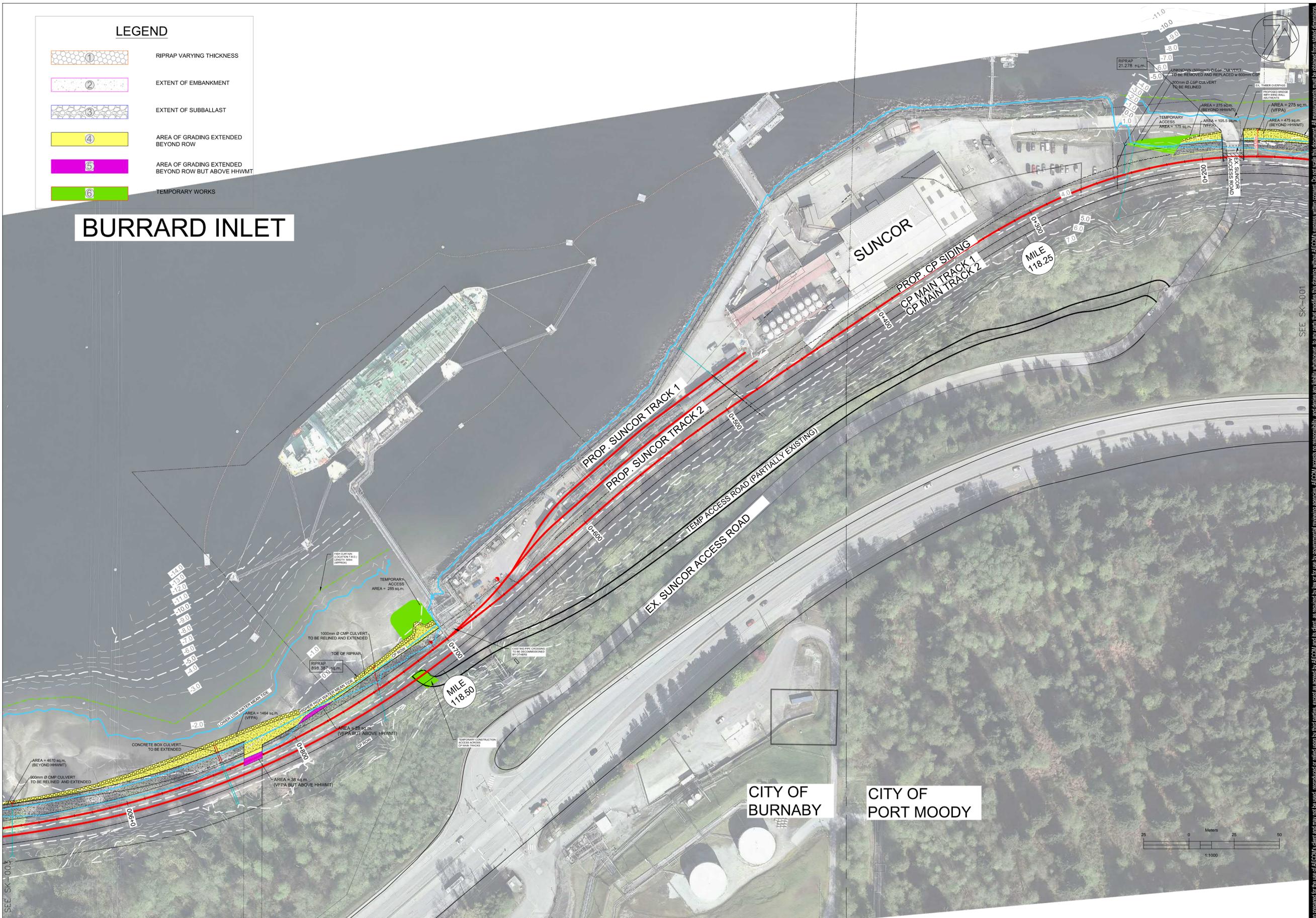
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- ② EXTENT OF EMBANKMENT
- ③ EXTENT OF SUBBALLAST
- ④ AREA OF GRADING EXTENDED BEYOND ROW
- ⑤ AREA OF GRADING EXTENDED BEYOND ROW BUT ABOVE HHWMT
- ⑥ TEMPORARY WORKS

Project Management Initials: Designer: _____ Checker: _____ Approver: _____
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| LEGEND | |
|--------|---|
| | RIPRAP VARYING THICKNESS |
| | EXTENT OF EMBANKMENT |
| | EXTENT OF SUBBALLAST |
| | AREA OF GRADING EXTENDED BEYOND ROW |
| | AREA OF GRADING EXTENDED BEYOND ROW BUT ABOVE HHWMT |
| | TEMPORARY WORKS |

BURRARD INLET



GRADING IMPACT - CENTER
SCALE 1:1000



PROJECT
 CP Rail
 Capacity Expansion
 Cascade Subdivision
 Mile 118.06 to
 Mile 118.67

9950 Barnet Highway
 Port Moody, BC

CLIENT

Canadian Pacific Railway Company
 7550 Ogden Dale Road S.E.
 Calgary, Alberta T2C 4X9
 1-888-333-6370 tel www.cpr.ca

CONSULTANTS

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ISSUE/REVISION

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| A | 2018/06/05 | ISSUED FOR DISCUSSION |
| I/R | DATE | DESCRIPTION |

INITIALS

| JTC | JTC | BJ | JTC |
|---------|----------|---------|----------|
| DRAFTER | DESIGNER | CHECKER | ENGINEER |

REGISTRATION

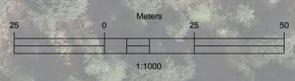
PRELIMINARY FOR DISCUSSION ONLY

PROJECT NUMBER
60580255

SHEET TITLE
GRADING IMPACT
FULL SLOPE

SHEET NUMBER
SK-002

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| NO. | DATE | DESCRIPTION |
|-----|------------|-----------------------|
| A | 2018/06/05 | ISSUED FOR DISCUSSION |
| I/R | DATE | DESCRIPTION |

INITIALS

| JTC | JTC | BJ | JTC |
|---------|----------|---------|----------|
| DRAFTER | DESIGNER | CHECKER | ENGINEER |

REGISTRATION

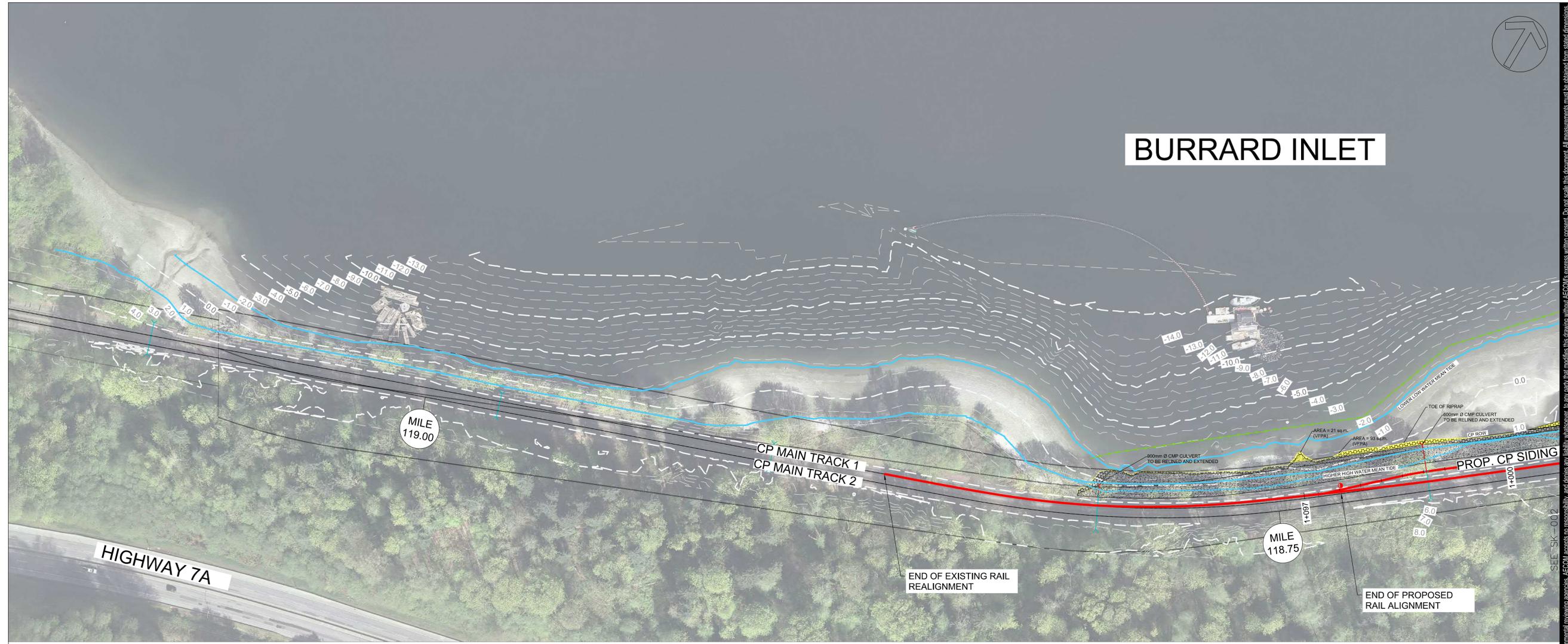
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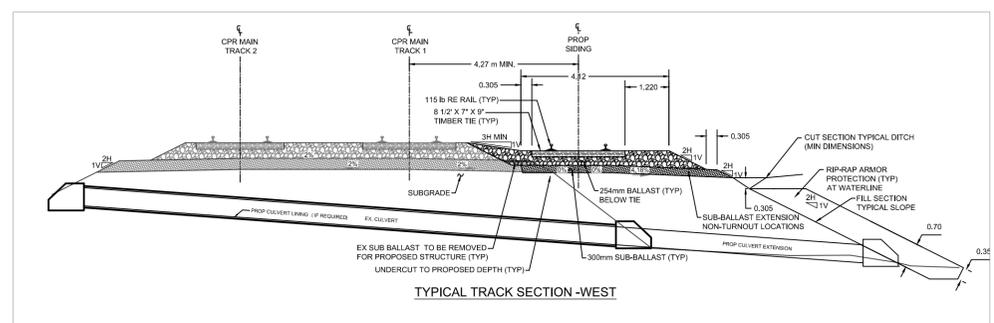
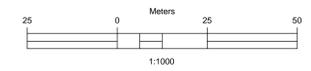
SHEET TITLE
GRADING IMPACT
FULL SLOPE

SHEET NUMBER
SK-003

BURRARD INLET



GRADING IMPACT - WEST
 SCALE 1:1000



LEGEND

-  1 RIPRAP VARYING THICKNESS
-  2 EXTENT OF EMBANKMENT
-  3 EXTENT OF SUBBALLAST
-  4 AREA OF GRADING EXTENDED BEYOND ROW
-  5 AREA OF GRADING EXTENDED BEYOND ROW BUT ABOVE HHWMT
-  6 TEMPORARY WORKS

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Appendix C

Subtidal Survey Results

Methodology

Foreshore Technologies Inc. conducted subtidal surveys on June 21st and June 22nd, 2018. The survey team included a SCUBA equipped Qualified Environmental Professionals (QEP), with knowledge and experience of the local aquatic biology and ecology, and a vessel operator/dive tender. Tide heights during the surveys ranged from +1.68m to +3.43m Chart Datum (CD).

The survey included:

- A biophysical overview of approximately 50,000m² of subtidal habitat,
- 14 belt transects (3 metre width; 1.5 metres on each side of the transect tape),
- Photographs and video of typical and rare observations along each transect,
- Mapping of surface substrates and biota abundance, elevation and distributions,
- Reconnaissance survey's between transects to confirm that transect observations were representative of overall site habitat conditions.

Additional substrate conditions noted during the survey included any significant build-up of shell hash, woody debris and/or anthropogenic materials.

Species and biota groups chosen for surveying and mapping purposes were selected by the QEPs at the time of the survey as those that best represented the environmental and habitat conditions present. The abundance levels of selected species or biota groups were based on the following criteria:

| Abundance | | |
|------------------|-------------------------|---------------------------------|
| Amount | % Areal Coverage | Individuals per Transect |
| Rare | <5% | 1 |
| Sparse | 5% to 25% | 2 to 5 |
| Few | 26% to 50% | 6 to 10 |
| Common | 51% to 75% | 11 to 30 |
| Abundant | >75% | >30 |

Abundance categories have been adapted from the Department of Fisheries and Oceans' Coastal/Estuarine Fish Habitat Description and Assessment Manual (1990). Percent areal coverage refers specifically to areas along transects where the species were observed within the specified species depth range.

Elevations and boundaries between different substrate and biota types were mapped using tidal elevations, local geographical features and survey tapes. Elevations were related to Canadian Hydrographic Service Chart Datum.

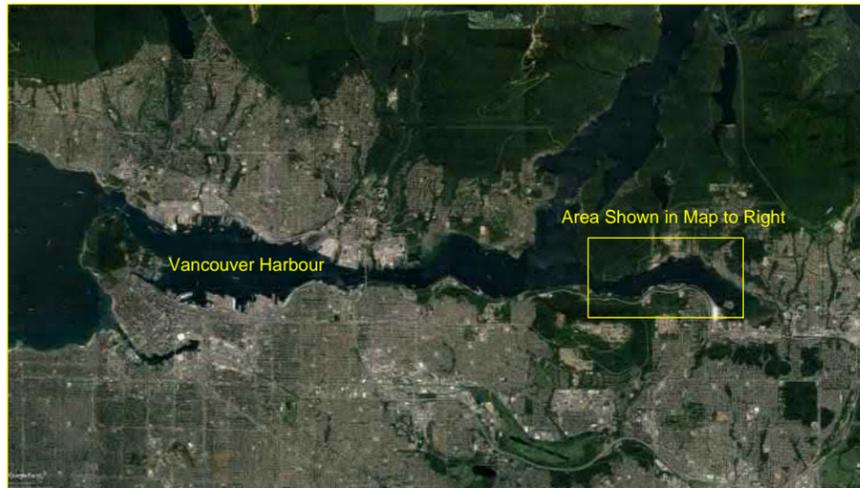
Results

The biophysical survey included two (2) main survey areas (East and West) along the shoreline immediately adjacent to the Suncor Terminal Facility in Port Moody, British Columbia (see Drawings 3967-D-01.1 Substrate Conditions East and 3967-D-03.1 Substrate Conditions West). Biophysical

conditions varied according to depth, but similar trends in substrates and species were observed across both survey areas.

Substrate conditions ranging between 2.0m and -0.5m chart datum (CD) typically comprised cobble (60%), pebble (20%), sand (10%) and boulders (10%). A transition to sand (55%), mud (35%) and cobble (10%) occurred at approximately -0.5m CD while depths beyond -1.2m CD consisted primarily of mud (80%) and sand (20%) on both East and West survey areas (see Drawings 3967-D-01.1 Substrate Conditions East and 3967-D-03.1 Substrate Conditions West) .

Low diversity in biota was observed throughout the East and West survey areas. Barnacle and sea lettuce were the most abundant species within the intertidal zones along with shore and hermit crabs. A swath of horse clams was found between -1.2m and -2.4m CD across both survey areas. Laminarian kelp, leather, mottled and ochre sea stars, red rock and dungeness crabs, as well as english sole fish were typically observed in subtidal habitats between -1.0m and -4.5m CD. The remainder of the subtidal area consisted almost entirely of mud and sand sediment, which likely limited growth and colonization of organisms (see Drawings 3967-D-02.1 Biological Conditions East and 3967-D-04.1 Biological Conditions West).



DRAWING NOTES

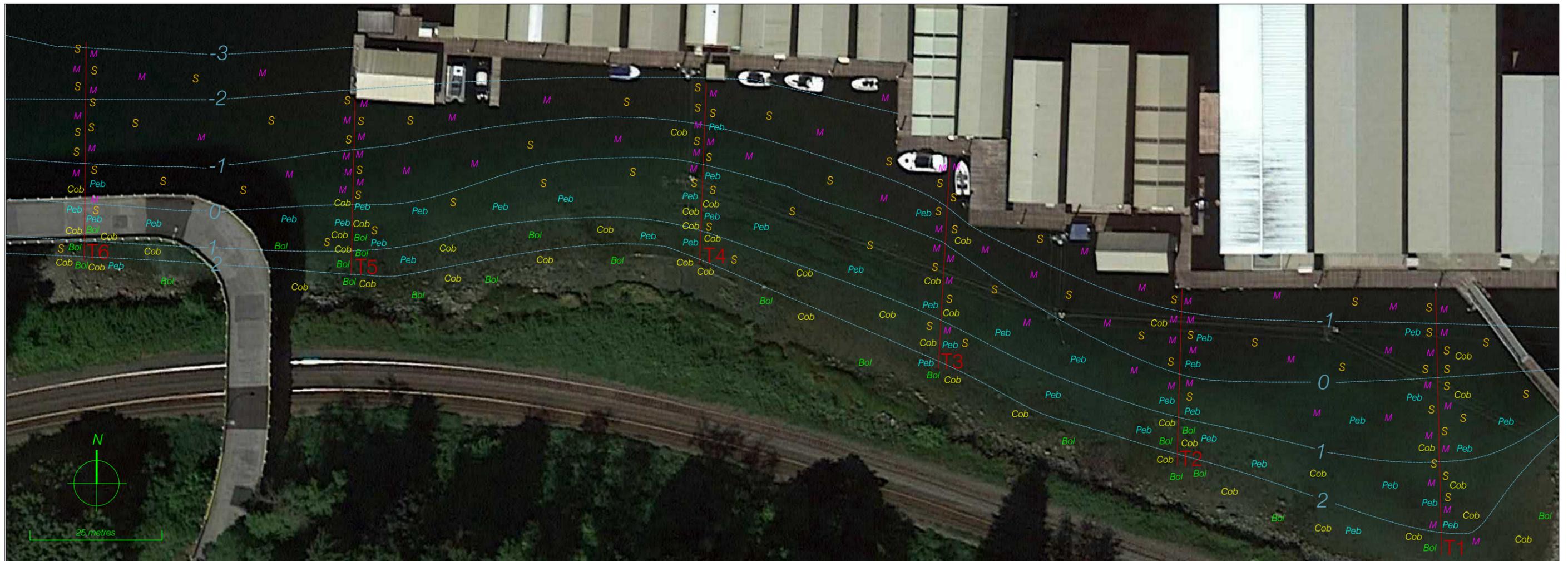
- Transect location positions are approximated and based on GPS location data and local geographical features.
- Biophysical survey was conducted on June 21 and 22, 2018.
- All elevations are in metres and related to Canadian Hydrographic Service Chart Datum and taken from identified reference drawings listed.
- The information, including bathymetric and survey data, presented on the drawings may vary from current conditions due to the passage of time or seasonal changes in substrate and biota.
- Substrate and biota are mapped on the basis of "presence" (not density), however, the number of tags/symbols present in a given area can provide, in relative terms, an indication of abundance and uniformity. Where tags/symbols are grouped together in an area, the tagged substrate or biota can be assumed to be contiguous.

LEGEND

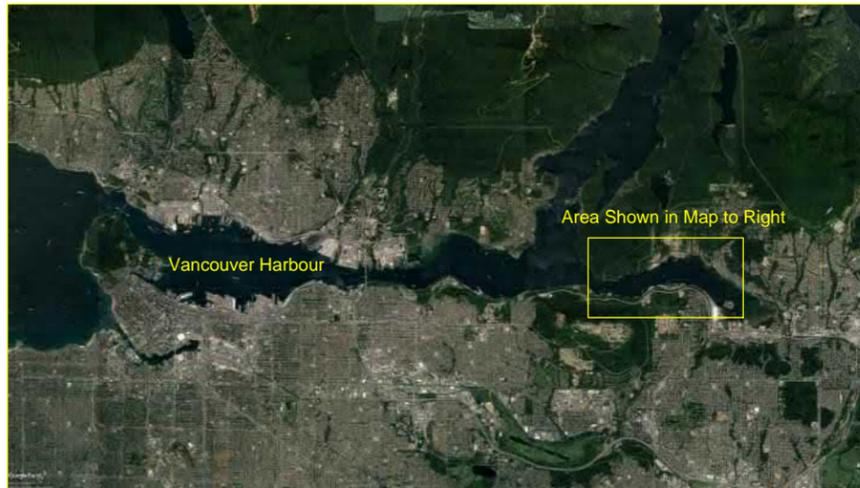
- Contours in Metres Chart Datum
- Transect Locations

SUBSTRATE KEY

- Bol** Boulders (>255mmØ)
- Cob** Cobble (64mm to 255mmØ)
- Peb** Pebble (2mm to 64mmØ)
- S** Sand (0.0625mm to 2mmØ)
- M** Mud (<0.0625mmØ)



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| | | | | | | Drawn by | GM | | | |
| | | | | | | Date | July 13, 2018 | | | |
| | | | | | | Scale | See Barscale | | | |
| | | | | | | Inspectors | GM, LG | | | |
| Ref. No. | REFERENCE | | | | | Paper | 11 x 17 | DWG. No. 3967-D-01.1 | | |



DRAWING NOTES

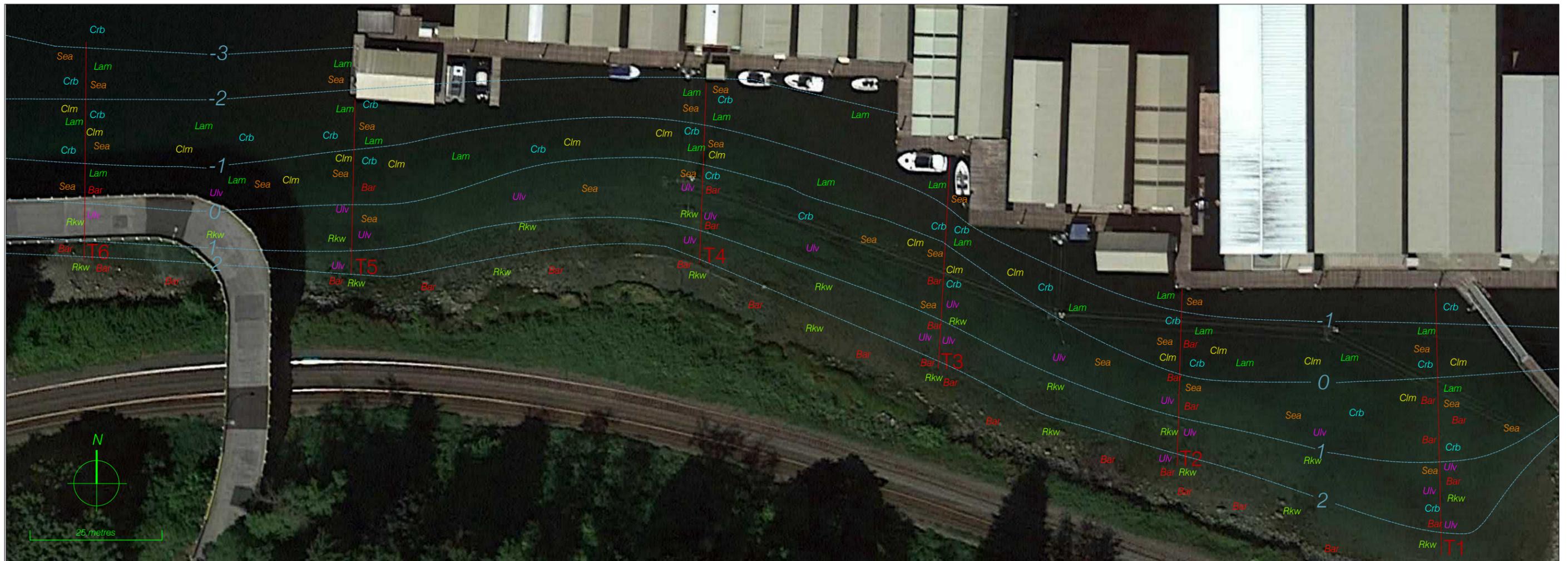
- Transect location positions are approximated and based on GPS location data and local geographical features.
- Biophysical survey was conducted on June 21 and 22, 2018.
- All elevations are in metres and related to Canadian Hydrographic Service Chart Datum and taken from identified reference drawings listed.
- The information, including bathymetric and survey data, presented on the drawings may vary from current conditions due to the passage of time or seasonal changes in substrate and biota.
- Substrate and biota are mapped on the basis of "presence" (not density), however, the number of tags/symbols present in a given area can provide, in relative terms, an indication of abundance and uniformity. Where tags/symbols are grouped together in an area, the tagged substrate or biota can be assumed to be contiguous.

LEGEND

- Contours in Metres Chart Datum
- Transect Locations

BIOTA KEY

- Ulv Sea lettuce
- Lam Laminarian kelp
- Rkw Rockweed
- Bar Barnacles
- Sea Sea stars
- Crb Red rock or Dungeness crab
- Clm Horse clams



| | | | | | | | | | | |
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| | | | | | | | Drawn by GM | | | |
| | | | | | | | Date July 13, 2018 | | | |
| | | | | | | | Scale See Barscale | | | |
| | | | | | | | Inspectors GM, LG | | | |
| | | | | | | | Paper 11 x 17 | DWG. No. 3967-D-02.1 | | |
| Ref. No. | REFERENCE | | | | | | | | | |



Photo 1. Cobble, sand and pebble substrate located along transect 5 (Area East).



Photo 2. Sand, mud cobble and pebble substrate in the subtidal zone on transect 1 (Area East).



Photo 3. Typical mud and sand bottom at subtidal depths along all transects in area east.



Photo 4. Cobble and pebble substrate in the intertidal zone along transect 6 (Area East).



Photo 5. Pebble and sand surveyed in the upper subtidal zone on transect 3 (Area East).



Photo 6. Typical substrate found in upper subtidal area along transects 1, 2, 3 and 4 (Area East).



Photo 7. Cobble, pebble, sand substrate found in upper subtidal zones across most transects in survey area west.



Photo 8. Sand, pebble substrate found in upper subtidal zone along transect 8 (Area West).



Photo 9. Typical sand and mud bottom at subtidal depths across all transects in area west.



Photo 10. Cobble, pebble, sand substrate in lower intertidal zone along transect 9 (Area West).



Photo 11. Sand, cobble, pebble bottom at mid subtidal zone on transect 10 (Area West).



Photo 12. Sand and mud bottom in mid subtidal zone along transect 13 (Area West).

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| | | | | 120 GARDEN AVE, NORTH VANCOUVER BRITISH COLUMBIA, V7P 3H2 | Drawn by | | | GM |
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| | | | | | Scale | | | |
| | | | | | Inspectors | | | |
| | | | | | GM, LG | | | |
| | | | | | Paper | | | |
| | | | | | 11 x 17 | | | |
| | | | | | | DWG. No. 3967-D-05.1 Substrate Photographs | | |
| Ref. No. | REFERENCE | | | | | | | |



Photo 1. Ochre sea star and barnacles in lower intertidal zone along transect 6 (Area East).



Photo 2. Sea lettuce in upper subtidal zone along most transects in survey area east.



Photo 3. Laminarian kelp and dungeness crab in subtidal area along transect 6 (Area East).



Photo 4. Leather sea star and laminarian kelp along transect 2 (Area East).



Photo 5. Red rock crabs were observed through out survey area east and west.



Photo 6. Ochre sea star among sea lettuce in upper subtidal zone along transect 4 (Area East).



Photo 7. Rock weed and barnacles in intertidal zone along transect 10 (Area West).



Photo 8. Red rock crab and sea lettuce typically found through out survey area west.



Photo 9. Mottled sea stars and laminarian kelp located upper subtidal zone on transect 11 (Area West).



Photo 10. Horse clams were found throughout survey areas west and east.



Photo 11. Red rock crab, sea cucumber and laminarian kelp in upper subtidal zone along transect 14 (Area West).



Photo 12. Sea lettuce typically observed throughout lower intertidal and upper subtidal zones in survey area west and east.

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| DWG. No. | 3967-D-06.1 Biota Photographs |

Appendix D

Select Site Photographs



Characteristic intertidal habitat of Area 1, looking southeast. The edge of the Suncor facility is visible on the left of the photo.

Photo 1



Intertidal substrate in Area 1.

Photo 2



Characteristic intertidal habitat of Area 1, looking west to end of project area.

Photo 3



Upper intertidal habitat at the east end of Area 1, looking east.

Photo 4

| | | |
|---|--|--------------------------------|
|  | <p>SITE PHOTOGRAPHS - 3.1.1 Area 1 Marine Habitat Summary</p> | <p>PROJECT NO. 18-7764</p> |
| <p>August 2018</p> | <p>CP Cascade Capacity Expansion Project - DFO Request for Review Submission</p> | <p>PHOTO NO. 1,2,3,4</p> |



Boulders colonized with rockweed, mussels and barnacles that characterize the upper intertidal zone of Area 1.

Photo 5



Sugar Kelp found in Area 1.

Photo 6



Vegetation established on the upper intertidal zone of Area 1.

Photo 7



Intertidal pool located in Area 1.

Photo 8



August 2018

SITE PHOTOGRAPHS - 3.1.1 Area 1 Marine Habitat Summary

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

PHOTO NO.
8



Intertidal habitat characteristic of Area 2, looking west. Floats and buildings of Reed Point Marina are visible in the right of the photo.

Photo 9



Intertidal substrates and vegetation in Area 2.

Photo 11



Exposed intertidal habitat in Area 2 at low tide, looking east.

Photo 10



August 2018

SITE PHOTOGRAPHS - 3.1.2 Area 2 Marine Habitat Summary
 CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
 18-7764
 PHOTO NO.
 9,10,11



Rockweed, Sea Hair and Lyngbye's sedge characteristic of Area 2.

Photo 12



Barnacles and cobble in Area 2 beneath the Suncor trestle.

Photo 13



Substrate and biota detail in Area 2.

Photo 14



August 2018

SITE PHOTOGRAPHS - 3.1.2 Area 2 Marine Habitat Summary

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

PHOTO NO.
12,13,14



Outflow of Culvert 0+004.31 into intertidal area of Burrard Inlet. Photo 15



Downstream seepage into intertidal habitat of Burrard Inlet at Station 0+004.31. Photo 17



Upstream habitat at Station 0+004.31. Photo 16

| | | |
|--|---|------------------------|
|  | SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat | PROJECT NO. 18-7764 |
| | CP Cascade Capacity Expansion Project - DFO Request for Review Submission | PHOTO NO. 15,16,17 |

August 2018



Standing water, no observed flow at upstream entrance to Station 0+004.31

Photo 18



Inlet to the culvert at Station 0+035.75.

Photo 19



Habitat upstream at the culvert at Station 0+035.75.

Photo 20



Downstream outflow of culvert at Station 0+035.75.

Photo 21



August 2018

SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

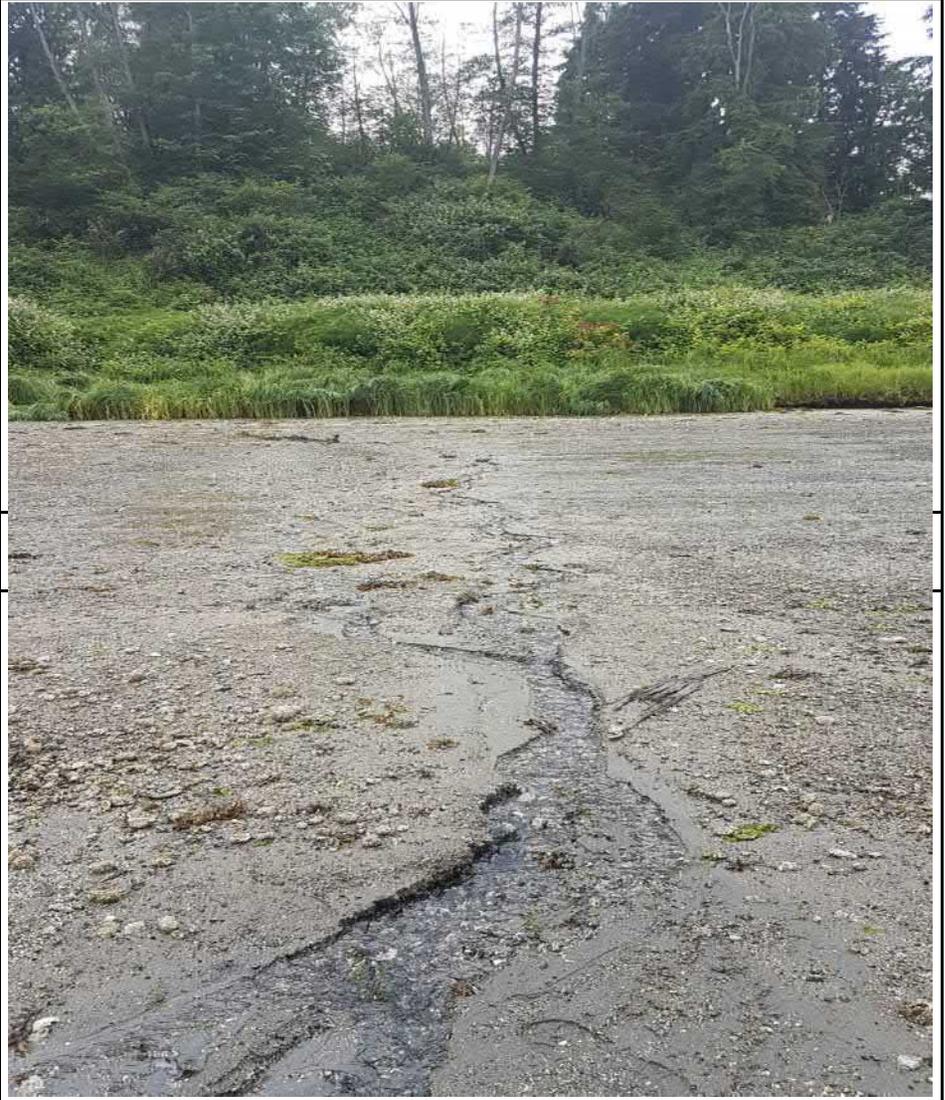
PROJECT NO.
18-7764

PHOTO NO.
18,19,20,21



Downstream seepage at culvert at Station 0+035.75.

Photo 22



Groundwater seepage on the foreshore of Area 2.

Photo 23

| | | |
|--|--|--------------------------------|
|  <p>DILLON CONSULTING</p> | <p>SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat</p> | <p>PROJECT NO. 18-7764</p> |
| <p>August 2018</p> | <p>CP Cascade Capacity Expansion Project - DFO Request for Review Submission</p> | <p>PHOTO NO. 22,23</p> |



Downstream seepage between Station 0+035.75 and Station 0+236.91 (10 U 508037 5459855). Photo 24



Habitat upstream (eastward) from culvert at Station 0+236.91. Photo 26



Culvert at Station 0+236.91. Photo 25

| | | |
|---|---|------------------------|
|  | SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat | PROJECT NO. 18-7764 |
| | CP Cascade Capacity Expansion Project - DFO Request for Review Submission | PHOTO NO. 24,25,26 |
| August 2018 | | |



Outflow at Station 0+243.62.

Photo 27

Outflow at Station 0+236.91. Culvert was not visible from downstream end.

Photo 28



Culvert at Station 0+489.94. Only upstream end accessible.

Photo 29



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SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

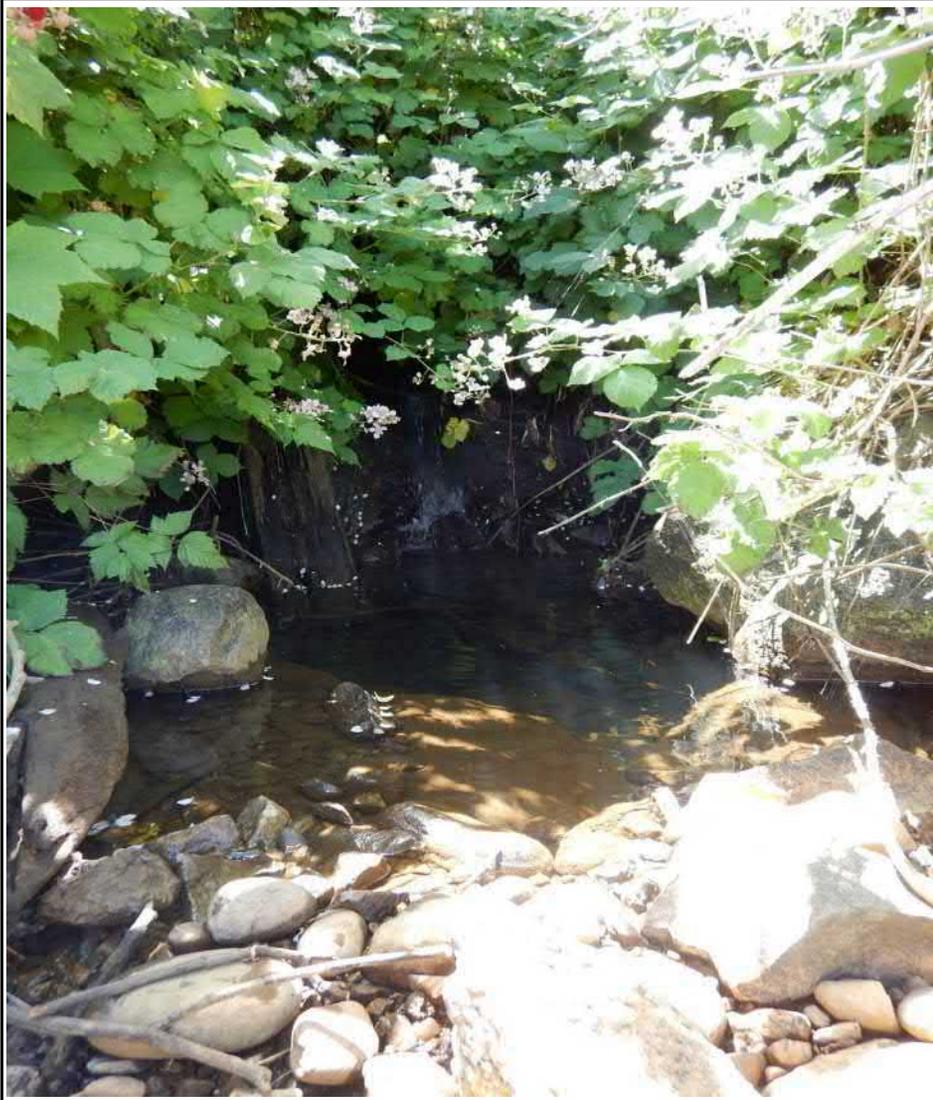
PHOTO NO.
27,28,29



Habitat upstream at Station 0+489.94 (looking west).

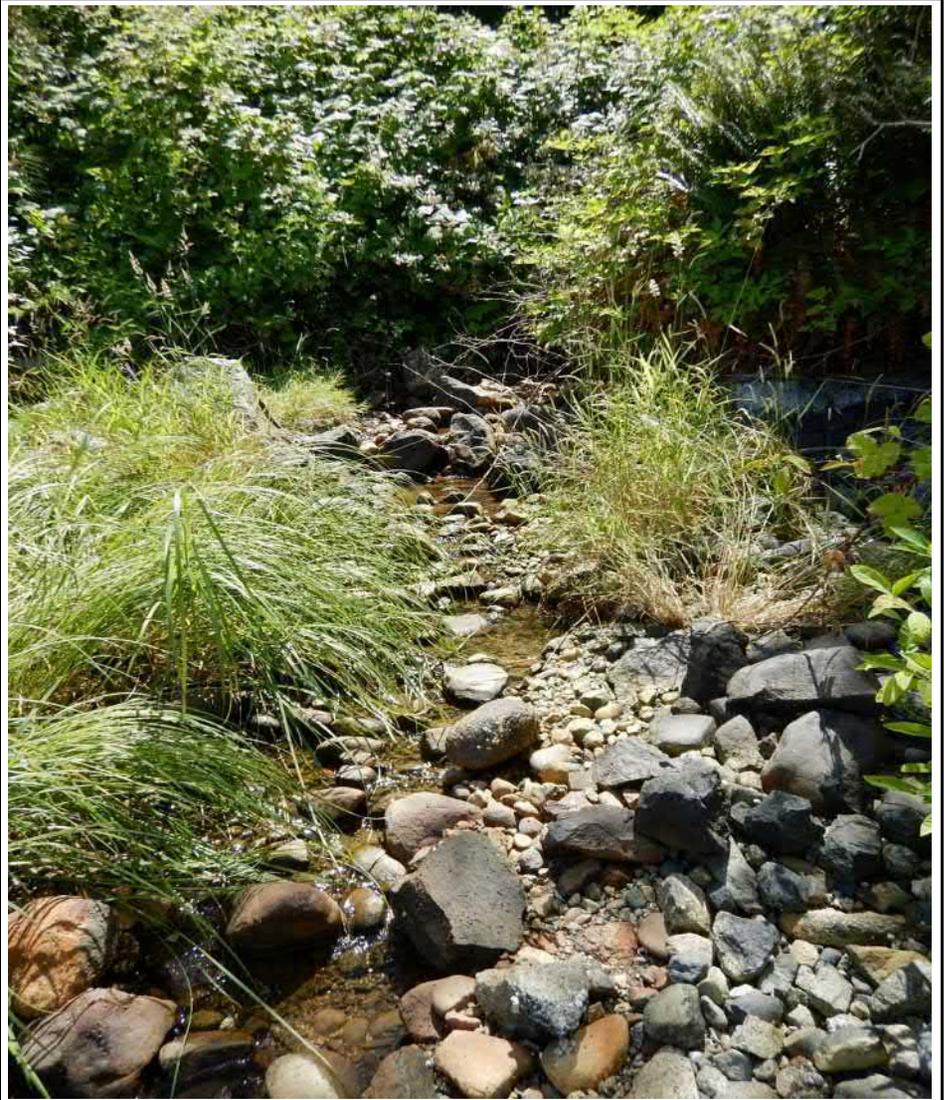
Photo 30

| | | |
|---|---|------------------------|
|  | SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat | PROJECT NO. 18-7764 |
| August 2018 | CP Cascade Capacity Expansion Project - DFO Request for Review Submission | PHOTO NO. 30 |



Outflow at culvert at Station 0+747.79.

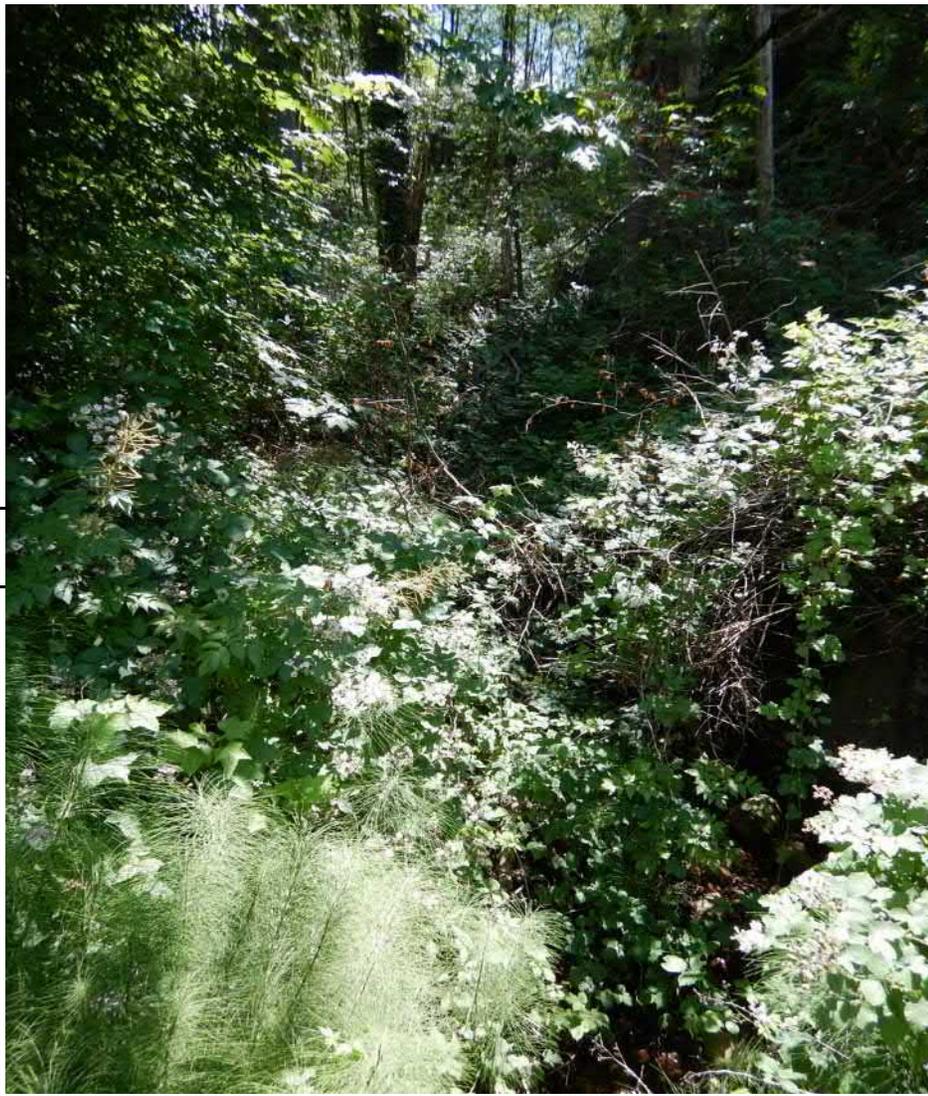
Photo 31



Downstream flow at culvert at Station 0+747.79.

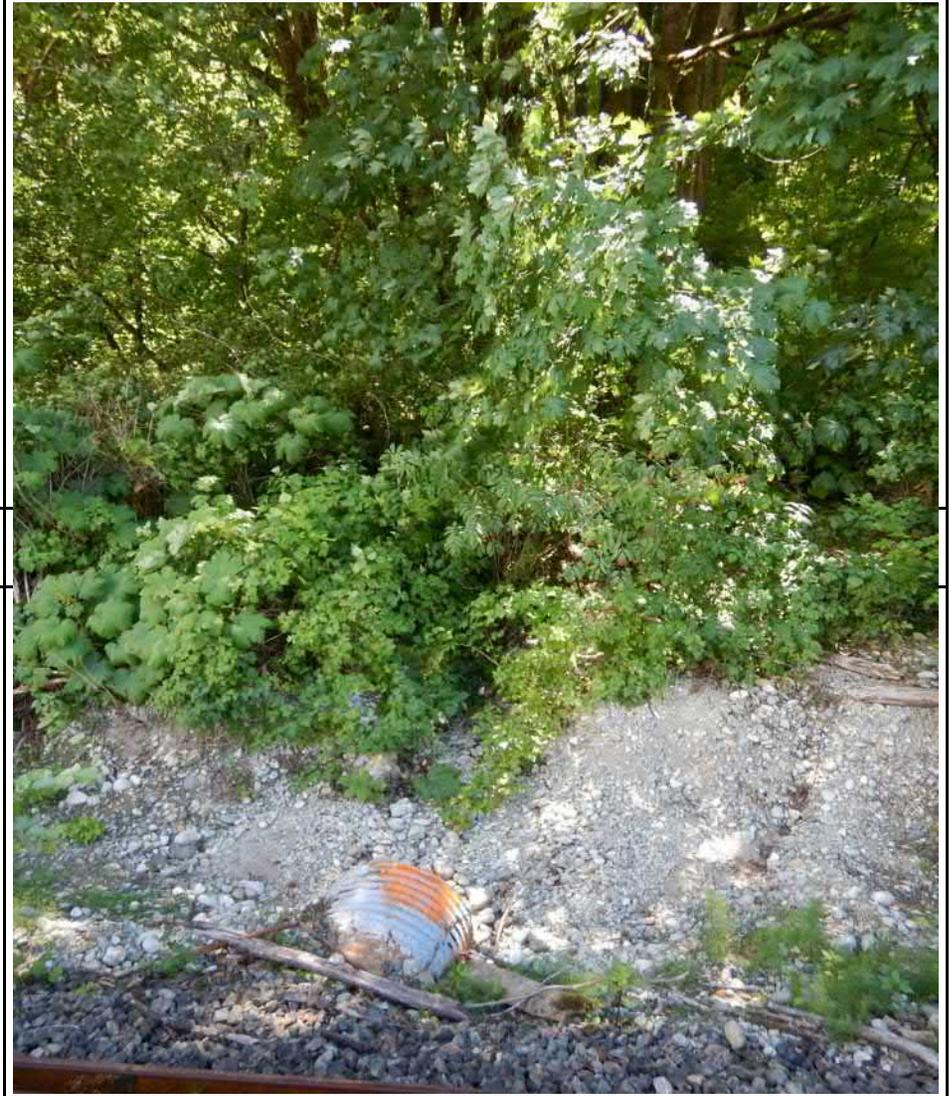
Photo 32

| | | |
|---|--|--------------------------------|
|  | <p>SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat</p> | <p>PROJECT NO. 18-7764</p> |
| <p>August 2018</p> | <p>CP Cascade Capacity Expansion Project - DFO Request for Review Submission</p> | <p>PHOTO NO. 31,32</p> |



Habitat upstream at Station 0+747.79.

Photo 33



Upstream culvert and habitat at Station 0+964.01.

Photo 34



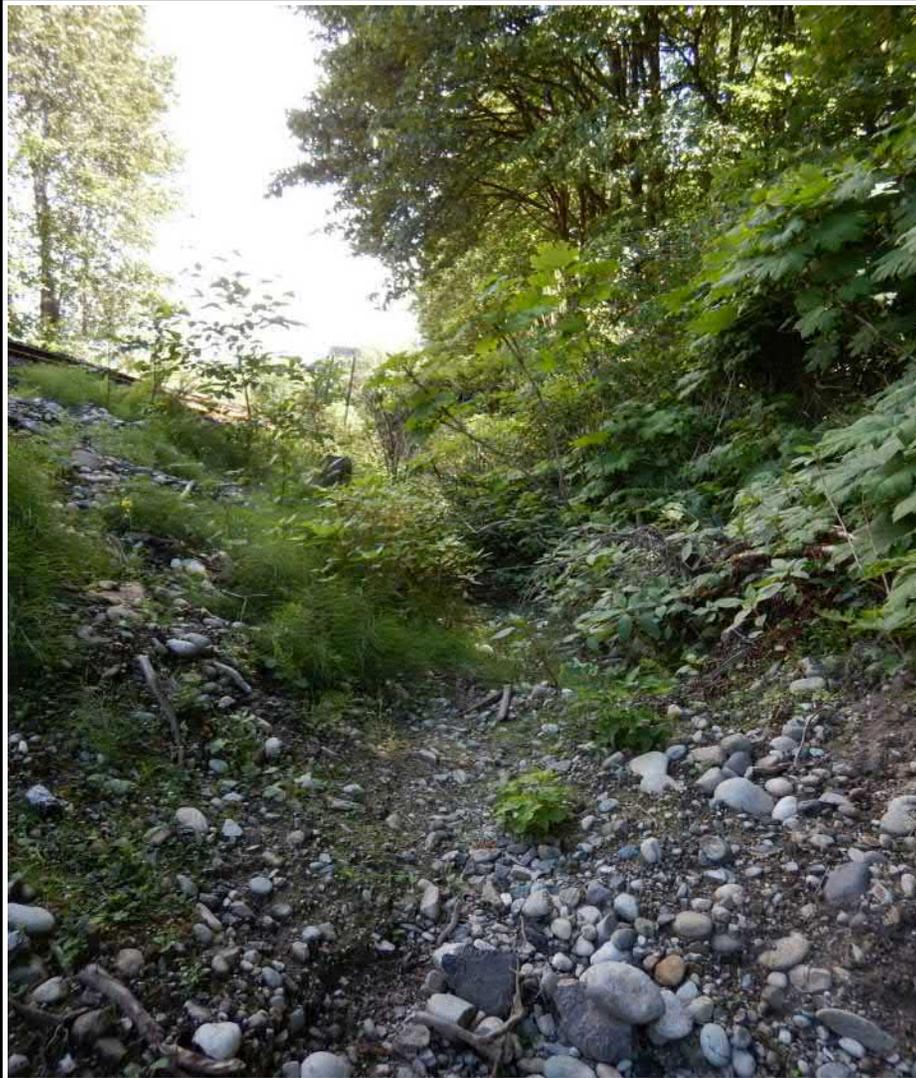
August 2018

SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

PHOTO NO.
33,34



Upstream habitat at Station 0+964.01.

Photo 35



Highly eroded culvert at Station 0+964.01.

Photo 36



Upstream habitat at Station 0+964.01.

Photo 37



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SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

PHOTO NO.
35,36,37



Upstream entrance to culvert at Station 1+039.28.

Photo 38



Downstream culvert at Station 1+039.28. View from the railway tracks as culvert was difficult to view/access from downstream intertidal area.

Photo 39



Downstream culvert at Station 1+039.28. View from railway tracks as culvert was difficult to view/access from downstream intertidal area.

Photo 40

| | | |
|---|---|------------------------|
|  | SITE PHOTOGRAPHS - 3.2 Freshwater Aquatic Habitat | PROJECT NO. 18-7764 |
| | CP Cascade Capacity Expansion Project - DFO Request for Review Submission | PHOTO NO. 38,39,40 |

August 2018



Upper intertidal zone and riparian vegetation in Area 1, looking east. Photo 41



Mature riparian vegetation in Area 1. Photo 43



Riparian shrub in Area 1. Photo 42



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SITE PHOTOGRAPHS - 3.3 Riparian Vegetation

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

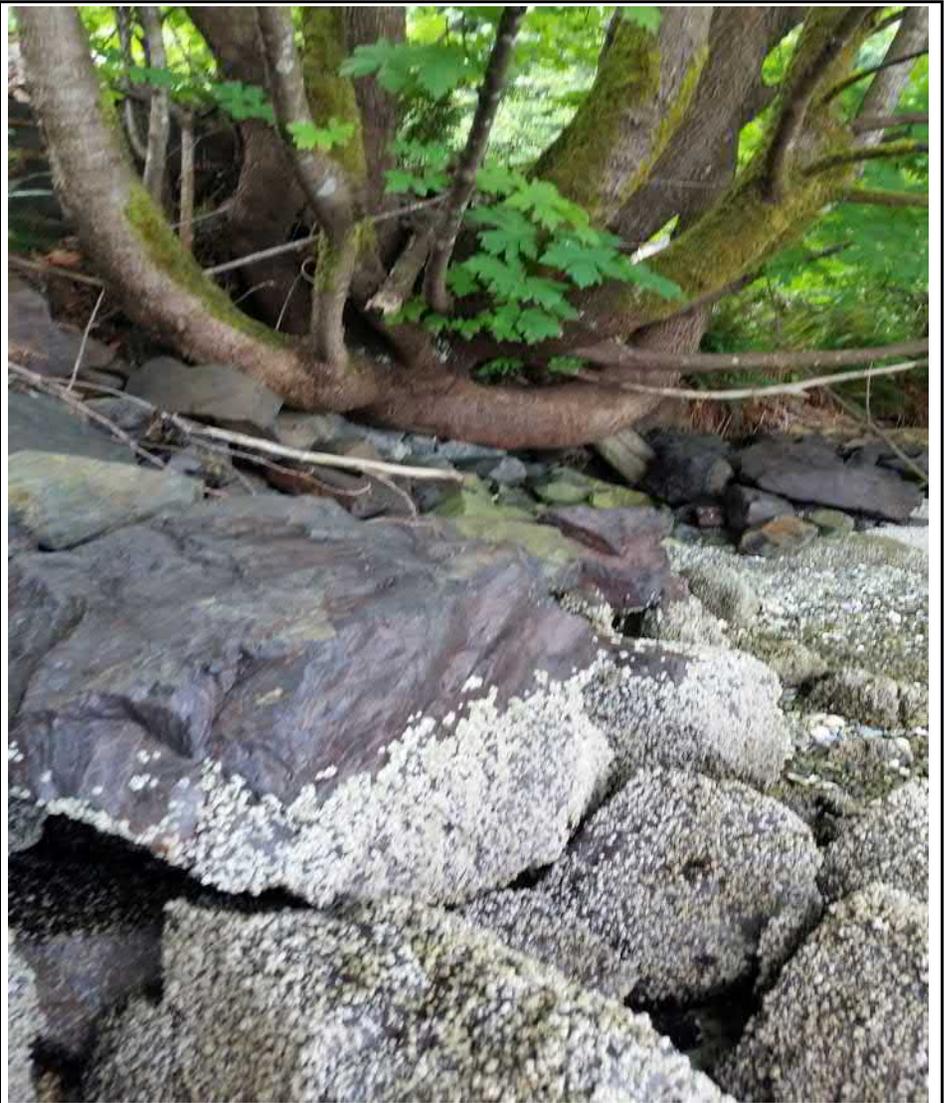
PROJECT NO.
18-7764

PHOTO NO.
41,42,43



Clump of mature riparian vegetation in Area 1, north of existing alignment.

Photo 44



Typical riparian vegetation clump in Area 1.

Photo 45

Multi-stem mature riparian vegetation found in Area 1.

Photo 46

| | | |
|---|--|--------------------------------|
|  | <p>SITE PHOTOGRAPHS - 3.3 Riparian Vegetation</p> | <p>PROJECT NO. 18-7764</p> |
| <p>August 2018</p> | <p>CP Cascade Capacity Expansion Project - DFO Request for Review Submission</p> | <p>PHOTO NO. 44,45,46</p> |



Gap in riparian vegetation in Area 1, looking west

Photo 47



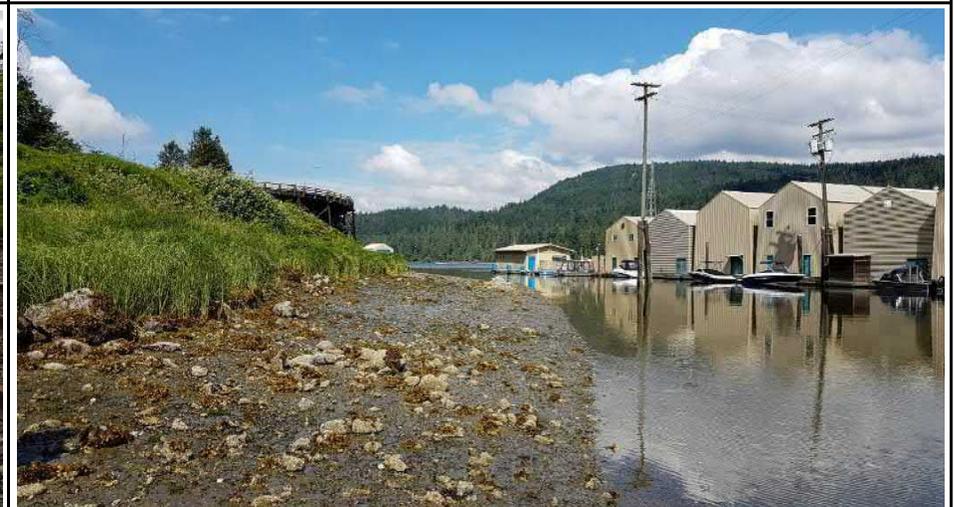
Upper intertidal zone and riparian vegetation in Area 2, looking east from Suncor trestle.

Photo 48



Strip of riparian vegetation in Area 2, looking east.

Photo 49



Upper intertidal zone and riparian vegetation in Area 2, looking west.

Photo 50



August 2018

SITE PHOTOGRAPHS - 3.3 Riparian Vegetation

CP Cascade Capacity Expansion Project - DFO Request for Review Submission

PROJECT NO.
18-7764

PHOTO NO.
47,48,49,50

Appendix E

Draft Construction Environmental Management Plan



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CANADIAN PACIFIC RAILWAY

Construction Environmental Management Plan

Cascade Capacity Expansion Project

Commercial Confidentiality Statement

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Appendices

A Spill Response Plan



1.0 INTRODUCTION

Canadian Pacific Railway (CP) is proposing to expand existing railway infrastructure to increase capacity along a section of their mainline right-of-way (ROW) on the Cascade Subdivision. The Suncor Energy (Suncor) Burrard Products Terminal expansion requires a third rail track to serve as the switching lead/service track for the facility. It would be situated within the CP right-of-way on the north side of the existing mainline tracks. The addition of the proposed switching lead/service track will require extending the embankment by the addition of structural fill and rip rap into the riparian and foreshore areas of Burrard Inlet at several locations.

On behalf of CP, Dillon Consulting Limited (Dillon) has prepared this Construction Environmental Management Plan (CEMP) to outline commitments to undertake works in an environmentally responsible manner. The CEMP describes potential Project effects and how environmental risk will be mitigated through proper planning, work management and reporting. In the event of an incident, this CEMP provides guidance that will reduce potential effects to the environment. This CEMP is a 'guidance' document used to identify and address environmental values before, during and after construction within the Project site.

This CEMP is considered a "living document" and will be updated regularly, up to the initiation of construction, to ensure that the most current and site-specific information and conditions are reflected.

1.1 Project Location and Scope

The proposed Cascade Capacity Expansion Project is located between Mile 118.06 (west of the public crossing to Reed Point Marina) and Mile 118.67 (west of Suncor's facility) along the shoreline of Burrard Inlet (Figure 1). The areas of interest for the proposed track expansion are situated west and east of the existing Suncor Burrard Products Terminal and include the intertidal zone and the foreshore vegetation areas.

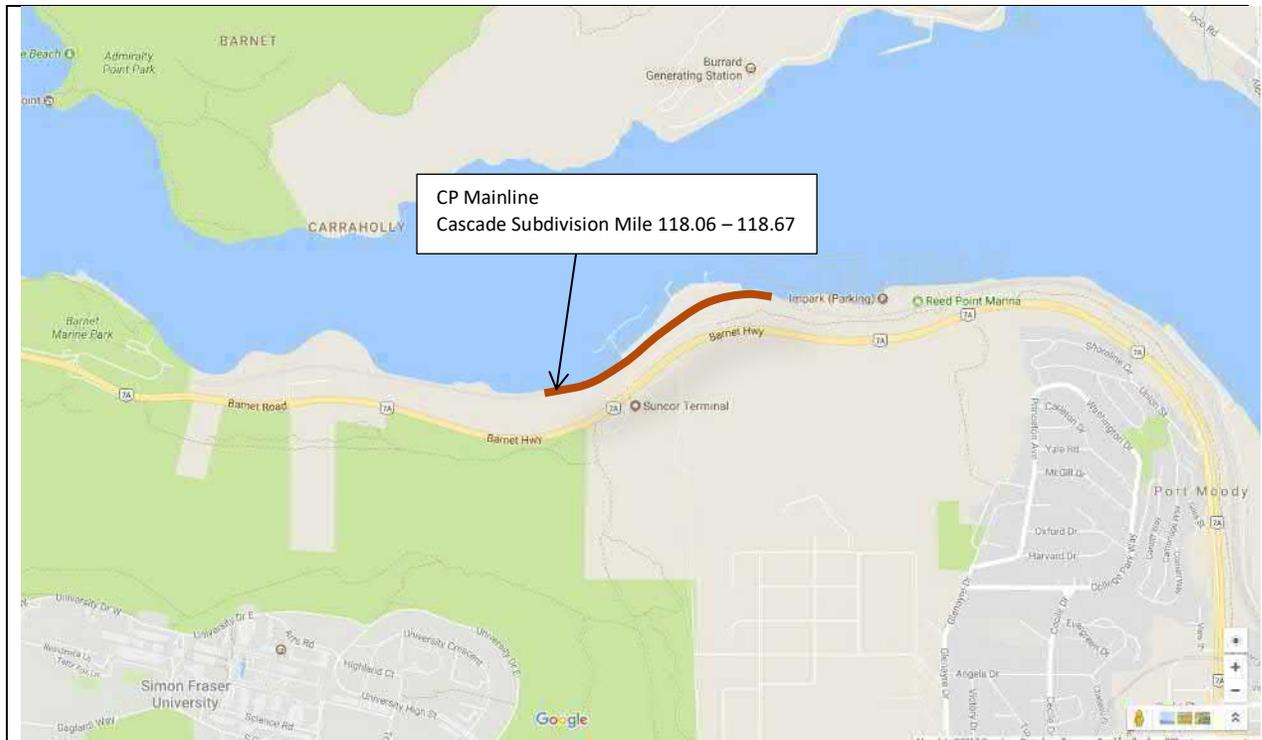


Figure 1 Project Location

The Project area extending approximately 399 metres to the west from the existing Burrard Terminal to the western extent of the proposed alignment is herein referred to as Area 1; the Project area extending approximately 285 metres to the east from the existing Burrard Terminal trestle to the mid-point of Reed Point Marina is referred to as Area 2 (Figure 2). The area to the west of the Suncor trestle extending to the western extent of the Suncor facility is identified as the Suncor plant area.



Canadian Pacific
Cascade Capacity Expansion

Study Area Locations

Legend

- Proposed Alignment
- Existing Alignment
- AREA 1
- AREA 2

0 20 40 80 Meters
 SCALE 1:3,500



MAP DRAWING INFORMATION:
 ESRI Basemaps

MAP CREATED BY: RBB
 MAP CHECKED BY: RD
 MAP PROJECTION: NAD_1983_UTM_Zone_10N



PROJECT: 18-7764
 STATUS: DRAFT
 DATE: 2018-08-13



1.2 Purpose of the Construction Environmental Management Plan

CP has retained Dillon to prepare a Construction Environmental Management Plan (CEMP) for this project. The CEMP describes the environmental performance standards and responsibilities of the Contractor(s) in executing the Project. This CEMP describes the site-specific mitigation measures and Best Management Practices (BMPs) which will be implemented by CP and any Contractors on site.

The following sections are contained within this CEMP.

- Identify environmental roles, responsibilities, scheduling, and contact information (Section 1.0);
- Identify key environmental features and values in the area that could be potentially affected by project construction (Section 2.0);
- Identify environmental regulatory requirements (Section 3.0);
- Identify elements of the work that could present a risk to the receiving environment and identify BMPs and/or work procedures that will be followed to minimize environmental risks (Section 4.0);
- Provide a protocol to respond chance archaeological finds (Section 5.0);
- Provide direction regarding post-construction follow-up and conclusion (Section 6.0); and
- Provide environmental spill response planning and incident reporting procedures (Appendix A).

The guidelines and procedures addressed herein apply to all on-site activities. CP and Contractors will undertake project activities in strict compliance with the direction provided in this CEMP and the conditions contained in the applicable authorizations, permits, licenses, and approvals from the environmental regulatory agencies. In addition, CP and Contractors will rely on Dillon to assist in the implementation of BMPs as appropriate. Overall, the intent of this CEMP is to provide guidance to CP and Contractors to help them meet or exceed compliance requirements. This will also assist CP in achieving its overarching goals and standards in relation to environmental management and sustainability.

This CEMP is not intended to address health and safety issues. All work by Dillon, CP or other Contractors on site will be conducted in accordance with WorkSafe BC Standards.

1.3 Project Milestones and Schedule

Key project milestones are:

- August 2018 – Submit Request for Review (RFR) to Fisheries and Oceans Canada (DFO)
- September 2018 – Submit Application for Project Authorization to DFO including off-setting and construction/post-construction monitoring plans;

- September 2018 – Submit Application for Project Approval to the Vancouver Fraser Port Authority;
- December 2018 – Receive project approvals from DFO and VFPA to proceed with project
- January 2019 – Mobilize to site and establish environmental controls;
- January 2019 – October 2019 – Construction of project and off-setting fish habitat; and
- 2020 - 2024 – Post-monitoring of constructed fish habitat

1.4 Roles and Responsibilities

CP is responsible for compliance with the requirements of applicable environmental legislation and other applicable legal requirements and the practices and procedures identified in the CEMP. CP is responsible for ensuring that all staff and sub-contractors working on-site are familiar and comply with the contents of the CEMP and Environmental BMPs and that their employees and subcontractors have appropriate environmental training including:

- Environmental Legislation and Regulations Awareness;
- Spill Prevention and Response;
- Working In and Around Water; and
- Archaeology and Cultural Resources Awareness.

Prior to the start of any construction activities, CP will confirm that the CEMP prepared by Dillon has been fully reviewed and checked, and complies with the requirements of the Contract and applicable laws.

For the duration of construction activities and following project completion, CP will:

- Ensure that all appropriate environmental safeguards are planned and executed in the course of performing the work. This includes the timely acquisition and handling of any required permits, licenses, and notifications as required;
- Keep environmental disturbances to the minimum necessary for accomplishing the proposed project activities in compliance with BMPs outlined in the CEMP and as directed by the Environmental Monitor;
- Comply with any directions given by Dillon Consulting Limited’s Representative or the Environmental Monitor to protect and preserve the environment;
- Take every precaution to avoid unnecessary impacts to the natural environment, both within and adjacent to the project footprint;
- Ensure that good housekeeping practices are implemented for the duration of the project; and
- Leave the job site in a safe, clean, and environmentally stable condition.

Table 1 below identifies the responsibilities of key personnel on the project.

Table 1 Responsibilities of Key Personnel

| Role | Responsibility | Name | Organization |
|--------------------------------|---|---|---------------------------|
| CP's Representative | <ul style="list-style-type: none"> Promotes and supports adherence to the requirements set out in the CEMP and other applicable legislation. Communicates environmental responsibilities and requirements of the CEMP to CP staff and subcontractors. Ensures that applicable CP staff and subcontractors are appropriately trained to prevent or mitigate environmental impacts. Addresses deficiencies and any non-compliance items raised by the Environmental Monitor through CP staff and subcontractors. | Chris Dane (Environmental Permitting Specialist) | CP |
| Environmental Monitor | <ul style="list-style-type: none"> Reviews and understands the CEMP. Communicates the requirements of the CEMP to CP and its subcontractors and assists with implementation of mitigation and BMPs. Advises on methods to address issues of non-conformity to the CEMP. Conducts routine and random inspections of construction activities and practices. Attends environmental pre-job meetings with CP staff as required. Has the ability to stop work if environmental damage is imminent. Completes environmental monitoring reports at an agreed frequency. | To be determined | Dillon Consulting Limited |
| Construction Contractor | <ul style="list-style-type: none"> Provides oversight on day-to-day implementation of CEMP. Interacts with the Environmental Monitor to ensure environmental protection through effective implementation of CEMP and by responding to non-conformances that may arise. Coordinates appropriate reporting in the event of a spill or environmental incident. | To be determined | To be determined |

1.5 Communication

Communication between all parties involved during all phases of construction is paramount to timely and efficient implementation of the CEMP. The following communication measures will be implemented:

- The CEMP will be made available to key representatives of the Project/Construction team prior to commencement of the proposed work and will be available at all times at the work site during construction;

- A pre-construction meeting(s) will be convened between CP, Dillon and those undertaking the construction of the project to review the CEMP and to outline the roles and responsibilities of each party; and
- The construction lead and subcontractors will ensure that the CEMP is accessible to their employees at all times over the duration of the construction period.

Construction and environmental monitoring reports outlining site activities will be prepared at an agreed upon frequency and forwarded to the appropriate CP's representatives.

Environmental incidents will be reported to CP's Representative and the Environmental Monitor immediately, so that appropriate notifications can be made and site management personnel can ensure that incidents are handled appropriately. For response to spill emergencies, refer to Appendix A, General Emergency Spill Response Plan and follow the six steps of spill response. Spills will be promptly cleaned up and reported in accordance with regulatory agency requirements.

2.0

ENVIRONMENTAL FEATURES OF THE PROJECT AREA

Environmental features of the Project Area are described in the Request for Project Review document submitted by Dillon to DFO. Elements of the environment potentially affected by construction of the proposed Project include intertidal and subtidal zones of Burrard Inlet (marine habitat), riparian vegetation (i.e., trees, shrubs and herbaceous plants) situated between Burrard Inlet and CP's existing mainline tracks, and freshwater drainage pathways that convey surface and groundwater from areas south of the CP right-of-way to Burrard Inlet via culverts. A description of each element of the environment of the Project Area is found in the Request for Project Review document.

Biotic diversity in both areas of the Project (i.e., Areas 1 and 2) is low with common species of barnacle, clam and crab being the most abundant within the intertidal/subtidal zones. Rockweed, sea lettuce and sugar kelp were the most common vegetation species. Five species of fish were observed during field surveys. No species at risk were observed during field investigation or have been identified for the Project area in federal or provincial databases.

3.0

REGULATORY BACKGROUND AND REQUIREMENTS

As a federally-regulated entity, CP is required to comply with the following applicable federal environmental legislation:

Fisheries Act

The Fisheries Act is the primary federal legislation providing protection for all fish, fish habitat, and water quality and is administered by DFO and Environment Canada. The overarching goal of the Fisheries Act is to prevent “serious harm” to fish and fish habitat that support a commercial, aboriginal or recreational fishery.

Dillon has submitted a “Request for Project Review” to DFO for the proposed Project.

Species at Risk Act

The federal Species at Risk Act (SARA) comprises legislation that prohibits the killing, harming, harassing, capturing or taking of species at risk, or destruction of their critical habitats. Background review and site assessments of the area have indicated that there is a low risk for rare and/or endangered species to be present in the Project Area.

Migratory Birds Convention Act

The Migratory Birds Convention Act prohibits the taking or killing of migratory bird nests and eggs, and the deposition of harmful substances in areas frequented by migratory birds. Vegetation removal that will affect trees used by all birds and other wildlife must be avoided while they are breeding, nesting, roosting or rearing young.

Other Guidance Documents

Other applicable federal and other environmental standards, guidelines and Best Management Practices are available for application during the proposed capacity expansion project.

4.0

BEST MANAGEMENT PRACTICES FOR CONSTRUCTION

Potential impacts of project construction on fish and fish habitat may occur. This includes the potential for “serious harm” to the broad definition of fish and their habitats under the Fisheries Act. Negative effects may be direct or indirect. This section outlines the impact mitigation measures and BMPs that will be applied during construction of the proposed Project and which will be overseen by the Environmental Monitor. Regarding the frequency of environmental monitoring, it is anticipated that the Environmental Monitor will have a significant presence on-site during project initiation, the establishment of environmental controls, and key activities taking place in areas where sensitive environmental features/functions may be affected. Initially, frequent monitoring is anticipated in order to assess the efficacy of environmental controls. The requirement for visits to the Project site will subsequently be reduced as construction proceeds and, in particular, once construction activity is above the high water level of Burrard Inlet.

4.1 Working In or Near Water

The Project will occur adjacent to Burrard Inlet (Pacific Ocean) as well as drainage pathways that convey surface and groundwater from upland areas to the ocean. Working in or near both the marine and freshwater environment is applicable to the proposed Capacity Expansion Project.

Work activities will occur below the high water mark of Burrard Inlet. The annual “window” of least risk to Marine/Estuarine fish and fish habitat for Burrard Inlet is August 16 – February 28. It is clear that construction of the Project requires encroachment beyond February 28 and well into the restricted activity window. CP is proposing the establishment of a floating curtain in the intertidal zone offshore of the project. The proposed curtain will operate at all tide levels with the significant objectives of isolating potential project impacts from Burrard Inlet as well as keeping aquatic life out of the working area. The curtain would be installed during the winter fish window and would be removed, in sections, as construction progresses above the high water mark. CP believes that the benefits of isolation in this manner outweigh the temporary unavailability of intertidal habitat areas.

Other mitigation measures to be implemented during construction activities in or near Burrard Inlet include:

- Construction support barges or other vessels will not ground on the for or otherwise disturb the foreshore;
- No equipment will operate beyond the Project footprint on the intertidal foreshore;
- Visual monitoring for the presence of marine mammals will be conducted during impulse-generating activities such as pile driving. Should a cetacean/marine mammal species at risk, or

harbour seal, be observed within a species-specific exclusion zone, that activity will be temporarily suspended until the individual has left the exclusion zone or does not reappear within 30 minutes.

- A large spill clean-up kit, sufficient for use in Burrard Inlet (i.e., including sufficient booms to contain a major spill), will be on site during all construction work adjacent to the marine environment.

In the drainage pathways of the Project Area upslope of Burrard Inlet, fish habitat is limited to the contribution of food and nutrients to downstream habitat (i.e., Burrard Inlet). Existing culverts are perched above the high water mark and habitat conditions and value of upslope pathways are limited by the absence of defined pathways, flow and other factors. Where appropriate, construction activities in and around freshwater will follow best management practices described in sections below (e.g., erosion and sediment control, water management, hydraulic connections).

4.2 Erosion and Sediment Control

CP will comprehensively address erosion and sediment control (ESC) issues as directed by the Environmental Monitor and outlined in this CEMP throughout the duration of the Project to prevent the mobilization and deposition of sediment. The following mitigation measures have been developed to minimize the effects of construction on aquatic habitat of Burrard Inlet:

- Disturbed areas with exposed soil will be stabilized at the end of construction through the effective use of soil cover (e.g., vegetation, straw mulch, erosion control blankets) to minimize soil erosion;
- All areas that are not part of the final footprint of construction will be re-vegetated to prevent potential surface erosion and siltation of aquatic habitat;
- Exposed soil on any steep grade will be protected at the end of construction from surface erosion by hydroseeding with a heavy mulch, tackifier, and seed mix or by installing erosion blankets;
- ESC structures will be inspected at least weekly and after each storm event of 25 mm of rain within a 24-hour period. Repairs will be completed to each structure as required;
- Machinery will not enter any part of a wetted area unless appropriate approvals have been obtained to do so. Proper site isolation to minimize the potential generation of sediment and to better enable mitigation of sedimentation will be applied;
- Site grading activities will not be completed during periods of inclement weather; and
- Sediment-laden water exceeding discharge limits will be retained on-site until concentrations reach an acceptable level.

4.3 Water Management

Surface water management will be required – particularly during months of precipitation. All surface water leaving the Project site will be required to meet or exceed federal quality standards. The primary source of potential water quality degradation is related to erosion and sedimentation, however other sources of deleterious substances include equipment, machinery, and construction materials. General mitigation measures to assist in preserving water supply and quality are also provided below:

- The Environmental Monitor will continually be searching for visual evidence of deleterious substances affecting freshwater and marine environments of the Project site;
- In-water/instream works will be undertaken and completed in isolation of flowing water by temporarily diverting, enclosing or pumping water around the site as required;
- Controls, such as floating silt curtain, sand bags and silt fence, will be monitored for effectiveness and maintained as necessary; and
- Spill response will be initiated if fuels, oil or coolants are observed to be present and will include vacuuming the contaminated material into a vacuum truck or secure container for off-site disposal.

4.4 Hydraulic Connections

CP is proposing to repair/reline/extend eight culverts crossing the right-of-way during the proposed Project. The following mitigation measures will be implemented for works at the connections of constructed ditches and culverts:

- The work area will be isolated upstream with sandbags, road plates or other appropriate material. Where appropriate, a fish salvage will be conducted in each isolated section of channel;
- The isolated section of ditch/channel will be dewatered following the completion of the fish salvage. Water will be pumped to the adjacent vegetation;
- If necessary, flowing water will be diverted around the site using a portable pump or flume;
- To re-establish flow into the new/repared culvert and/or channel section, the upstream isolation barrier will be slowly removed to prevent a rush of water that may cause erosion and generate sediment. This water will be allowed to fill the culvert/channel where it will be held by the lower isolating barrier to promote the settlement of sediment; and
- The lower isolating barrier will be removed slowly once the upstream water is clear.

4.5 Vegetation Management

Removal of riparian vegetation will be limited only to what is required to construct the proposed infrastructure and to provide adequate working space. Where appropriate, select areas of riparian vegetation not within the construction footprint (e.g., at the western Project limit) will be protected by

snow fence, silt fence or some other visible barrier. No removal of this vegetation will occur. In addition, the following mitigation measures have been developed for vegetation management:

- Visible work area boundaries will be maintained for the duration of construction;
- Vegetation clearing will be scrutinized by the Environmental Monitor;
- Burning and burying of vegetation and/or woody materials on-site will be prohibited; and
- Equipment will be maintained in a clean and weed-free condition

4.6 Soil Management

Only small areas of soil will be managed during the proposed Project construction. Unsuitable soils situated at the toe of the proposed embankment will be excavated by machinery, removed from the site by truck and disposed of at an approved facility.

Imported materials will be structural fill and railway-specific materials such as ballast and riprap that will be sourced from CP pits and quarries.

4.7 Storage of Petroleum Products

Petroleum products (i.e., fuels, hydraulic fluids and lubricants) will be used during construction. Effective mitigation will be required to ensure that these materials stored and managed appropriately and are not accidentally discharged to the environment. The following BMPs are available for application during construction:

- All petroleum products used on-site will be stored in a designated location that poses no risk of soil or surface water contamination. The designated storage area will be secure and clearly labelled and managed in accordance with local safety regulations;
- Impervious containment structures able to contain 110% of the maximum capacity of storage vessels will be installed and maintained;
- Handle petroleum products in such a manner as to minimize leakage and spillage and to ensure containment and recovery in the event of a spill. Petroleum products no longer required during construction will be removed from the site;
- Designate and appropriately label containers to be used for the temporary storage of used petroleum products. These containers will not be used for disposal of garbage or construction debris; and
- Inspect the site on a regular basis to ensure that all waste petroleum products and waste materials (e.g., oil cans, grease tubes, oily rags) are collected and properly disposed of at a location approved by regulatory authorities.

Storage areas for petroleum products will be inspected and monitored on an on-going basis during construction by the Environmental Monitor and/or Site Engineer.

4.8 Spill Prevention and Readiness

Project construction will involve the operation of vehicles, equipment and machinery using petroleum products (i.e., fuels, hydraulic fluids, lubricants). There is, therefore, the potential for environmental damage to occur from accidental spills of petroleum products to the surrounding environment with the resulting potential for soil contamination. To minimize the likelihood and potential environmental impact of a spill event, BMPs to be implemented during construction include:

- Review and approval of the Contractor's Project-specific Emergency and Spill Response Plan by CP or their representative prior to commencement of site preparation and/or construction activities by the Contractor to ensure compliance with Project-specific environmental protection measures and commitments;
- The names and contact information of all persons responsible for the implementation of the Emergency and Spill Response Plan shall be made available to all workers on-site including the Site Engineer and Environmental Monitor;
- Verify that Contractor personnel are trained in proper spill containment and remediation procedures;
- Verify that on-site fuel and lubricant storage adheres to applicable regulations and technical specifications (e.g., appropriate containment, areas away from drainage pathways, etc.);
- Monitor all on-site storage areas throughout the construction period for signs of spillage or leakage of stored product;
- All vehicles, equipment and machinery will be kept in good repair to avoid leakage of petroleum products; emergency spill response materials will be carried by all equipment working on-site; leaking equipment and/or equipment and machinery requiring maintenance will be immediately removed from the active work site to a maintenance area located at a suitable location approved by the Environmental Monitor and/or Site Engineer;
- Monitor equipment throughout the construction period to ensure that it is well-maintained and that there are no signs of leaking;
- Conduct all vehicle and equipment refueling on flat surfaces in designated areas using appropriate spill prevention procedures;
- Waste materials and liquids from servicing equipment must be properly packaged and removed from site daily;
- Use a controlled containment structure (i.e., drip tray) when refueling/servicing equipment, as appropriate; equip refuelling hoses with safety nozzles and automatic shut-off valves; retain an on-site supply of synthetic absorbent material and/or spill kit on-site at all fuelling locations;
- Verify that all vehicle and equipment refuelling, lubrication and maintenance are being conducted in designated areas; and
- Inspect work areas following construction for the visual presence of potentially contaminated soil (e.g., fuel or oil stains on the ground).

Monitoring to reduce the potential for spills will include the review and approval of the Contractor's Spill Response Plan and verification of compliance with the Plan (e.g., Contractor has adequate cleanup materials on-site, staff are trained in use and application of materials and procedures, etc.). Inspection and monitoring of equipment, storage, refuelling/maintenance and construction areas will be regularly completed by the Environmental Monitor and/or the Site Engineer.

4.9 Spill Response

There is the low potential for environmental damage to occur from the accidental spillage of hazardous substances to the surrounding environment. Adequate spill response measures must be in place at all times during Project construction activities. To minimize the potential environmental impact and ensure the proper management of a spill event, BMPs to be implemented during construction include:

- In the event of an accidental spill, initial response will be by the Contractor's designated on-site personnel and will follow these steps: 1) ensure safety; 2) stop the source of the release; 3) secure and isolate the spill; 4) assess the situation (identification of product, equipment involved, affected area(s) and spill status); and 5) report the spill;
- Initial response will focus on minimizing the saturation of spilled material into the soils by using appropriate absorbent materials (e.g., pads);
- All spills, regardless of quantity, are required to be reported to the CP Network Management Centre (NMC) at 1-800-795-7851 as well as the Site Engineer and Environmental Monitor;
- CP staff will liaise with the appropriate government agencies as required.
- The Contractor will have the appropriate equipment available on-site to clean up the contamination and properly manage its removal and disposal;
- Each piece of equipment must carry a 45L Spill Kit having the contents (or equivalent) described below. A 240L Rolling Bin Spill Kit having the contents (or equivalent) described below must be available at the designated equipment refueling location.

| <p>TSKO/U Oil/Universal 45 Litre Truck Spill Kit</p> <p>Contents:</p> | <p>SRK 240 Litre Medium Rolling Bin Spill Kit</p> <p>Contents:</p> |
|---|--|
| <p>1 only Zippered Yellow All Weather Bag Part#: S46 15 only Oil Only White Perforated Pads Part#: WPB 100GL 15 only Universal Grey Perforated Pads Part#: GB100H 1 only 3" x 4' Oil Only Socks Part#: WSO 430 1 only 3" x 8' Oil Only Socks Part#: WSO 815 1 only 3" x 4' Grey Socks Part#: GSO 430 1 only Orange Disposal Bag Part#: OB3550 1 only Epoxy Stick for Metal Repair Part#: P1500</p> | <p>1 only Yellow rolling bin c/w lid Part#: GMT-240 1 only Large White Spill Kit Label Part#: A-KITLABEL 50 only Oil Only White Perforated Pads Part#: WPB 100ML 50 only Universal Grey Perforated Pads Part#: GB100H 2 only 3" x 4' Oil Only Socks Part#: WSO 440 2 only 3" x 8' Oil Only Socks Part#: WSO 815 2 only 3" x 4' Universal Socks Part#: GSO 440 2 only 3" x 8' Universal Socks Part#: GSO 815 1 only Orange Disposal Bag Part#: OB3550 2 only White Oil Only Pillows Part#: WPIL818 1 pair Green Nitrile Gloves Part#: 316 1 only Solid-A-Sorb Granular Sorbent, 2 ib. Bag Part#: 715-2 1 only Epoxy Stick for Metal Repair Part#: P1500 1 only Plug N Dyke Plug Pattie, 10 oz. Part#: P2 1 only Chemical Splash Goggles Part#: 315 1 only Nitrile drain cover Part#: NDC36</p> |

Monitoring will be undertaken during regular environmental monitoring visits by the Site Engineer and/or the Environmental Monitor. Additional monitoring will be required if a spill occurs on-site to verify reporting and clean-up methods. Compliance with this directive will be monitored during site visits.

4.10 Wildlife Species Management

Habitat in and around the Project site provides nesting opportunities for numerous bird species. The nesting “window” for these species extends from March 1st to August 15th at the proposed site. As such, clearing of vegetation during this window is restricted unless a “nest sweep” is completed by a Qualified Environmental Professional following standard procedures to ensure that no active nests occur in the area identified to be cleared. If a nest is observed, CP will liaise with the Environmental Monitor and construction contractor to identify a species-specific buffer around the nest that will be maintained until all young have fledged.

Construction personnel will not feed, harass or otherwise interact with wildlife species at the Project site.

4.11 Construction Noise

Short-term noise generation will result from construction equipment and associated activities during Project construction. The following general measures will minimize the potential for construction-related noise effects:

- All equipment will be properly maintained to limit noise generation and fitted with functioning exhaust and muffler systems;
- As much as possible, construction activities will be coordinated with daytime periods; and
- CP will consider municipal noise bylaws and will, if applicable, apply for exemptions.

4.12 Air Quality

Construction activities can cause adverse impacts to local air quality. The following mitigation measures will be implemented to mitigate concerns regarding the potential degradation of local air quality during construction:

- No on-site burning of cleared vegetation or other construction-related materials will be permitted;
- All mechanical equipment that is required on-site will be in good working order and will comply with local emissions standards;
- Idling of equipment will be kept to a minimum;
- Low-sulphur fuels will be used for on-site machinery;
- CP's contractor will visually inspect all vehicles and equipment. Vehicles or equipment producing excessive exhaust pollution will be repaired or replaced at their cost prior to being used on the project; and
- Dust-generating activities will be minimized as much as possible during windy periods to minimize airborne dust emissions. Water or some other environmentally acceptable dust suppressant and appropriate application equipment will be available to be used as needed.

4.13 Solid Waste Management

Solid wastes generated during the Project will be removed from the site for recycling, where possible, or disposal. CP's contractor will adhere to applicable legislation/regulation with respect to the handling, transportation, and/or disposal of all Project materials including waste including the following measures:

- Garbage will be removed from site of a regular basis;
- The construction contractor will provide portable sanitary facilities on-site for workers use throughout the duration of the construction period. The facilities will be serviced regularly by a qualified Contractor; and
- The construction contractor will provide properly labeled separate container(s) for potentially hazardous waste such as oily rags and hydrocarbon absorbent pads. Absorbent materials or

soils contaminated with oil (greater than 3% by weight) or any quantity of gasoline will be handled and transported as Hazardous Waste. Any contaminated soils will be excavated and hauled off-site to an authorized treatment/disposal area in accordance to the BC Hazardous Waste Regulations.

Upon completion of construction, CP will inspect the site to ensure that all waste material has been removed and managed as described above.

5.0

ARCHAEOLOGICAL AND CULTURAL RESOURCES

In the event that buried archaeological or cultural resources are encountered during site operations, the contractor will immediately stop construction, notify CP's Representative and comply with the procedures identified below. Any item of particular archaeological, cultural or scientific interest found on the Project site will be the property of CP until further notice. CP will work with the Project archaeologist and appropriate authorities having jurisdiction to properly manage and protect such resources.

5.1 Archaeological/Cultural Sites Chance Find Guidelines

The following emergency impact management guidelines apply to archaeological and cultural sites. Emergency management procedures for suspected human burial sites are presented separately below.

Initial Response

1. The construction contractor will immediately stop construction in the immediate vicinity of the archaeological or cultural site.
2. The construction contractor will contact the CP Representative who will contact Project Archaeologist for further guidance.
3. The construction contractor will wait for a response from CP and the Project Archaeologist regarding further action.

Initial Action

Depending on the nature of the situation, one of the following responses is likely:

- Based on a telephone description of the incident, it may be decided that there are no further concerns, allowing construction to continue as planned; or
- A field visit by Project Archaeologist may be required. In this case, CP or their agents will notify the appropriate First Nations organizations. It is anticipated that suitable protocols for such situations will be established in consultation with all interested parties.

Management Options

Based on direction from the Project Archaeologist and discussions with appropriate First Nations organizations, several options may be considered when determining how to proceed. CP anticipates this will constitute avoidance, implementation of protective measures, or salvage. Regardless, CP will not proceed without appropriate direction from the Project Archaeologist in consultation with First Nations organizations.

5.2 Chance Find Impact Management for Burial Sites

CP Initial Response

If definite or possible human remains are encountered:

1. The construction contractor will immediately stop construction in the vicinity of the remains.
2. The construction contractor will immediately contact the CP Representative who will contact the RCMP for further guidance.

Initial Action

CP anticipates that initial actions will be determined by the CP Representative, First Nations organizations and/or the RCMP. CP will not initiate any action until direction is provided as required.

Management Options

CP will implement management options as directed. CP is aware that removal of human remains and subsequent reburial might involve certain ceremonies or procedures that could delay construction. If CP has any concerns about possible archaeological, historic, or burial locations, the Project Archaeologist will be contacted for direction.

6.0 POST-CONSTRUCTION FOLLOW-UP

Upon completion of construction activities, CP will leave all areas of the Project site stable and free of waste materials. As appropriate, disturbed areas outside of the project footprint will be stabilized through seeding or another form of surface protection, as required.

Subsequent to completion of construction, CP will conduct a five years of post-construction monitoring consisting of three monitoring objectives:

- Objective 1: Document that Project activities have been completed in accordance with the applicable sections of the CEMP. This will include the following:
 - Establish permanent monitoring locations;
 - Identify monitoring criteria (e.g., quantity/quality) for “success” measurement;
 - Evaluate the level of success achieved.
- Objective 2: Document that Project off-setting habitat has been constructed in accordance with off-setting plans as follows:
 - Compare “as constructed” observations of completed Project with design plans including quantities, quality, species, etc. for “success” measurement;
 - Evaluate the level of success achieved.
- Objective 3: Document long-term functioning of off-setting habitat as follows:
 - Establish permanent monitoring locations;
 - Identify monitoring criteria (e.g., quantity, quality, evidence of use) for “success” measurement;
 - Annually evaluate the level of success achieved culminating in a final evaluation of off-setting habitat function in Year 5.

If deficiencies are identified at any stage of the post-construction monitoring period, Dillon will provide an update to CP along with a series of suggestions for addressing these deficiencies in order achieve the objectives of the Off-setting Plan. CP will address these deficiencies at their cost as per the requirements of the CEMP.

7.0 CONCLUSION

Information presented in this CEMP is based on information provided in the Request for Project Review document submitted to DFO, discussions between CP and Dillon representatives, and the knowledge and experience of Dillon staff. Should additional information become available that is relevant to environmental protection during construction of the proposed Capacity Expansion Project, the recommendations and findings of this CEMP will be revised.

Appendix A

Spill Response Plan

General Spill Response Plan

If a spill of fuel, oils, lubricants, or other harmful substances occurs, the following procedures will be implemented:

1. Ensure safety.
2. Stop/contain the flow (when possible).
3. Secure the area.
4. Contain the spill.
5. Notify/report to Hydro's Representative and/or the Environmental Monitor.
6. Clean-up.

1) Ensure Safety

1. Ensure personal/public, electrical, and environmental safety.
2. Wear appropriate Personal Protective Equipment (PPE).
3. Never rush in, always determine the product spilled before taking action.
4. Warn people in the immediate vicinity.
5. Ensure no ignition sources are present if spill may be a flammable material.

2) Stop the Flow (When Possible)

1. Act quickly to reduce the risk of environmental impacts.
2. Close valves, shut off pumps or plug holes/leaks, set containers upright.
3. Stop the flow of the spill at its source.

3) Secure the Area

1. Limit access to the spill area.
2. Prevent unauthorized entry onto the site.

4) Contain the Spill

1. Block off and protect drainage pathways. In the event of a spill onto the ground, a spill boom will be placed on the downslope side. The containment boom will be placed downstream where there is a spill to water.
2. Prevent spilled material from entering drainage structures (i.e., local watercourses).
3. Use spill absorbent material to contain the spill.
4. If necessary, use a constructed dam or any other method to prevent any discharge off-site.
5. Make every effort to minimize contamination.
6. Contain as close to the source as possible.

5) Notify / Report

Once the spill is contained, contact the Environmental Monitor and inform them of the issue at hand (see Table 1 in Section 1.4 of the CEMP Document).

For spills in amounts requiring external notification, the person who had possession, charge or control of a substance immediately before its spill will immediately report details of the spill to the Environmental Monitor who will subsequently contact PEP at 1-800-663-3456 (24-hour).

Spill reports to PEP must include:

- Name and phone of the person(s) responsible for the spill;
- Location, time, and date of spill;
- Material spilled and quantity;
- Cause and effect of the spill;
- Action taken to contain the spill;
- Duration of occurrence;
- Weather conditions;
- Planned follow-up;
- Government agencies on the scene;
- Persons or agencies advised; and
- Environmental “Near Misses” are also to be reported to the Environmental Monitor.

6) Clean Up

1. Technical assistance is available from the Environmental Monitor on clean-up procedures and residue sampling.
2. All equipment and/or material used in clean-up (e.g., used absorbent, oil containment materials, etc.) will be disposed of in accordance with regulatory requirements.
3. Accidental spills may produce hazardous wastes (e.g., material with > 3% oil) and contaminated soil. All waste disposals must comply with the Environmental Management Act and Regulations.
4. Contaminated soil will be treated and dealt with as required on a site-specific basis.



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September 10, 2018

Our file *Notre référence*

18-HPAC-00759

Joe Van Humbeck
Canadian Pacific Railway
7550 Ogden Dale Road SE
Calgary, Alberta T2C 4X9

Via email: Joe_VanHumbeck@cpr.ca

Subject: Embankment Extension, Burrard Inlet – Application for Authorization under the *Fisheries Act* Required, but Prohibited Effects on Listed Aquatic Species at Risk Not Likely.

Dear Mr. Van Humbeck:

The Fisheries Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received your proposal on August 14, 2018. We understand that you propose to:

- Extend an existing embankment on the north side of CP's Cascade Subdivision between Mile 118.06 and 118.67 to accommodate construction of a new track adjacent to the existing mainline on the south shore of Burrard Inlet.

Our review considered the following information:

- *Request for Review* received by email on August 14, 2018; and
- *Canadian Pacific Railway, Department of Fisheries and Oceans – Request for Project Review, Cascade Capacity Expansion Project* prepared by Dillon Consulting Limited received by email on August 14, 2018.

Your proposal has been reviewed to determine whether it is likely to result in serious harm to fish which is prohibited under subsection 35(1) of the *Fisheries Act* unless authorized. Your proposal has also been reviewed to determine whether it is likely to affect listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*, unless authorized.

We understand the following aquatic species listed under the *Species at Risk Act* may use the area in the vicinity of where your proposal is to be located:

- Leatherback Sea Turtle (Pacific population) listed as Endangered,
- Northern Abalone listed as Endangered,
- Killer Whale (Northeast Pacific Transient population) listed as Threatened,
- Harbour Porpoise (Pacific Ocean population) listed as Special Concern,
- Humpback Whale (North Pacific population) listed as Special Concern,
- Grey Whale (Eastern North Pacific population) listed as Special Concern,
- Steller Sea Lion listed as Special Concern, and
- Green Sturgeon listed as Special Concern.

Based on the review of the above information, the Program has concluded that the following work, undertaking or activity is likely to result in serious harm to fish:

- Clearing of 4,525 m² of riparian vegetation for extension of the embankment resulting in the destruction of habitat that provides food, nutrients, cover, and shading of intertidal fish habitat.
- Infilling of 6,560 m² of intertidal habitat for the embankment extension resulting in the death of fish and destruction of fish habitat.
- Infilling of 1,229 m² of intertidal habitat for the creation of temporary workspace resulting in the death of fish and a permanent alteration to fish habitat.

Your proposal requires an authorization pursuant to paragraph 35(2) (b) of the *Fisheries Act* in order to proceed. As your proposal will not result in prohibited effects on listed aquatic species at risk, no permit will be required under the *Species at Risk Act*.

Please submit the following information and documents to apply for a *Fisheries Act* authorization:

- a completed Application for Authorization under Paragraph 35(2) (b) of the *Fisheries Act* Form (www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/authorization-autorisation-eng.html);
- the required information and documentation set out in the *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations* (<http://laws-lois.justice.gc.ca/eng/regulations/SOR-2013-191/page-1.html>); and
- an irrevocable letter of credit (for requirements see: <http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html#ch33>) to cover the cost of offsetting plan, if you are required to provide one as set out in subsection 3(2) of the Regulations.

DFO would like to bring to your attention that we anticipate the proposed site may be suitable for forage fish spawning, including Surf Smelt and Pacific Sand Lance. If you elect to apply for a *Fisheries Act* authorization, please ensure you review the required information and documentation and that you include a description of the fish and fish

habitat at the proposed project site, including how the site directly or indirectly supports forage fish.

Should you choose to relocate or redesign your proposal, this could reduce the potential impacts of your proposal to a level where serious harm to fish can be avoided and a *Fisheries Act* authorization would no longer be required. If you choose to modify your proposal to avoid a need for authorization, please submit your revised Request for Review form.

Please be advised that any unauthorized work, undertaking or activity that contravenes section 35 of the *Fisheries Act* or sections 32, 33 and/or subsection 58(1) of the *Species at Risk Act* could lead to corrective action, such as enforcement. It is also your *Duty to Notify* DFO if you have caused, or are about to cause, serious harm to fish that are part of or support a commercial, recreational or Aboriginal fishery. Such notifications should be directed to the DFO-Pacific Region Observe, Record and Report phone line (toll free) at 1-800-465-4336; or in Greater Vancouver at 604-607-4186.

It remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your project.

If you have any questions with the content of this letter, please contact Andrew MacInnis at our Nanaimo office at 250-756-7266 or by email at Andrew.MacInnis@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Sincerely,



Michael Engelsjord, R.P.Bio.
Team Lead
Fisheries Protection Program

cc: Paul Schaap, Dillon Consulting Limited, pschaap@dillon.ca