

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
419	EC-054	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	SO2, NO2, CO, and PM are associated with combustion source emissions and must be included in the emissions assessment.	ECCC-AQ-IR-1 (Ref CEAA-IR-32): In addition to PM, SO2 and NO2, ECCC requests that the proponent provide quantitative estimates of CO emissions related to the mobile equipment (on-road and off-road engines).	SO2, NO2 and PM associates with Project related combustion sources were included in the assessment. Air quality indicator compounds were defined within the approved EAC Application Information Requirements/EIS Guidelines (BURNCO Aggregate Project AIR/EISg 2014). Input into the AIR/EISg were provided by the Technical Working Group, BC EAO and CEA Agency. Within the Approved AIR/EISg, air quality indicator compounds were defined as TSP, PM10, PM2.5, SO2 and NO2. Carbon monoxide (CO) was not included an indicator compound, therefore quantitative estimates of CO emissions was not considered in the EAC Application/EIS. In addition, it is noted that the are a very small number of mobile equipment (on-road and off-road engines) emission sources as detailed in Section 5.7.5.2.1.2 and Appendix 5.7-A of the EAC Application/EIS.
420	EC-055	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	ECCC requires further technical information in order to confirm the air emission estimates provided by the proponent in the EIS.	ECCC-AQ-IR-2: ECCC recommends that the Proponent provide technical information such as the emissions factor per type of engine standards, transient adjustment and deterioration factors, load factor, etc to allow for the assessment of air emissions.	Please refer to attached Table EC-055.
421	EC-056	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	ECCC requires estimates for emissions related to water taxis in order to confirm how much the Project would increase emissions from this sector activity.	ECCC-AQ-IR-3: ECCC recommends that the Proponent include a quantitative assessment of water taxis as a source of emissions resulting from the Project, and provide any related information such as the number of additional trips/day, and taxi engine size.	Water taxi emissions were not included in the list of modelled sources reviewed and approved by the BCMOE in the detailed model plan (Appendix 5.7-E) and were therefore not included in the air dispersion modelling and subsequent assessment. Water taxis are anticipated to be a relatively small boat with a small engine. Furthermore, consideration of water taxi emissions in the air quality assessment is not expected to change the conclusions of the air quality assessment. No additional data will be provided at this time.
422	EC-057	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The Proponent states in Table 5.7-7 that the barge transport and the additional water taxis to transport crew and material are expected to be minimal to the current level of marine traffic in the region. The Regional Study Area (RSA) assessed by the proponent is limited to the marine region of Howe Sound. However, the Project will involve barge traffic on the Fraser river (outside this RSA) and this has not been assessed as part of the Project. Considering this, the barge emissions may be underestimated. ECCC cannot confirm marine emissions due to the Project along the Fraser River because emissions from barge transport beyond the Project site have not been assessed.	ECCC-AQ-IR-4: ECCC recommends the Proponent include an assessment of emissions on the barge traffic route on the Fraser River, with and without the Project, and include information on emission factors, activity, and estimation methodology.	Underway shipping emissions have been considered, but not modelled, between the Project and Golden Ears Bridge. Aggregate material will be shipped from Project to existing processing facilities in Burnaby and Langley. The current plants are supplied with aggregate from a combination of the following locations: - Polaris Material Corp.'s Orca Quarry at Port McNeil located on northern Vancouver Island, BC; - Jack Cewe Ltd.'s Treat Creek Operations located in Jervis Inlet, BC; and - Construction Aggregates Ltd.'s gravel mine located in Sechelt, BC Gravel from proposed Project will replace the gravel that is currently transported by barge from these facilities. In addition, the development of the Project would result a reduction in barge transport distance of up to 280 km, thereby reducing the associated environmental impacts. Furthermore, the CEA Agency and BC EAO have confirmed that the scope of assessment does not include shipping from where the barges meet the existing shipping lanes in the Strait of Georgia and the Fraser River.
423	EC-058	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Because the RSA doesn't include barge transport along the Fraser River, further information is required to confirm that fugitive dust from barges on the Fraser River will be controlled.	ECCC-AQ-IR-5: ECCC requests that the Proponent provides information regarding the mitigation measures that will be applied to control fugitive dust from barge transport, including along the Fraser River.	As detailed in Section 5.7.5.3.2 of the EAC Application/EIS, mitigation measures for fugitive barge emissions will include: -Barges will only be travelling loaded in one direction. -The barges will have 2.74 m box walls which will act as partial windscreens. -The loaded aggregate material will be wet. -Five of the seven aggregate types will have material silt content less than 1.5% -material silt content of 14 mm concrete stone, 10 mm concrete stone and 20 mm concrete stone will be 0%. -material silt content of 25 mm crushed rock will be 1% - material silt content of washed sand (5mm) will be 1.5%
424	EC-059	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	ECCC notes that the Proponent is using data from the BC Chamber of Shipping Inventory from 2007, which has been updated in ECCC's National Marine Emissions Inventory. Using up-to-date emissions factors is necessary to confirm the marine emissions estimations, and ensure that this review is consistent with other project reviews. The National Marine Emissions Inventory (MEI), produced by ECCC, is a database of marine emissions from all commercial vessels operating in Canadian waters, based on current activity data, and is updated on an on-going basis. Where applicable, proponents are encouraged to refer to the MEI for the most current and best available information for estimating marine emissions, (load factors, emission factors etc.).	ECCC-AQ-IR-6 (Ref CEAA-IR-36): ECCC requests that the Proponent update load and emission factors for GHGs from tugs using data from ECCC's National Marine Emissions Inventory. ECCC is able to provide the proponent with updated emission factors upon request.	Total tugboat GHG shipping emissions (docking at the Project and shipping between the Project and Golden Ears Bridge) presented in Chapter 5.8 is 9.4 tonne CO2e/operating day (2,834 tonne CO2e/year). Using ECCC's National Marine Emissions Inventory Tool (MEIT) and conservative assumptions total GHG emissions are anticipated to be 11.5 tonne CO2e/operating day (3,450 tonne CO2e/year). The limited increase in tugboat GHG emissions will not change the conclusions, or the significance determine within the GHG assessment.

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425	EC-060	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Section 15.0 Requirements for Federal Environmental Assessments; Accidents and Malfunctions states:</p> <p>“Accidents and Malfunctions – The EAC Application/EIS will:</p> <ul style="list-style-type: none"> - Identify potential accidents, malfunctions, and unplanned events that could occur in any phase of the Proposed Project, the likelihood and circumstances under which these events could occur and the environmental effects that may result from such events, including impacts to marine benthic communities, assuming contingency plans are not fully effective; - Describe how each potential accident, malfunction or unplanned event would be managed or mitigated; and - Accidents or malfunctions that will be discussed in the EAC Application/EIS include: fire, contamination of soils and / or water due to fuel or hydrocarbon spills, power outages, flooding, erosion and / or loss or containment of aggregate pit, sediment transport into watercourses, accidental discharge of sediment laden wash water, motor vehicle and boating accidents and barge shipping accidents. - Factors of safety for the side slopes will be provided where sloughing or slope failure could cause retrogression of the pit crest to a degree that could impact on the safety of mine personnel. - Mitigation Measures – The EAC Application/EIS will identify mitigation measures that are technically and economically feasible that would avoid and limit the environmental effects described in Sections 5.0 - 9.0. Descriptions of proposed mitigation will include: <ul style="list-style-type: none"> - their suitability for project- and site-specific application; - their technical and economic feasibility; and - the extent to which their effectiveness can be measured and verified, including 	<p>ECCC-EE-IR-1: In Section 7.2 Marine Transportation, 7.2.1 Introduction of the EIS, the Proponent states that: “Volume 3, Part D – Section 14.0: (Accidents and Malfunctions) – addresses the potential environmental effects as a result of accidents and malfunctions related to marine transportation.”</p> <p>ECCC requests that the missing information from Volume 3 Part D – Section 14.0: (Accidents and Malfunctions) be provided, in addition to clarifying the following:</p> <ol style="list-style-type: none"> 1) Is the Accident and Malfunction information provided in Section 15.1.4 the same information that was intended for inclusion in Section 14.0? If yes, does the information provided in tables 15-4 and 15-5 provide the same level of detail that was to have been provided in Section 14.0? 2) ECCC requests that the Proponent provides all information respecting the Mitigation Measures for Accidents and Malfunctions specifically related to Marine Transportation, including: the extent to which their effectiveness can be measured and verified, including linkages to the Environmental Monitoring and Follow-up Program presented in Section 17.0 where appropriate. 	<p>1) In Section 7.2 Marine Transportation, 7.2.1 Introduction of the EIS, the Proponent states that: “Volume 3, Part D – Section 14.0: (Accidents and Malfunctions) – addresses the potential environmental effects as a result of accidents and malfunctions related to marine transportation.” This sentence should read: “Volume 2, Part B – Section 5.2 (Marine Resources) – addresses the potential environmental effects as a result of accidents and malfunctions related to marine transportation. A summary of the accidents and malfunctions assessed for the Proposed Project is also provided in Section 15.1.4”. In order to reduce redundancy in the EAC Application/EIS, the assessment of accidents and malfunctions (including many of the missing information identified in the comment provided in #2 below) are described in the discipline specific sections. Accidents and Malfunctions specifically related to Marine Transportation are assessed in the Marine Resources Section (Volume 2, Part B - Section 5.2: Toxic and Hazardous Material Spills and Aggregate Spills in the RSA).</p> <p>2) The requested information for the assessment of Accidents and Malfunctions specifically related to Marine Transportation is provided the following sections:</p> <ul style="list-style-type: none"> - the extent to which their effectiveness can be measured and verified - This is summarized in Volume 2, Part B - Section 5.2 - Marine Resources: Table 15-18 and is discussed in Section 5.2.5.4.2. Mitigation measures will be measured and verified through the implementation of the Construction Environmental Management Plan (CEMP) and the Operational Environmental Management Plan (OEMP) outlined in Volume 3, Part E - Section 16.0. All non-compliance items will be reported through the implementation of these plans. Marine contractors will be held accountable to these mitigation measures through the implementation of contract terms that adhere to the mitigation measures relevant to their work activities. For example, the tug operator will be required to adhere to the mitigation measures outlined in the Marine Transport Management Plan (Section 16.2.2.11) and the Spill Prevention and Emergency Response Plan (Section 16.6). - linkages to the Environmental Monitoring and Follow-up Program - No specific Environmental Monitoring and Follow-up Programs have been suggested for Accidents and Malfunctions related to Marine Transportation in Section 17.0. In the event of an accident or malfunction, a follow-up program may be suggested depending on the event (e.g., type of material spilled, location, clean-up success etc.). Mitigation measures related to Marine Transportation are summarized in Volume 3, Part D - Section 15.1.4: Table 15-5 (Column title Key Mitigation Measures) and outlined in Volume 3, Part E - Section 16.0 (Spill Protection and Emergency Response Plan (16.6) and the Marine Transport Management Plans (16.2.2.11)). These plans will be further developed in consultation with regulatory agencies and First Nations. - their suitability for project- and site-specific application - The mitigation measures outlined in the Spill Protection and Emergency Response Plan (Section 16.6) and the Marine Transport Management Plan (Section 16.2.2.11) have been selected based on their suitability to the Project and the site. Examples of Project and site specific mitigation measures are:
426	EC-061	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>EIS Table 15-4: “Likelihood of occurrence” values are provided for each of the Accident and Malfunction types.</p> <p>EIS Table 15-5: “Significance Analysis of Residual Effect” values are provided for each Accident and Malfunction type.</p> <p>There is no discussion of the characterization of either “likelihood” or “severity” that is applicable to Section 15.4.1 wherein all Accident and Malfunction types have been assigned one or a mix of “Negligible” or “Not-Significant”.</p>	<p>ECCC-EE-IR-2 (Ref CEAA-IR-51): ECCC requests that the Proponent provides the Risk Rating Matrix that was used to inform the “Significance Analysis of Residual Effects”, and that was ultimately used to determine the Proponent’s selected mitigation measures, including:</p> <ul style="list-style-type: none"> - “their suitability for project- and site-specific application; and - their technical and economic feasibility”. 	<p>The methods for assessing the potential effects relating to accidents and malfunctions, including Significance (Section 4.5.3.2) are consistent with those provided in Volume 2, Part B - Section 4.0. Mitigation measures were selected that were suitable for the site conditions and that were technically and economically feasible. A description of the mitigation measures selected for each residual effect are presented in the discipline specific sections Volume 2, Part B - Section 5.1 through Section 9.2 and are summarized in Table 15-5.</p>
427	EC-062	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The Proponent states “In the unlikely event of a collision of a Proposed Project vessel with another vessel, shore feature or man-made structure, effects may include the rupturing of the vessel’s fuel tank. In the worst-case scenario, the maximum amount of fuel that can be released into the marine environment is 81 m3 of diesel fuel (total tank volume of Seaspan Commander).”</p> <p>Given that a worst-case accident scenario could reasonably involve the sinking of the Proposed Project vessel, then all petroleum product types and volumes contained onboard the vessel should be included in a worst-case accident scenario.</p>	<p>ECCC-EE-IR-3: ECCC recommends that the Proponent’s characterization of a worst-case scenario involving the rupturing of the vessel’s fuel tank is revised to include the potential spilling of all other types and quantities of oils and gear lubes that are normally required to operate the vessel. The associated environmental effects and effectiveness of mitigation measures should also be revised accordingly.</p>	<p>Diesel is the largest fuel type by volume that will be transported by the tug (total onboard volume of 81m3 for the Seaspan Commander or equivalent tug). The amount of intermediate and heavy fuel oils (IFOs and HFOs) also present on-board the tug will be limited to volumes required for engine consumption and lubrication as summarized in Table EC-062 (attached). The proposed mitigation measures outlined in the Spill Protection and Emergency Response Plan are intended to capture spills of all fuel types and are anticipated to be equally effective at responding to and managing any spills related to the IFO and HFOs that will be present on board the tug. In summary, the residual effects assessment for fuel spills, as characterized in Section 5.2.5.4.2.2. and presented in Table 5.2-22, remains valid as presented.</p>
428	EC-063	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>EIS guidelines state that “The LSA will also apply a buffer to this [spatial] boundary [for wildlife and vegetation VCs] based on local topography.” However, the buffer size is not stated in the EIS. ECCC provided similar comments in Annex 1.</p>	<p>ECCC-Wildlife-IR-1: ECCC requests that the Proponent provide the size of the buffer that will be applied within the Local Study Area (LSA) and the rationale for this size.</p> <p>If no buffer has been applied, the spatial boundary for terrestrial wildlife and vegetation assessment on Valued Components (VCs) will need to be reassessed with the buffer in place.</p>	<p>The Terrestrial LSA is 569 hectares (ha) and was delineated based on topography to encompass the area in which the majority of direct and indirect measurable Proposed Project effects on vegetation and wildlife are expected to occur (Figure 1 of Vol 2, Sec 5.3). The Terrestrial LSA encompasses topographical features and habitat within the McNab Valley similar to the Proposed Project Area to facilitate the study of comparable habitat types. The LSA extends approximately 250 m to 500 m from the property boundary edge on the east and west sides and approximately 1.8 km to the north where the McNab River changes from a delta river system to a canyon (Table 5.3-4, Vol 2, Sec 5.3). The Terrestrial LSA boundary was delineated to the south using the high tide mark.</p>

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429	EC-064	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>All VCs (except roosevelt elk) are SARA-listed or COSEWIC-assessed and are used as indicators/surrogates for certain ecosystems and species (e.g. amphibian species at risk as aquatic indicator species).</p> <p>In addition, groups of species, which include species at risk, are listed as a single VC (e.g. amphibian species at risk).</p> <p>When selecting surrogate/indicator species, ECCC does not recommend using SARA-listed or COSEWIC-assessed species as surrogate/indicator species (e.g., Northern Goshawk and Western Screech-owl were selected as surrogate species for excluded Bald Eagle and Osprey, while Common Nighthawk was selected for Purple Martin). Listed species often have very specific habitat needs that do not reflect those of the larger species group. Despite this, ECCC advises that each SARA-listed species that is likely to occur within the Local and Regional Study Areas be included as separate VCs (not representing a larger grouping).</p> <p>In general, ECCC recommends choosing migratory breeding bird indicator species that consider all bird guilds present (waterbirds, waterfowl, shorebirds, and landbirds) and all habitat types that the Project will likely impact (e.g. old growth forest, riparian areas, wetlands, freshwater/stream, alpine) as VCs when undertaking baseline work.</p> <p>ECCC recommends using the list of Priority Species provided by Bird Conservation Region Strategies as a selection guideline for potential Indicator Species: http://nabci.net/Canada/English/bird_conservation_regions.html</p> <p>The following can also aid in selection of indicator species:</p>	<p>ECCC-Wildlife-IR-2 (Ref CEAA-IR-17): ECCC recommends revising the selection of VCs such that each species listed under SARA or assessed by COSEWIC is included as its own VC. ECCC recommends that an effects assessment be conducted and mitigation measures be provided to address effects for each VC.</p> <p>ECCC recommends that species listed under SARA or assessed by COSEWIC are not included as surrogate/indicators of larger species groups.</p>	See 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065.
430	EC-065	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The rationale for exclusion of olive-sided flycatcher as a VC states that "the proposed project area...is not considered highly suitable olive-sided flycatcher habitat...", and that band-tailed pigeon was chosen as a surrogate.</p> <p>However, olive-sided flycatcher was observed in the proposed Project area and at other observation stations, as stated in the baseline report. ECCC notes that "no high suitability habitat" does not justify exclusion of olive-sided flycatcher, as it has been documented near the proposed Project Area within the LSA.</p>	<p>ECCC-Wildlife-IR-3 (Ref CEAA-IR-19): ECCC recommends including the olive-sided flycatcher species as its own VC as it was observed in the LSA following the recommendation above.</p> <p>ECCC also recommends updating Table 5.3-7 and the effects assessment to include olive-sided flycatcher as identified wildlife in the LSA.</p> <p>Following this recommendation, ECCC also recommends updating Table 5.3-7 to include other species at risk confirmed in the LSA during surveys.</p>	See 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065.
431	EC-066	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Table 5.3-7 states that Northern Red-legged Frog was not identified in the LSA. This information contradicts the baseline report, which indicates that Northern Red-Legged Frog was one of two amphibian species recorded during amphibian species surveys in the LSA.</p>	<p>ECCC-Wildlife-IR-4 (Ref CEAA-IR-23): ECCC recommends that Table 5.3-7 is updated in the EIS to include Northern Red-legged Frog as identified wildlife in the LSA.</p>	BURNCO recognizes that an error has been made in Table 5.3-7 (Volume 2, Sec 5.3). The table correctly indicates that the Northern red-legged frog was confirmed in the Terrestrial LSA. However, the table indicates that this species is not listed as "Identified Wildlife" under the BC Forest and Range Practices Act, which is incorrect (Pearson and Healey 2012).

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432	EC-067	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	ECCC notes that no baseline surveys were conducted for invertebrate species at risk, nor were any included or addressed in the VC selection .	ECCC-Wildlife-IR-5 (Ref CEAA-IR-18): ECCC requests an explanation as to why invertebrate species at risk were not considered in the VC selection .	<p>A query of the BC Species and Ecosystem Explorer database found a total of five federally listed invertebrate species at risk with ranges overlapping the CWH biogeoclimatic zone, Sunshine Coast Forest District, and the Lower Mainland (BC CDC 2016). One of these species, Northern Abalone (<i>Haliotis kamtschatkana</i>) has a range that does not overlap the Terrestrial LSA and is discussed further in the Marine Resources Section of the EA (Appendix 5.2-A, Vol 4, Part G). The threaded vertigo (<i>Nearctula</i> sp. 1), a gastropod, is typically found in bigleaf maple (<i>Acer macrophyllum</i>) stands (COSEWIC 2010). Bigleaf maple stands are present in the Terrestrial LSA as a riparian species and an early ecological succession species but do not occur in the Project area (App 5.3-B, Vol 4, Sec G). In addition, threaded vertigo has only been recorded on southern Vancouver Island and near Egmont on the Sunshine Coast (BC CDC 2016; Forsyth 2004). Therefore, the threaded vertigo is not expected to occur in the Project area or to be affected by the Proposed Project.</p> <p>Dun skipper (<i>Euphyes vestris</i>) and Oregon branded skipper (<i>Hesperia colorado oregonia</i>) were identified with ranges overlapping the Project area (BC CDC 2016). However, the Dun skipper occurrence range does not overlap with the Project area based on mapping undertaken by the South Coast Conservation Program (SCCP 2011). The nearest recorded Dun skipper occurrence is 54 km to the southeast of the Project area in Burns Bog (Province of BC 2013). Therefore, Dun skipper is not expected to occur in the Project area or to be affected by the Proposed Project. The nearest occurrence of the Oregon branded skipper to the Project area is on southern Vancouver Island and this species has not been recorded on the mainland (COSEWIC 2013). The Oregon branded skipper is typically found in sparsely vegetated Garry oak and coastal sand spit ecosystems (COSEWIC 2013), which are not present in the Project area (App 5.3-B, Vol 2). Therefore, Oregon branded skipper is not expected to occur in the Project area or be affected by the Proposed Project.</p> <p>The range for monarch (<i>Danaus plexippus</i>) butterfly overlaps with the Project area (BC CDC 2016). This species typically occurs in dry meadow habitat of the BC Interior Region and is infrequently observed in the Lower Mainland (BC CDC 2016). Monarchs are associated with showy milkweed (<i>Asclepias speciosa</i>) as a host plant. The nearest known location of showy milkweed (<i>Asclepias speciosa</i>) is 56 km from the Project area, located in Coquitlam, BC. Although there is appropriate habitat in the Project area (moist to mesic roadsides, ditches, streamsides, meadows and grasslands in the steppe and montane zones [Douglas et al. 1998]), extensive vegetation surveys conducted in the Project area did not locate any occurrences of showy milkweed. Vegetation surveys were conducted in the Project area during eight field trips covering 125 plots (full plots, ground inspections, and visual observation plots) to account for different seasons and flowering periods (App 5.3-B, Vol 4, Part G). There is a low likelihood of showy milkweed occurring in the Project area. Therefore, monarch is not expected to occur in the Project area or to be affected by the Proposed Project.</p>
433	EC-068	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The Proponent indicates that "critical nesting habitat has been identified within the LSA but not within the Proposed Project Area, and therefore no direct loss of critical Marbled Murrelet nesting habitat is expected."</p> <p>ECCC advises that Marbled Murrelet terrestrial critical habitat is identified in the final recovery strategy, and that shapefiles are available for its critical habitat. An identification of marine critical habitat is not included in the Recovery Strategy at this time.</p> <p>ECCC notes that the proposed recovery strategy for Marbled Murrelet referenced in the baseline may not have included the most recent shapefiles for critical habitat. ECCC advises that Marbled Murrelet critical habitat, as defined in the recovery strategy, will be refined over time; this refinement may include the addition of new critical habitat, if further research supports this inclusion.</p> <p>The environmental assessment should identify and describe any potential direct or indirect impacts to Marbled Murrelet and its critical habitat arising from Project activities.</p> <p>Baseline studies should include, but not be limited to:</p> <ul style="list-style-type: none"> - a determination of whether suitable nesting habitat (SNH) for Marbled Murrelet is present within or near the Project area and, - if SNH is present within or near the Project area, or if a nest has been identified: Marbled Murrelet surveys during the breeding season to determine whether Marbled Murrelets are likely nesting in the Project area. <p>Refer to Attachment 4: Standard Guidance for Environmental Assessments for</p>	<p>ECCC-Wildlife-IR-6 (Ref CEAA-IR-20): ECCC requests clarification as to whether the critical habitat referenced in the baseline and EIS was based upon the geospatial files available as open data through the Open Data Portal at: http://donnees.ec.gc.ca/data/species/developplans/critical-habitat-for-species-at-risk-british-columbia/critical-habitat-for-species-at-risk-british-columbia-marbled-murrelet-brachyramphus-marmoratus/?lang=en</p> <p>If not, ECCC requests a reassessment of Marbled Murrelet critical habitat using these geospatial files.</p> <p>ECCC recommends that the Proponent), provide appropriate baseline studies based on the advice in the Marbled Murrelet Standard Guidance Memo (Attachment 4) and identify and describing all potential direct and indirect effects to Marbled Murrelet critical habitat as well as mitigation measures that will avoid or lessen the effects.</p>	<p>The proposed Recovery Strategy for Marbled Murrelets in Canada has mapped critical marbled murrelet habitat in the Southern Mainland Coast (Environment Canada 2014). A total of 46.5 ha of marbled murrelet terrestrial critical habitat is present in the Terrestrial LSA and was included in the effects assessment for the species (Vol 2, Sec 5.3). This is consistent with the geospatial file obtained from the Environment Canada reference provided in Comment CEAA-214. Critical nesting habitat has been identified within the Terrestrial LSA but not within the Proposed Project Area, and therefore no direct loss of critical marbled murrelet nesting habitat is expected. Marbled murrelet surveys were conducted according to protocols outlined in the "Inventory Methods for Marbled Murrelets in Marine and Terrestrial Habitats" (RIC 2001) during the breeding season. Marbled murrelet was not recorded during species-specific field surveys and are not expected to breed in the Project area. Potential nesting habitat is available outside the Project area in mature riparian forest along McNab Creek and tributaries, as well as mature foreshore coastal rainforest along the southern boundary of the Terrestrial LSA (App 5.3-A, Vol 4, Part G). Potentially suitable for marbled murrelet is not present in the Project area. Critical marine habitat has not yet been identified (Environment Canada 2014).</p>
434	EC-069	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The EIS indicates that "a total of 0.125 ha of amphibian breeding habitat will be established during the construction phase of the project..." and that the predicted change in amphibian mortality is considered fully reversible.</p> <p>Human-made habitats, such as pit lakes, are sometimes used by Western Toad for breeding (COSEWIC 2012). However, human-made habitats can be a reproductive sink where these habitats produce no metamorphs (because the habitats attract the species, but do not meet the requirements of the species) and result in a waste of reproductive effort (Stevens and Paszkowski 2006).</p> <p>References: COSEWIC. 2012. COSEWIC assessment and status report on the Western Toad <i>Anaxyrus boreas</i> in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xiv + 71 pp.</p> <p>Stevens, C.E., and C.A. Paszkowski. 2006. Occurrence of the western toad and its use of 'borrow pits' in west-central Alberta. <i>Northwestern Naturalist</i> 87:107-117</p>	<p>ECCC-Wildlife-IR-7: ECCC recommends that the Proponent provide anre-evaluation of the expectation of full reversibility of the predicted change in mortality taking into consideration that human-made habitat may not be as effective as natural breeding habitat for Western Toad.</p>	<p>Human-made habitats, such as excavations forming ephemeral ponds and ditches, may act as reproductive sinks to breeding amphibians (Environment Canada 2015, COSEWIC 2012). Borrow pits were found to be a potential population sink because there is a lack of suitable larval habitat (Stevens and Paszkowski 2006). Ephemeral ponds and ditches can collect contaminants from runoff, spread non-native species, and/or become population sinks (BC MFLNRO 2014).</p> <p>Amphibian compensation ponds are planned to restore breeding habitat in the Terrestrial LSA. The four amphibian ponds will be created with consideration for suitable habitat characteristics including vegetation species for foraging, shelter and protection from the elements as well as water depth. The amphibian breeding ponds will be designed based on available literature and best management practices with a focus on the most common pond breeding amphibian recorded in the Project area, the northern red-legged frog. Northern red-legged frog and western toad breeding habitat is comparable (see response to CEAA-217). Western toad were not observed during amphibian surveys during three rounds of surveys or incidentally during three years of field studies (App 5.3-A, Vol 2, Sec 5.3). Methodology and monitoring measures to establish four amphibian ponds, as well as criteria to measure the success of established amphibian breeding ponds, will be described in the Wildlife Protection Plan. Qualified environmental professionals will provide guidance during the establishment, monitoring and reporting of the amphibian breeding ponds.</p>

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435	EC-070	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Mitigation for habitat loss of VCs includes "Maintain[ing] vegetation buffers..." but provides no other detail.	ECCC-Wildlife-IR-8: ECCC requests clarification on what is defined as a vegetation buffer, how much of a buffer will remain, and the rationale for the amount that will be maintained and excluded.	Mitigation measures for habitat loss are described in Section 5.3.1.5.4.2.1, Vol 2. For amphibians, buffers of undisturbed native vegetation, a minimum of 30 m in width (BCMOE 2014; BC MWLAP 2002), will be maintained around suitable breeding habitats, where feasible (see Section 5.3.1.5.4). For raptor species, vegetation buffers will be established and retained around raptor nests in accordance with "Guidelines for Raptor Conservation during Urban and Rural Land Development in British Columbia" (BCMOE 2013b), although exceptions may be requested from provincial regulators in some circumstances. Pre-clearing bird nest surveys will be undertaken if clearing during the migratory bird nesting period cannot be avoided, in which case disturbance set-back buffers will be established around observed or suspected active nests following provincial and federal guidance. For Roosevelt elk, habitat linkages and vegetation buffers will be maintained through winter habitat restoration and compensation that will be described further in the Wildlife Protection Plan.
436	EC-071	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The EIS states that "an accidental release of deleterious substances or sediment could occur when machinery is operated near aquatic breeding habitat." The potential for accidents is not discussed in the proposed mitigation measures.	ECCC-Wildlife-IR-9: ECCC recommends that the Proponent provide: mitigation measures to prevent and mitigate an accidental release of deleterious substances; an explanation as to why the mitigation measures were selected; and a mitigation and follow-up strategy for potentially affected species at risk and migratory birds if an accidental release does occur.	BURNCO acknowledges that there is a potential for the releases of deleterious substances (e.g., hydrocarbon spill, hazardous materials) or silt into aquatic habitat that may reduce the suitability of the receiving environments for aquatic and semi-aquatic species with low mobility, such as amphibians. BURNCO is committed to responding to spills based on current best management practices and will follow mitigation measures as described in the Spill Prevention Response Plan. The Wildlife Protection Plan will detail mitigation measures and response protocols in the event of a spill with the potential to affect wildlife species. Guidance to prevent and mitigate an accidental release of deleterious substances will be described in the Spill Prevention Response Plan. A mitigation and follow-up strategy for potentially affected species at risk and migratory birds if an accidental release does occur will be described in the Wildlife Protection Plan.
437	EC-072	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The EIS states that "The habitat removed may be replaced at the end of the proposed project"; however, the EIS also states that habitat loss is predicted to be "fully reversible".	ECCC-Wildlife-IR-10: ECCC requests clarification as to why the habitat may be replaced, as opposed to will be replaced, given the statement that habitat loss is predicted to be fully reversible.	The habitat removed will be replaced at the end of the proposed Project when reclamation and effective closure occurs. BURNCO intends to restore wildlife habitat, with a focus on Roosevelt elk winter range, during the reclamation and effective closure phase.
438	EC-073	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The EIS indicates that salvaging of amphibians within natal and upland habitat affected by the proposed Project will reduce project-related mortality. ECCC does not recommend amphibian salvaging be considered as a measure to mitigate mortality due to construction activities because the survival of translocated individuals is highly uncertain (Malt 2012). Refer to Attachment 4: Standard Guidance for Environmental Assessments for Western Toad for more information on salvage. References: Malt, J. 2012. Assessing the Effectiveness of Amphibian Mitigation on the Sea-to-Sky Highway: Population-level Effects and Best Management Practices for Minimizing Highway Impacts. Final Report. Ministry of Forest, Lands, and Natural Resource Operations.	ECCC-Wildlife-IR-11: ECCC recommends revising the mitigation measures proposed for Western Toad by using guidance on translocation for Western Toad provided in the standard guidance memo in Attachment 4.	Efforts will be taken to minimize the need for amphibian salvage activities given the low survival rate (8-27%) of translocated individuals (Malt 2012). The preferred approach is to minimize salvage activities by infilling existing ponds outside of the amphibian breeding, migration and dispersal time periods. However, to avoid contravention of the BC Wildlife Act, amphibian salvage will be considered when construction activities could injure or kill amphibians. A General Wildlife Permit is required prior to conducting amphibian salvages to authorize the applicant to capture, hold and relocate wildlife to a safe location (BC MFLNRO 2014).
439	EC-074	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The clearing and constructing of the processing area is anticipated to result in a temporary loss of riparian forest.	ECCC-Wildlife-IR-12: ECCC requests clarification on what ecosystem functions will be temporarily lost, what specific mitigation measures will be used to restore these functions, and how they restore them. ECCC further requests information on whether a monitoring plan for the mitigated riparian ecosystem will be implemented	The temporary loss of swamp forest/ riparian forest in the processing area will remove the following ecosystem functions (as described in Hanson et al. [2008]): <ul style="list-style-type: none"> Hydrological function: Shoreline and erosion protection – dissipating high energy flows and waves, and maintaining cohesion of shoreline materials. Biogeochemical function: Carbon sequestration and storage – decomposed woody surface vegetation and large woody debris store carbon on the order of years to centuries. Seasonal fluctuation of water tables allow for decomposition. However, high biomass productivity may offset decomposition. Habitat function: Biological productivity/ biodiversity support – presence/ abundance of different plant and wildlife species, and provision of habitat for wildlife. Reclamation of the processing area will re-establish terrestrial forest, which, along with the creation of 1.9 ha of riparian forest surrounding the extension of WC 2 (Volume 4, Part G: Appendix 5.1-B, Figure 6), will provide the above-listed ecological functions. Reclamation monitoring will include visual assessment of shoreline erosion, as well as health and survivorship of plantings (a proxy for both carbon sequestration/storage and for biological productivity/biodiversity support).
440	EC-075	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	ECCC previously commented that the EIS was "missing discussion regarding key life stage requirements of wildlife VCs, and landscape alteration as a function of biodiversity and ecosystem function." (From Table of Concordance at previous stage). The EIS requires that a discussion on key-life stage requirements for each VC be added, in addition to a discussion on landscape alteration as a function of biodiversity and ecosystem function.	ECCC-Wildlife-IR-13: ECCC requests the provide key life-stage requirements in the effects assessment and mitigation measures (for example, migration corridors and other life stage habitats).	Species profiles for each of the eight selected VCs are described in App 5.3-A, Vol 4, Sec G. Species profiles describe range, provincial and federal designations, primary threats, key life-stage requirements (e.g., breeding, foraging, denning habitat), if the species was observed on site, habitat suitability index modelling results (if applicable), and inferences on species use of the Project area based on the availability of key life-stage requirements. Migration corridors were not observed for Roosevelt elk or Columbian black-tailed deer (Odocoileus hemionus columbianus) during three years of remote camera data collection. Grizzly bears (Ursus arctos) were not observed in the Project area during three years of field surveys and therefore seasonal grizzly bear migration corridors are not expected to be present in the Project area.

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441	EC-076	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	As indicated in the IRs elsewhere in this document, the VC selection, analysis of key life stage requirements, and baseline work (See IRs re: bird surveys including ECCC-Wildlife20 and ECCC-Wildlife 21) on certain species are inadequate for the scope of the Project. Residual cumulative effects were not assessed for any bird VCs.	ECCC-Wildlife-IR-14: ECCC recommends that with the additional survey data as requested in ECCC-Wildlife20 and ECCC-Wildlife21, residual cumulative effects and their significance be re-assessed.	<p>The purpose of baseline wildlife field surveys was to assess species presence and habitat use in the Terrestrial LSA. Surveys for migratory birds were completed as part of the wildlife baseline program (App 5.3-A, Vol 4, Sec G). Extensive baseline surveys were conducted for avian species in the Terrestrial LSA and were consistent with the level of care normally exercised by environmental professionals currently practicing under similar conditions in BC. Wildlife baseline surveys were sufficient for data collection for the purpose of an EA. Avian baseline surveys included breeding bird, western screech-owl, nocturnal owl, northern goshawk and marbled murrelet surveys.</p> <p>The objective of the breeding bird survey was to assess the presence and distribution of resident and neotropical migrant bird species in the LSA, with a focus on species at risk. Three rounds of breeding bird surveys were conducted in 2012. Given the small size of the Terrestrial LSA (569 ha) it was feasible to survey 33 stations in one day per survey round. Point count surveys were conducted for five minutes after one minute of silence, recording all visual and auditory observations within a 75 m area, according to guidance in BC Inventory Methods for Forest and Grassland Songbirds (RIC 1999). Forty three species of bird were recorded during breeding bird surveys with an additional five species recorded incidentally.</p> <p>The objective of the western screech-owl and nocturnal owl surveys were to assess species presence in the LSA. Two rounds of western screech-owl surveys were conducted in 2012 at eight locations. Surveys were conducted 30 min after sunset with three call series per station following a two minute silence period according to Inventory Methods for Owl Surveys (RISC 2006). Two responses were elicited from a ridge approximately 600 m west of the Proposed Project area. Two rounds of nocturnal owl surveys were also conducted in 2012 at the same eight locations. Nocturnal owl surveys targeted northern saw-whet owls (<i>Aegolius acadicus</i>), barred owls (<i>Strix varia</i>) and great horned owls (<i>Bubo virginianus</i>). The same methodology and guidance document was followed as for western screech-owl surveys but calls were broadcast from smallest to largest owl. Northern saw-whet owl and barred owl were recorded during the surveys.</p> <p>Call playback surveys for northern goshawk were conducted to assess species presence in the Terrestrial LSA. Three rounds of northern goshawk surveys were conducted in 2012 at seven locations. Northern goshawk surveys followed a two minute quiet period followed by three rounds of alarm call and listening periods according to Inventory Methods for Raptors (RIC 2001b). Northern goshawks were not observed during species-specific surveys or incidentally on site.</p> <p>Marbled murrelet surveys were conducted to document seasonal presence of the species in the Terrestrial LSA. Two rounds of marbled murrelet</p>
442	EC-077	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The EIS identifies significant cumulative effects to grizzly bears. However, potentially important effects pathways, such as habitat fragmentation and barriers to movement, were not considered in the effects assessment.</p> <p>The Proposed Project Area is not expected to cause any further fragmentation, but the justification for this statement is insufficient and requires further detail. In addition, existing projects in the area are characterized as creating a baseline barrier to grizzly bear movement without an appropriate explanation.</p>	<p>ECCC-Wildlife-IR-15: Given that significant cumulative effects to grizzly bears are predicted in the EIS, ECCC recommends carrying forward of all effects pathways be included in the effects assessment.</p> <p>ECCC requests clarification as to how existing projects provide a baseline barrier to movement for grizzly bears.</p>	<p>Past, present and reasonably foreseeable projects and activities that restrict grizzly bear access to foraging habitat may create barriers to movement. Barriers created by Eagle Mountain Woodfibre Gas Pipeline Project are predicted to be temporary as vegetation will re-grow over the pipeline after installation. The Woodfibre LNG Project is predominately situated on a brownfield site and thus is not expected to increase barriers to movement. The Proposed Project is predominately situated in a cleared area that is accessible to grizzly bear. The Proposed Project may limit access during the construction and operation phases. However, the Proposed Project will not impede grizzly bear access to McNab Creek and grizzly bears are expected to moving freely around Project infrastructure after clearing and construction activities are complete (Sec 5.3.3.5.1.3, Vol 2). Therefore, barriers to movement for grizzly bear was not carried forward to the cumulative effects assessment (Table 5.3-45, Vol 2). Habitat loss and change in mortality were carried forward to the cumulative effects assessment for grizzly bear (Table 5.3-45, Vol 2).</p> <p>Based on conservative assumptions regarding the extent of grizzly bear spring, summer and fall foraging habitat it is predicted that the cumulative residual effects of past, present and reasonably foreseeable projects and logging activities in the Terrestrial RSA may reduce the amount of suitable grizzly bear foraging habitat available in the RSA by 7% (528 ha). Of this, 6% is attributed to logging activities and 1% to the Proposed Project, with less than 0.1% attributed to other reasonably foreseeable developments activities (Sec 5.3.3.5.1.1, Vol 2).</p> <p>Grizzly bear mortality due to clearing is not predicted to occur because during most of the year grizzly bears can vacate areas ahead of clearing, and grizzly bear denning habitat is not predicted to occur in the Proposed Project area. Other foreseeable projects and activities in the Terrestrial RSA are also not predicted to overlap with denning habitat, and are therefore not expected to contribute to grizzly bear mortality during clearing. Incidental mortality due to interactions with workers and vehicle collisions may occur for the Proposed Project and past, present and reasonably foreseeable projects and activities within the Terrestrial RSA. New roads created by the forestry industry will provide additional access into grizzly bear habitat, which may result in increased mortality due to increased poaching (Sec 5.3.3.5.1.2, Vol 2).</p> <p>Habitat loss and change in mortality are predicted to result in low magnitude residual cumulative effects on grizzly bear; therefore, the magnitude of the net cumulative residual effects of the Proposed Project and past, present and reasonably foreseeable projects and activities on grizzly bear is also predicted to be low. The predicted effects are regional, medium duration, continuous over the life of the Project and have a high likelihood to occur. The cumulative residual net effects are considered partially reversible with habitat restoration and management of human-bear conflicts. Confidence that the effects will not be greater than predicted is moderate due to the conservative assumptions (Sec 5.3.3.7.3, Vol 2).</p>

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443	EC-078	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	No Marbled Murrelet monitoring plan is provided, even though it was observed during baseline studies.	<p>ECCC-Wildlife-IR-16 (Ref CEAA-IR-21): ECCC recommends that mitigation measures addressing potential effects on Marbled Murrelet be included in the EIS due to ECCC's concerns regarding the quality of baseline information (see IR ECCC-Wildlife06 regarding Marbled Murrelet baseline surveys). In addition, ECCC recommends that project monitoring be conducted in accordance with standardized methods (e.g. RISC 2001) for Marbled Murrelet and its habitat RISC (Resources Information Standards Committee). 2001. Inventory methods for Marbled Murrelets in marine and terrestrial habitats, Version 2.0. Standards for components of British Columbia's biodiversity, No. 10. Ministry of Environment, Lands and Parks, Resources Inventory Branch, Victoria, BC. URL: http://www.lmb.gov.bc.ca/risc/pubs/tebiodiv/murrelet2k1/mamu%20ml20.pdf</p>	<p>The proposed Recovery Strategy for Marbled Murrelets in Canada has mapped critical marbled murrelet habitat in the Southern Mainland Coast (Environment Canada 2014). A total of 46.5 ha of marbled murrelet terrestrial critical habitat is present in the Terrestrial LSA and was included in the effects assessment for the species (Vol 2, Sec 5.3). This is consistent with the geospatial file obtained from the Environment Canada reference provided in Comment CEAA-214. Critical nesting habitat has been identified within the Terrestrial LSA but not within the Proposed Project Area, and therefore no direct loss of critical marbled murrelet nesting habitat is expected. Marbled murrelet surveys were conducted according to protocols outlined in the "Inventory Methods for Marbled Murrelets in Marine and Terrestrial Habitats" (RIC 2001) during the breeding season. Marbled murrelet was not recorded during species-specific field surveys and are not expected to breed in the Project area. Potential nesting habitat is available outside the Project area in mature riparian forest along McNab Creek and tributaries, as well as mature foreshore coastal rainforest along the southern boundary of the Terrestrial LSA (App 5.3-A, Vol 4, Part G). Potentially suitable for marbled murrelet is not present in the Project area. Critical marine habitat has not yet been identified (Environment Canada 2014).</p> <p>Marbled murrelets were not recorded in the Proposed Project Area during species-specific surveys completed during the breeding season and suitable nesting habitat is not present in the Project area (see response to CEAA-214). Critical marbled murrelet nesting habitat has been identified within the Terrestrial LSA but not within the Proposed Project Area, and therefore no direct loss of critical habitat is expected to occur. Noise levels predicted to be emitted in marbled murrelet Wildlife Habitat Areas (WHA) during the construction and operational phases of the Project will remain below 40 dBA and therefore below the assumed noise threshold of 70 dBA for the species (Sec 5.3.1.5.3.3.1.1, Vol 2). In addition, the Proposed Project will only be operational during daylight hours and is not expected to coincide with peak marbled murrelet movements to and from nesting habitat, which typically occur during crepuscular hours (Section 5.3.1.5.3.3, Vol 2).</p> <p>The net residual effects of the Proposed Project on marbled murrelet in both terrestrial and marine environments are considered negligible – not significant. The overall significance of net residual effects of the Proposed Project, which incorporates all potential effects in both marine and terrestrial environments, are also considered negligible – not significant, with a high prediction confidence. Please refer to response CEAA-208 for details on Proposed Project effects on marbled murrelet in the terrestrial and marine environments. For these predicted Project effects, focused monitoring for marbled murrelet would not be appropriate. Any observed instance of marbled murrelet mortality will be reported to provincial and federal regulators, as appropriate.</p>
444	EC-079	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The baseline notes that Northern Red-legged Frog, Coastal Tailed Frog, and Western Toad all have the potential to occur in the LSA. However, no species-specific surveys were conducted.	<p>ECCC-Wildlife-IR-17 (Ref CEAA-IR-23): ECCC recommends that species-specific surveys be conducted and included for all amphibian species at risk with the potential to occur in the LSA, given differences in habitat, life stage requirements, and breeding behaviour. ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects. ECCC recommends that the Proponent refer to Attachment 4: Standard Guidance for Environmental Assessments for Western Toad for details on ECCC's suggested survey methodologies for Western Toad.</p>	<p>Surveys for pond breeding amphibians were completed as part of the wildlife baseline program (App 5.3-A, Vol 4, Sec G). The objective of the pond breeding amphibian surveys were to determine amphibian presence in the Terrestrial LSA and focused on detecting species at risk. Amphibian surveys were conducted in the spring of 2012 and 2014 according to standard technical procedures for systematic surveys outlined in "Inventory Methods for Pond Breeding Amphibians and Painted Turtle" (RIC 1998). The amphibian surveys that were conducted were appropriate for collecting data on northern red-legged frog (<i>Rana aurora</i>) and western toad (<i>Anaxyrus boreas</i>), as well as the broader suite of pond-breeding amphibians. Evidence of breeding for northern Pacific tree frog (<i>Pseudacris regilla</i>) and northern red-legged frog was recorded in and around the Proposed Project area during amphibian surveys.</p> <p>Species-specific surveys are not necessary for collecting data on northern red-legged frog and western toad. Northern red-legged frog breeding occurs in cool ponds or lake margins, slow moving streams, marshes, bogs, or swamps with standing water at least 50 cm deep (Lannoo 2005). Breeding habitat contains soft substrate and thin stemmed, emergent plants, such as rushes (<i>Juncus</i> spp.) or sedges (<i>Carex</i> spp.), onto which the frogs attach their egg masses (Corkran and Thoms 1996). Northern red-legged frogs and breeding activity was observed more frequently than any other amphibian species and species specific surveys are not considered necessary. Western toads occur near ponds, lakes, slow moving rivers and streams, wetlands, bogs, fens, and roadside ditches (Slough and Mennell 2006; Wind and Dupuis 2002). No evidence of western toad breeding was recorded in the Terrestrial LSA during three years of field surveys. However, western toad breeding habitat is comparable to breeding habitat of Northern red-legged frog as described above. Therefore, amphibian survey methods and efforts were sufficient to determine western toad presence in the Terrestrial LSA and western toad surveys are not required.</p> <p>Coastal tailed frogs (<i>Ascaphus truei</i>) occur in fast flowing perennial mountain streams typically associated with drainage basins less than 10 km² (Dupuis and Friele 2003). Suitable habitat consists of a boulder or cobble substrate, which provides spaces where females can deposit egg masses in summer months (Dupuis and Friele 2003), refuges from predators and dynamic system events (Frid et al. 2003) and interstices where larvae can forage (Dupuis and Friele 2003). Coastal tailed frog breeding was confirmed incidentally during electrofishing surveys. However, species-specific surveys for tailed frogs were not conducted and are not considered necessary because the Proposed Project area does not overlap with potential tailed frog habitat (i.e., streams within the Proposed Project area do not have habitat characteristics required by tailed frogs).</p>
445	EC-080	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Amphibian surveys were done on two dates in 2012 (March 26 and June 26), and one date in 2014 (March 25), and only in select areas of the LSA. No road surveys were performed. ECCC advises that the amphibian surveys conducted are not adequate for establishing an accurate baseline that will reflect natural inter-annual variation, which is important for assessing potential project impacts, focusing mitigation and monitoring, and addressing potential cumulative impacts. In addition, it appears that terrestrial habitats (for summering and wintering) for amphibians were not included in the effects assessment. ECCC emphasizes the importance of protecting amphibian terrestrial habitats. Terrestrial habitats are important habitats for feeding and overwintering and the biological interdependence between terrestrial and aquatic habitats is essential for the persistence of populations.	<p>ECCC-Wildlife-IR-18: ECCC recommends including additional amphibian surveys, conducted as per appropriate standards:</p> <ol style="list-style-type: none"> 1. within the entire LSA; and 2. for more than one year per survey location. <p>ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects. ECCC requests the inclusion of terrestrial habitat in the effects assessment, and mitigation measures be provided to address effects.</p>	<p>Amphibian surveys were conducted in potential amphibian breeding areas across the entire Terrestrial LSA over multiple years according to RIC (1998) standards. Circumlinear transects were walked around wet features looking for amphibian presence and breeding activity. Survey results were appropriate for describing baseline conditions in and around the Project area and Terrestrial LSA and provided appropriate information for assessing Proposed Project effects on amphibians and amphibian species at risk.</p> <p>Amphibians utilize aquatic habitat for breeding, terrestrial habitat for foraging and hibernation habitat. Northern red-legged frog and western toad both utilize forested habitat, outside of the breeding season, and can be found far from standing water (RIC 1998). Locating pond-breeding amphibians in aquatic habitat is more efficient than in terrestrial environments where amphibians are cryptic, generally difficult to find and may use underground burrows (RIC 1998). Egg masses, larvae and adults are relatively easy to see and count in aquatic habitat and can be used to assess the number of breeding females. Therefore, terrestrial surveys were not considered appropriate. Proposed Project effects to amphibian terrestrial habitat is covered by the Terrestrial Vegetation section of the EA (Sec 5.3.2, Vol 2).</p> <p>Mitigation measures to minimize the Proposed Project effects on amphibian breeding habitat and adjacent terrestrial habitat are outlined in Section 5.3.1.5.4, Vol 2. Effects to amphibians observed in the Terrestrial LSA were considered in the effects assessment for amphibian species at risk (Sec 5.3.1.5.3) and the cumulative effects assessment for amphibian species at risk (Sec 5.3.3.5.1, Vol 2).</p>

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446	EC-081	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	The Appendix states that no amphibian breeding was recorded in Pond 4 in 2014. However, ECCC notes that Red-Legged Frog tadpoles were recorded in Pond 4 in 2014. These two statements appear to contradict each other. The presence of tadpoles indicates that amphibian breeding occurs in the pond.	ECCC-Wildlife-IR-19: ECCC requests that the Proponent update the statement in the Appendix to reflect and/or clarify the 2014 survey information on Red-legged Frogs.	Red-legged frog tadpoles were recorded in Pond 4 in 2012, but not in 2014 (see Table 8 of Appendix 5.3-A).
447	EC-082	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Breeding bird surveys were only conducted two days in one year.</p> <p>The existing baseline sampling for migratory birds does not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project, including those on COSEWIC-assessed and SARA-listed avian species detected in the LSA and RSA. ECCC notes that Common Nighthawks (SARA: Threatened), Barn Swallows (COSEWIC: threatened), and Short-eared Owls (SARA: Special Concern) are not well represented by standard avian point counts and other standard survey techniques because of their unique behaviours.</p> <p>Establishing an accurate baseline that reflects natural inter-annual variation is important for assessing potential project impacts, focusing mitigation and monitoring, and addressing potential cumulative impacts. It is also important to note that a key purpose of collecting baseline data is to determine the presence of any biodiversity or distribution hotspots.</p> <p>The sampling methods chosen do not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project on migratory birds.</p>	<p>ECCC-Wildlife-IR-20 (Ref CEAA-IR-22): For the scientific assessment of potential impacts on migratory birds, ECCC recommends that the EIS should follow the guiding principles as presented in: Hanson et al. 2009, A framework for the scientific assessment of potential project impacts on birds - CWS Technical Report series No. 508 (available online at: http://publications.gc.ca/site/archives-archived.html?url=http://publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf).</p> <p>ECCC recommends including additional baseline surveys using species-specific protocols throughout the LSA for Common Nighthawk, Barn Swallow, and Short-eared Owl.</p> <p>For all bird surveys, ECCC recommends the inclusion of surveys conducted over multiple years, incorporating multiple visits per year at the same points to account for natural and contemporary inter-annual variation and maximize detectability within the LSA.</p> <p>ECCC recommends that based on the survey information collected, reassess the effects on each VC and mitigation measures should be provided to address effects.</p>	<p>The overall purpose of the baseline wildlife field surveys was to assess species presence and habitat use in the Terrestrial LSA. Surveys for breeding birds were completed as part of the wildlife baseline program (Appendix 5.3-A). The objective of the breeding bird survey was to assess the presence and distribution of resident and neotropical migrant bird species in the LSA, with a focus on species at risk. Breeding bird surveys were conducted according to standard technical procedures for point count survey methods outlined in "Inventory Methods for Forest and Grassland Songbirds" (RIC 1999). Barn swallow (<i>Hirundo rustica</i>) was recorded during breeding bird surveys and confirmed to be present in the Terrestrial LSA. Common nighthawk was not recorded during breeding bird surveys but was recorded incidentally. Habitat suitability index modeling predicted a very small proportion of suitable habitat in the Project area (2% (1 ha) loss of moderately suitable common nighthawk breeding habitat). The purpose of species-specific surveys would be to confirm presence on site and this was established during breeding bird surveys for barn swallow and common nighthawk. Short-eared owls (<i>Asio flammeus</i>) nest in open habitat supporting year-round populations of cyclic small mammals (Wiggins et al. 2006). However, potential habitat is not known to be present in the Proposed Project area based on mapping by the BC Ministry of Environment (Cooper and Beauchesne 2004). Short-eared owl are not expected to occur in the Project area. Therefore, species-specific surveys are not considered necessary for barn swallow, common nighthawk or short-eared owl.</p> <p>See also response to ECCC-Wildlife-IR-14 (Ref EC-076).</p>
448	EC-083	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Black Swift is COSWEIC assessed as Endangered and was observed at a station during breeding bird surveys. However, the EIS indicates that no species specific surveys were done due to "no suitable breeding habitat...in the LSA"	<p>ECCC-Wildlife-IR-21: ECCC requests the inclusion of black swift surveys following ECCC's standard advice on Black Swifts (Refer to Attachment 4: Black Swift – baseline survey protocol and effects assessment for Environmental Assessment).</p> <p>ECCC requests the inclusion of further baseline surveys for Black Swift in the Project area following RISC protocols ("Inventory Methods for Swallows and Swifts (Version 2.0)" and attached Memo on Black Swift Protocol (Attachment 4).</p> <p>These surveys may be guided by habitat suitability modeling in the project area.</p> <p>ECCC recommends that if Black Swift is observed during surveys then it should be included in the effects assessment and mitigation measures be provided to address effects.</p>	<p>The overall purpose of the baseline wildlife field surveys was to assess species presence and habitat use in the Terrestrial LSA. Surveys for breeding birds were completed as part of the wildlife baseline program (Appendix 5.3-A). The objective of the breeding bird survey was to assess the presence and distribution of resident and neotropical migrant bird species in the LSA, with a focus on species at risk. Breeding bird surveys were conducted according to standard technical procedures for point count survey methods outlined in "Inventory Methods for Forest and Grassland Songbirds" (RIC 1999). Barn swallow (<i>Hirundo rustica</i>) was recorded during breeding bird surveys and confirmed to be present in the Terrestrial LSA. Common nighthawk was not recorded during breeding bird surveys but was recorded incidentally. Habitat suitability index modeling predicted a very small proportion of suitable habitat in the Project area (2% (1 ha) loss of moderately suitable common nighthawk breeding habitat). The purpose of species-specific surveys would be to confirm presence on site and this was established during breeding bird surveys for barn swallow and common nighthawk. Short-eared owls (<i>Asio flammeus</i>) nest in open habitat supporting year-round populations of cyclic small mammals (Wiggins et al. 2006). However, potential habitat is not known to be present in the Proposed Project area based on mapping by the BC Ministry of Environment (Cooper and Beauchesne 2004). Short-eared owl are not expected to occur in the Project area. Therefore, species-specific surveys are not considered necessary for barn swallow, common nighthawk or short-eared owl.</p>
449	EC-084	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Marbled Murrelet surveys were only conducted twice in a one year period (May and June 2012) and only repeated twice at two out of four observation stations. The observation stations from Figure 4 ("Marbled Murrelet Survey Locations, 2012") do not fully encompass the LSA; specifically, marine areas that Marbled Murrelet may use to forage, or the forested areas used for movement are not included.</p> <p>ECCC notes that many sections of the LSA have not been surveyed, including the existing infrastructure in the southwest portion, proposed marine portion of the Project, and proposed Project area in the central portion though construction and operation activities are proposed in these areas.</p> <p>This sampling does not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential impacts of the Project on Marbled Murrelet.</p> <p>ECCC notes that the federal recovery strategy for Marbled Murrelet can be accessed here: http://sararegistry.gc.ca/document/default_e.cfm?documentID=1290.</p>	<p>ECCC-Wildlife-IR-22: ECCC recommends that the Proponent provide information collected from conducting surveys over 5-10 years, incorporating 2 surveys per month (during the breeding season) each year at the same survey locations to account for natural and contemporary inter-annual variation and maximize detectability within the LSA.</p> <p>If Marbled Murrelet is observed during surveys, then it should be included in the effects assessment and mitigation measures be provided to address effects.</p>	<p>Please see response to ECCC-Wildlife-IR-16 (Ref EC-078). Marine habitat for marine birds, including marbled murrelet, was assessed in Section 5.2 of the EAC Application/EIS (Marine Resources).</p>

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450	EC-085	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Three species of bat were stated to have the potential to occur in the LSA. Two of the species are considered species at risk under SARA (Keen's Long-eared Myotis is identified as 'Data Deficient' in the baseline but is included in Schedule 3 of SARA as Special Concern, and Little Brown Myotis is listed as endangered on Schedule 1 of SARA). However, no bat surveys were conducted specific to these two bat species.	<p>ECCC-Wildlife-IR-23 (Ref CEAA-IR-24): ECCC recommends that Keen's Long-eared Myotis SARA status be updated to Special Concern (Schedule 3) in Table 27.</p> <p>ECCC recommends that baseline studies be conducted for bat species at risk that include both desktop surveys (see, for example, Bat Acoustic Monitoring Portal http://databasin.org/groups/59d81a3951fd4915909efacbe2317efb) and field surveys. ECCC recommends that field surveys employing methodologies such as radio telemetry, visual surveys, and acoustic monitoring should be evaluated for use in acquiring baseline information, including locations of hibernacula and maternity roosting sites. ECCC suggests referring to provincial inventory standards, published methodologies, and provincial best management practices for guidance on surveying methodologies. ECCC advises that acoustic bat surveys alone are insufficient in determining the presence and location of hibernacula and roosting sites for bats.</p> <p>ECCC recommends that bat surveys be conducted for more than one year to account for inter-annual variation, as well as survey and potential weather limitations. (See Loeb et al. 2015, Holroyd and Craig 2016).</p> <p>ECCC recommends that any species observed during surveys be included in the effects assessment and mitigation measures be provided to address effects.</p> <p>References: Loeb, S.C., Rodhouse, T.J., Ellison, L.E., Lausen, C.L., Reichard, J.D., Irvine, K.M., Ingersoll, T.E., Coleman, J.T., Thogmartin, W.E., Sauer, J.R. and Francis, C.M., 2015. A plan for the North American bat monitoring program (NABat).</p> <p>Holroyd, S.L., and V.J. Craig. 2016. Best Management Practices for Bats in British Columbia, Chapter 2: Mine Developments and Inactive Mine Habitats. B.C. Ministry of Environment, Victoria, BC. 60pp.</p>	<p>Range maps, habitat preferences, and professional judgement were used to determine which federally listed bat species at risk may occur in the Project area. Keen's long-eared myotis (<i>Myotis keenii</i>) and little brown myotis (<i>Myotis lucifugus</i>) have ranges that overlap with the Terrestrial LSA and are federally listed SAR (Table 26, App 5.3-A, Vol 4, Sec G). Old-growth forests contain a combination of habitat features used for foraging by bats that are not found in younger forested habitats (Thomas 1988; Crampton and Barclay 1998). The primary foraging habitat for Keen's long-eared myotis and little brown myotis in the Terrestrial LSA is likely to be limited to the beaver impoundment and riparian forest associated with McNab Creek and the older shoreline habitat in the Terrestrial LSA. Conversely, areas of clearcuts and regenerating forests are not expected to provide significant foraging habitats for these bats. Field surveys studying bat activity in foraging habitats would not likely help inform the impact assessment because no old-growth forest will be removed during Proposed Project construction or operation. Therefore, no Proposed Project effects to foraging habitat are expected.</p> <p>Keen's long-eared myotis and little brown myotis are potential rock and tree roosters (Nargorsen and Brigham 1993; COSEWIC 2003; Evelyn et al. 2004). No exposed talus or bedrock occurs in the LSA and potential roosting is limited to old-growth forests, which are likely to contain tree cavities and/or exfoliating bark. Old growth forest (i.e., vegetation units with forest stands >250 years old) does not occur in the Terrestrial LSA as the majority of the Terrestrial LSA is in various stages of regeneration following logging (App 5.3-B, Vol 4, Sec G). Therefore, roosting habitat is not expected to occur in the Terrestrial LSA and dedicated field surveys would likely not be informative.</p> <p>Of the few known hibernacula on the BC Coast, none are located in the Terrestrial RSA because mine workings, cave features, marble deposits, karst features, and tall rock faces with deep fissures are not known to occur in the Terrestrial LSA (Government of BC 2015). Although hibernation may also occur in broken rock and under root wads (Blejwas 2015, pers. comm.), the Terrestrial LSA is expected to be too warm to facilitate hibernation. A study of bat hibernacula at Haida Gwaii found that sea level caves and mines were unoccupied by bats and had warmer temperatures than are likely to be preferred for hibernation (Burler 2015, pers. comm). Therefore, dedicated surveys to locate bat hibernacula will not be necessary because suitable features for bat hibernacula and suitable temperatures for hibernation are not likely to be present in the Terrestrial LSA.</p> <p>Bat surveys are not considered necessary because Proposed Project effects to foraging habitat, roosting or hibernation habitat for bats are not expected.</p>
451	EC-086	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	In the EIS, all mitigation measures are anticipated to be effective, but ECCC notes that the issues with baseline data raised in the IRs above indicate that this prediction may need to be reassessed.	<p>ECCC-Wildlife-IR-24: ECCC recommends reassessing the identified mitigation measures after more accurate baseline data has been collected for VCs and species at risk.</p>	<p>As described in 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065, and in response to CEAA-212, 216, 217, 218, and EC-076 and 080, baseline data collection is considered appropriate for describing baseline conditions for wildlife and informing the effects assessment on wildlife. Mitigation measures and wildlife monitoring to evaluate the effectiveness of those mitigation measures will be refined and described further in the Wildlife Protection Plan. The data collected during wildlife monitoring will be used to regularly evaluate and, where appropriate, update the wildlife monitoring plan and mitigation measures (i.e., adaptive management).</p>
452	EC-087	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>ECCC's focus when reviewing Emergency Response Plans and Spill Contingency Plans and generating comments and recommendations to proponents is from the perspective of ensuring, to the extent possible, that all matters and issues pertaining to the Department's mandate under the Canadian Environmental Protection Act, 1999, (CEPA), the Migratory Birds Convention Act, 1994, and the pollution prevention provisions of the Fisheries Act are considered and addressed via preventative and mitigative measures. The feedback that ECCC provides to proponents is also based on any hazard assessment analyses (physical, environmental, and human health and life) if available, and whenever relevant to the subject project.</p> <p>Based on the above, ECCC requests further information regarding potential environmental effects as a result of accidents and malfunctions related to marine transportation (see Annex 2, IR ECCC-EED1).</p> <p>ECCC requests further information regarding the Risk Rating Matrix used to inform the "Significance Analysis of Residual Effects (see Annex 2, IR ECCC-EED2).</p>	<p>ECCC-EE-1: Assessment of Risk and Environmental Effects ECCC encourages proponents to demonstrate, in their Environmental Impact Statement, how they have evaluated the risk of environmental effects arising from the project and what actions they would undertake to remediate spill-affected lands and waters. This is a longer term specialist task that could be partially accomplished during the environmental assessment phase through close coordination with environmental agencies and the expert community of environmental consultants and academia.</p> <p>While conducting the hazard identification and risk assessment, ECCC would ask that the proponent also consider contributing and/or complicating factors. These factors may pose unintentional or unplanned risk to a facility or process and may include external hazards such as severe meteorological events or other physical hazards which may have the potential to affect the integrity of project infrastructure or activities.</p> <p>Development of Environmental Management and Safety Management Systems ECCC recommends that proponents assume that worst-case accident and malfunction scenarios are not only possible, but rather are likely to occur during the lifespan of the project, and that contingency plans and response capabilities be developed accordingly. ECCC recommends that proponents commit to developing and adhering to Environmental Management and Safety Management Systems that include Emergency Response Plans (based on CSA Standard CAN/CSA Z731-03 (R2009) Emergency Preparedness and Response) detailing all relevant roles and responsibilities of their response personnel. ECCC encourages proponents to prepare Emergency Response Plans and Spill Contingency Plans that reflect a consideration of potential accidents and malfunctions and that take into account site-specific conditions and sensitivities. The Canadian Standards Association publication, Emergency Preparedness and Response, CAN/CSA-Z731-03, is a useful reference for this.</p> <p>ECCC encourages proponents to demonstrate, in their environmental assessment submission, which actions they would undertake and what equipment they would deploy to respond to spills. This would include showing a commitment to develop partnerships within industry sectors for mutual aid, and to practice and train with local emergency responders such as fire and public safety officials.</p>	<p>The methods for assessing the potential effects relating to accidents and malfunctions are consistent with those provided in Volume 2, Part B - Section 4.0. The assessment of risk and environmental effects is provided in each of the relevant VC sections as referenced in Table 15-5. The evaluation of confidence and risk is outlined in Section 4.5.4. Action that would be taken in the event of a spill or release is outlined in the Spill Prevention and Emergency Response Plan which will be further detailed and developed in consultation with ECCC, First Nations and other relevant regulatory agencies. This includes but is not limited to:</p> <ul style="list-style-type: none"> - All accidents, spills, and near-misses will be reported and recorded in the Proposed Project database. A formal investigation will be conducted, if necessary, to determine causes of an accident and adequate resources will be allocated to conduct the investigation. - Implementation of Shoreline Cleanup and Assessment Technique (SCAT) survey in the event of a spill, if deemed necessary. - In a case of a spill of a toxic or deleterious material, all efforts will be made to contain and recover the substance and act according to the plan and procedures that will encompass different scenarios of potential spills. The level of response will depend on the circumstances of the spill. - In a case of reportable spill, the closest Canadian Coast Guard Station (1-800-889-8852) or Emergency Coordination Centre (1-800-OILS-911) will be contacted. The spill contingency plan will list the amounts and types of reportable substances as defined by the Spill Reporting Regulation under the Environmental Management Act. <p>Contributing and/or complicating factors were considered part of the accidents and malfunctions assessment. These were described as 'worst-case scenarios' in the effects assessment (Volume 2, Part B - Section 5.1 through Section 9.2) which considered the following contributing and/or complicating factors (but not limited to):</p> <ul style="list-style-type: none"> - amount of material to be spilled/released (e.g., max possible amount) - location of material to be spilled/released (e.g. into sensitive area) - weather conditions (e.g., high winds/waves) <p>An outline of the mitigation measures that will be undertaken for land and marine based spills is provided in the Spill Prevention and Emergency Response Plan (SERP) and the Emergency Response Plan (ERP) provided in Volume 3, Part E - Section 16.0. The SERP will be developed and implemented in accordance with the requirements and provisions of the applicable regulations including:</p> <ul style="list-style-type: none"> - the BC Environmental Management Act (2003); - Navigation Protection Act (1985); - Fisheries Act (1985);
453	EC-088	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Greenhouse Gases - potential effects of pollutants of concern identified under Canadian Environmental Protection Act, 1999, (CEPA) - Schedule 1	<p>ECCC-AQ-1: Site-specific plans should be developed and implemented to minimize releases of greenhouse gases.</p> <p>Plans should describe:</p> <ul style="list-style-type: none"> - potential sources of releases of greenhouse gases; - factors that may influence releases of greenhouse gases; - measures to minimize releases of greenhouse gases; - monitoring and reporting programs for releases of greenhouse gases; - mechanisms to incorporate the results of monitoring programs into further improvements to measures to minimize releases; and - mechanisms to periodically update the plans. 	<p>Chapter 5.7 of the EAC Application/EIS outlines the potential sources of GHG, factors that influence GHG emissions and mitigation measures.</p> <p>The Project is an aggregate facility with limited direct GHG emission sources related to welding activities and a small number (seven) of vehicles. Measures to monitor and report GHGs will be incorporated into the facility environmental management program.</p> <p>Total direct GHG emissions from the facility is anticipated to be in the order of 2,000 tonnes (Table 5.8-10) which is well below the BC provincial (10,000 tonnes CO₂e) and federal (50,000 tonne CO₂e) reporting program thresholds.</p>

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454	EC-089	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Air Pollutants -potential adverse effects of pollutants of concern identified under the Canadian Environmental Protection Act, 1999, Schedule 1 (CEPA).</p> <p>CEPA provides the Government of Canada with tools to protect the environment and human health and establishes strict deadlines for controlling certain toxic substances.</p> <p>A key aspect of CEPA is the prevention and management of risks posed by toxic and other harmful substances. Substances that are declared "toxic" under CEPA are added to the List of Toxic Substances in Schedule 1 of the Act. CEPA regulates many of the substances that have a deleterious effect on the environment.</p> <p>Transboundary Air Quality: potential adverse effects of transboundary air pollution under Article V of the 1991 Canada/US Air Quality Agreement.</p>	<p>ECCC-AQ-2: Site-specific plans should be developed and implemented to minimize releases of particulate matter. These plans should describe:</p> <ul style="list-style-type: none"> - potential sources of releases of airborne particulate matter, including specific activities and specific components of mine infrastructure; - factors that may influence releases of airborne particulate matter, including climate and wind; - potential risks to the environment and human health from releases of airborne particulate matter; - measures to minimize releases of airborne particulate matter from the sources identified; - monitoring programs for local weather, for consideration in the ongoing management of releases of airborne particulate matter; - monitoring and reporting programs for releases of airborne particulate matter and for environmental impacts of releases; - mechanisms to incorporate the results of monitoring programs into further improvements to measures to minimize releases; and - mechanisms to periodically update the plans. 	<p>Within Section 5.7.6 of the EAC Application/EIS the Project Proponent has committed to developing an Air Quality and Dust Control Management Plan. In addition, establishment of an air quality and meteorological monitoring program has been identified as a specific commitment within Section 5.7.</p>
455	EC-090	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Migratory Birds, and Migratory Birds Convention Act, 1994 (MBCA)</p>	<p>ECCC-CWS-1: The purpose of the MBCA is to implement the Migratory Birds Convention between Canada and the United States by protecting and conserving migratory birds, as populations and individuals. It is the responsibility of the Federal Government of Canada to protect and conserve the roughly 500 species of migratory birds regularly occurring in Canada. ECCC Canadian Wildlife Service provides the list of bird species protected under the MBCA, which derives from Article I of the Convention. This list includes all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds and most landbirds (birds with principally terrestrial life cycles).</p> <p>Section 5.1 of the MBCA prohibits the deposit of a substance that is harmful to migratory birds in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. The Act prohibits the possession of a migratory bird, nest or egg without lawful excuse. The Migratory Birds Regulations (MBR) provide for the conservation of migratory birds and for the protection of individuals, their nests and eggs. A prohibition against hunting is set out in section 5 of the MBR. The term "hunt" is given a specific definition in section 2 of the Regulations and includes attempting in any manner to kill, injure or harass migratory birds. A prohibition against the disturbance, destruction, or taking of a nest, egg or nest shelter of a migratory bird is set out in subsection 6(a) of the MBR.</p> <p>Avoiding of Detrimental Effects to Migratory Birds (Incidental Take): Migratory birds, the nests of migratory birds and/or their eggs can be inadvertently harmed or disturbed as a result of many activities—including but not limited to clearing trees and other vegetation, draining or flooding land, or using fishing gear. This inadvertent harming, killing, disturbance or destruction of migratory birds, nests and eggs is known as incidental take and is prohibited under the MBCA. Incidental take, in addition to harming individual birds, nests or eggs, can have long-term consequences for migratory bird populations in Canada, especially through the cumulative effects of many different incidents. For further details, please refer to the Avoidance of Detrimental Effects to Migratory Birds (Incidental Take) website at: http://ec.gc.ca/paom-itmb/default.asp?lang=En&n=C51C415F-1</p> <p>Endangered and threatened migratory bird Species at Risk (species, subspecies, and distinct populations) also have federal legislative protection under the Species at Risk Act (SARA).</p>	<p>BURNCO acknowledges the purpose of the Migratory Birds Convention Act is to protect various species of migratory game birds, migratory insectivorous birds, migratory non-game birds and the nests of migratory birds (Government of Canada 1994). BURNCO will implement appropriate mitigation measures to reduce the likelihood of incidental take to migratory birds, such as through vegetation clearing or a release of a deleterious substance to the environment (Sec 5.3.1.5.4, Vol 2). Clearing will be avoided, when possible, during the migratory bird nesting season (i.e., March 26th to August 16th in nesting zone A1) as outlined by Environment Canada (2016). Appropriate mitigation measures will be applied to reduce incidental take during the migratory bird window.</p>
456	EC-091	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Species at Risk and Species at Risk Act (SARA)</p>	<p>ECCC-CWS-2: The purposes of the SARA are to prevent wildlife species from being extirpated or becoming extinct, to provide for the recovery of wildlife species that are extirpated, endangered or threatened as a result of human activity, and to manage species of Special Concern to prevent them from becoming endangered or threatened. SARA supports the federal commitments under the 1996 Accord for the Protection of Species at Risk, which outlines commitments by federal, provincial and territorial ministers to designate Species at Risk, protect their habitats and develop recovery plans as well as complementary legislation, regulations, policies and programs, including stewardship.</p> <p>ECCC has responsibilities for overall administration of SARA (subsection. 8(1)). As well, SARA defines "competent ministers" as the Minister responsible for the Parks Canada Agency (PCA) (with respect to individuals* of a wildlife species in or on federal lands administered by that Agency); the Minister of Fisheries and Oceans (with respect to aquatic species other than individuals on lands administered by the PCA); and, the Minister of the Environment and Climate Change (with respect to all other individuals of a wildlife species). Competent ministers have responsibilities regarding recovery planning, protection, permitting, and other activities identified within the legislation.</p> <p>SARA sets out a process for an independent assessment of species potentially at risk and for their consideration by Governor in Council for listing on Schedule 1 of SARA as extirpated, endangered, threatened, or of special concern. SARA requires that recovery strategies and action plans be developed by the competent minister for species listed as extirpated, endangered or threatened. Management plans must be developed for species of special concern.</p> <p>SARA also provides measures for the protection of listed threatened, endangered or extirpated species and their residences. Under section 32 and 33 of SARA, individuals and residences of aquatic species and birds protected by the MBCA are automatically protected anywhere they are found in Canada. These general prohibitions apply to all other extirpated, endangered or threatened species listed on Schedule 1 of SARA when they are on federal lands in the provinces and on land under the authority of the Minister of the Environment and Climate Change or the Parks Canada Agency in the territories. These prohibitions can also apply on non-federal (provincial, territorial and private) lands if the Governor in Council makes an order to that effect, based on a recommendation from the federal Minister of the Environment (SARA s. 34 and s. 35).</p>	<p>Critical habitat within the Terrestrial LSA is limited to marbled murrelet. The proposed Recovery Strategy for Marbled Murrelets in Canada has mapped critical marbled murrelet habitat in the Southern Mainland Coast (Environment Canada 2014). A total of 46.5 ha of marbled murrelet terrestrial critical habitat is present in the Terrestrial LSA and was included in the effects assessment for the species (Vol 2, Sec 5.3). This is consistent with the geospatial file obtained from the Environment Canada reference provided in Comment CEAA-214. Critical nesting habitat has been identified within the Terrestrial LSA but not within the Proposed Project Area, and therefore no direct loss of critical marbled murrelet nesting habitat is expected. Marbled murrelet surveys were conducted according to protocols outlined in the "Inventory Methods for Marbled Murrelets in Marine and Terrestrial Habitats" (RIC 2001) during the breeding season. Marbled murrelet was not recorded during species-specific field surveys and are not expected to breed in the Project area. Potential nesting habitat is available outside the Project area in mature riparian forest along McNab Creek and tributaries, as well as mature foreshore coastal rainforest along the southern boundary of the Terrestrial LSA (App 5.3-A, Vol 4, Part G). Potentially suitable for marbled murrelet is not present in the Project area. Critical marine habitat has not yet been identified (Environment Canada 2014).</p>

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457	EC-092	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Breeding bird surveys	<p>ECCC-CWS-4: For all migratory bird species (including federally-assessed and –listed Species at Risk) that the Project may impact, ECCC recommends that:</p> <ul style="list-style-type: none"> - Project effects be identified and assessed, and mitigation and monitoring plans be provided; - If a species is not identified, surveyed, and assessed as part of the Application, that a clear justification be provided; - Migratory bird survey data be evaluated in relation to habitat use, specifically: species abundance, distribution, and density in each habitat of the Project area, including the marine areas; and - Surveys be conducted in all seasons, including the winter months, in order to collect accurate baseline data <p>Please see Annex II for specific IRs related to the above.</p>	<p>Terrestrial Wildlife VCs band-tailed pigeon, common nighthawk, northern goshawk, and western screech-owl were selected as focal-species for migratory birds occurring in the different habitat types in the Terrestrial LSA. Project effects to migratory bird species were considered in the EA for the aforementioned avian VCs and included a quantitative assessment of changes to nesting habitat through habitat loss and a qualitative assessment of changes to abundance and density through barriers to movement and changes in mortality (Section 5.3.1.5.3). Mitigation measures to minimize Potential Project effects on avifauna are outlined in Section 5.3.1.5.4. Mitigation and monitoring measures for avian species will be described in detail in the Wildlife Protection Plan.</p> <p>Rationale for the selection of VCs using a focal species approach is provided in the Valued Component Selection Document and described further in Technical Memorandum #. The rationale for substituting black swift (<i>Cypseloides niger</i>), olive-sided flycatcher, great blue heron and barn swallow with selected VCs is also described in 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065.</p> <p>Migratory bird survey data were described in terms of habitat use, species richness, species abundance and distribution (App 5.3-B, Vol 4, Sec G). Breeding bird survey methods and results are described further in response to EC-076 and App 5.3-B, Vol 4, Sec G. Marine bird survey methods and results are described further in App 5.2-A, Vol 4, Sec G.</p> <p>Bird surveys were conducted during the breeding season, as this is when the majority of songbird species are vocalizing. Winter surveys can be useful for some avian species (RIC 1999). However, RIC (1999) recommends conducting bird surveys during the breeding season. The majority of migratory bird species that may utilize the Terrestrial LSA and interact with the Proposed Project are not present during the winter months and overwintering species are typically not vocalizing and are more mobile compared to the breeding season. Breeding bird surveys were conducted according to standard technical procedures for point count survey methods outlined in "Inventory Methods for Forest and Grassland Songbirds" (RIC 1999). Breeding bird surveys are consistent with the level of care normally exercised by environmental professionals currently practicing under similar conditions in British Columbia.</p>
458	EC-093	3-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	Disposal at sea information if/as applicable to the Project	<p>ECCC-MP-1: CEPA prohibits the disposal of wastes and other matter at sea within Canadian jurisdiction and by Canadian ships in international waters and waters under foreign jurisdiction, unless the disposal is done under a permit issued by the Minister.</p> <p>ECCC regulates disposal at sea (DAS) under CEPA with the objective of protecting the marine environment. Regulated aspects of disposal at sea include the loading of material for disposal, the transport of that material to a disposal site and the disposal itself. The permit system allows Canada to meet its international obligations under the London Convention, 1972 and the 1996 Protocol to the Convention.</p> <p>Only material listed in Schedule 5 of CEPA may be considered for DAS under permit. A proposal to dispose of waste material at sea will only be considered for approval under CEPA if it is the environmentally and technically preferable means of managing that material. Meeting this requirement generally necessitates the conduct of a waste prevention audit and an alternatives assessment of waste management options (e.g. re-use, on-land disposal) including alternative DAS sites.</p> <p>Guidance related to the preparation and review of permit applications is accessible at http://www.ec.gc.ca/iem-das/Default.asp?lang=En&n=0047B595-1. This guidance highlights the need to ensure potential environmental impacts on values such as fish and fish habitat, and other users of the sea, are taken into account and addressed.</p> <p>There are three regulations that further govern requirements for DAS permitting:</p> <ul style="list-style-type: none"> - The Regulations Respecting Applications for Permits for Disposal at Sea, under CEPA, set out the application form and information requirements for submitting a permit application; - The Ocean Dumping Permit Fee Regulations (site monitoring), under the Financial Administration Act, set out the permit fee for dredged and excavated materials; - The Disposal at Sea Regulations (http://laws-lois.justice.gc.ca/eng/regulations/SOR-2001-275/FullText.html), under CEPA, set out the reporting requirements for emergency dumping incidents and the action list for screening of dredged and excavated material. 	<p>BURNCO understands that a Disposal at Sea (DAS) Permit would be required for the disposal of waste material at sea. No disposal at sea requirements are anticipated or proposed.</p>

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459	EC-094	11-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>The proponent used the Maximum Authorized Monthly Mean TSS Concentration from Schedule 4 of MMR, 15 mg/L, in water quality modeling (Appendix 5.5-D, pg 12/22), rather than TSS data collected at the site of the proposed project.</p> <p>In order to accurately assess the effects of the project, site-specific TSS baseline measurements should be used in water quality modelling.</p>	<p>ECCEC-WQ-IR-1 (Ref CEAA-IR-26): ECCEC recommends that the proponent update water quality modelling with site-specific TSS concentrations, and provide rationale for the revised TSS concentrations selected.</p>	<p>The pit lake will be a deep waterbody with a relatively long residence time that will allow for settling of TSS and associated metals. Empirical evidence from similar sites has confirmed this assumption. Therefore, total suspended solids (TSS) was not modelled in the water quality model. The water quality model predicts dissolved and total metal concentrations based on inputs derived from monitoring data and geochemical testing. For natural runoff to the pit lake (water quality inputs C1 and C2) and baseline flow in Mc Nab Creek (water quality inputs C9 and C11), input water qualities were based on baseline data. These baseline data included measurements of total metals which were used to calculate median and 95th percentile input concentrations. Groundwater inflow to the lake (water quality inputs C5, C6, C7) was assumed to carry no particulate load as the flow gradient is not predicted to be sufficient to transport particulate material.</p> <p>The input water quality for runoff and seepage from the separated fines to be stored north of the pit (water quality inputs C3a/b and C8a/b) were derived from shake flask extraction (SFE) results for the fines material. These results did not include measurements for total metals. Therefore, an empirical particulate concentration for each metal was calculated using elemental analysis results for the fines material and assuming a TSS concentration of 15 mg/L. This TSS concentration corresponds to the Maximum Authorized Monthly Mean Concentration in Schedule 4 of the Metal Mining Effluent Regulations (MMER 2014). This assumption is conservative as baseline water quality measurements at the Project are all below detection (< 0.5 to < 2.0 mg/L).</p> <p>Studies at other pit lakes (Beddoes et al. 2016, Vandenberg et al. 2016) indicate that total metal concentrations can be expected to decrease as particulate metals settle in the pit lake and that TSS will be well below 15 mg/L. The pit lake at the proposed Project will be predominantly filled with low-TSS groundwater, relative to the pit lake referenced in Vandenberg et al. (2016), which was filled with high-TSS tailings slurry. In the high-TSS system discussed in Vandenberg et al. (2016), total metal concentrations decreased rapidly owing to particulate settling; after one year of monitoring, the TSS in the pit lake is at or below detection limits.</p> <p>The predicted total metal concentrations in the pit lake are thought to be conservative as the model assumes no settling of suspended material will occur. During the pit lake filling and initial discharge period, monitoring will be conducted to confirm this assumption.</p> <p>References: Beddoes, P., and M. Herrell, J. Vandenberg, J. Richards, R. Millar, K. McMahan. 2016. Validation of Springer Pit Lake Water Balance and Water Quality Model, Mount Polley Mine, British Columbia, Canada. Mining Meets Water – Conflicts and Solutions. Proceedings of the 2016 IMWA</p>
460	EC-094.1	11-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Following a teleconference with CEA Agency and Environmental Canada on 02-Dec-2016, BURNCO understands ECCEC's information request to be related to potential changes in TSS levels in McNab Creek.</p>	<p>What changes in TSS levels in McNab Creek will result from Project-related increases in McNab Creek baseflows?</p>	<p>The upper portion of the existing constructed groundwater-fed channel (WC2 Phase 3, constructed 2001-2003) that runs through the Site acts as a "French drain" that draws water from McNab Creek and the surrounding area and lowers the overall level of the water table within the Site. In the first year of mining, the portion of WC2 Phase 3 within the aggregate pit area will be de-activated by constructing a plug immediately downgradient of the pit. This will enable the pit lake groundwater recharge to re-establish and maintain pre-WC2 Phase 3 groundwater levels. The increase in groundwater levels relative to existing conditions will result in a reduction in the rate of flow from McNab Creek to the groundwater system in the reach adjacent to the northern and eastern site boundaries. That is to say, the predicted increase in baseflows in McNab Creek is related to a reduction in the loss of flows from McNab Creek rather than a flow from the Site into McNab Creek. It is not anticipated that this increase in baseflows in McNab Creek will have an effect on TSS in McNab Creek.</p>
461	EC-095	11-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Marine habitat should be mapped using direct observations of the habitat type, rather than mapping substrate types and making assumptions about the resulting habitat.</p>	<p>ECCEC-WQ-IR-2 (Ref CEAA-IR-12): ECCEC recommends the proponent update marine habitat maps to be based on direct observation of habitat types (found in Appendix 5.2, Tables 11-13), and benthic invertebrate infauna groups (found in Appendix 5.2, Table 20).</p>	<p>Habitats are defined as spatially recognizable areas where the physical, chemical and biological environment is distinctly different from surrounding environments. The proposed classification of marine benthic habitats for the BURNCO Project was based on a combination of physical, chemical and biological data collected through integrated geophysical surveys, and quantitative biophysical sampling (including underwater video and dive surveys, and sediment / benthic infaunal sampling). The approach applied for the BURNCO Project was in alignment with established standards for classification of marine intertidal and subtidal habitats (Robinson and Levings 1995; Allee et al. 2000; Valentine et al. 2005). Results from quantitative biological sampling conducted in the marine resources LSA were directly correlated with physical habitat features in the LSA including substrate type and depth. These results are presented in the marine resources technical baseline report (Volume 4, Part G – Section 22.0, Appendix 5.2-A). Specifically, refer to Table 14 for a detailed description of habitat types based on both physical and biological data collected in the LSA. Figure 34 through 36 provide detailed cross shore profiles that identify physical and biological features associated with each habitat type. Detailed intertidal and subtidal mapping of the different habitat types in the LSA is provided in Figure 36. We acknowledge that the naming convention applied for the various habitat types is potentially misleading given it uses a physical descriptor in the name of the actual habitat category (e.g. hard bottom, soft bottom, log / woody debris), which perhaps suggests that biological considerations were not included in habitat classification. This is not the case – the habitat classification system applied also accounts for spatial variation in biological community composition and species occurrences (marine flora and fauna).</p> <p>REFERENCES</p> <p>Allee, R. J., M. Dethier, D. Brown, L. Deegan, R. G. Ford, T. F. Hourigan, J. Maragos, C. Schoch, K. Sealey, R. Twilley, M. P. Weinstein, and M. Yoklavich. 2000. Marine and estuarine ecosystem and habitat classification. NOAA Technical Memorandum NMFS-F/SPO- 43. Available: www.nmfs.noaa.gov/habitat/ecosystem/habitat_docs/habitatclassdoc.pdf (February 2005).</p> <p>Robinson, CALK. and C.D. Levings. 1995. An overview of Habitat Classification Systems, Ecological Models, and Geographic Information Systems Applied to Shallow Foreshore Marine Habitats. Can. Manusc. Rep. Fish. Aquatic. Sciences: 2322: 65 p.</p> <p>Valentine, P.C., B.J. Todd and V.E. Kostylev, V.E. 2005. Classification of Marine Sublittoral Habitats, with Application to the Northeastern North America Region. American Fisheries Society Symposium 41:183-200.</p>
462	EC-096	11-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	<p>Chapman Creek records are used to establish the McNab Creek streamflow baseline. The proponent rationalizes that flows in Chapman Creek can be considered representative of flows in McNab Creek, because the McNab Creek flow monitoring station and the Chapman Creek hydrometric station have similar trends.</p> <p>Data from the McNab Creek monitoring station was collected during the period of Nov. 2011-Nov. 2012.</p> <p>Regional streamflow data from the Chapman Creek monitoring station was available for the period of 1970-1988.</p>	<p>ECCEC-WQ-IR-3 (Ref CEAA-IR-25): Given the temporal variation between the two data sets, ECCEC requests a rationale for why the comparison of these data sets is appropriate, and how the proponent can be confident that Chapman Creek streamflow baseline is representative of McNab Creek streamflow baseline.</p> <p>Without a viable explanation, streamflow baseline trends are required from McNab Creek itself.</p>	<p>The McNab and the Chapman Creek watersheds are in the same hydrologic zone, approximately 20 kilometers away, have comparable watershed average elevations and similar watershed areas. The estimation of extreme low flow conditions in McNab Creek based on long term data recorded at the Chapman Creek was considered to provide a more appropriate basis for analysis than the relatively short term recorded at McNab Creek.</p>

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463	EC-097	11-Oct-16	June Yoo Rifkin, Environment and Climate Change Canada	On pages 5.5-18 and 5.5-19 (Section 5.5), the proponent states that Port Mellon Station records are used to derive site-specific climate baseline parameter characterizations. Site-specific characterizations are provided in Appendix 5.5 for average, mean maximum and mean minimum monthly temperatures. However characterizations are missing for annual, seasonal (wet dry) and monthly precipitation; 200-year return period extreme high precipitation for various durations; and average monthly and annual evapotranspiration and evaporation.	ECCC-WQ-IR-4: ECCC recommends that the proponent provide site-specific estimates for all parameters listed on pages 5.5-18 and 5.5-19.	All of the requested data are provided in the Surface Water Hydrological Baseline Report which is included in Part G, Section 22, Appendix 5.5-A of the EAC Application/EIS.
738	EC-094.2	29-May-17	Environment and Climate Change Canada		The response does not answer the IR. Based on the December 2, 2016 conference call, ECCC understood that the Proponent would look at the flow data again to include McNab Creek in the modeling to answer the IR.	It was unclear that ECCC-WQ-IR-1 (Ref CEAA-IR-26, EC-094) was referring to TSS concentrations in McNab Creek since the section referenced is related to stored fines runoff and seepage that reports to the Pit Lake. The concern as originally understood was presented the 22-Dec-2016 response to EC-094. ECCC's concern was clarified during a 02-Dec-2016 conference call and the clarification was added to the Issues Tracking table as EC-094.1. A further clarification of the response to EC-094.1 is presented below in line EC-094.11.
739	EC-094.11	29-May-17	Environment and Climate Change Canada		The response does not answer the IR. On December 2, 2016, ECCC met with Golder Associates and the Agency to discuss TSS in McNab Creek. ECCC noted that an increase in base flow in McNab Creek has the potential to increase peak flow and erosion rates which can lead to higher TSS. ECCC requested that Golder provide an analysis from the data collected in McNab Creek (Appendix 5.5-C) to back up the rationale that there would not be an increase in TSS in McNab Creek. Golder confirmed that they would re-evaluate their response. The response to EC-094.1 does not provide the requested information for ECCC to comment on the accuracy of the assessment of effects of TSS in McNab Creek.	The shape of a channel typically defined by a flow rate with a return period in the range of 1.5 to 2 years. The average annual flow rate in McNab Creek was estimated to be 4.5 m3/s and the 2 year return period flow was estimated at 118 m3/s. The peak predicted change in McNab Creek flow is estimated to be 0.08 m3/s or approximately 2% of the annual average flow and 0.07% of the 2-year flow. It is not anticipated that the predicted change in flow in McNab Creek will have any influence on erosion rates or TSS in McNab Creek. As outlined conceptually in the EAC Application/EIS (Volume 3, Park E), a monitoring strategy will be implemented to verify findings of the effects assessment. A water quality monitoring program is proposed for watercourses downstream of the Project Area, including McNab Creek. A monitoring and reporting schedule is presented in Table 9 of Section 4.1.3.3 of the Water Management Plan (see attached DRAFT Water Management Plan (WMP, dated 07-Apr-2017)). Surface water triggers, responses and the response plan framework are provided in WMP Table 12 and Figure 6.
740	EC-096.1	29-May-17	Environment and Climate Change Canada		The proponent did not provide an estimate of the change in hydrometric profile due the temporal difference (23 years) between Chapman Creek and McNab Creek datasets. The temporal difference cannot account for variations due to effects caused by 2 decades of climate change. ECCC continues to recommend using McNab Creek to estimate streamflow data. Provide an updated response based on discussions regarding using Capilano River, and additional baseline monitoring during construction.	Additional analysis to predict low flow for McNab Creek at the BURNCO Project site using the Box Canyon data for McNab Creek, and correlated with the long term Capilano flow data will be carried out. This analysis will be presented in a separate technical memo prepared as a supplement to the Water Management Plan at permitting. As with the analysis presented in the EA, these data will be used to create a synthetic hydrograph and will be used as a means to quantify a predicted positive effect (i.e., reduction in drought duration). The results of this analysis will in no way influence the assessment of any negative site-specific impacts of the BURNCO Project on McNab Creek including the predicted direction of an effect (positive vs. negative) or the magnitude of the effect (the rate at which water moves from McNab Creek to the groundwater table).

end.