Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
299	CEAA-195	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The creation of an outlet to the pit lake containment berm is not currently planned to occur until closure. At closure, the outlet is designed to connect to WC2 at the head of the proposed offset channel. Changes have recently been made by the Province to the criteria used in classifying berms and dams.	CEAA-IR-1 (Ref DFO-IR-5): Since the containment berm will likely be reclassified as a dam to meet new provincial regulations, provide the location of all outlet and overflow structures to the containment berm. This is required to assess any associated effects to fish and fish habitat.	It is BURNCO's understanding that the containment berm will not be classified as a dam. The location and design of the pit lake outlet structure, that will only become active following operations, is provided in the figures describing the habitat offset channel in Appendix 5.1-B of the EAC Application/EIS (Figures 8 and 10).
300	CEAA-196	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Proposed mitigation includes designing the pit lake in such a way that the lake elevation can be used to manage hydrostatic pressure through the course of operations so that changes to groundwater flow do not lead to a loss of flow within McNab Creek. As well, the elevation of the pit lake will be used to manage baseflows in the groundwater watercourses below pit lake. No outlet / overflow channel is currently planned for the pit lake during operations and lake inflows are groundwater, precipitation, and surface runoff. As such, it is unclear at this time how the lake elevation will be managed.	CEAA-IR-2 (Ref DFO-IR-6): To evaluate the effectiveness of the proposed mitigation, provide details regarding how the elevation of the pit lake will be engineered to manage the groundwater and base flows within McNab Creek (upstream) and the groundwater channels below the pit lake (downstream). Describe how the elevation of the water in the pit lake will be monitored and what hydrological conditions would require active management of the elevation.	Baseflow loss from McNab Creek to the groundwater system is influenced by the gradient between the creek water surface and the groundwater table. Decommissioning the upper segment of the Constructed Groundwater Channel is predicted to result in an increase in the groundwater levels in the area of the pit. This will result in a predicted reduction in the rate of baseflow loss from McNab Creek to the groundwater system. There will be no outlet structure present for the Pit Lake during operation so no active management of the Pit Lake elevation would be practical. Monitoring of the gradient between the water surface of McNab Creek and the groundwater table will be used to adaptively manage the size of the pit area and avoid increasing loss of baseflow from McNab Creek. Once operations finish the outlet structure will be activated and the elevation of the outlet structure will be adjusted to avoid increased baseflow losses from McNab Creek. Surface flows in the groundwater channels below the pit lake will also be monitored and used to refine the elevation of the pit lake outlet. The elevation of the outlet structure will be adjustable through the addition or removal of stop logs. Once set the elevation of the pit lake outlet will passively release water when the lake elevation is above the set elevation.
301	CEAA-197	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Limited information on the groundwater flow patterns around the existing groundwater channels in the foreshore area and in the proposed mitigation area has been provided. The hydraulic properties of the sediments present in the area of the groundwater channels and foreshore below pit lake have not been described. More detailed baseline information and predictions are required to ascertain where the increased groundwater from the pit lake will discharge into the freshwater and marine environments. The EIS predicts an increase in groundwater flow in WC3, WC4, WC5, and in the estuary. The proposed mitigation channel will also rely on groundwater flow. It is not clear where groundwater will leave the ground and enter the watercourses, estuary, and marine environment. A better understanding of where and how the groundwater would flow into the aquatic and marine environments is required to understand mixing with surface water and its potential effects. The source of the groundwater is not understood (from the pit lake or deep groundwater), which can have implications on fish habitat.	CEAA-IR-3 (Related to DFO-IR-7): Provide a description of the location where groundwater will enter each watercourse, the source of the groundwater, its flow volume (current and predicted), wetted area, flow depth, and potential effects on fish and fish habitat, including the effects of temperature changes. The description should include any new watercourses constructed as habitat to offset effects to fish habitat such as the extension to WC2.	Please refer to Section 5.5.5.1.2.1 of Surface Water Resources for a description of the groundwater system and its interaction with baseflows in the streams. The movement and connection of groundwater in relation to surface streams will follow existing patterns that are determined by subsurface conditions. An assessment of existing baseflow conditions and predicted changes to baseflow conditions in terms of changes in wetted area and average flow depth in the potentially affected channels is also provided. Predicted changes to baseflows, wetted areas and average depths for all of the potentially affected streams are provided in Tables 5.5-11 to 5.5-17 of Surface Water Resources. As described in section 5.1.5.2.2.1.3 of Fisheries and Freshwater Habitat, predicted changes on groundwater flows will result in increased baseflows, wetted areas and average depths in McNab Creek, WC 3, WC 3-E, WC 4-E, WC 4-W, and WC 5. These predicted changes are expected to result in increased amounts of available fish habitat in these streams. As can be seen in Table 5.5-11 of the Surface Water Resources there will be a predicted reduction in flow for the lower section of WC2 caused by the loss of surface flow from the upper section of the channel. This loss will be offset by the creation of additional habitat through a 790 m extension of the channel to the west as described in the Fish Habitat Offset Plan (Appendix 5.1-B). While there will be a predicted reduction in surface water input to the lower section of the channel, there will also be a predicted increase in groundwater influx to the lower section of the channel. It is predicted that there will be a 45% increase in year 5 that will continue to increase during operation up to a 110% increase at closure. The substrate of the existing channel is mainly gravel and cobble so it is expected that this increase in groundwater influx will lead to relatively uniform increase in groundwater upwelling into the channel. Salmonids are known to use upwelling zones for spawning so it is expected that an increase in groundwater upwelling will benefit spawning.
302	CEAA-198	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Limited information on seasonal water temperatures have been provided for the fish bearing watercourses downstream of the pit lake. Given the proximity to the pit lake and the groundwater inputs that will likely be sourced from the pit lake, water temperature changes are likely to be higher in the fall and lower in the spring. More detailed baseline information and predictions are required to identify and understand the magnitude of water temperature changes and any potential associated effects to fish and fish habitat including egg to fry survival, growth rates and changes to the aquatic invertebrate and macrophyte communities.	CEAA-IR-4 (Ref DFO-IR-8): Provide current and predicted post operation seasonal water temperatures in WC2, WC3, WC4 and WC5 as well as the proposed mitigation rearing channels. Discuss any potential effects (positive and negative) to the fish communities utilizing the watercourses including any changes to the habitat quality and food availability resulting from potential changes to the benthic macroinvertebrate and macrophyte communities.	The predicted baseflow increases for WC3 , WC4 and WC5 will only involve increases of groundwater influx. These channels currently derive most of their flow from groundwater inputs so there are not expected to be any changes in the average seasonal temperature within these channels. Therefore there are no predicted effects on average temperatures within these channels. WC2 is predicted to receive some surface water directly from the pit lake after operations are completed. Appendix 5.5-B provides a summary of the hydrodynamic modelling assessment conducted for the pit lake outflows. The surface overflow from the pit lake is only expected to occur periodically between October to April. Overflow from the lake will enter the constructed groundwater-fed watercourse (WC 2) through the extension that would be constructed as habitat offsetting for the Project. Monthly average outflow water temperature predictions for the pit lake are provided in Table 5 of Appendix 5.5-B. A review of these temperature predictions indicates that the predicted average outflow temperatures are with in the range of temperatures suitable for salmonids to complete all life history stages.
303	CEAA-199	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Section 5.1 and Appendix 5.1-B of the EIS describes the upper portion of Water Course 2 (WC2) as only containing rearing and overwintering habitat; however, in Appendix 5.1-A, the upper 20% of the channel is described as having "riffle-glide habitat with suitable gravels for spawning salmonids." There are also sections of exposed gravels elsewhere in WC2 that are suitable for spawning. In 2004 and 2012 adult Chum, Coho and Pink salmon were observed spawning in WC2. Cutthroat Trout are also known to spawn in the upper reaches of WC2 but these data have not been provided in the EIS.	CEAA-IR-5 (Ref DFO-IR-1): In order to understand the effects to all life stages of salmon using WC2, provide a characterization of salmon spawning habitat in the upper and lower reaches of WC2. Describe how the loss of this habitat will affect the different salmon populations in WC2 including recruitment to WC2.	Please refer to Section 2.2 of Appendix 5.1-A for fish habitat assessment methods. The upper segment of WC 2 mainly contains rearing habitat for juvenile salmonids and cutthroat trout, with the exception of a segment of riffle habitat near the top of the constructed channel that has exposed gravels and depth suitable for spawning. Approximately 186 m2 of suitable spawning habitat was originally identified in the upper segment of WC 2. This information is provided in Figure 6 of the Fish and Fish Habitat Baseline Report (Appendix 5.1-A). On 13 November 2016, while conducting a spawner survey, observations of available spawning habitat indicated that less than 200m2 of suitable spawning habitat was present in the upper section of WC2.
304	CEAA-200	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The proposed offsetting for the loss of fish habitat within WC2 is to develop rearing and overwintering habitat in the channel downstream of the pit lake. The proposed offsetting channel does not include any spawning habitat. While the plan proposes to use gravel suitable for spawning over 10% of its length there is no commitment to create functional spawning habitat to replace the loss of the spawning habitat in the upper reach of WC2. Offsetting options for the creation of spawning habitat downslope of the pit lake or in adjacent fish bearing watercourses should be considered. If no opportunities exist within or near the local study area, opportunities within the region could also be explored. Changes to the proposed channel design optimizing slopes and groundwater capture to increase velocities and to maximize groundwater upwelling may be beneficial.	CEAA-IR-6 (Ref DFO-IR-3): Provide a conceptual plan to offset effects to fish habitat that includes replacing the loss of spawning habitat in upper WC2.	Please refer to DFO-023 below. The Fish Habitat Offset Plan (Appendix 5.1-B) proposes to create more than 5,000 m2 of additional groundwater-fed channel habitat with approximately a 1:1 ratio of pool to run habitat. The offset channel extension uses the design of the existing lower channel as a template so it is reasonable to expected that approximately 2,500 m2 of the new habitat will have conditions similar to the run habitat present in the existing lower channel where chum salmon where observed to be spawning. As described in section 3.1.3.2 of Appendix 5.1-A the lower section of WC2 consists of low gradient run and pool habitat with exposed gravels present in the runs and fines occurring in the pool areas. The distribution of pool to run habitat is approximately 1:1 along the length of the lower section. During the 13 November 2016 spawner survey more than 4 times as many chum salmon were observed to be spawning in the available run habitat present in the lower section of the channel as compared to the upper section of the channel (Figure 1, 30-Dec-2016 Technical Memo entitled BURNCO Aggregate Project: Additional Information Regarding Watercourse Two (WC2), Fish and Fish Habitat).

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
305	CEAA-201	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The groundwater contribution to the marine estuary (inactive fan) is anticipated to increase as a result of the proposed pit lake. The locations of where the groundwater is expected to upwell have not been identified / modelled. An increase in groundwater may result in an increase in the hydrostatic pressure in the subsurface. With only limited information on the geology and groundwater flow patterns, there is insufficient information to determine if there is a risk the increased hydrostatic pressure could impact the stability of the inactive fan forming the marine estuary.	CEAA-IR-7 (Ref DFO-IR-9): Describe the effects of the increased ground water flow and associated hydrostatic pressure on the stability of the sediments and slopes in the marine estuary, the potential for movement, and any associated effects to fish and fish habitat.	The numerical hydrogeological model was used to estimate groundwater conditions prior to the construction of the groundwater channel. Compared to this pre-construction scenario, the construction of the groundwater channel resulted in a reduction of the groundwater flow to and the pressures in the estuary slopes. The model predicts that although these pressures and groundwater flows during the life of the project will be greater than the baseline condition with the groundwater channel present, they will be less than or equal to the flows and pressures experienced prior to the construction of the groundwater channel. Therefore, no changes are expected to the stability of the delta in the marine foreshore, and by extension, no adverse effects are anticipated on fish and fish habitat.
306	CEAA-202	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that the barging route overlaps with the glass sponge reef at the mouth of Ramillies Channel. No other sponge reefs (glass sponge or otherwise) have been identified by the proponent in the proximity of the Project. At the public information sessions held Sept. 12-13, 2016 several members of the public expressed concern for cloud sponge reefs close to the proposed Project infrastructure.	CEAA-IR-8 (Ref DFO-IR-10): Confirm whether additional sponge reefs, including the cloud sponge reefs alleged to occur in proximity to the proposed project area, are present in the Marine Resources Local Study Area or Regional Study Area. If present, provide the location, depth and distance to the Project and provide an assessment of potential effects from barging activities.	The closest known individual glass sponges to the proposed BURNCO site are located on a subtidal rock wall (49.33.55 N, 123.22.66 W) approximately 1 km to the east of the barge load-out jetty, or approximately 100-150 m east of the outlet of McNab Creek (on the east side of the estuary), in water depths around -25 m depth chart datum (CD). This site is located within the Marine Resources LSA and RSA. The closest known sponge reefs (i.e., bioherms) to the BURNCO site are on the north side of the eastern Defence Island (49.34.67 N, 123.16.26 W - west side of Porteau sill),) in water depths between -28 m and -35 m (CD). This site is approximately 9 km east of the proposed barge load-out jetty, and is located outside the Marine Resources LSA but within the RSA. The closest known sponge reefs to the proposed shipping corridor occur at the entrance to Howe Sound (west of Passage Island in Queen Charlotte Channel), where two known sponge reef sites directly overlap with the proposed shipping route in water depths ranging from -40 m to -120 m depth (CD). Both of these sites are located in the Marine Resources LSA and the RSA. Within Howe Sound, the shipping route also passes within 990 m of a known sponge reef in Ramillies Channel (in water depths of -20 to -30 m CD); as well as within 574 m of a known sponge reef in Thornbrough Channel (in water depths of -150 to 160 m CD). Both sites are located outside the Marine Resources LSA but within the RSA. All known sponge reef locations in the vicinity of the Project footprint including the proposed shipping corridor are below -20 m (CD). At these depths, potential impacts from Project shipping would be limited to potential propeller wash effects. In consideration of this potential impact, propeller scour effects on the seabed were assessed at a modelled depth of -20 m (CD) to correspond with the uppermost depths of glass sponge habitat. Jet velocities generated by the tug propeller at -20 m were compared to natural velocities derived from wave and tidal activity in Howe Sound. Estimates of maximum horizontal velocity associated with wind waves were developed from wave hindcasts based on available wind data for the Strait of Georgia using the Halibut Bank Ocean Buoy (Environment Canada Station 46146), as summarized in Table 5.2-12. At -20 m depth, the jet velocities of the proposed tug-assisted barge movements were shown to be within the same magnitude as tidal currents present at this depth, and below the velocity threshold (0.25 m/s) required for seabed particle mobilization (USACE 1989). Given that all known glass sponges and sponge reefs in the RSA occur in water depths below -20 m (CD), the potential effects of tug propeller scour on glass sponge assemblages in the proposed shipping corridors were considered negligible and were not carried forward in the assessment.
307	CEAA-203	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that in-air noise as a result of Project-related activities will be at least 108 dBA at the source, which exceeds the established bird disturbance threshold level of 80 dBA, (page 5.2-102). The EIS also states, however, that residual effects to marine birds as a result of in-air noise will be negligible because threshold exceedances are not predicted in the McNab Creek estuary (Page 5.2-139). The Agency notes that if behavioral disturbance occurs as a result of a threshold exceedance in the Project area where birds are known to be present, a residual effect occurs and this must be characterized.	CEAA-IR-9: Provide a revised residual effects assessment of in-air noise on all birds that use the marine environment to fulfill any of their biological or life stage requirements. Ensure that all potentially impacted marine locations are assessed. Alternatively, provide a rationale for why this is not necessary.	1 - It is important to note that the Marine Resources section of the EIS summarizes bird species in the Marine Resources LSA including information on seasonal occurrence relative to different life stage periods (e.g. breeding, migratory, overwintering periods). Baseline survey results indicated that the majority of bird sightings in the Marine Resources LSA occurred during the fall, winter and spring in conjunction with migratory and overwintering periods, as supported by the literature (Gaydos and Pearson 2011; Bird Studies Canada 2016). During late spring, the majority of marine bird species migrate to inland or arctic ponds and lakes (waterfowl and waterbirds) or small coastal islands and cliffs (colonial seabirds) for breeding purposes, and therefore are less likely to be present in the Marine Resources LSA during this time. Sensory disturbance to birds from project-generated noise during sensitive breeding/nesting periods was assessed in the Terrestrial Wildlife Section (Section 5.3) (e.g., disturbance to marbled murrelets during their nesting period). 2-The following initial sentence of the Agency Context for this IR (CEAA-IR-9) is incorrect: "The EIS states that in-air noise as a result of Project-related activities will be at least 108 dBA at the source, which exceeds the established bird disturbance threshold level of 80 dBA, (page 5.2-102)." We acknowledge that this should have been better clarified in the EIS, but the 108 dBA value in this case refers to a source sound power level (input to the model), while the 80 dBA threshold represents a unit of sound pressure level (SPL), which is an output of the noise model. These are different metrics that cannot be compared as they have different reference values. The appropriate sound power and pressure levels for project noise sources of concern are outlined further below. The following section provides clarification on how noise disturbance was assessed for birds in the marine environment during the migratory and overwintering periods, including potential avoidance or displacement behaviour that may lead to a change in distribution of marine birds in this area. Awbrey and Bowles (1990) suggest that disturbance in birds is typically initiated at 80 to 85 dBA with flight response elicited at 95 dBA. Project activities in the marine environment with potential to result in disturbance of birds in the marine environment were considered to include aggregate loading at the barge load-out jetty, as well as operation of the following equipment types at the jetty: diesel crane, impact drop hammer, and tug boat. Table CEAA-203 (attached)+[@[Proponent Response (Include Memo reference as applicable)2]] outlines the sound power and pressure levels associated with each of these project noise sources, as well as the associated zones of disturbance (as applicable) based on the 80 dBA disturbance threshold.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
308	CEAA-204	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that the benthic invertebrate community where the piles would be installed is "characterized by low species density and diversity… and associated with relatively low value benthic habitat" (page 5.2-67). The EIS states that habitat loss will occur, as well as changes in habitat quality, but that no residual effects would occur because "the majority of habitat loss corresponds with areas of low value habitat due to wood waste accumulation from historical log dump operations" (page 5.2-119). However, the Non-Traditional Land Use section of the EIS, as well as comments received from the public, indicate that the Local Study Area is an important harvesting area for crabs, prawn, shrimp, fish and other marine resources. If marine resources are present in the area, and habitat destruction and alteration will occur after the implementation of mitigation measures, residual effects would likely occur.	CEAA-IR-10: Conduct a revised residual effects assessment for marine benthic communities that reconciles the discrepancy.	BURNCO acknowledges that the Local Study Area (LSA) identified for 'Non-Traditional Land Use' does include important harvesting areas for shellfish and fish; however, these occur outside the zone of potential impact identified for 'Marine Resources' (note that the boundaries of the 'Non-Traditional Resources' LSA are different than those for the 'Marine Resources' LSA). As outlined in the EA chapter for Marine Resources (Vol. 2, Section 5.2), the subtidal area associated with potential habitat loss and/or alteration effects is limited to the immediate area around the proposed piles and the barge-load out jetty, corresponding with water depths shallower than -45 feet or 14 m (chart datum). This area of 'potential impact' is correlated with low value benthic habitat and low productivity due to extensive carpeting of the seafloor with fir bark as a result of historical log booming activities along the shoreline. Although it is acknowledged that shellfish harvesting activities occurs throughout Howe Sound, Thornbrough Channel is considered to be a lower use area for both recreational and commercial harvesting relative to the rest of Howe Sound, as outlined in the Non-Traditional Land and Resource Chapter (Vol. 2, Section 7.3.4.5.2). For shellfish harvesting activities that do occur locally, there is no spatial overlap between the harvesting activities and the area of 'potential impact' resulting from pile driving or berthing activities. As outlined above, pile driving and berthing activities will occur in shallower waters (<45 feet) than those areas where shellfish harvesting is known to occur. Crab traps in the McNab Creek estuary area are set offshore at depths of approximately 100 feet (or deeper) and prawn/shrimp traps are set at depths of 350 to 450 feet, as outlined in the Non-Traditional Land Use section of the EA (Section 7.3, Sub-section 7.3.4.5.2). Shellfish harvesting has also been reported close to the McNab Strata dock, which is outside of the area of potential impact for the above described activities.
309	CEAA-205	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The baseline data (pages 5.2-84 and 85) presented for the assessment of impacts to the marine mammals does not include noise generated from BC Ferry vessel transits. The EIS states on page 5.2-147 that "no concurrent vessel movements are expected and therefore no aggregate acoustic effects are predicted to occur." There is a potential for marine mammals to be affected by cumulative noise if a BURNCO barge operates in the same area at the same time as a BC Ferry vessel or an LNG carrier.	CEAA-IR-11: Provide additional information to explain how it was determined that the radii for acoustic injury and disturbance resulting from a BURNCO barge and a BC Ferry vessel or an LNG carrier operating in Howe Sound would not overlap.	The following marine mammal acoustic thresholds for continuous noise sources (e.g. vessel noise) were applied as part of the assessment (included here for reference purposes): • injury threshold for cetaceans = 180 dB re 1 µPa SPLrms (unit hereafter referred to as 'dB') • injury threshold for pinnipeds = 190 dB • behavioral disturbance for all marine mammals= 120 dB The statement highlighted by the reviewer (on page 5.2-147 of the EIS) is in specific reference to potential concurrent movements between a BURNCO barge and Woodfibre LNG carrier only. The rationale for assuming a BURNCO barge movement would not occur concurrently with that of an LNG carrier was based on the recommended minimum safety distance of 1 km applicable to LNG tankers while in transit (Transport Canada 2005), in addition to the low probability of vessel overlap given each vessel's estimated transit period in the RSA (< 2h per transit for both BURNCO and Woodfibre) and the anticipated frequency of transits per year for either project (80 Woodfibre transits per year; 380 BURNCO transits a year). However, in the event that both vessels were to overlap in space and time, the cumulative noise field resulting from the barge (source level = 170 dB @1m; maximum potential disturbance zone of 2.2 km) and the LNG carrier (175 dB @1 m; maximum potential disturbance zone of 4.6 km) may encompass a greater spatial area[1], but the cumulative sound level would not be greater than 176 dB at any single point within the zone of acoustic overlap. This is due to the logarithmic nature of sound underwater (i.e., the cumulative effect of multiple co-occurring noise sources is not linear in scale). In summary, the resulting cumulative noise field would be below levels known to potentially result in injury to cetaceans and pinnipeds (180 dB and 190 dB, respectively). We wish to clarify that no statement was included in the EIS indicating that "the radii for acoustic injury and disturbance resulting from a BURNCO barge and a BC Ferry vessel operating in Howe Sound would not overlap". BURNCO acknowledges that this interaction is likely to occur given the overall frequency of ferry transits in Howe Sound. Reported sound source levels for a ferry vessel or vehicle carrier are available in the literature: Mckenna et al. (2012) list a source level of 180 dB re 1µPa @1m (20-1000 Hz) for a vehicle carrier of 173-m in length overall (LOA); and Bassett et al. (2010) list a source level of 179 dB ± 4 dB re 1µPa for the 84-m (LOA) Keystone/Port Townsend ferry (M/V Salish – Washington State Department of Transport) in Puget Sound. Both of these vessels are similar in size to BC Ferries vessels currently operating in Howe Sound (e.g., M/V Queen of Surrey: 140-m LOA; M/V Queen of Capilano: 96-m LOA), so a source level of 180 dB re 1µPa at 1 m is considered an appropriate estimate for a ferry vessel in Howe Sound. Cumulative sound levels resulting from the interaction between a BURNCO barge (170 dB
310	CEAA-206	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Marine habitat should be mapped using direct observations of the habitat type, rather than mapping substrate types and making assumptions about the resulting habitat. See Table 14, page 87 and Figure 36, page 88 of Appendix 5.2-A for reference.	CEAA-IR-12 (Ref ECCC-WQ-IR-2): Provide updated marine habitat maps to be based on direct observation of habitat types (found in Appendix 5.2-A, Tables 11-13), and benthic invertebrate infauna groups (found in Appendix 5.2-A, Table 20). Alternatively, provide a rationale for why substrate types are an appropriate proxy.	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). REFERENCES 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: ww.nmfs.noaa.gov/habitat/ecosystem/habitat docs/habitatclassdoc.pdf (February 2005). 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. 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.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
311	CEAA-207	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that "exceedances of sediment quality guidelines were recorded for certain trace metals including arsenic, cadmium, copper and zinc...[as well as] a number of PAHs" (Page 5.2-23).	CEAA-IR-13: Provide 95th percentile sediment quality and marine water quality modelling tables for all phases of the Project, with CCME Guideline exceedances clearly highlighted.	Detailed analytical results for marine sediment chemistry are presented in the marine resources technical baseline report (Volume 4, Part G – Section 22.0, Appendix 5.2-A). Specifically - refer to Section 3.3.1.5 (Marine Sediment Quality Section) as well as Appendix H of baseline report (detailed chemistry results screened against CCME and BCMOE guidelines). No marine sediment or water quality modelling was conducted for the Project. Any reference in the EIS to exceedances of sediment quality guidelines for certain trace metals is derived solely from screening of the sediment chemistry data against CCME and BCMOE guidelines and not from modelling. The purpose of the baseline study was to characterize the existing conditions of the marine environment for use as a benchmark for future monitoring studies to compare against potential Project effects. Future monitoring studies may incorporate sediment and/or water quality modelling to determine whether anthropogenic enrichment of trace metals has occurred as a result of the Project; however, this is beyond the scope of the baseline investigations. Trace metals analyzed in water and sediment samples were instead screened against relevant CCME and BCMOE guidelines to determine whether any metals are already enriched in the Project area as a result of historical contamination (i.e. from previous logging activities) as this can have implications on determining the effects of Project activities.
312	CEAA-208	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Some birds, including the SARA-listed Marbled Murrelet, use both terrestrial and marine environments. Due to the structure of the EIS, impacts to Marbled Murrelet are assessed in two different sections (terrestrial environment and marine resources, respectively).	CEAA-IR-14: Provide an overall assessment of significance to SARA-listed birds, including the Marbled Murrelet, that incorporates all potential effects in both the marine environment and the terrestrial environment.	The only SARA-listed bird species observed within the Project area that uses both terrestrial and marine environments are marbled murrelet (Brachyramphus marmoratus) and great blue heron, fannini subspecies (Ardea herodia fannini; Table 5.3-7, Vol 2, Sec 5.3). The great blue heron was excluded as a VC because nesting is not known to occur within the Project Area and potential interactions with food sources (i.e. fish) were assessed as part of the fisheries and freshwater habitat VCs and marine resources VCs (Table 5.3-3, Vol 2, Sec 5.3 and 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065). The only Proposed Project-related residual effect on marbled murrelet in the terrestrial environment is change in mortality and no effects are expected to marbled murrelet habitat or barriers to movement (Vol 2, Sec 5.3.1.5.5.1.3). Potential Project-related residual effects on marine bird VCs, including the marbled murrelet, in the marine environment are (Vol 2, Sec 5.2.5.4.1.5): • Behavioral disturbance due to in-air noise from pile driving (construction), Proposed Project vessels (all phases) and barge loading (operations) • Accidental spills of toxic materials (e.g. fuel spills) (all phases) The Proposed Project is predicted to result in no loss of suitable marbled murrelet nesting habitat, no barriers to movement, and a negligible impact on mortality due to the potential for interactions with infrastructure. Therefore, the magnitude of the net terrestrial effects of the Proposed Project on marbled murrelet is predicted to be negligible. The predicted net effects are local in extent, long-term in duration, continuous over the life of the Proposed Project (high frequency). The effects are expected to have a low likelihood of occurrence because mortality events for marbled murrelet will occur rarely, if at all. The effects of the Proposed Project are considered fully reversible with reclamation and closure (Vol 2, Sec 5.3.1.5.5.1.3). Marbled murrelet were determined to be moderately resilient with a generally stable population in BC with localized declines, and common and widespread along BC coast. The effects of the Proposed Project on marbled murrelet in the terrestrial environment are not expected to exceed ecological thresholds and compromise the resilience of the regional population, and are determined to be negligible – not significant. The level of confidence in the residual effect prediction is high because conservative assumptions likely overestimate Project effects and mitigations are likely to be effective (Vol 2, Sec 5.3.1.5.6.1). Project-related noise sources (i.e., pile driving, vessel operations and barge loading) may result in behavioral disturbance of birds occurring in the Marine Resources LSA, although this would be limited to the immediate jetty area. Any residual effects would be temporary and fully reversible, with no effects at the population level anticipated. Based on the literature, marine birds will either habituate to the noise and remain in the area, or leave temporarily and return once the noise has subsided. Given the in-air noise disturbance will not exceed established bird
313	CEAA-209	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS notes that in-air noise as a result of Project-related activities will result in exceedances of terrestrial bird behavioral disturbance thresholds (>80 dBA), including to moderate suitability Northern Goshawk habitat (page 5.3-40).	CEAA-IR-15: Provide an assessment of the effect of in-air noise on terrestrial birds, in both the marine and terrestrial environment, for all locations where birds may be present.	BURNCO acknowledges that there may be effects from noise on terrestrial birds during the construction and operational phases of the Proposed Project. The effects of noise on bird VCs were estimated by overlaying the output of noise models with species-specific habitat suitability mapping or with habitat associations based on available literature. Noise thresholds were defined from literatures and used to summarize expected changes in habitat use. Noise emissions from Proposed Project activities is expected to be lower than noise thresholds in suitable habitat for northern goshawk (Accipiter gentilis; Sec 5.3.1.5.3.2, Vol 2), marbled murrelet (Sec 5.3.1.5.3.3, Vol 2), and common nighthawk (Chordeiles minor; Sec 5.3.1.5.3.6, Vol 2). Band-tailed pigeon (Patagioenas fasciata) and western screech-owl (Megascops kennicottii kennicottii) were the two terrestrial bird species predicted to have noise threshold exceedances during Project activities (Sec 5.3.1.5.3.4 and Sec 5.3.1.5.3.5, Vol 2). In the terrestrial environment, the magnitude of potential habitat loss due to noise is predicted to be negligible and limited to the Terrestrial LSA after noise mitigation measures have been implemented for band-tailed pigeon and western screech-owl (Section 5.3.1.5.6.4 and 5.3.1.5.6.1.5, Vol 2). The net effect to these bird species is considered local in extent, long-term, continuous over life of the Project (high frequency), with a high likelihood of occurrence (Section 5.3.1.5.5.1.4.3. and 5.3.1.5.5.1.5.3, Vol 2). Industrial noise will not persist beyond the life of the Proposed Project. Therefore, habitat loss due to noise is predicted to be fully reversible upon closure. Confidence that the effect of noise will not be greater than predicted is moderate to high due to conservative assumptions that have likely resulted in an overestimation of the amount of habitat loss that will occur due to the Proposed Project (Table 5.3-26, Vol 2). The sentence referring to moderate suitability habitat on page 5.3-40 was a typo. Northern goshawk habitat modelling was not undertaken as part of the EA Application. Data from 148 northern goshawk nests on Vancouver Island indicate that the majority of nests (79%) are located more than 200 m from an edge, whereas 14% are located 100 to 200 m from an edge, and 7% are located less than 100 m from an edge (Mahon et al. 2008). None of the mature forest that occurs in the Project Area is more than 100 m away from forest edge, and therefore the Project Area is unlikely to contain suitable northern goshawk nesting habitat. Noise thresholds are not expected to be exceeded for northern goshawk in habitat that may be suitable for nesting in the Terrestrial LSA (Sec 5.3.1.5.3.2, Vol 2). Project-related noise sources (i.e., pile driving, vessel operations and barge loading) may result in behavioral disturbance of marine birds occurring in the Marine Resources LSA. The magnitude of the residual effect is considered low, since the area with noise levels exceeding bird disturbance thresholds is limited to the proposed Project area. The geographic extent is local, the duration is short-term for pile driving and
314	CEAA-210	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS does not include an effects assessment of the impacts of the release of deleterious substances into the aquatic environment on birds and mammals as it does for amphibians. While birds and mammals do not use this aquatic habitat for breeding, they may use this habitat type for foraging and drinking, and thereby be exposed and affected. Refer to pages 5.3-31, 5.3-32, 5.3-34, 5.3-35, and 5.3-38 for reference.	CEAA-IR-16: Provide an assessment of the effects of the release of deleterious substances into the aquatic environment on birds and mammals.	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.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
315	CEAA-211	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS uses certain SARA-listed or COSEWIC-assessed species as indicators for ecosystems and other species (e.g. amphibian species at risk as aquatic indicator species). Groups of species, which include species at risk, are also listed as a single VC (e.g. amphibian species at risk). It is not appropriate to use species identified under SARA or COSEWIC as indicators (e.g., Northern Goshawk and Western Screech-owl were selected as surrogates for Bald Eagle and Osprey; Common Nighthawk was selected for Purple Martin). SARA-listed species have specific habitat needs that may not reflect those of the larger species group. Chosen migratory breeding bird indicator species should consider all bird guilds present (waterbirds, waterfowl, shorebirds, and land birds) 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. Use the list of Priority Species provided by Bird Conservation Region Strategies as a guide for selecting indicator species: http://nabci.net/Canada/English/bird_conservation_regions.html The following can also aid in selection of indicator species: • Caro, T. (2010). Conservation by proxy: indicator, umbrella, keystone, flagship, and other surrogate species. Island Press, Washington, DC, USA • Kershner, J., Samhouri, J.F., James, C.A., and Levin, P.S. (2011). Selecting indicator portfolios for marine species and food webs: a Puget Sound case study. PloSONE 6:e25248 See page 5.3-2, table 5.3-3, page 5.3-4 and page 5.3-184 for reference.	CEAA-IR-17 (Ref ECCC-Widlife-IR-2): Assess the potential effects to each wildlife species listed under SARA and COSEWIC as a separate Valued Component, rather than grouping them. Since each SARA species has specific habitat requirements that may not reflect those under which they have been grouped provide mitigation measures to reduce or eliminate the potential effects for each of the species. The use of indicator species is not recommended for assessing effects to species listed under SARA and COSEWIC.	See 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065.
316	CEAA-212	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	ECCC notes that no baseline surveys were conducted for invertebrate species at risk, nor were any included or addressed in the VC selection. See Table 5.3-2 and page 5.3-3 for reference.	CEAA-IR-18 (Ref ECCC-Widlife-IR-5): Provide baseline information for invertebrate species at risk, or provide a rationale for why they were not included as Valued Components.	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 (Haliotis kamtschatkana) 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 (Nearctula sp. 1), a gastropod, is typically found in bigleaf maple (Acer macrophyllum) 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. Dun skipper (Euphyes vestris) and Oregon branded skipper (Hesperia colorado oregonia) 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. The range for monarch (Danaus plexippus) 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 (Asclepias speciosa) as a host plant. The nearest known location of showy milkweed (Asclepias speciosa) 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.
317	CEAA-213	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The rationale for exclusion of olive-sided flycatcher as a VC is that "the proposed Project area…is not considered highly suitable olive-sided flycatcher habitat…", and that band-tailed pigeon was chosen as a surrogate. The olive-sided flycatcher however, 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. See Table 5.3-3, page 5.3-4, Table 5.3-7, page 5.3-15, and Appendix 5.-3A Table 12, page 38 and Figure 10 page 42.	CEAA-IR-19 (Ref ECCC-Widlife-IR-3): Assess the potential effects to olive-sided flycatcher species as its own VC, as this species is a species at risk and likely has specific habitat requirements that may not be considered appropriately by a proxy. Update Table 5.3-7 and the effects assessment to include olive-sided flycatcher as identified wildlife in the LSA. Update Table 5.3-7 to include other species at risk confirmed in the LSA during surveys.	Olive-sided flycatcher (Contopus cooperi) were observed in the Terrestrial LSA. However, the presence of a federally listed species in the Terrestrial LSA is not sufficient rationale for its selection as a VC. The rationale for the use and selection of VCs as indicators for the effects of the Proposed Project on the broader suite of wildlife species is described in 24-Nov-16 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests CEAA-211, EC-064 and EC-065.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
318	CEAA-214	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	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" (page 5.3-43). The Recovery Strategy for Marbled Murrelet referenced in the baseline data may not include the most recent shapefiles for terrestrial critical habitat. Baseline studies should include: -a determination of whether suitable nesting habitat (SNH) for Marbled Murrelet is present within or near the Project area; -if a nest has been identified; and -Marbled Murrelet surveys during the breeding season to determine whether Marbled Murrelets are likely nesting in the Project area. Refer to Attachment 4: Standard Guidance for Environmental Assessments for Marbled Murrelet for detailed recommendations, as well as ECCC's responsibilities, related to Marbled Murrelet.	CEAA-IR-20 (Ref ECCC-Widlife-IR-6): Provide baseline information and an assessment of potential effects on Marbled Murrelet that uses the most recent critical habitat geospatial files (available 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). Alternatively, provide a rationale as to why this information is not required.	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).
319	CEAA-215	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	No Marbled Murrelet monitoring plan is provided, even though Marbled Murrelets were observed during baseline studies (Page 5.3-67, Table 5.3-15, page 5.3-75). Refer to 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:ttp://www.ilmb.gov.bc.ca/risc/pubs/tebiodiv/murrelet2k1/mamu%20ml20.pdf	CEAA-IR-21 (Ref ECCC-Widlife-IR-16): Provide a plan for monitoring the presence of the Marbled Murrelet in the local study area, or provide rationale as to why this is not necessary.	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). 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.
320	CEAA-216	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Breeding bird surveys were only conducted two days in one year. 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. The 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 (Appendix 5.3-A, Section 2.2, Table 1, page 4; and Section 3.5, page 38). Establishing an accurate baseline that reflects natural inter-annual variation is important for assessing potential Project effects, focusing mitigation and monitoring, and addressing potential cumulative effects. 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. The sampling methods chosen do not meet requirements necessary to establish an accurate or current baseline that allows for assessment of potential effects of the Project on migratory birds. Guiding principles on bird survey can be found at: 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/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2010/ec/CW69-5-508-eng.pdf).	CEAA-IR-22 (Ref ECCC-Widlife-IR-20): Provide additional baseline data on migratory bird surveys in the local study area. Conduct species-specific surveys for the Common Nighthawk, Barn Swallow, and Short-eared Owl over multiple years, incorporating multiple visits per year at the same points.	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 (Hirundo rustica) 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 (Asio flammeus) 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.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
321	CEAA-217	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The baseline information 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 (Appendix 5.3-A, page 5 and 27). Recommend 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.	CEAA-IR-23 (Ref ECCC-Widlife-IR-17, ECCC-Widlife-IR-4): Provide data from species-specific surveys to confirm the presence of Northern Red-legged Frog, Coastal Tailed Frog, and Western Toad. Alternatively, provide a rationale as to why species-specific surveys are not required.	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 (Rana aurora) and western toad (Anaxyrus boreas), as well as the broader suite of pond-breeding amphibians. Evidence of breeding for northern Pacific tree frog (Pseudacris regilla) and northern red-legged frog was recorded in and around the Proposed Project area during amphibian surveys. 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 (Juncus spp.) or sedges (Carex 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. Coastal tailed frogs (Ascaphus truei) 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).
322	CEAA-218	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	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 (Appendix 5.3-A, page 75). Bat acoustic monitoring alone are not considered sufficient to determine the presence of bats, and monitoring should occur over more than two years. (Loeb et al. 2015, Holroyd and Craig 2016). See Bat Acoustic Monitoring Portal http://databasin.org/groups/59d81a3951fd4915909efacbe2317efbReferences: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).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.	CEAA-IR-24 (Ref ECCC-Widlife-IR-23): Provide baseline information from field studies assessing use of the local study area by bats, including Keen's Long-eared Myotis and the Little Brown Myotis. Field studies should include radio telemetry, visual surveys, and acoustic monitoring. Identify any hibernacula and maternity roosting sites in the local study area.	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 (Myotis keenii) and little brown myotis (Myotis lucifugus) 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. 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. 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 (Burles 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. Bat surveys are not considered necessary because Proposed Project effects to foraging habitat, roosting or hibernation habitat for bats are not expected.
323	CEAA-219	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	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. The fact that data from the McNab Creek monitoring station collected during the period of Nov. 2011-Nov. 2012 is similar to Chapman Creek during that time does not mean that that data from Chapman Creek from 1970-1988 is analogous to McNab Creek. Factors which could affect stream flow include different patterns of groundwater loss / gain between the two watersheds, differences in sediment porosity, and the presence of beaver dams.	CEAA-IR-25 (Ref ECCC-WQ-IR-3): Provide streamflow baseline trends from McNab Creek between the Chapman Creek dataset and the McNab Creek flow dataset collected at station MC-US-01, or a rationale as to why flow records from Chapman Creek are an appropriate proxy given the temporal variation and that two creeks are in different watersheds. Provide raw data for the one year (Nov 2011 – Nov 2012) of baseline monitoring that was conducted on McNab Creek at site MC-US-01. Confirm whether McNab Creek modelled flows include inputs from Box Canyon Creek, as MC-US-01 is located above the confluence of the two streams. Confirm whether modelled flows as a result of the Box Canyon Hydro Project were included in the flow models, as it is the Agency's understanding that the Box Canyon Hydro Project began commercial operation in January 2016. If these were not included, provide revised flow estimates.	Extreme low flows in McNab Creek were estimated based on flow records from Chapman Creek Above Sechelt Station (08GA060). Extreme high flows in McNab Creek were estimated using site specific characteristics of the McNab Creek watershed. It is also important to note that estimates of potential impacts of the Project on McNab Creek flow were based on a site specific analysis of the hydrogeologic conditions and do not rely up the regional hydrometric data. The flow records derived from water levels measured in the McNab Creek hydrometric station (MC-US-01) are provided in a separate spreadsheet entitled CEAA-219 McNab Flow Series MC-US-01.xls. McNab Creek Station MC-US-01 is located upstream of Box Canyon and therefore the flows recorded at this station do not include contributions from Box Canyon. The entire watershed area upstream from the Site (including Box Canyon) is accounted for in the analysis.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
324	CEAA-220	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The Maximum Authorized Monthly Mean TSS Concentration from Schedule 4 of MMER, 15 mg/L, in water quality modeling (Appendix 5.5-D, page 12/22) was used, rather than TSS data collected at the site of the proposed Project. In order to accurately assess the effects of the Project, site-specific TSS baseline measurements should be used in water quality modelling.	CEAA-IR-26 (Ref ECCC-WQ-IR-1): Provide updated water quality modelling with site-specific TSS concentrations, and provide a rationale for the revised TSS concentrations selected.	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. 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). 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. 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. References: Beddoes, P., and M. Herrell, J. Vandenberg, J. Richards, R. Millar, K. McMahen. 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
325	CEAA-221	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Table 5.6-5 (pages 5.6-24 to 27) indicates that incidental fuel spills are addressed in Section 5.5 Surface Water. "Incidental" fuel spills still have the potential to affect groundwater quality. Further, Table 5.6-5 identifies the potential interaction between site preparation and groundwater quality during the construction phase of the Project as a result of incidental leaks and fuel spills.	CEAA-IR-27: Describe and quantify the extent by which baseline groundwater chemistry is predicted to change as a result of these leaks / spills (if at all), including site preparation. Alternatively, provide rationale as to why this is not required or possible.	Potential impacts on surface water and ground water quality from possible fuel spills will be mitigated through the implementation of task-specific Materials Storage, Handling and Waste Management Plan(s) (MSHWMP) and a site-specific Spill Prevention and Emergency Response Plan(s) (SPERP; details provided in Volume 3, Part E – Section 16.0). An environmental monitor will monitor the implementation and performance of the material handling, spill prevention and emergency response plans. Operational surface and groundwater water quality monitoring will be undertaken according to permit requirements.
326	CEAA-222	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The final EIS Guidelines states that the EAC Application/EIS will "use the numerical model to predict and characterize potential changes to LSA and RSA groundwater-surface water interactions (i.e., baseflow), including potential changes to the manmade groundwater channel resulting from the Proposed Project and potential changes to groundwater resulting from Project-induced changes to the channel" (page 5.6-28).	CEAA-IR-28: Describe the potential effects to the manmade groundwater channel as a result of groundwater changes from the Project.	As described in Section 2.4 in Part A of the EAC Application/EIS, WC2 is a groundwater-fed watercourse designed and constructed by DFO (1985-2003) to provide spawning and rearing habitat for chum and coho salmon. In the first year of mining, the upper portion of WC2 within the ultimate outline of the aggregate pit would be de-activated by constructing a plug immediately down-gradient of the pit. This will enable the pit lake groundwater recharge to re-establish and maintain natural groundwater levels. The loss of WC 2 within the proposed project footprint will be offset by the construction of a new groundwater-fed watercourse extension in the foreshore area and connected to the existing watercourse below the plug. This extension would mimic the features of the lower segment of the existing WC 2 that are suitable for aquatic habitat. De-activation of the upper portion of WC 2 during operations would initially cause a decrease in groundwater discharge to WC 2 downgradient of the mine but as the pit lake elevation gradually rises throughout the mine life the average groundwater discharge to the watercourse would gradually increase. At closure, a spillway will be constructed above the extension where it connects to the pit lake flood control berm at the southern margin of the pit lake. The spillway will be designed to manage the pit water level and keep it at 5.0 m elevation as predicted at the end of mining as well as to enable the pit to overflow during high precipitation events.
327	CEAA-223	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that "If observed water quality is poorer than predicted and/or the water flows are less than predicted, then corrective action will be taken" (page 5.6-31).	CEAA-IR-29: Outline the technically and economically feasible action(s) that would be taken if measured groundwater flow and quality is worse than the changes predicted in the EIS. Confirm whether "monitoring of the groundwater flow rates, hydraulic heads and quality" will be conducted during operations and at closure? If not, monitoring of the water quality in the pit lake and downstream creeks should be undertaken during these phases of the Project.	A Water Management Plan, currently being prepared for inclusion in the Mines Act and Water Sustainability Act Permit applications, will provide a long-term water management strategy that includes the management of water resources, a mitigation plan to reduce potential effects to water resources and an effects monitoring plan to monitor water resources in the receiving environment. The plan is designed to meeting the preliminary mitigation measures and commitments and assurances outlined in the EAC Application/EIS and those required by the Water Sustainability Act. Based on the water quantity and water quality monitoring programs (hydraulic heads and quality), if observed water levels and water quality start to show a trend towards potential negative effects to the receiving environment, then adaptive management will be undertaken. Adaptive management techniques to be implemented as required include: - Continue to evaluate the extent of the pit during operations. - During the wet season, if water levels in the pit lake become higher than has been designed for the Pit Lake Containment Berm then the valves in the culverts will be closed to reduce the amount of water reporting to the pit from the surface water on the western slope. - The height of the pit lake at the outlet structure can be adjusted to increase or decrease the level of the pit lake (e.g., adding or lowering stop logs) at closure to maintain the hydraulic gradient between McNab Creek and the Project Area following closure.
328	CEAA-224	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Table 5.6-5 identifies the potential interaction between site preparation and groundwater quality during the construction phase of the Project as a result of incidental leaks and fuel spills.	CEAA-IR-30: Describe and quantify the extent by which baseline groundwater chemistry is predicted to change as a result of these leaks / spills (if at all) from site preparation. Alternatively, provide rationale as to why this is not required or possible.	Potential impacts on surface water and groundwater quality from possible fuel spills will be mitigated through the implementation of task-specific Materials Storage, Handling and Waste Management Plan(s) (MSHWMP) and a site-specific Spill Prevention and Emergency Response Plan(s) (SPERP; details provided in Volume 3, Part E – Section 16.0 of the EAC Application/EIS). An environmental monitor will monitor the implementation and performance of the material handling, spill prevention and emergency response plans. Operational water quality monitoring will be undertaken according to permit requirements.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
329	CEAA-225	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The final EIS Guidelines states that the EAC Application/EIS will discuss "the effectiveness and limitations of identified mitigation measures, environmental management, and compensation strategies."	CEAA-IR-31: Describe the limitations of the proposed measures in Table 5.6-7 to address potential effects to groundwater flow and quality.	As stated in section 5.6.6 of the EAC Application/EIS, the significance of potential effects to groundwater flow and groundwater quality through construction, operations, and reclamation and closure are considered negligible – not significant. The assessment of significance used an approach that was conservative in nature so that there is a high level of confidence that the Proposed Project-related effects have not been underestimated. Although groundwater flow is predicted to be less than the baseline during the first 15 years of operation, reduced groundwater loss from McNab Creek are predicted to result in an overall benefit to the environment. In the last year of operations and through to reclamation and closure, groundwater flow is expected to increase by 2% from the baseline. Effects to groundwater quality are considered to be negligible – not significant; no water quality parameters are predicted to exceed BCWQ or CCME guidelines throughout operations and reclamation and closure. The suggested mitigation is considered effective and incorporates adaptive management techniques that can be undertaken if monitoring data indicates a different balance between losses from McNab Creek, changes in groundwater flow rates and the water flow in down gradient aquatic habitat need to be achieved.
330	CEAA-226	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	SO2, NO2, CO and PM are associated with combustion emissions. Estimates of carbon monoxide (CO) emissions associated with project-related mobile equipment were not included in the EIS (Table 4-4, page 4-24).	CEAA-IR-32 (Ref ECCC-AQ-IR-1): Provide quantitative estimates of CO emissions related to the mobile equipment (on-road and off-road engines) required for the Project.	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.
331	CEAA-227	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	According to Table 5.7-1 there are no Federal guidelines for NO2 or SO2 in air. There are existing National Ambient Air Quality Objectives (NAAQOs), and the Government of Canada is in the process of updating the air quality standards for NO2 and SO2 to replace the outdated NAAQOs. The new standards for these two pollutants will likely be lower than the NAAQOs. Therefore a sensitivity analysis using NAAQS issued by US EPA for NO2 and SO2 should be conducted for a more meaningful analysis, as the US EPA NAAQS are based on a more current database similar to that being used in Canada to develop the new standards. The USEPA NAAQs can be found at https://www.epa.gov/criteria-air-pollutants/naaqs-table The supporting documents for these NAAQS can be found at: http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=259167#Download (for NO2); and http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=198843 (for SO2).	CEAA-IR-33 (HC-IR-06, HR-IR-07): Compare predicted future concentrations of NO2 and SO2 to current federal guidelines and the USEPA National Ambient Air Quality Objectives.	At the time of the assessment the BCMOE had adopted interim air quality objectives for NO2 and SO2. These objectives were used to undertake the assessment as specified in detailed model plan (Appendix 5.7-E). At the time of the assessment, these interim BC air quality objectives were lower (more stringent) than the Canadian National Ambient Air Quality Objectives for both NO2 and SO2. Additionally, these interim BC air quality objectives for NO2 and SO2 are equal to, or lower than (more stringent) than the US EPA NAAQS. Therefore a further comparison to the US EPA standard would not change the results or conclusions of the air quality assessment.
332	CEAA-228	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that "Due to the fact that intermittent nature of emissions associated with the construction and reclamation and closure phases of the Proposed Project and due to the fact that annual land clearing activities associated with pit expansion are incorporated in the operation phase's emission activities, the climate change assessment temporal boundaries were limited to the Proposed Project's operational phase."	CEAA-IR-34: Provide equipment inventories and their respective emissions. Conduct a GHG emissions assessment for all phases of the Project, including the construction, and reclamation and closure phases. Alternatively, provide a rationale as to why this is not necessary.	Equipment inventories can be found in Chapter 2.5 of the EAC Application/EIS. The GHG emission levels from the operational phase are expected to be greater than (and therefore bound) GHG emission levels from the construction and decommissioning phases for the following reasons: 1) The main construction activities that will result in GHG emissions are associated with land clearing activities to construct and expand the gravel pit. This involved mobile equipment such as bulldozers, excavators for material handling and rock trucks to move material within the Project. The gravel pit will be expanded on a phased approach, meaning that construction activities to expand the pit will occur for approximately 30 days each year. This annual construction activity has been included in the annual emission estimate for the operational phase. 2) GHG emissions will also occur due to project construction as a result of land clearing and the associated loss of vegetation as a carbon sink. GHG emissions associated with the maximum land area to be cleared annually over the Project life were included in the GHG estimates for the operational phase.
333	CEAA-229	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS states that "as discussed above the potential effect of changing climate on the Proposed Project is not carried through to the effects assessment because it is not a potential impact of the Proposed Project" (page 5.8-22). Effects of the environment on the Project relating to climate change should be assessed as required in the EIS Guidelines (Part 15, page 126).	CEAA-IR-35: Provide an assessment of the effects of the environment on the Project relating to climate change. Alternatively, provide a rationale as to why this is not necessary.	Section 5.8.5 of the EAC Application/EIS provides an overview of potential effects of changing climate and Table 5.8-8 is the climate risk matrix which outlines a description of potential project interaction with climate change. The Project's operational phase is expected to end by 2034 or 2035, which is considered too short for considerable climate-infrastructure interaction impacts.
334	CEAA-230	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The greenhouse gas emissions (GHG) assessment uses data from the BC Chamber of Shipping Inventory from 2007, which has been updated in ECCC's National Marine Emissions Inventory. It is necessary to use up-to-date emissions factors 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. 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 is able to provide the proponent with updated emission factors upon request. Link to the inventory: http://data.tc.gc.ca/archive/eng/innovation/tdc-Projects-marine-g-5612-1214.htm	CEAA-IR-36 (Ref ECCC-AQ-IR-6): Provide an assessment of GHG emissions from tugs using updated load and emission factors data from ECCC's National Marine Emissions Inventory.	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.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
335	CEAA-231	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Appendix 9.1A states that "the purpose of the [baseline] sampling program was to provide site-specific chemistry results that will be used to determine baseline exposure concentrations and calculate site-specific bioaccumulation factors as a part of the public health assessment." There was no discussion of bioaccumulation factors and no evaluation of the baseline risk from consumption of terrestrial or aquatic country foods in the Public Health Assessment (EIS Section 9.1).	CEAA-IR-37 (Ref HC-IR-17): Provide an assessment of potential bioaccumulation of contaminants from water sources (ammonia, hardness, alkalinity and titanium), soil (metal concentrations that exceed any health-based guidelines including arsenic) and air (lead, beryllium (short-term), and cobalt, chromium, nickel (long-term) and any other substances that exceed their guideline values). Assess the effect of increased levels of those substances on human health. Consider any additional substances that should not have been screened out of the assessment (see IR 34 below).	No residual changes are anticipated to water and sediment quality (in freshwater or marine) fish-bearing watercourses) as a result of the Project. In addition, dioxins, furans, and other bioaccumulative substances will not be emitted / discharged to the aquatic environment as a result of the Project. Historic sediment contamination (including dioxins and furans) does exist within Howe Sound due to past industrial activities in the region. Aquatic biota may be exposed to existing dioxin and furan contaminants as a result of Project-related sediment disturbances and introduction of suspended sediments into the water column. The potential for resuspension of sediments was evaluated as part of the Marine Resources assessment (See section 5.2). Results indicate that localized short-term increases in suspended sediment concentrations could occur during construction (due to pile driving) and as a result of propeller scour during berthing activities. Impacts on water quality and aquatic biota related to pile driving would be controlled with the application of known and effective mitigation (e.g. silt curtains around wetted pile). Impacts on water quality and aquatic biota related to propeller scour would be limited to the immediate seafloor area beneath the barge load-out jetty; an area presently associated with low value benthic habitat and low productivity due to extensive carpeting of the seafloor with woody/bark debris as a result of historical log handling activities in this area. Therefore, given that residual changes in water/sediment quality are predicted to be negligible – not significant in this context, measurable increases in tissue concentrations of aquatic species associated with country foods are not expected as a result of the Project.
336	CEAA-232	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS indicates that crab tissue was analyzed for metal concentrations and muscle tissue was analyzed for background concentrations of metals and PAHs. Given the historical contamination of Howe Sound which includes dioxins and furans from current and historical industrial operations (e.g. the former pulp mill at Woodfibre) and the fact that marine sediment will most likely be disturbed during construction activities in the marine environment (which could remobilize existing contaminants), it is unclear why these marine species were not also analyzed for background concentrations of dioxins and furans. In addition, no marine fish (such as species consumed by local people -e.g. flounder) were analyzed as pat of the baseline program. No rationale was provided for this.	CEAA-IR-38 (Ref HC-IR-09): Include background concentration of dioxins and furan present in crab tissue in the analysis for the HHRA. Alternatively, provide a rationale as to why this is not necessary.	Project-related surface water and sediment quality changes were not predicted to occur for substance in McNab Creek and Howe Sound (see Section 5.5 of the EAC Application/EIS). Therefore, concentrations in fish and shellfish tissue are not anticipated to change as a result of the project and this pathway was not retained for the human health risk assessment. For a more detailed discussion on dioxins and furans, please refer to response CEAA-IR-37. The baseline program was designed to collect information to characterize baseline conditions in support the risk assessment. If an operable pathway were identified for fish consumption, then collection of additional fish tissue samples would be warranted. However, additional sampling was not recommended because the problem formulation did not retain this exposure pathway for the risk assessment.
337	CEAA-233	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Section 9.1.3.3.1 of the EIS states that "fish tissue data… were used to gain a better understanding of baseline conditions at the site."Section 4.2.1 of Appendix 9.1C indicates that baseline fish data (freshwater fish only) was based on a single sample that was collected from McNab Creek. Analysis of one fish is not sufficient to determine baseline conditions, nor is it possible to determine baseline health risks or future health risks based on one fish sample. EIS Section 9.1.3.3.6 states that First Nations have reported harvesting all five species of salmon, steelhead and Dolly Varden char in McNab Creek. As such, it appears that additional fish species may be present in McNab Creek. In order to acquire sufficient numbers of the various species of fish expected to be present in McNab Creek, it would be useful to collaborate with local people who consume fish from this area to obtain samples for analysis.	CEAA-IR-39 (Ref HC-IR-11): Include additional baseline samples of fish tissue for all species of fish consumed by Indigenous people. Alternatively, provide a rationale for why the single sample that was used is sufficient to describe the baseline conditions of contaminants in fish tissue.	Project-related surface water and sediment quality changes were not predicted to occur for substance in McNab Creek and Howe Sound (see Section 5.5 of the EAC Application/EIS). Therefore, concentrations in fish and shellfish tissue are not anticipated to change as a result of the project and this pathway was not retained for the human health risk assessment. For a more detailed discussion on dioxins and furans, please refer to response CEAA-IR-37. The baseline program was designed to collect information to characterize baseline conditions in support the risk assessment. If an operable pathway were identified for fish consumption, then collection of additional fish tissue samples would be warranted. However, additional sampling was not recommended because the problem formulation did not retain this exposure pathway for the risk assessment.
338	CEAA-234	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	When comparing predicted maximum concentrations to acute screening criteria, the EIS states that "if the predicted maximum concentrations were greater than the selected screening criteria and the percent change from Base Case was greater than 10% then the chemical was retained as a COPC and considered further in the acute inhalation assessment." The use of a change of more or less than 10% to screen substances for further assessment in the HHRA is not appropriate and is arbitrary. This approach is not health-based and no rationale was provided in the report as to how this might affect human health. It is recommended that the EIS clarify this assumption and provide rationale on a chemical-specific basis to identify whether there may be adverse health impacts associated with an increase of <10% relative to baseline. Health-based guidelines are based on human (and animal) toxicity studies and are intended to be protective of human health, whereas screening substances for inclusion in the HHRA based on a >10% increase from baseline conditions or screening out substances from the HHRA based on a <10% increase from baseline has no human toxicological basis. All substances that exceed their applicable regulatory criteria/guideline value should be further evaluated in the HHRA irrespective of the percentage change in concentrations from Base Case. See Health Canada (2012), below, for more information about appropriate methods for screening substances for further evaluation in an HHRA. Health Canada. 2012. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA), Version 2.0. Ottawa, Ontario: Environmental Health Assessment Services, Safe Environments Program. http://www.hc-sc.gc.ca/ewh-semt/pubs/contamsite/index-eng.php	CEAA-IR-40 (Ref HC-IR-01, HC-IR-02, HC-IR-03, HC-IR-04): Include all COPCs in the HHRA that were screened out. This includes substances in: -air emissions (TSP, PM10 and PM2.5., SO2, NO2, lead, beryllium (short-term), and cobalt, chromium, nickel (long-term) and any other substances that exceed their guideline values (or have no guideline value)), -surface water (ammonia, hardness, alkalinity and titanium), and -soil (arsenic). Alternatively, provide a rationale as to why screening-out COPCs from the HHRA is appropriate if their predicted change is less than 10% of the baseline conditions.	See 05-Dec-16 Technical Memo entitled Re-evaluation of identification of contaminants of potential concern (COPCs) for the Human Health Risk Assessment, BURNCO Aggregate Project.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
339	CEAA-235	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	No cumulative effects assessment was undertaken for noise, based on the assumption that "all potential Project-related residual adverse effects were determined to be negligible and requiring no further consideration. No residual effects were carried forward to a cumulative effects assessment." Given that there are other industrial activities occurring in the vicinity of the Project (including logging), it is unclear why no cumulative assessment of noise was undertaken.	CEAA-IR-41 (Ref HC-IR-25): Provide a cumulative effects assessment of noise on nearby human receptors or provide additional justification as to why this was not considered necessary.	As per Section 4.5.3.2 of the EA a Negligible-Not Significant residual effect was defined, for the purposes of this assessment, as a residual effect that will result in no change or an incremental change to the indicator that is not measureable or within the natural variability of the system. Negligible-Not Significant residual effects were not carried forward to the cumulative effects assessment. Cumulative effects due to noise were not assessed because the significance of the noise VC was Negligible-Not Significant. The cumulative contribution of noise from other facilities such as the Box Canyon project is expected to be minimal, based on previous assessments of run-of-river projects (e.g. Narrows Inlet Hydro Project, 2012). Logging was included in the baseline noise levels and therefore was included in the Application Case noise levels.
340	CEAA-236	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	As stated in Appendix 9.1-B, "the predicted 1-hour air concentrations for selected receptor locations screened against the selected thresholds are presented." The background/baseline concentrations were not added to the predicted future concentrations when screening substances for further evaluation in the HHRA. In order to evaluate concentrations that may be present during Project operations, it is necessary to include background/baseline concentrations in addition to the predicted emissions from the Project to evaluate overall health risks.	CEAA-IR-42 (Ref HC-IR-08): Provide a prediction of future concentrations of substances in air that includes baseline concentrations.	The predicted air concentrations for each receptor location include background (i.e., predictions are equal to background plus project-related contribution). See Section 5.7.3 of the EAC Application/EIS for a more detailed description of the air quality assessment methodology.
341	CEAA-237	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Table 9.1-C-3 provides the input values and sources used to calculate fish and shellfish screening levels. For fish and shellfish ingestion rates Health Canada (2007) is cited. This consumption rate may not be representative of local Indigenous Peoples consumption rates for fish and shellfish. The First Nations Food Nutrition and Environment Study (FNFNES) should be consulted (in addition to any other dietary surveys or consumption studies for local Indigenous Peoples) in order to more accurately determine local consumption rates/patterns and those values should be used in screening equations to determine the COPCs to be evaluated in the HHRA. In addition, using consumption rates from Health Canada (2007) does not take into consideration the potential for very high rates of consumption for short periods of time, such as during a weekend fishing trip or a ceremonial event.	CEAA-IR-43 (Ref HC-IR-13): Include in the HHRA current consumption rates of country foods by local Indigenous peoples based off the First Nations Food Nutrition and Environment Study and any other dietary surveys or consumption studies for local Indigenous people, rather than data from 2007.Alternatively, provide a rationale as to why data from 2007 is applicable for describing current consumption rates.	Site-specific consumption rates were not available for local First Nations at the time of the assessment. Therefore, the Health Canada fish consumption rates for 'high-consumers' was used to derive screening values for fish tissue. The First Nations Food Nutrition and Environment Study (Chan et al 2010) reports consumption rates for a number of First Nations groups in BC broken down by 'ecozone/culture area'; however, First Nations local to the study area were not represented in the report. The closest regional data are from Pacific Maritime/Subarctic/Northwest Coast and the Pacific Maritime/Plateau ecozones, which included 9 participating First Nations communities in coastal BC. The reported average daily ingestion rates for fish/shellfish consumption (including salmon, halibut, lingcod, mussels, and crab) was 33.8 g/day (96.5 g/day corrected for consumers only) for the Subarctic/Northwest Coast ecozone and 18.9 g/day (67.5 g/day for consumers only). The high-consumer rate reported in Health Canada (2007) is equivalent to the 90th percentile consumption rate of 45 g/day (49 g/day for consumers only) from a Canadian dietary survey. Therefore, use of the Health Canada high-consumer value of 49 g/day (fish and shellfish combined) was considered reasonable for preliminary screening purposes for coastal BC First Nations. It should also be noted that changes in fish/shellfish tissue are not predicted to occur as a result of the project; therefore the fish/shellfish consumption pathway was not retained for the risk assessment. Health Canada. 2007. Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption. Bureau of Chemical Safety. March 2007. Laurie Chan, Olivier Receveur, Harold Schwartz, Amy Ing and Constantine Tikhonov. 2011. First Nations Food, Nutrition, and Environment Study. Results from British Columbia (2008/2009). Prince George: University of Northern British Columbia, 2011.
342	CEAA-238	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Tables 9.1-D-1 to D-4 identify the locations where predicted annual deposition rates were calculated. There were no predicted soil concentrations presented for the location(s) where the highest deposition of airborne particulates could occur. It also does not appear that the nearest community (McNab Strata community) was evaluated with regard to increases in concentrations of substances in soil as a result of deposition of airborne particulate matter during Project operation. In addition, there are two locations (Unknown First Nations and Unknown Residence) that were not identified either on a map or by geographical coordinates. Failure to evaluate soil at the nearest receptor locations may result in underestimation of potential human health risks associated with Project activities.	CEAA-IR-44 (Ref HC-IR-15): Provide baseline and predicted future soil concentrations at the maximum point of impingement and at the community of McNab Strata. Alternatively, provide a rationale as to why this is not required.	Annual deposition rates are not provided for the MPOI. The MPOI is only considered for short-term exposures, as there are no human health receptor locations in the MPOI location. McNab Creek Strata was included as a receptor location and annual deposition rates and soil concentrations were predicted at this location. The maximum predicted application case soil concentration among all receptor locations was used to identify COPCs in soil. The predicted concentrations of metals in soil were greatest at the McNab Creek Strata (see Table 9.1-C-2 in Appendix 9.1-C), which represents the worst-case scenario for exposure to soil and associated terrestrial country foods. The Unknown First Nations receptor location is shown on Figure 9.1-1 as "First Nations Cultural Site" (Key 12). The Unknown Residence, which should be identified as Key 13 on Figure 9.1-1, is located west of the Project area. No soil COPCs were identified at McNab Strata.
343	CEAA-239	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Part C should include an analysis of all residual effects on current use of lands and resources for traditional purposes, and impacts on Aboriginal rights. The EIS states that "there will be no significant adverse effects to deer, elk, or key habitats". The EIS indicates, however, that the proponent has not yet engaged the Squamish Nation in detailed technical consultation on the assessment of effects to deer, elk, or key habitats for these species". On page 11-30 the Squamish Nation is reported as saying that there may be still be impacts to their Aboriginal Rights such as access to these species for current use purposes, and that additional mitigation may be required (pending further review and consultation). There may also be residual effects from potential accidents and malfunctions.	CEAA-IR-45: Provide an analysis of all effects of the Project on Aboriginal groups' current use in the study area. This includes impacts to deer, elk and their key habitats, use of the area by all potentially impacted Aboriginal groups, and the effects from any potential accidents or malfunctions related to the project. Provide a list of additional proposed mitigation measures to avoid or reduce any impacts.	Squamish Nation has stated that proposed measures would mitigate potential effects on their current use of lands and resources for traditional purposes. See 01-Aug-2017: Letter from Chief Bill Williams (Squamish Nation) to Rob Hajdú (CEA Agency) RE: CEAA Request for Additional Information regarding the BURNCO Aggregate Project (the "Project"). An assessment of the current use of lands and resources for traditional purposes by the Tsleil-Waututh Nation and other Aboriginal Groups is presented in a 27-June-2017 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests and Comments Related to Current Use of Lands and Resources for Traditional Purposes and Mitigation of Potential Effects.

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
344	CEAA-240	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The Squamish Nation uses Roosevelt elk from the project area for current uses purposes. The cumulative effect assessment should consider how all stressors (direct habitat loss, indirect effects, impacts to movement etc.) from all land uses may affect the Roosevelt elk population. This requires a more meaningful and descriptive assessment than only stating that 16% of the RSA winter habitat will be affected, and that "The magnitude of the potential cumulative residual effects on Roosevelt elk winter habitat loss, mortality, and barriers to movement are predicted to be medium, negligible and negligible, respectively" without evidence or rationale to explain these determinations of the cumulative effect within the RSA.	CEAA-IR-46: Provide a discussion and analysis of the cumulative effects to the Roosevelt elk population, considering all stressors and land uses that may result in direct habitat loss, indirect effects, and effects to elk movement. If a residual cumulative effect is identified, provide an assessment of this effect on Squamish Nation's current use of Roosevelt elk, and any corresponding impacts to their asserted Aboriginal rights.	Cumulative effects to Roosevelt elk (Cervus elaphus roosevelti) habitat loss, change in mortality, and barriers to movement as a result of the Project as well as past, present and other reasonably foreseeable projects and activities were considered in the cumulative effects assessment (Section 5.3, Vol 2). The cumulative effects that may occur are a reduction of overwintering habitat, mortality due to roads or hunting, and barriers to movement due to fencing and roads. Habitat loss - Historical and active logging of low elevation mature and old growth forests has and is likely to further reduce the availability of Roosevelt elk wintering habitat. Based on conservative assumptions regarding the extent of Roosevelt elk winter habitat that may be affected by reasonably foreseeable developments the Terrestrial RSA, 15% (334 ha) of suitable Roosevelt elk winter habitat in the Terrestrial RSA may be lost. The Proposed Project is predicted to affect 36 ha (1.5%) of suitable winter habitat in the Terrestrial RSA. Therefore, the cumulative loss of high and moderate suitability Roosevelt elk winter habitat in the Terrestrial RSA is predicted to be 370 ha (16%, Sec 5.3.3.5.1.1, Vol 2). Change in mortality - Mortality due to clearing is not predicted to occur for Roosevelt elk, which will be able to vacate areas ahead of clearing. New roads and increased vehicle traffic on existing roads within the RSA may increase the risk of vehicle collisions with Roosevelt elk. New roads created by the forest industry may result in increased mortality due to increased vehicle collissions as well increased access for hunters and poachers. However, public access to the McNab Valley FSR via the Proposed Project Area will be controlled and limited to First Nations communities, which will result in a reduction in access to Roosevelt elk habitat for hunters and poachers due to the Proposed Project (Sec 5.3.3.5.1.2, Vol 2). Barriers to movement - Barriers created by Eagle Mountain Woodfibre Gas Pipeline Project are predicted to be temporary because 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 in a previously cleared area that is used by Roosevelt elk. The Box Canyon Hydro Project and forestry activity in the Terrestrial RSA, including road building, may increase Roosevelt elk movement barriers. The design of the Proposed Project may create a barrier to elk movement through the Proposed Project Area. However, riparian habitat along McNab Creek will be maintained which is expected to maintain landscape connectivity for elk movement (Sec 5.3.3.5.1.3, Vol 2). The available evidence suggests that the Roosevelt elk population in the Terrestrial RSA is self-sustaining and maintaining its ecological function (Sec 5.3.1.5.6.1.7, Vol 2). Therefore, the Roosevelt elk population within the Terrestrial RSA is determined to be resilient to imposed stresses.
345	CEAA-241	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Table 11-5 identifies all the activities carried out at the traditional use and occupancy sites identified in the LSA by the Squamish Nation. Part C does not analyze Project effects on these current use activities for Squamish Nation nor does it provide an assessment on Project effects on Aboriginal rights, including current use.	CEAA-IR-47: Provide an assessment on the effects of the Project on current use of lands and resources for traditional purposes by Aboriginal peoples, separate from the assessment of impacts to Aboriginal rights. Include a determination of significance of the residual effects to current use of lands and resources for traditional purposes by Aboriginal peoples that is separate from impacts to Aboriginal rights.	Squamish Nation has stated that proposed measures would mitigate potential effects on their current use of lands and resources for traditional purposes. See 01-Aug-2017: Letter from Chief Bill Williams (Squamish Nation) to Rob Hajdú (CEA Agency) RE: CEAA Request for Additional Information regarding the BURNCO Aggregate Project (the "Project"). An assessment of the current use of lands and resources for traditional purposes by the Tsleil-Waututh Nation and other Aboriginal Groups is presented in a 27-June-2017 Technical Memo entitled BURNCO Aggregate Project: Response to Information Requests and Comments Related to Current Use of Lands and Resources for Traditional Purposes and Mitigation of Potential Effects.
346	CEAA-242	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS indicates that the only two Indigenous groups that use Howe Sound for the current use of lands and resources for traditional purposes are the Squamish Nation and the Tsleil-Waututh Nation. Musqueam Indian Band have reported using Howe Sound for traditional purposes, including for hunting, fishing, and harvesting of marine resources. Other Aboriginal groups whose asserted traditional territories overlap the marine shipping route in Howe Sound may also use the area for traditional purposes.	CEAA-IR-48: Provide an explanation of how the information related to current use of lands and resources for traditional purposes was verified with all Aboriginal groups. If confirmed traditional use exists in Howe Sound that was not included in the EIS: -provide a new description of each group's use of the area; -conduct a new residual effects assessment on each Aboriginal group's current use of lands and resources for traditional purposes; -conduct a new assessment of the potential effects of the Project on their asserted Aboriginal rights; and -if residual effects are identified, conduct a revised cumulative effects assessment on current use and assess the impacts to Aboriginal Rights.	As directed by CEAA, BURNCO relied on publicly-available sources for the effects assessment, as well as regulatory documents for other projects in proximity to the Proposed Project Area. BURNCO provided Aboriginal Groups with a preliminary draft of the background information prepared from publicly-available sources to be included in the EAC Application/EIS for review and comment in November 2015. BURNCO provided Aboriginal Groups with the draft effects assessment and First Nations Consultation Report for review and comment in January 2016 prior to finalizing the EAC Application/EIS. BURNCO addressed all review comments that were received from Aboriginal Groups in response to these requests. Squamish Nation has stated that proposed measures would mitigate potential effects on their current use of lands and resources for traditional purposes. See 01-Aug-2017: Letter from Chief Bill Williams (Squamish Nation) to Rob Hajdú (CEA Agency) RE: CEAA Request for Additional Information regarding the BURNCO Aggregate Project (the "Project"). BURNCO did not find information indicating that Cowichan Tribes, Halalt First Nation, Penelakut Tribe and Stz'uminus First Nation use Howe Sound in the exercise of their Aboriginal Rights, including current use of lands and resources for traditional purposes. The sources indicated that Musqueam potentially harvested aquatic resources, specifically herring, in Howe Sound and birds on Passage Island and the entrance to Howe Sound. The LSA was selected to include the immediate freshwater and terrestrial footprint of the Project and adjacent areas. These areas are where potential Project-related disturbances could occur during the construction, operation, reclamation and closure phases. The RSA was selected to be larger in scope, encompassing an area broader than the immediate footprint of the Project. RSA boundaries were selected to represent an appropriate scale that provides relevant context for consideration of the Project effects, offer useful and meaningful data, and neither over-emphasizes nor under-emphasizes the scale of the Project effects. The scope of the assessment does not include shipping from where the barges meet the existing shipping lanes in the Strait of Georgia and in the Fraser River or Burrard Inlet. The Proponent did note in Section 11.4.2.3.1 of the EAC Application/EIS that sources indicated that herring was harvested by Musqueam in Howe Sound; however, no specific locations within Howe Sound were identified. As noted in Section 5.2.4.6, no sensitive fish habitats overlap with the Project Area, including no known spawning sites for key forage fish species, such as herring or capelin. The potential effects of the Project were assessed for marine resources in Section 5.2 and no significant residual effects are predicted for this VC. The Proponent is of the view that the Project does not have the potential to affect marine resources that are relevant to Musqueam's current

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
347	CEAA-243	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The Squamish Nation uses elk from the Project area for current uses purposes.In the remote camera survey for Roosevelt elk the baseline report says that "Data from such studies can be particularly helpful in assessing the presence of wildlife in the landscape, and in assessing wildlife activity and movement patterns, on a seasonal basis." (s.2.2.6.1). Interpretations of the camera data in 3.6.5.1 and 3.6.7.2 do not describe potential movement patterns on a seasonal basis for elk and deer. No analysis has been conducted on migration patterns of the Roosevelt elk from these data. The data from the EIS suggests that preferred migration routes are along the main road (elk observations high at camera locations 18, 14 and 20). This interpretation is important to understand how the Project will affect seasonal movements of ungulates along this route and to determine how mitigation measures may be applied.	CEAA-IR-49: Provide a description of seasonal movement patterns of Roosevelt elk in the LSA and RSA using the data that was collected and Aboriginal traditional knowledge. Remote camera data indicate that preferred ungulate movement routes are along the main road. Describe how the Project may affect ungulate use of this route. Quantify the proportion of direct and indirect habitat loss for Roosevelt elk in the Regional Study Area, with a particular focus on percentage of low elevation winter habitat loss. Discuss any potential effects to the ability of Roosevelt elk to persist in the McNab Creek watershed or move and persist in adjacent watersheds, which may also be affected by other land use and/or industrial activities.If a residual effect is identified provide an assessment of this effect on Squamish Nation's current use of Roosevelt elk, and any corresponding impacts to their asserted Aboriginal rights.	The primary purpose of the remote camera program was to determine presence and distribution of medium and large mammals in the Terrestrial LSA (Section 2.2.6, App 5.3-A, Vol 4, Sec G). Quantifying landscape level movement routes and seasonal movement patterns was not the intent of the camera program. However, remote camera data were analyzed to provide insights into wildlife use of the Terrestrial LSA. The seasons when elk and deer were most frequently recorded and the habitat types most frequently utilized (i.e., 57% of observations on roads) are described in Section 3.6.5.1 of the Wildlife Baseline Report. Construction and operations of the Project is predicted to affect 165 ha (36 ha direct and 128 ha indirect due to sensory disturbance) of high and moderate suitability winter elk habitat in the Terrestrial RSA, which represents 3.9% of suitable habitat in the Terrestrial RSA (Sec 5.3.1.5.3.7.1.1, Vol 2). However, habituation by elk to sensory disturbance is expected, and much of the habitat conservatively estimated to be indirectly affected will be available to elk over time. The area of suitable Roosevelt elk habitat affected represents approximately 2.5% of the McNab Creek watershed, which covers an area of approximately 6,498 ha. Loss of suitable Roosevelt elk winter habitat will be limited to the Proposed Project Area and is expected to be fully reversible through progressive reclamation and replanting after Project completion, with the exception of the area that will become the pit-lake (0.8% or 36 ha of the Terrestrial RSA) at the end of the life of the Project (Sec 5.3.1.5.5.1.7.1, Vol 2). Roosevelt elk are expected to avoid areas where clearing activities are occurring. Given the availability of habitat in the Terrestrial LSA and elsewhere in the Terrestrial RSA, it is unlikely that construction of the Project would represent a measureable impact on the population of Roosevelt elk. Forage habitat is relatively abundant in the Terrestrial LSA outside of the Project Area, and snow interception cover is much more abundant outside the Project area and Terrestrial LSA, which is mostly composed of early seral forest. The McNab Creek riparian areas will not be affected by the Proposed Project. Therefore, landscape connectivity for elk will remain intact along McNab Creek. Noise from the Proposed Project area will affect approximately 3% of suitable Roosevelt elk winter habitat within the Terrestrial RSA and less than 1% of suitable habitat will be lost due to clearing. Net residual effects of the Proposed Project on elk are predicted to be of low magnitude (Section 5.3.1.5.5.1.7; Table 5.3-22). Reclamation of the Proposed Project area will support restoration of suitable Roosevelt elk winter range habitat. The available evidence suggests that the Roosevelt elk population in the Terrestrial RSA is self-sustaining and maintaining its ecological function. Therefore, the Roosevelt elk population within the Terrestrial RSA is determined to be resilient to imposed stresses (Sec 5.3.1.5.6.1.7, Vol 2). The effects of the Proposed Project are not expected to exceed ecological thresholds and compromise the resilience of the regional
348	CEAA-244	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	In order to assess all potential accidents and malfunctions, and develop appropriate Spill Prevention and Emergency Response Procedures associated with fuel spills in the marine environment, it is important to know where tug boats servicing the Project will be housed and refueled (Table 2-5, page 2-20).	CEAA-IR-50 (Ref TC-IR-01): Indicate where tug boats that service the Project will be bunkered and refueled.	Tugboats will not refuel at the Project site. Tugboats will be bunkered at an approved facility to be determined by the contracted tug and barge operator.
349	CEAA-245	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	The EIS (Table 15-4) includes "Likelihood of occurrence" values for each of the Accident and Malfunction types. 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."	CEAA-IR-51 (Ref ECCC-EE-IR-2): Provide the Risk Rating Matrix that was used to inform the "Likelihood of Occurrence" of an Accident or Malfunction.	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 likelihood of occurrence presented in Table 15-4 was based on the following: The likelihood of potential residual effects occurring was characterized for each VC using appropriate quantitative or qualitative terms, with sufficient description of how conclusions were reached. The following scale was use, unless otherwise specified in the discipline specific sections, for the assessment of likelihood: - Low - likelihood of occurrence (0 to 40%) – Residual effect is possible but unlikely; - Medium - likelihood of occurrence (41 to 80%) - Residual effect may occur, but is not certain to occur; and - High - Likelihood of occurrence (81% to 100%) - Residual effect is likely to occur or is certain to occur. Likelihood may be influenced by a variety of factors, such as the likelihood of a causal disturbance occurs or the likelihood of mitigation being successful. The likelihood of each residual effect occurring is presented in the discipline specific sections Volume 2, Part B - Section 5.1 through Section 9.2 and as summarized in Table 15-5.
350	CEAA-246	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Thirteen "key" mitigation measures are presented for land-based hazardous material spills that may impact surface water quality (Table 15-5). No human health-based mitigation measures were presented. In the event of chemical spills to surface water, drinking water, fish and other aquatic foods consumed by Indigenous Peoples may also be impacted.	CEAA-IR-52 (Ref HC-IR-27): Provide mitigation measures that are relevant from a human health perspective or provide justification as to why additional mitigation measures are not necessary (e.g. surface water is not expected to be consumed by people).	Mitigation measures that are also relevant to human health are presented in Table 15-5 with respect to the following accidents and malfunctions: - Geohazards: Factors of safety for the side slopes are considered in the Volume 4, Part G – Section 22.0: Appendix 5.4-Q where sloughing or slope failure could cause retrogression of the pit crest to a degree that could impact on the safety of mine personnel; - Power outages; - Accidental discharge of sediment into watercourses from erosion/loss of containment of aggregate pit; - Accidental Hazardous Material Spills (e.g., motor vehicle accidents or other accidents causing land-based or marine based spills are considered); No additional mitigation measures are necessary specifically for human health other than those presented in Table 15-5 regarding these mitigation measures. A single surface water license (PD44460) exists for the McNab residents downstream of the Proposed Project Area. Loss of containment of aggregate pit due to a failure of the Pit Lake Flood Protection Dyke could result in a potential effect to the quality of water of this water license. Details regarding this will be provided in the Consequence Analysis that will be provided with the Water Sustainability Act application and the Mines Act Permit Application. It is not expected that other spills or releases in the Proposed Project Area (e.g., Accidental discharge of sediment into watercourses from erosion; Accidental Hazardous Material Spills (e.g., motor vehicle accidents or other accidents causing land-based or marine based spills are considered) would cause potential effects to the water license due the location of the license out of the Proposed Project Area. In relation to a spill or release to the foreshore environment and the potential effects to marine species consumed by people, A Human Health Risk Assessment may be initiated to determine the potential effects of consumption of downstream resources. How and when this type of assessment is necessary depends on several factors including: ■ the substance that is spilled or released ■ location of spill or released ■ timing of the spill or released Closure of recreational finishing activities is regulated by Fisheries and Oceans Canada (DFO). In the event of any spill to freshwater and marine

Line No.	For Working Group Use					For Proponent Use
	Issue Ref.	Comment Date	Reviewer Name / Agency	Agency Context	Comment	Proponent Response
351	CEAA-247	3-Nov-16	Rob Hajdú, Canadian Environmental Assessment Agency	Page 5.4-28 states: "Further investigation and assessment will be required to evaluate the debris flood/debris flow potential and determine if engineering designs are required to mitigate potential risks." The very next two sentences state: "There is no evidence for debris flood/debris flows that could potentially impact the Project area. Therefore no further investigations or assessments for debris floods / flows are required and engineering designs are expected to mitigate the potential risks". These statements are contradictory.	CEAA-IR-53: Confirm if additional studies are required to determine whether debris flood / debris flow has the potential to impact the Project. If the potential exists, conduct a residual effects assessment to determine significance, and discuss mitigation measures to mitigate potential risks.	A terrain stability field assessment was completed on November 2-3, 2016. The results of the field assessment, together with the data in our existing hydrologic and geotechnical assessment reports (Hydrological and Hydraulic Characterization McNab Valley Aggregate Project Howe Sound BC, Concrete Aggregate Summary, Assessment of Avulsion Risk of McNab Creek (located in EA Vol. 4 Appendix 5.4 – C, F, A respectively) indicate that there is no evidence for historic debris flows or debris floods. Therefore, further investigations are not considered to be required.
665	CEAA-248	19-Dec-16	Rob Hajdú, Canadian Environmental Assessment Agency	In the Environmental Impact Statement (EiS) received from BURNCO Rock Products Ltd. (BURNCO) on August 4, 2016 sub reach 3.3 of McNab Creek is identified as having moderat to high avulsion risk prior to implementation of mitigation measures (EIS Appendix 5.4-A). the mitigation measures identified to reduce this risk to a rating of "very low" include imposing a minimum setback for construction of no less than 75 meters from McNab Creek, and building a training berm. There is a gap between the Containment Berm (south and southeast of the Pit Plak) and for Flood Protection Dyke (north and northeast of the Pit Lake) along a segment parallel to sub-reach 3.3. It is not clear why the containment berm or the flood protection dyke fo not extent to this segment (Figure 5.1-4) of the EIS). The minimum setback between the creek and construciton activity in this location is also not clear.	Since the training berm is listed as a mitigation measure to reduce the risk of avulsion from "moderate to high" to "very low", provide a rationale for why there is a gap beween the flood protection dyke and the containment berm, in the area parallel to sub reach 3.3, and why the training berm is not required. Also describe what the setback of construction will be from McNab Creek in subreach 3.3 when water levels are highest. Provide information on any local topography along sub-reach 3.3 that would inhibit flow from an extreme flood event that would cause avulsion in this location.	The McNab Creek Flood Control Dyke along the northern edge of the Site and the Pit Lake Containment Berm along the southern edge of the Site are different structures with different primary purposes. The primary purpose of the McNab Creek Flood Control Dyke is the management of floods from McNab Creek. The primary purpose of the Pit Lake Containment Berm is the containment of floods from within the Pit Lake. Both the McNab Creek Flood Control Dyke and the Pit Lake Containment Berm are being engineered to serve the function of a training berm as discussed in the avulsion risk assessment provided in Appendix 5.4-A of the EAC Application/EIS. Revisions to the McNab Creek Flood Control Dyke design criteria for permitting and review of the recommendations provided in Appendix 5.4-A have resulted in the extension of the Flood Control Dyke adjacent to McNab Creek reach 3.3 to connect to the Pit Lake Containment Berm. The Flood Control Dyke, the Pit Lake Containment Berm and the 1/100 flood inundation area are presented in the attached Figure 2 entitled 100 Year Flood Inundation Area. As shown, the proposed works have been designed as set-back structures and they are to be developed on existing ground which is generally higher than the Creek and the floodplain relative to the current hydrologic regime.

end.