EPA Comments – Pebble Project Preliminary Draft EIS, Appendix K4.18 - Water and Sediment Quality

Agency	Comment No.	Section, Paragraph, and Page #	Cooperating Agency Comment (and Purpose of Comment)	Proposed Resolution (Additions or Deletion of Text)	Response
EPA	1	K4.18	Nitrates and ammonia from blasting residues	The discussions of water quality estimates do not explain whether the predictions include contributions from explosives residuals, such as nitrates and ammonia, that may leach to groundwater or surface water or be contained in the water management ponds and require treatment. We recommend that this appendix clearly describe whether this information was factored into the estimates and describe the procedures used. If it was not included, then we recommend that these predictions be developed and provided in the DEIS.	Explosive residue inputs were factored into water quality estimates (SRK 2018a). Text has been clarified.
EPA	2	Section K4.18.1.1, Page K4.18-1	Climate variability is incorporated in the model using a 76-year synthetic time series of monthly temperature and precipitation values to simulate the cyclical nature of the climate record.	We recommend providing information on the rationale for using a period of 76 years in the model, and why monthly values were used.	Addressed in text. Additional information regarding the development of the 76-year synthetic record, including calibration and validation of the watershed module, is presented in Appendix K3.16.
EPA	3	Section K4.18.1.1, Page K4.18-1	Three of these model runs were selected to represent dry, average, and wet climate conditions and illustrate the range of potential flows for the mine site under these varying conditions.	We recommend explaining how the dry and wet conditions are being defined and determined.	Addressed in text. Discharge volumes may vary month to month based on the timing and magnitude of precipitation and snowmelt; however, in general on an annual basis, the dry scenario had the lowest total

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					discharge and the wet scenario yielded the greatest total discharge. Higher discharge rates correspond to higher levels of precipitation and lower discharge rates correspond to lower levels of precipitation.
EPA	4	Section K4.18.1.1, Page K4.18-1	Details regarding the water balance model inputs and assumptions are provided in Knight Piésold (2018a).	The reference section (Chapter 9) does not include a Knight Piésold (2018a) document. As recommended in our previously submitted comments, models used for environmental predictions should include discussion of model inputs and assumptions, a sensitivity analysis, and discussion of uncertainties. Otherwise, the validity of the outputs cannot be determined. As such, there is insufficient information provided in this section to evaluate the impacts from this project on water quality and we recommend that additional information be included in the DEIS regarding the model inputs and assumptions.	Reference section has been updated to include referenced documents. Referenced documents are available on the Pebble Project EIS website. Additional information regarding sensitivity analysis has been received through the RFI process, and is incorporated in the current text as appropriate.
EPA	5	Section K4.18.1.1, Page K4.18-1	The water quality model is used to predict the influent water quality to the water treatment plants and the water quality in the water management ponds (WMPs), under varying climate	We recommend providing information regarding how the groundwater quality was modeled, particularly the bulk/main TSF.	Discussion of the water quality modeling process has been expanded.

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			conditions		
EPA	6	Section K4.18.1.1, Page K4.18-1	Geochemical source term inputs for the water quality model were developed by SRK Consulting (Canada) Inc. (SRK) (2018a).	The references (in Ch 9) do not include an SRK 2018a document. Without reviewing how the source terms were calculated, the validity of these input parameters cannot be determined. As such, there is insufficient information provided in the EIS to evaluate the impacts from this project on water quality and we recommend that additional information on the modeling inputs be included in the DEIS.	Addressed; the reference section has been updated to include SRK (2018a). This document is available on the Pebble Project EIS website.
EPA	7	Section K4.18.1.1, Page K4.18-1	Geochemical source term inputs for the water quality model were developed by SRK Consulting (Canada) Inc. (SRK) (2018a).	Specific information that we recommend be included in the DEIS includes but is not limited to: (1) Specifying the geochemical characterization data that were used to develop the source terms. (For example, whether only the HCT results were used or whether barrel test results were also incorporated.) We recommend providing a rationale for these decisions; (2) Describing whether release rates from multiple tests were averaged or otherwise combined, or whether only selected test results were used; (3) Describing whether the source terms were developed from data over the entire duration of the tests or if they were from a differently defined time period; and (4) Describing any temperature corrections used when translating lab-based predictions to model predictions of field conditions	Addressed. Text added to incorporate additional information received through the RFI process and clarify how the geochemical source terms were developed (SRK 2018a, 2018f). These reports are available on the Pebble Project EIS website.
EPA	8	Section K4.18.1.1, Page K4.18-2	Table K4.18-1	It is not clear what “realization #” is referring to. We recommend that the DEIS define this.	Addressed in text. Each realization represents a unique model run selected from the 76 total model runs (Knight Piésold 2018a).

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EPA	9	Section K4.18.1.1, Page K4.18-3	Table K4.18-2	In general, in this document, mercury (Hg) pollution originating from the mine site has not been highlighted in any of the text. However, based on this table the predicted water quality concentrations are very elevated: 2,170 ng/L, 500 ng/L, and 6,200 ng/L for the waste rock, rock fill, and non-acidic stockpiles. These values are somewhat surprising given the relatively low Hg concentrations in the ore-body. However, given that the water quality standard is 12 ng/L, the exceedance of this value by several orders of magnitude is of concern, and we recommend that this be discussed in detail in the text of section 4.18. What is of additional concern is that these materials associated with these high Hg values are all from non-acidic sources and may not be subjected to a similar level of treatment/capture as materials destined for the PAG TSF. The potential for Hg releases in conjunction with sulfate releases (even if the WTP meets WQS for sulfate—250 mg/L) are also of concern because the WQS for sulfate are based on direct impacts from sulfate and not on its impact on promoting Hg methylation through stimulation of sulfate reducing bacteria. We recommend expanding the analysis and discussion of Hg impacts in Section 4.18.	Source terms provided in Table K4.18-2 are an upper end estimate of potential constituent concentrations that may occur. Contact water resulting from these sources would be treated in WTPs. Table K4.18-2 provides the 95th percentile predicted water quality information, including constituent concentrations and physical parameters, expected to be produced from various geochemical sources at the mine site. The set of geochemical source terms were used as conservative inputs to the water quality model for analysis of mine site water quality and water treatment processes.
EPA	10	Section K4.18.1.1,	Table K4.18-2	We recommend that the text or a footnote to	Addressed.

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		Page K4.18-4		the table describe what is meant by "Tailings Pond Adjustment."	Footnote has been added to the table to indicate adjustments made for specific location and orographic effects. Tailings pond adjustment values were applied for Al, SO4, Fe, Cu and Mn in the bulk TSF and pyritic TSF.
EPA	11	Section K4.18.1.1, Page K4.18-6	Values in the table represent the maximum monthly predicted concentrations for the 50th percentile flow values and the 95th percentile source term concentrations for flows going to the WTPs from each facility for the final year of operations.	We recommend providing additional information on the "50th percentile flow values" and why this was selected instead of the 95th percentile as was done with the source terms concentrations.	Addressed; text added. The 95th percentile represents a source term input to the water quality model that will be greater than 95% of all possible inputs to the WTP, hence providing a conservative estimate from the water quality model. The 50th percentile flow value, a value in which 50% of results were greater and 50% were less, represents a middle estimate of potential outputs from the WTPs. Use of the 50th percentile results modeled

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					from the 95th percentile source terms yields a conservative estimate for mid-range flow conditions and provides insight into how we expect the WTP to perform for water quality near worst-case under representative flow conditions. As noted below, predicted water quality data under additional flow conditions have been added.
EPA	12	Section K4.18.1.1, Page K4.18-6	Values in the table represent the maximum monthly predicted concentrations for the 50th percentile flow values and the 95th percentile source term concentrations for flows going to the WTPs from each facility for the final year of operations.	Ideally, instead of a singular value presented in this table, a range of values should be included and/or a mean value with a measure of dispersion around the mean to represent the expected variability in the predictions. We recommend that the table and accompanying text be revised accordingly.	Addressed. Tables have been updated to include 10th and 90th percentile as well as 50th percentile flow values.
EPA	13	Section K4.18.1.1, Page K4.18-6	Table K4.18-2	The table presents data on the concentrations but not on the mass loads of the parameters to surface waters. In identifying potential impacts to the environment, it would be very helpful to provide mass loading data alongside the concentration data. For example, based only on the information provided in this table, it is not possible to identify the relative importance of	Addressed. Table of mass loads has been added Table K4.18-3: Modeled Mass Loads – Final Year of Operations.

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				the different mine site geochemical sources. As such, providing loading data alongside the concentration data is important for assessing the potential impacts of the project on the environment and we recommend that this information be added to the table or provided in additional tables.	
EPA	14	Section K4.18.1.1, Page K4.18-17 to 22	Tables K4.18-5, 6, 7, and 8	We recommend that the DEIS describe why the 50th percentile of the max monthly values is used to represent predicted water quality values. As noted above, we recommend that a range of values be reported and/or a measure of dispersion around the mean value be included in the DEIS.	Addressed. Text added to Appendix K4.18 elaborating on the use of the 95th percentile source terms and the 50th percentile value output. Range of monthly values is not currently available; however, ranges under additional flow conditions have been added. Use of the 95th percentile source terms provides a conservative estimate of water quality under each of these flow conditions.
EPA	15	Section K4.18.1.3, Page K4.18-24	Surface runoff into the pit lake could cause metals to leach from the pit walls. In addition, contaminated groundwater would flow into the pit.	We recommend that the text describe the sources of contaminated groundwater that would flow into the pit at closure.	Addressed. The resultant groundwater capture zone, in which all groundwater will flow into the pit in

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					closure, would primarily be located in the SFK watershed with parts extending under the pyritic TSF. The corresponding zone of influence of the pit lake would extend marginally farther out than the capture zone (Piteau Associates 2018a). The extent of the groundwater capture zones in operations and closure are discussed and depicted on figures in Section 4.17 and Appendix K4.17.
EPA	16	Section K4.18.2.4, Page K4.18-27	The predicted quality of discharge water from both WTPs in operations is provided in Table K4.18-9, and from the WTP in closure in Table K4.18-10.	It is not clear whether the predicted values in these tables represent average or maximum values. We recommend that both the 50th percentile and 90th percentile values be provided.	Addressed in text. Tables contain the 50th percentile of model results.
EPA	17	Section K4.18.2.4, Page K4.18-29	Table K4.18-10	The Cd outflow value of 0.049 mg/L is in bold, indicating that it does not meet WQS; however, in Table K3.18-1, the standard is shown to be 0.08 mg/L. We recommend that the DEIS address this potential discrepancy.	Addressed, the value was mistakenly bolded. Bold format has been removed.
EPA	18	Section K4.18.2.4, Page K4.18-30	Table K4.18-10	The Hg concentration from the WTP outflow post-closure is predicted to be 61 ng/L, which is significantly elevated above the WQS of 12	Addressed. Information regarding WTP in

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				ng/L. This, in conjunction with the sulfate levels of 151 mg/L (same table), have the potential to create a problem with methylmercury production and the potential bioaccumulation of methylmercury in downstream fish tissue. We recommend that this be described in the DEIS in section 4.18 and 4.24 (fish values).	closure phase has been revised with additional information provided through the RFI process.
EPA	19	Section 4.18.2.1 and K4.18.2.1 and K4.18.2.2	"This may require further investigation as design progresses and/or long-term adaptive management strategies (Chapter 5)"	We recommend considering alternatives for management of concentrated treatment wastes, such as disposal off-site under conditions suited to minimize potential for remobilization (and hence, retreatment), if this is possible.	Noted. Additional text describing WTP issues and potentially necessary WTP redesign to manage salt loading has been added to K4.18.
EPA	20	Section 4.18.2.1 and K4.18.2.1 and K4.18.2.2	"This may require further investigation as design progresses and/or long-term adaptive management strategies (Chapter 5)"	While adaptive management is defined in Chapter 5, there is no discussion of this approach with respect to TDS or selenium (Se). We recommend that this discussion be added to Chapter 5.	Noted. USACE will include the requested measure with all additional measures suggested by cooperating agencies and the public to be evaluated after the Draft EIS comment period.